ARCHAEOLOGICAL EVALUATION REPORT:

LAND AT BRILLS FARM, NORTON DISNEY, LINCOLNSHIRE

NGR: SK 8578 5960
AAL Site Code: NDBF 23
OASIS Reference Number: allenarc1-521355

Report prepared for the Norton Disney History and Archaeology Group

By
Allen Archaeology Limited

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Allenarchaeology

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Cover image: Working shot in Trench 2

Executive Summary

- Norton Disney History and Archaeology Group commissioned Allen Archaeology Limited to undertake an archaeological evaluation on land at Brills Farm, Norton Disney, Lincolnshire, as part of an ongoing community research project.

- The site lies within an area of significant archaeological activity, with a Scheduled Roman villa lying 700m to the north-northeast. Iron Age activity has also been identified by geophysical survey and trial trenching to the north of the site.

- A prior geophysical survey on the site revealed a number of potential linear enclosures likely relating to animal enclosures or field systems probably dating to the Roman period.

- This new excavation follows on from last year's excavation by Allen Archaeology Ltd and the Norton Disney History and Archaeology Group of a series of intercutting enclosure features dating to the Iron Age in the field immediately to the south of the Roman Villa.

- The excavation involved opening four areas within one of the paddocks immediately north of Brills Farm, each targeting specific features seen on the geophysical survey. Each trench revealed archaeological features, with likely former boundary, enclosure and drainage ditches uncovered in Trenches 1 and 2. Roman pottery from the 1st to the 3rd century AD was recovered from fills within these features.

- Within Trench 3 a large spread of material was revealed, from which Roman material was retrieved. Below the spread a number of intercutting pits were revealed, with Roman pottery and a Roman coin uncovered. A couple of linear features were also identified within the area.

- A large possible quarry pit was uncovered within Trench 4, and material from this feature put a likely date of 4th century AD for the backfill. Alongside pottery and CBM, a very rare Roman dodecahedron was retrieved, certainly the highlight of this seasons' community dig.

- This has been a very successful archaeological dig with the Norton Disney History and Archaeology Group, and there is plenty of scope for expanding on what have been uncovered this year in future digs.

1.0 Introduction

1.1 Norton Disney History and Archaeology Group commissioned Allen Archaeology Limited to undertake an archaeological excavation on land at Brills Farm, Norton Disney, Lincolnshire, as part of an ongoing community research project.

1.2 All fieldwork and reporting has been undertaken in line with the recommendations of the Chartered Institute for Archaeologists *'Standard and guidance for archaeological excavation'* (CIfA 2020) and the Historic England document '*Management of Research Projects in the Historic Environment*' (Historic England 2015), and the local guidelines in the *Lincolnshire Archaeological Handbook* (LCC 2019).

2.0 Site Location and Description

2.1 Norton Disney is located approximately 15.2km to the southwest of Lincoln and 10.3km to the north-northeast of Newark. The area of investigation lies approximately 2.9km to the west of the centre of Norton Disney and comprised a 0.33ha area within the northern half of a larger paddock, immediately to the north of Brills Farm, and centred on NGR SK 8578 5960 (Figure 1).

2.2 The local geology comprises a bedrock geology of Scunthorpe Mudstone Formation, with Eagle Moor Sand and Gravel Member superficial deposits recorded over the entire site (http://mapapps.bgs.ac.uk/geologyofbritain/home.html).

3.0 Archaeological and Historical Background

3.1 Approximately 700m to the north-northeast of the site is a Roman villa, which is designated as a Scheduled Monument (No. 1005018, Lincolnshire Historic Environment Record (LHER) Reference 60745). Excavations undertaken between 1934 and 1937 identified a multiphase development of the villa site from the 1st century AD through to the middle of the 4th century AD. A geophysical survey (Bunn 2018) of the entire field containing the villa, using both magnetometry and resistivity techniques, revealed anomalies associated with the primary villa complex, as well as features potentially associated with prehistoric occupation of the site.

3.2 Immediately to the south of the villa field cropmarks recorded in the LHER (Monument No. 1067645) suggest the location of a probable prehistoric or Roman settlement consisting of enclosures and a possible hut circle. A geophysical survey (AAL 2020) on the site identified a circular/sub-rectangular feature along with potentially associated positive linear features corresponding with the cropmarks.

3.3 Trial trenching (AAL 2021) comprising seven 10-15m long by 1.8m wide trenches sited on the results of the preceding geophysics work and aerial photographs revealed archaeological features within each trench corresponding well with features seen on the geophysical survey and aerial photographs. The evaluation revealed more archaeological features than shown on the geophysical survey, which suggests that the cropmarks shown on the aerial photographs are likely a good representation of surviving archaeology within the field. Finds and environmental evidence was very sparse, and comprised a small number of sherds of probable prehistoric date, but they were not closely dateable.

3.4 A follow up excavation (AAL 2022) over the possible hut circle revealed a series of intercutting enclosure features with three phases of activity, all dated to the middle Iron Age, along with post holes and pits. The first phase ditch was not uniform in shape or size, and was possibly too large to indicate a roundhouse. The later two ditch cuts were slightly smaller in diameter and far more uniform in size and shape, and may well represent ring ditches associated with Iron Age roundhouses.

3.5 A geophysical survey (Bunn 2017) immediately to the west of Folly Lane (and to the north of the site) revealed potential pits and ditches. A follow up evaluation (Brocklehurst 2018) established these features as being Iron Age in origin, therefore pre-dating the villa.

4.0 Methodology

4.1 The excavation involved opening four areas within one of the paddocks immediately north of Brills Farm, each targeting specific features seen on the geophysical survey. Trench 1, aligned roughly north to south, measured approximately 20m by 5m and was located at the northeast corner of the paddock. Trench 2, aligned north to south was located approximately 20m to the west-southwest and measured approximately 25m by 5m. Trench 3, aligned east to west, was approximately 20m south of Trench 1 and measured 20m by 4m, with a 5m extension northwards towards the eastern end. Trench 4, 20m to the west-southwest of Trench 3, was aligned north-northwest to south-southeast and measured approximately 20m by 5m.

4.2 The fieldwork was conducted by volunteers from Norton Disney History and Archaeology Group over a period of two weeks, Wednesday 7th to Tuesday 20th June 2022, and was supervised by the author.

4.3 The four areas were located on site using a Leica GS08 RTK NetRover GPS. Within the excavation areas, topsoil, subsoil and other non-archaeological deposits were removed by mechanical excavator in spits not exceeding 0.1m in thickness down to the first archaeological horizon or natural geology, whichever was reached first. The machine excavation was monitored at all times by the author of this report. Where complex archaeological deposits, structures or groups of features were exposed, these were hand cleaned using hoes and trowels and then sample slots were dug to ascertain sections of features and to recover finds.

4.4 A full written record of the deposits were made on standard AAL context record sheets. Each deposit, was allocated a unique identifier (context number) and accorded a written description. Numbers in square brackets represent cut features, e.g linear ditch [101]. A summary of all contexts has been included in Appendix 1.

4.5 Deposits were drawn in section (at scales 1:10 or 1:20). Digital photography formed an integral part of the recording strategy, and all photographs had scales, an identification board and directional arrow, as appropriate.

5.0 Results

5.1 The stratigraphy of the site remained constant across all four trenching areas, with a topsoil/ploughsoil of grey to greyish brown silty sand, between 0.20m and 0.35m thick. This sealed a buried soil layer, 121/234/301/401, a mid-brownish grey silty sand between 0.21m and 0.40m thick. Below this was the natural geology, 122/201/302/402, a sandy gravel.

5.2 Roman pot sherds of varying dates were recovered from the topsoil relating to Trenches 1, 2 and 3, with Roman CBM recovered from the same material in Trenches 2 and 3. A stone tessera of probable Roman date and a possible whetstone of unknown date were recovered from the topsoil in Trench 3.

Trench 1 (Figure 3)

5.3 Trench 1 measured approximately 20m by 5m and was orientated roughly north-northwest to south-southeast, aligned with the edge of and in the northeast corner of the paddock. The trench targeted three potential linear features aligned roughly east-northeast to west-southwest identified on the geophysical survey.

5.4 At the northwest corner of the trench the eastern edge of a potential linear ditch was revealed [103], aligned north to south. Only part of this feature was revealed within the trench, measuring 2.85m in length and 0.75m wide with a steeply sloping edge. It was filled with a dark brownish grey silty sand, 104, 0.45m in depth. There were no finds recovered from this feature.

Plate 1: South-southeast and east-northeast section of ditch [103], scale 1m

5.5 Immediately to the south of [103], was a linear ditch aligned roughly east to west [101]. This feature measured 1.59m wide and 0.50m deep and ran across the entire width of the trench. It was filled with a dark brownish grey silty sand, 102], from which a 1st to 2nd century AD sherd of pottery was recovered.

5.6 Just over 2m to the south of [101] were a pair of parallel ditches, [107]/[111] and [109]/[113], aligned roughly east-northeast to west-southwest and measuring 1.30m in width and 0.50m in depth and 0.85m in width and 0.36m in depth respectively. Both were filled with brownish grey silty sand, 108/112 and 110/114 respectively, but no finds were recovered from these features.

Plate 2: West-southwest facing sections of [107]/[111], [109]/113] and northern edge of [123]. Scale 1m

5.7 To the south of [109]/[113] and extending from the eastern edge of the trench were two intercutting pits or ditch termini, [123] and [125]. They measured 2.30m in length by 1.32m in width and 2.35m in length by 1.22m in width respectively. The fill of [123] was a light to mid brown silty sand, 124, 0.52m thick, from which a small group of Roman pottery sherds were recovered. [125] cut [123] and was filled with a light brown silty sand, 126, 0.36m thick.

5.8 The southern edge of [125] cut through a further linear ditch [115]/[117], which was aligned east-northeast to west-southwest, similar to [107]/[111] and [109]/[113]. This ditch measured 2.11m in width and 0.68m deep and contained a mid-brown sandy silt, 116/118, from which a single Roman pottery sherd and a possible small iron ferrule was recovered.

Plate 3: East-northeast-facing section of [115]/[117], scale 1m

Trench 2 (Figure 4)

5.9 Trench 2 was aligned north to south, measuring approximately 30m by 5m, and located approximately 20m southwest of Trench 1. A scrap of lead and an undated iron nail were recovered from the topsoil 200.

5.10 At the very northern end of the trench was a linear ditch running roughly east to west [204]/225]. This ditch measured 2.46m in width and up to 0.56m deep and contained a dark brown silty sand 205/233. Extending north-northeast from the northern edge this feature was another linear ditch [235] measuring 2.61m wide and 0.58m deep, containing a dark brown silty sand, 236, which was indistinguishable from the fill of the east-west feature. A large quantity of pottery was recovered from both ditches, the majority from within 205/233, of mixed date from Iron Age through to the 4th century. Since it was not possible to tell whether the north-northeast running ditch was earlier, later or contemporary to the east-west feature, it is possible that it predates it and that the Iron Age pottery came from there, with the east-west ditch containing the Roman pottery. A few cattle and unidentified large mammal bones were also recovered from the fill of the ditch.

Plate 4: East-facing section of [204]/[225] and south-facing section of [235], scales 2 x 1m

5.11 Potentially the earliest archaeological feature within the trench was revealed at the base of the slot dug along the eastern edge of the trench from the southern edge of [204]/[225] southwards for approximately 4m. This was a very well compacted gravel layer, 239, only visible within the slot, and cut by ditch [204]/[225] at its northern extent and ditch [208] at its southern extent. This feature may represent a former surface or trackway but could represent a change in the natural geology. Sealing the gravel layer is potentially redeposited material, 258, a dark brown silty sandy gravel.

Plate 5: West-facing section of the slot at the northeast end of the trench, the gravel layer 239 is visible cut at the northern end by ditch [204]/[225]. Scale is 1m

5.12 Cutting through the possible redeposited layer, 258, over the potential trackway, 239, was either the terminus of a ditch or part of a pit [226]. This feature was aligned east to west extending approximately 2.16m into the trench from the eastern edge, measuring 1.39m at its widest. This feature contained a mid-greyish brown sandy silt, 227, 0.32m thick.

5.13 Aligned east-southeast to west-northwest, running across the trench, and also cutting into 258 towards its southern end, was a linear ditch [231], measuring 1.26m wide and 0.32m deep. This contained a greyish brown slightly silty sand and gravel fill 232.

5.14 [231] cuts the northern edge of linear ditch [208], which ran roughly east to west across the trench, measuring 1.02m wide and 0.24m deep. It contained a yellowish-brown sandy silt and gravel fill, 209, from which a small group of Roman pottery sherds were recovered. [208] in turn cut through the east-southeast to west-northwest aligned ditch [229]/[242], which measured 2.30m wide and 0.51m deep. [229]/[242] contained a mid-brownish grey silty sand fill, 230/243, from which a small group of Roman greyware body sherds was recovered.

5.15 [229]/[242] cut the northern edge of the linear ditch [212]/[244], which was aligned east-northeast to west-southwest and measured 1.72m wide and 0.80m deep, and contained a greyish brown slightly silty sand and gravel fill, 213/245, from which a small group of middle 2nd century AD pottery sherds was recovered.

5.16 There were a few possible linear features which were only visible within the east-facing section of the trench. The earliest of these was [206], measuring 2.30m wide and 0.50m deep, containing a yellowish-brown sandy silt and gravel fill, 207. [206] was cut by [202], which measured 0.38m wide and 0.22m deep and was filled by a yellowish-brown silty sand with frequent gravel 203. [202] was cut by [228], which measured 0.45m wide and 0.42m deep and was filled with a yellowish grey sandy gravel 222. [228] was cut by [210], which measured 0.35m wide and 0.33m deep and contained a yellowish-brown sandy silt and gravel fill 211. [210] was truncated by linear ditch [208].

Plate 6: East-facing section of [210], [228], [203], [229]/[242], [206] and [231], scale 2m

5.17 Just to the south of [212]/[244], and visible only within the slot along the western edge of the trench, is another very well compacted gravel layer, 254, 0.19m thick. This feature may, similarly to 239, represent a former surface or trackway, but could simply represent a change in the natural geology. Sealing 254 was a loose dark brown silty gravel layer, 257, 0.35m thick, potentially representing redeposited material.

Plate 7: East-facing section of [214], [246], [248] and gravel la8er 254, and south-facing section of [255], scale is 2m

5.18 Cutting through 254 were two potential beam slots, [246] and [248], which ran across the trench east to west, and were approximately 0.40m apart. [246] measured 0.34m wide by 0.25m deep and was filled with a mid-brown sandy silt, 247. [248] measured 0.22m wide and 0.21m deep and was filled with a mid-brown sandy silt, 249. A potential further beam slot aligned roughly north to south was also identified within the trench (Plate 7), [255], measuring 0.19m wide and 0.26m deep. It also contained a mid-brown sandy silt, 256.

Plate 8: West-facing section of beam slots [248] and [246], scale is 1m

5.19 Truncating [246] and [248] is an east-west aligned ditch [214]/[252], measuring 1.66m wide and 0.28m deep. This was filled by a mid-brown sandy silt, 215/253. Pottery sherds dating to the 2nd to 3rd century AD were recovered from 215/253 along with a couple of unidentified large mammal bones. [214] cut through the northern edge of narrow linear ditch [240], which measured 0.40m wide and 0.40m deep. This contained a light brownish grey sandy silt, 241. Clipping the southern edge of [240] was a wide ditch [216]/[223] measuring 2.24m wide and 0.58m deep, containing a light greyish brown slightly silty sand, 217/224, from which pottery sherds dating to the 2nd century AD were recovered.

5.20 Approximately 1m to the south of [216]/[223] was the east-west aligned linear ditch [218]/[237], measuring 1.94m wide and 0.91m deep. This contained a dark brownish grey silty sand, 219/238, from which pottery sherds dating to the 1st to 2nd century AD were recovered.

Plate 9: East-facing section of [218]/[237]m scale is 1m

5.21 Within the southwest corner of the trench there was part of a potential pit [220], which was not fully excavated, the fill of this feature was 221, a yellowish-brown sandy silt.

Trench 3 (Figure 5)

5.22 Trench 3 was initially dug roughly east to west, however when archaeological features were identified at the eastern end it was decided to extend part of the trench northwards to hopefully expose more of the archaeology. From within the topsoil, 300, a Bronze Age copper alloy blade and a Roman coin were recovered.

5.23 Towards the western end of the trench there was the potential terminus of a ditch [322], measuring 1.43m in length and 1.30m in width. This feature was not excavated.

5.24 Approximately 10m from the western end of the trench was a linear ditch aligned roughly north to south, [320], which also appeared to branch off to the west. Due to time constraints only the

southern part of this feature against the edge of the trench was investigated. [320] measured 1.08m wide by 0.56m deep and contained a mid/dark brown sandy silt, 321. Two greyware pottery sherds dating to the 2nd century AD were recovered from this feature.

Plate 10: North-facing section of [320], scale is 1m

5.25 To the east of [320], apart from a small area at the southeast corner of the trench, a large spread of dark greyish brown silty sand, 309, was revealed. Due to the time constraints of the dig, it was decided the best way to attempt to assess the archaeology in this area was to dig a slot straight across this area. This slot was located slightly off a north to south alignment in order to include areas within the layer where surface finds were clearly visible. The spread measured approximately 0.17m thick, and pottery sherds, including multiple joining sherds from a Samian ware vessel that had been repaired, dating to the 2nd to 3rd century AD were recovered, along with a few cattle bones.

5.26 Within the slot across the trench at the northern end visible on the west facing section was a pit [303], measuring 0.40m wide and 0.09m deep. The pit contained a mid/dark silty sand, 304, from which a single Roman coin, a radiate of Carausius (AD 286-293), was recovered.

5.27 Further to the south were a series of intercutting pits visible within the eastern and western facing sections. In the western facing section were pits [305] and [319], both cut by pit [307]. [305] measured 1.20m in width and 0.15m deep, and contained yellowish brown sandy gravel, 306. A small group of pottery sherds dated to the Roman period were recovered from this fill. [319] measured 2.24m wide and 0.26m deep, and contained a mid-greyish brown sand and gravel, 310. [307] measured 1.50m wide and 0.24m deep and contained a mid-greyish brown sand and gravel fill, 308.

5.28 In the eastern facing section of the slot were pits [311], [313], [315] and [317]. [311] was a small pit close to the southern end of the trench, measuring 0.36m wide and 0.23m deep. It contained a mid-greyish brown sand and gravel fill, 312. Immediately to the north of [311] was pit [313], measuring 1.00m wide and 0.42m deep, containing a pale greyish brown sand and gravel fill, 314. This was cut on its northern edge by pit [315], measuring 1.70m wide and 0.40m deep, which contained a mid-greyish brown sand and gravel fill, 316. The northern edge of [315] cut the southern edge of pit [317],

which measured 1.25m wide and 0.40m deep, and contained a greyish brown slightly silty sand and gravel, 318. Due to the location of the slot it was not possible to tell whether the features visible in the eastern section directly related to those in the western section, despite the similar stratigraphy of the pits.

Plate 11: East-facing section of pits [311], [313], [315] and [317], scale is 2m

Trench 4 (Figure 6)

5.29 Trench 4 was located at the southwest corner of the site and was targeted on a large positive amorphous feature seen on the geophysical survey. The trench measured approximately 20m by 5m and was aligned roughly north-northwest to south-southeast. From the topsoil, 400, a copper alloy Roman brooch and a post-medieval dress hook were recovered along with an undated incomplete iron nail.

5.30 At the northern end of the trench, visible only in the section was the cut of a likely shallow linear feature [405]. This measured 1.55m wide and 0.22m deep and contained a dark greyish brown silty sand, 406. Potentially this represented a ditch running north to south, however due to the shallow nature of the feature it was not possible to ascertain this.

5.31 Within the centre of the trench and extending beyond the eastern and western edges was a large sub-circular feature [403]. Initially a slot was placed next to the edge of the trench to evaluate this feature however the feature proved to be far deeper than anticipated so the slot was widened to allow further safe digging. Even with stepping the slot, it was still not possible to reach the base of the feature due to time and safety concerns.

5.32 The pit measured 10.85m within the trench, with an undetermined width, and was dug to depth of 2.00m. There was a single fill, a mid-greyish brown sandy silt, 404, from which a large amount of pottery and CBM was recovered, dating the feature to the 4th century AD. Fifteen cattle bones and three unidentified large mammal bones were also recovered from the fill. Of very special interest was the small find recovered from fairly high up within the feature, a Roman dodecahedron. It is

possible that the pit represents former quarrying activity, backfilled with some Roman demolition material and other related rubbish.

Plate 12: The dodecahedron freshly retrieved from pit [403]

6.0 Discussion and Conclusions

6.1 The four trenches were all targeted on potential archaeological features identified in a previous geophysical survey. To say the archaeology revealed exceeded our expectations would be an understatement.

6.2 The linear features seen on the geophysical survey were represented as archaeological features within Trenches 1 and 2, with these features likely representing former enclosure, boundary or drainage ditches. The large number of different linear features and the slightly different alignments of these features potentially suggests a long period of occupation and use of the site, and the finds recovered from the features, dating from potentially as early as the 1st century AD through to the 4th century AD helps confirm this theory.

6.3 The archaeological features revealed within Trench 3 prove harder to interpret. The geophysical survey suggested a couple of possible enclosure or boundary ditches might be revealed, and whilst a couple of linear features were uncovered, a large spread of material, or occupation horizon, containing Roman material, at the eastern end of the exposed area was revealed which might be covering other earlier features. A slot put across the trench did in fact reveal some buried features under the spread, these were interpreted as pits, from which a Roman coin and pottery sherds were recovered. It is highly likely that there are more archaeological features hidden below the spread.

6.4 Trench 4 revealed both the simplest archaeological features to understand and the most exciting archaeological find of the entire dig. Two archaeological features were revealed, a potential shallow linear ditch, only seen in section, and a very large likely quarry pit. The slot through the fill of the quarry pit produced a large number of Roman finds, with a likely date for this feature put in the 4th century AD. The most exciting find, retrieved from fairly high up within the sequence was a metal dodecahedron, which is of at least national significance. This very rare Roman object, approximately 130 having been found within the bounds of the former Roman empire and only 32 within Roman Britain, is a bit of a puzzle, since there is no recorded information about them from the Roman period. A detailed report is included as an appendix to this report.

6.5 The trenching proved very successful and the author thoroughly enjoyed once again working with the Norton Disney History and Archaeology Group in revealing more of the archaeological history of the area. There is definitely far more work to be done in the area, with potential future work including revealing and excavating the entire of the quarry pit, and more work done in the area of Trench 3 to help fully reveal and excavate the feature.

7.0 Effectiveness of Methodology

7.1 The trenching methodology employed was suited to the scale and nature of the project in determining the nature of the archaeology present. It has confirmed the results of the geophysical survey and revealed a significant number of archaeological features which may lead to further archaeological work within the field.

8.0 Acknowledgements

8.1 Thanks are due to many people for the successful completion of this project. First of all, thanks go to Sophie and Charlie White for access to the land. Then there are the numerous funders who have contributed to the project; Lost Village Festival, Norton Disney Parish Council, Witham Staple Magazine, Collingham Parish Council, Collingham and District Local History Society, Association for Roman Archaeology, JS Teamwear, Southwell Local History Society, John D Robson , Carol Blumfield, North Kesteven District Council Lottery, Eileen Matthews, Andrew Allsop, Colin Glover, Phil Docherty, Lee Smith, Julian Clough, Richard Watts, Jim Priest, Mark Bamford, Jane Imrie, Christine Hasman.

8.2 MCB Brothers Langford are thanked for providing a digger for the excavation. Gusto Homes provided a digger driver. JS Teamwear provided hi viz for the team. Jane and Ben Smith provided the gazebo. Lorena Hitchens for her specialist report on the dodecahedron. Gerry McDonnell for the XRF on the dodecahedron.

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Appendix 1: Roman Pottery

Alice Beasley

Context	Fabric	Form	Sherds	Vessels	Weight	Abrasion	Rim diameter	RE	Base diameter	BE	Decoration	Part	Burning?	Residue	Comments	Date
100	SHEL1	-	1	1	6	abr						body				ROM?
102	CR	-	1	1	8	sli						body				ROM
116	GROG	-	1	1	3	sli					SHG	body				ROM
124	SHEL	JSTOR	1	1	63	sli	30	0.07				rim			slightly lid seated	ROM
124	GROG	-	1	1	13	sli						body				ROM
200	GREY	JCUR	1	1	184	sli	18	0.16				rim				C2+
200	GREY	J	1	1	21	mod	18	0.1				rim				C2+
200	GREY	BFL	1	1	23	mod	17	0.16				rim				L2+
200	GREY	JBKEV	1	1	6	mod	8	0.13				rim				C2
200	GREY	JEV	1	1	12	sli	16	0.08			BURN	rim				C2
200	GREY	JEV	1	1	14	sli	12	0.1			SHG	rim				C2
200	GYBN	JCUR	1	1	34	mod	14	0.14				rim		soot ext		EM2
200	GREY	-	1	1	4	sli					BEXT	body				ROM
200	GREY	-	10	10	99	sli						body				ROM
200	GREY	JBL	1	1	102	vabr						base			no external surfaces	ROM
200	GREY	OPEN	1	1	20	sli			9	0.1		base				ROM
200	GREY	-	1	1	50	mod			10	0.37		base			11mm rounded flint inclusion	ROM
200	GREY	JB	1	1	30	sli					SHG	body				ROM
200	GREY	-	1	1	12	sli					wiped ext	body				ROM

200	GREY	-	2	1	179	sli						body			oxidised surfaces	ROM
200	GREY	-	1	1	7	abr						body				ROM
200	SAMCG	33	2	1	5	abr						rim			no external surfaces	C2
205	GREY	MINI	1	1	174	sli	10	0.55	4	1		near complete vessel			miniature version of a carinated bowl	ML2
205	SAMSG	C?	1	1	12	sli			6	24		base	internal			C2
205	NVCC	BX	2	1	91	abr	11	0.22				rim				L3-M4
205	CR	FTR	1	1	7	sli	6	0.2				rim				C2-4
205	CR	F	1	1	10	mod						neck				C2-4
205	CR	-	4	4	21	mod						body				C2-4
205	MOMH	M	3	1	224	abr						spout, rim, base			non joining sherds	C2-4
205	GFIN	BK120	4	1	25	sli	6	0.65				rim				ML3
205	GREY	L	4	1	386	sli	30	0.29			BL, BWL	rim			burnished wavy lines seperated by burnished lines creating panels	ROM
205	GREY	JCR	1	1	64	sli	13	0.2			NOTC	rim				C4
205	GREY	BWM	1	1	113	sli	29	0.1			BWL, SHG	rim				C3+
205	NVCC	BFB	1	1	65	sli	17	0.25				rim			warped	C4
205	GREY	JBL	1	1	38	sli	22	0.05				rim				ROM
205	GREY	B411	1	1	64	sli	22	0.15				rim				C3+
205	GREY	JCUR	2	1	92	sli	12	0.38				rim				C3+
205	GREY	JEV	1	1	18	sli	8	0.38				rim				C2+
205	GREY	B411	1	1	32	sli	21	0.03			SHG	rim				C3+
205	GREY	JEV	1	1	39	sli	12	0.1				rim				C2+
205	GREY	JEV	3	1	89	sli	14	0.39				rim				C2+

205	GREY	DPR	1	1	14	sli	20	0.06			BWL	rim			exterior burnished and wavy lines burnished onto that	L3+
205	GREY	BFL	1	1	13	sli	20	0.05				rim				ML3+
205	GYBN	JEV	2	1	53	sli	16	0.23				rim				C2+
205	GREY	JBKEV	1	1	17	sli	11	0.17				rim				C2+
205	GREY	JEV	1	1	15	sli	20	0.06				rim				C2+
205	GREY	JCUR	1	1	36	sli	18	0.15				rim				C2+
205	GREY	JCUR	1	1	59	sli	22	0.13			BEXT	rim			hint of corrugations on body	C2+
205	GREY	JCUR	1	1	9	sli	12	0.07				rim				C2+
205	GYBN	JCUR	1	1	23	sli	16	0.12				rim				C2+
205	GREY	JH	1	1	118	sli						handle			lug	ROM
205	GYBN	J	8	8	148	sli						body			corrugations	ROM
205	GREY	J	17	1	154	sli					LA	body				M2+
205	GREY	JB	1	1	292	sli					SWL	body				ROM
205	GREY	-	19	1	251	sli						body				ROM
205	GREY	-	1	1	4	sli						body			spalled	ROM
205	GREY	-	15	15	139	sli						body				ROM
205	GREY	-	1	1	12	sli					BEXT, SHG	body		soot over break		ROM
205	GYBN	-	19	1	217	mod						body			non joining sherds, oxidised	ROM
205	GYBN	-	1	1	57	sli					SHG, BWL	body			BWL confined by two SHG	ROM
205	GREY	-	1	1	47	sli					BZ, SHG	body			BZ confined by SHG	ROM
205	GYBN	-	19	19	309	sli						body				ROM

205	GREY	-	19	19	462	sli						body				ROM
205	GROG	-	3	3	96	sli						body				ROM
205	GYBN	JB	3	1	151	mod			8	1		base				ROM
205	GREY	JB	1	1	64	mod			9	0.33		base				ROM
205	GYBN	JB	1	1	80	mod			11	0.21		base				ROM
205	GYBN	JB	1	1	53	mod			11	0.18		base				ROM
205	GREY	OPEN	2	1	55	sli			8	0.5		base				ROM
205	GREY	-	1	1	22	sli						base	underside of base			ROM
205	GREY	CLSD	1	1	27	sli						base				ROM
205	GREY	JBL	1	1	231	sli			14	0.5		base				ROM
205	GREY	CLSD	1	1	52	sli			8	0.32		base				ROM
205	SHEL	-	1	1	40	mod						base				ROM
205	SHEL	-	1	1	30	mod			10	0.2		base				ROM
205	QUCM	JUP	1	1	46	sli	20	0.11				rim				MIA
205	QUCM	-	1	1	18	sli						body				IA
205	QUCM	-	1	1	58	mod						base			externally abraded	IA
209	GREY	J	2	1	80	sli						body				ROM
209	SHEL	-	1	1	150	sli			13	1		base			hand built	ROM?
213	GREY	BCAR?	1	1	4	sli	12	0.02				rim				ROM
213	SHEL1	-	1	1	4	abr						body				ROM
213	OX	-	1	1	7	mod						body				ROM
215	CR	-	2	1	28	abr						handle			strap handle	ROM
215	GYBN	JEV	2	1	31	sli	18	0.07				rim				C2+
215	GREY	-	14	14	276	sli						body				ROM
215	GREY	-	1	1	25	sli					SHG	body				ROM
215	GYBN	-	3	3	48	sli						body				ROM
215	GROG	-	1	1	11	sli					RIL	body				L3-4

215	OX	-	2	1	60	sli						body			non joining sherds	ROM
217	GROG	B411	1	1	40	sli	30	0.04				rim				C2+
217	GROG	-	3	3	62	mod						body			two sherds have a iron rich concretion	ROM
219	GREY	B411	1	1	50	mod	24	0.07			BEXT	rim				C2-3
219	GREY	-	2	1	58	mod					SL	body				ROM
219	GYBN	-	2	2	43	sli						body				ROM
219	GREY	-	1	1	8	sli					BURN	body				ROM
219	GREY	-	1	1	5	sli					LA	body				C2-3
219	GREY	-	5	5	59	mod						body				ROM
219	GREY	-	2	2	14	abr						body			IRF	ROM
219	GREY	-	1	1	15	sli			8	0.13		base				ROM
219	GROG	JBEV	1	1	17	sli	16	0.17				rim		soot under rim		C1-2
219	GROG	-	1	1	9	abr						body				ROM
224	GREY	-	1	1	12	mod						body				ROM
233	GREY	BFB?	1	1	13	vabr						rim			no external surfaces	C3+
233	GROG	CPN	2	1	16	sli	20	0.1			SHG	rim			lid seating	C1-2
233	GROG	CPN	1	1	30	sli	14	0.2				rim	on rim			C1-2
233	GROG	-	1	1	7	sli					SHG	body				C1-2
233	GROG	-	6	6	20	abr						body				C1-2
238	SAMSG	18/31	1	1	9	mod	18	0.07				rim	on rim			L1-M2
238	CR	-	1	1	10	mod						neck				C1-2
238	GREY	JBL	1	1	35	mod	24	0.06				rim				ROM
238	GREY	-	1	1	12	sli						body				ROM
243	GREY	-	3	2	18	sli						body				ROM
253	SAMSG	-	1	1	2	vabr						body				C2

253	CR	-	1	1	20	sli						body				C1-2
253	OX	-	2	2	8	abr						body				ROM
253	GREY	B411	1	1	155	sli					SHG, BZZ	body				C2-3
253	GREY	JCUR	2	1	27	sli	26	0.1				rim				C2+
253	GREY	-	1	1	16	sli					BURN	body			cracked internally	ROM
253	GREY	-	16	16	248	sli						body				ROM
253	GREY	JBL	18	1	547	sli					BURN	body			underfired, spalled	ROM
253	GREY	-	1	1	5	sli					BEXT	body				ROM
253	GREY	-	1	1	59	abr						body				ROM
253	GREY	OPEN	1	1	17	sli			8	0.15		base				ROM
253	GREY	CLSD	1	1	32	sli			7	0.25		base				ROM
253	GREY	JEV	1	1	65	sli	14	0.21			SHG	rim				C2+
253	GREY	JCUR	1	1	52	sli	26	0.09			SHG	rim				C2+
253	GROG	JEV	1	1	13	sli	12	0.16				rim		soot ext		C2
253	GREY	-	6	6	65	sli						body				ROM
253	GYBN	-	3	3	48	sli						body				ROM
253	GREY	JB	1	1	135	mod			10	0.43		base				ROM
300	OX	JBCAR	28	1	260	mod	13	0.2	6	1		full profile			self slip on external surface	ML2
300	GREY	JDW	1	1	23	mod	14	0.11				rim				ML3+
300	GREY	JB	1	1	11	mod	16	0.05				rim				ROM
300	GREY	JBK	1	1	3	mod	12	0.07				rim				ROM
300	GREY	-	8	8	77	mod						body				ROM
300	GREY	-	1	1	7	abr						body				ROM
300	GREY	-	1	1	58	abr			12	0.19		base				ROM
300	GFIN	-	1	1	5	sli						body				ROM
300	OX	-	1	1	12	abr						body				ROM

300	SAMCG	-	1	1	1	vabr						body			no original surfaces	C2
306	GREY	-	2	2	32	mod						body				ROM
306	GREY	-	1	1	40	mod						base				ROM
306	GROG	-	1	1	5	sli						body				ROM
309	SAMEG	18	9	1	228	sli	18	0.16			repair	full profile	on base and rim			L2
309	NVCC	BKPR	1	1	2	abr	12	0.05				rim				M3+
309	GREY	BWM	1	1	127	mod	31	0.1				rim			neckless	ROM
309	GREY	JBL	1	1	44	mod	24	0.07				rim				C2-3
309	GREY	CP	2	1	64	sli	20	0.29				rim				M2+
309	GREY	BWM	1	1	29	sli	26	0.05				rim			Form as Field and Palmer-Brown 1991 fig 16.49	C2
309	GREY	L	1	1	17	sli	14	0.11				rim			Form as Oswald 1935 fig 4.51	C2
309	GREY	-	1	1	7	abr	16	0.05				rim				ROM
309	BB1	-	1	1	2	sli						body				M2+
309	GREY	-	10	10	100	sli						body				ROM
309	GREY	-	1	1	62	mod			8	0.45		base				ROM
309	GREY	-	4	1	107	sli			12	0.13		base			wear on underside	ROM
309	GYBN	-	1	1	19	abr			8	0.14		base				ROM
309	GROG	-	6	6	65	mod						body				ROM
309	GREY	-	1	1	63	sli					COMB	body			very light combing over the whole sherd	ROM
321	GREY	JRUST	1	1	19	sli					RLIN	body				C2
321	GREY	-	1	1	15	sli						body			oxidised surfaces	ROM
404	SAMEG	-	1	1	10	vabr						body				C2-E3

404	Dr20	A	1	1	19	vabr						body				C2
404	SPOX	B38	1	1	33	sli	12	0.05				rim				C4
404	CC	BFBL	1	1	19	sli	16	0.11				rim				C4
404	CR	-	1	1	3	sli						body				C1-2
404	NVCC	-	1	1	6	sli						body				ML3+
404	NVCC	-	2	1	16	mod					ROU	body				ML3+
404	CC	-	1	1	9	sli						body				ROM
404	NVCC	DPR	1	1	27	mod	18	0.11				rim				C4
404	GREY	BWM	1	1	128	sli	36	0.11				rim				C4
404	GREY	BFL	2	1	147	sli	17	0.36			BEXT	rim				L3+
404	GREY	BIBF	1	1	64	sli	23	0.1				rim			spalled underside of flange	C4
404	GREY	B38	1	1	75	sli						body			oxidised surfaces	C4
404	GREY	-	31	31	522	sli						body				ROM
404	GREY	-	1	1	20	sli					BSC	body				ROM
404	GREY	-	1	1	19	sli					BVL, BZZ	body				ROM
404	GREY	-	1	1	12	sli					RIL	body				L3+
404	GREY	CLSD	1	1	158	sli			7	1		base				ROM
404	GREY	CLSD	1	1	114	sli			10	0.5		base				ROM
404	GREY	CLSD	1	1	85	sli			4	1		base				ROM
404	GREY	CLSD	1	1	35	sli			12	0.1		base				ROM
404	GREY	CLSD	1	1	39	sli			12	0.15		base				ROM
404	GREY	JCUR	1	1	33	sli	20	0.12				rim				C3+
404	OX	-	2	2	9	abr						body				ROM
404	OX	CLSD	1	1	18	sli	6	0.22				base				ROM
404	OX	JSTOR	1	1	63	sli	20	0.04				rim				ROM
404	QUCM	-	4	4	19	sli						body				IA

Appendix 2: CBM

By Alice Beasley

Context	Form	Fabric	Abrasion	Frag count	weight	Comments	Features	Burnt?	Thickness
116	RTIL	T1	sli	1	12				
124	RTIL	T2	sli	1	18	poorly mixed clay, sand bedded on only surviving surface			
200	RTIL	T1	sli	1	206				
205	RTIL	T1	mod	1	19				
205	RTIL	T3	mod	1	67				
213	TEG	T1	mod	1	180	no flange surviving			
219	RTIL	T1	abr	1	2	flake			
219	RTIL	T1	sli	1	105	slight curve, warped?			
224	FC	FC1	mod	30	90	flakes, 2x single row of finger tip impressions			
224	RTIL	T3	sli	2	21	joining			
243	FC	FC1	mod	1	6	surface			
253	RBRICK	T1	mod	1	403	sand bedded on one surface			42mm
253	RTIL	T1	abr	3	7	scraps			
300	LDRAIN	-	sli	1	17				
309	RTIL	T1	mod	4	23	scraps, 2x join			
309	RTIL	T3	mod	2	15	scraps			
321	RTIL	T1	mod	1	16	scraps			
404	TEG	T1	sli	1	356	2x paw print on sand bedding on underside	paw print		18mm
404	RBRICK	T1	sli	1	398	sand bedded on one surface, finger swipe on other surface	signature?		37mm

404	BOX	T1	mod	1	86	combed			17mm
404	TEG	T1	sli	1	482	shallow combed signature, 4 curving lines crossed at the edge by 2 straight lines, incomplete. Finger drag mark on upper surface parallel to flange	signature	base	16mm
404	TEG	T3	sli	1	299	Cut away type B6			
404	TEG	T1	mod	1	473				25mm
404	TEG	T1	sli	1	203	4 comb marks on surface incomplete signature?			20mm
404	TEG	T3	sli	1	313	overfired, side wall wiped smooth			
404	RTIL	T1	sli	2	163	overfired			
404	TEG	T1	sli	1	330	slight curve, warped?			23mm
404	TEG	T1	sli	1	188				22mm
404	RTIL	T1	sli	1	106			over break	18mm
404	RTIL	T1	sli	1	156	width tapers			
404	RTIL	T3	mod	1	131	most original surfaces broken away			
404	RTIL	T3	mod	2	131	coarse variant of fabric			
404	TEG?	T1	mod	3	125	broken across cut away?		on flange	
404	RTIL	T1	sli	4	19	scraps			
406	LDRAIN	-	sli	1	34				
406	RTIL	T3	mod	1	22	no original surfaces			

Appendix 3: Roman coin

By Dr Lisa Brundle

An incomplete Roman copper-alloy radiate of Carausius (AD 286-293), dating to the period c.AD 286-293 (Reece Period 14). PAX AVG reverse type shows Pax standing left holding branch and transverse sceptre. Probably C Mint. Damaged around rim.

Obverse description: Radiate, draped and cuirassed right
Obverse inscription: IMP C[ARA]VSIVS P F] AVG
Reverse description: Pax, draped, standing left, holding olive-branch in right hand and transverse sceptre in left hand
Reverse inscription: PA[X A]VG

Diameter: 19.56 mm; Weight 2.35g; DA: 12

Found during a controlled archaeological dig during a community archaeology project. The coin was recovered from a pit feature (fill 304 cut 303).

Chronology

Broad period: ROMAN
Period from: ROMAN
Period to: ROMAN
Date from: Circa AD 286
Date to: Circa AD 293

Dimensions and weight

Quantity: 1
Weight: 2.35 g
Diameter: 19.56 mm

Personal details

Found by: Mr Bob Garlant
Recorded by: Dr Lisa Brundle

Identified by: Dr Lisa Brundle

Other reference numbers

Other reference: [303] (304) Finds No. 3

Materials and construction

Primary material: Copper alloy
Manufacture method: Struck or hammered
Completeness: Incomplete

Coin data (numismatics)

Denomination: Radiate (antoninianus)
Denomination qualifier: Certain

Ruler/issuer: Carausius
Primary ruler qualifier: Certain
Reece period: Period 14 [275-296]
Mint or issue place: C mint (Uncertain, England)
Mint qualifier: Probably
Obverse description: Radiate, draped and cuirassed right
Obverse inscription: IMP C[ARA]VSIVS P F] AVG
Reverse description: Pax, draped, standing left, holding olive-branch in right hand and transverse sceptre in left hand
Reverse inscription: PA[X A]VG
Die axis measurement: 12 o'clock
Degree of wear: Slightly worn: very fine
Status: Regular
Status qualifier: Certain

Appendix 4: Metal Objects

Context	Quantity	Material	Object	Period	Description	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
116	1	Iron	Hollow point	Unknown	Conical, circular-sectioned object which tapers from an open end to a pointed terminal. Possibly a small ferrule. 14mm diameter at the open end.	37.4			6
200	1	Lead	Scrap	Unknown	Formless lump of scrap lead.	23.8	14.5	8.4	9
200	1	Iron	Nail	Unknown	Large nail with square head. Shank is sub-circular in cross-section and broken. Shank diameter is 13mm.	48.2			35
233	1	Copper alloy	Perforated disc	Unknown	Thin sheet, sub-circular in shape although edges are corroded and broken. Slightly off-centre circular hole measuring 4.75mm diameter. Possibly a spangle or a washer.	18.6	15.4	1.4	1
300	1	Copper alloy	Blade	Bronze Age	Fragment of tanged knife. The tang is broken across the circular rivet hole. The blade is flat and sub-rectangular, and expands slightly towards the tang; the tip has broken off. It has a raised flat section running the length of the blade; all edges are bevelled creating a lozenge-shaped cross section. The knife has a very dark green patina.	71.3	22.6	2.7	20
300	1	Copper alloy	Coin	Roman	Small coin c. 13mm diameter. Unable to determine details owing to the amount of wear.			1.7	<1
300	1	Copper alloy	Unknown	Modern	Thin, curved sheet with a slight collar at each end. Remains of raised lettering along one broken edge, possibly ONLO.	15.6	6.1	0.8	<1
304	1	Copper alloy	Coin	Roman	Incomplete radiate of Carausius (AD 286-293). Damaged around rim. Obverse: Bust radiate, draped and cuirassed right. Inscription IMP C[ARA]VSIVS P [F] AVG. Reverse: Pax, draped, standing left, holding olive branch and sceptre. Inscription PA[X A]VG. Diameter 19.6mm.				2.3

Context	Quantity	Material	Object	Period	Description	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
400	1	Copper alloy	Brooch	Roman	Incomplete cast copper alloy bow brooch of Colchester Derivitive type. Undecorated with just a simple ridge down the centre of the bow. Tubular winged head with the spring in situ. Pin is broken, as is the catchplate.	43.7	27.2		13
400	1	Copper alloy	Dress hook	Post-medieval	Complete cast copper alloy one-piece dress hook. Plate has moulded relief and openwork decoration variously interpreted as a thistle, pine cone or pineapple. There is a small ridged collar at the junction with the hook, and a rectangular attachment loop at the top of the plate.	33.2	17.3	2.1	4
400	1	Iron	Nail	Unknown	Incomplete nail with square-sectioned shank and sub-circular head. Shank thickness 12.6mm.	40			5
404	1	Copper alloy	Dodecahedron	Roman	Complete cast copper alloy openwork 12-sided object; each face is a pentagon pierced with a different-sized hole. All 20 corners have a spherical knob.	80	80		254
unstrat	1	Iron	Unknown	Unknown	Heavily corroded, circular-sectioned with possible point at one end. Other end broken. Nail?	76.6		7	9

Table 1. Archive catalogue of metal objects

Appendix 5: Animal Bone Assessment

By Bryn Leadbetter

A sum of 44 specimens of animal bones and teeth were recovered from Roman period features during excavations undertaken by Allen Archaeology Ltd on land at Brills Farm, Norton Disney, Lincolnshire (Site code: NDBF23). An assessment of the assemblage follows.

Methodology

Recording of the remains follows guidelines set out by Baker and Worley (2019). Specimen identification was aided by published guides (Hillson 1996, Schmid 1972) and of butchery and cut marks with reference to Binford (1981). Evidence of gnawing, burning and pathological changes were also recorded. Specimens were identified to species where possible. Those not identified to a specific taxon were recorded as either micro (rodent size), small (rabbit size), medium (sheep/goat size), or large (cattle size), or as indeterminate (Indet) where neither element or taxon identification was possible. The ageing and sexing of the specimens was not attempted at this stage.

Results

The remains are summarised in Table 1, recording by context the number of identified specimens (NISP) for each species represented, along with those designated as indeterminate. Cattle are clearly the dominant animal in the assemblage with 26 specimens – comprised of 24 fragments of loose teeth and 2 fragments of mandible. The 8 fragmented specimens ascribed to a large mammal (LM) may well belong to cattle also, at least in part, but this is not for certain. Ten specimens were unidentifiable to any animal or bone element and thus ascribed as indeterminate. Fragmentation aside, the specimens were in a fair condition. No evidence of butchery, gnawing, burning or pathological change was observed.

Context No.	Type/feature context	Cattle	LM	Indet	Total
205	deliberate fill of ditch 204	3	1	3	7
236	fill of ditch 235	3	2	-	5
253	fill ditch 252	-	2	-	2
309	layer above pits	5	-	-	5
404	fill of former quarry pit 403	15	3	7	25
Total NISP/Indet		26	8	10	44

Table 1: Summary of animal bones and teeth from NDBF23

Summary and Discussion of Potential

The paucity of specimens and animal species represented provides no opportunity for a worthwhile interpretation relating to feature function or animal husbandry practice. Suffice to say cattle remains are a common component of Roman archaeological assemblages. Given that no useful information would be gained by their further study, no such undertaking is required and the remains may be discarded.

References

Baker, P., Worley, F., 2019, *Animal Bones and Archaeology, Recovery to Archive.* Historic England.

Binford, L., 1981, *Ancient Men and Modern Myths*, New York: Academic Press

Hillson, S., 1996, *Mammal Bones and Teeth: An Introductory Guide to Methods of Identification.* London: Institute of Archaeology, University College London

Schmid, E., 1972, *Atlas of Animal Bones: For Prehistorians, Archaeologists and Quaternary Geologists.* London: Elsevier

Reference				NISP		Indet' spec'	total ctxt spec	overall pres'	cattle elements					Notes
				Cattle	LM									
Site	CtxtCnt	Ctxt	fill/dtch/ctxt	NISP	NISP				mand	lt	Int'	frags	intB	
NDBF23	1	205	fill/ditch/204	3				3	2	1		3		1xlt,2xmand frags with teeth - all fragmented
NDBF23		205			1									likely lb frag
NDBF23		205				3	**7**	3						
NDBF23	1	236	fill/ditch/235	3						3	1	2		
NDBF23		236			2		**5**	2						likely lb frags
NDBF23	1	253	fill/ditch/252		2		2	2						likely lb frags
NDBF23	1	309	layer above pits	5			5	2		5	2	3		
NDBF23	1	404	fill/l quarry pit/403	15						15	1	14		
NDBF23		404			3									2xlikely lb frags, 1x orbital
NDBF23		404				7	25	2						
Totals:				26	8	10	44		2	24	4	22	0	
%:				59.09	18.19	22.72	100							
Contexts:	**5**			4	4	2								no signs of modifications or pathologies/but all
%														too fragmented to see If ever present

Table 1: Animal Bone Catalogue

Appendix 6: Stone

By Dr Joshua T. Hogue

Two pieces of worked stone (44.9g) and 12 pieces of unworked stone (1.368kg) were recovered from excavations at Brills Farm, Norton Disney, Lincolnshire. A description of the worked stone is given below (Table 1). All unworked stone was quantified by count and weight prior to discard (Table 2).

Context	Quantity	Object	Period	Description	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
300	1	Unknown	Unknown	A complete object, possibly a whetstone, of uncertain date. The object is sub-rectangular in plan, with convex delineation at the base and straight sides tapering to a rounded tip. The object has an ovoid cross-section. It is manufactured on a fine-grained grey stone. It does not retain any clear toolmarks but the shape appears intentional, possibly shaped and then smoothed.	92.9	32.1	10.9	37.4
300	1	Tessera	Roman	A complete stone tessera of probable Roman date (AD 100-410). The object is trapezoid in plan, has a flat cross-section, and is made on mid greenish grey course-grained stone. The upper surface shows some wear.	25.9	18.6	8.2	7.5
Total	2							44.9

Table 1. Archive catalogue of worked stone

Context	Quantity	Weight (g)	No. Burnt	Notes
237	1	85		
213	4	201	3	
209	1	35	1	
321	1	37		
219	2	7		
209	1	389	1	
404	1	557	1	
215	1	57	1	
Total	12	1368		

Table 2. Quantification of unworked stone prior to discard

Appendix 7: Roman Dodecahedron

By Lorena Hitchens

Introduction

Background context

Roman dodecahedra are mysterious copper-alloy objects from the period of the Roman Empire. Many have speculated for centuries about their function: gambling or fortune-telling devices, tools or gauges, surveying instruments, candlesticks, games or toys, or simply decorative items. The internet era has given rise to even more speculative theories, none of which are provable or disprovable.

Finds of dodecahedra are restricted to the northern- and western-most provinces of the Roman Empire, overlapping with the pre-conquest Celtic tribal areas (see Guggenberger 1999, 2013, and Grull 2016). The primarily represented provinces are Britannia, the Germanias, and the Gauls, with some from Raetia and Noricum, and one from Pannonia. No dodecahedra are yet known from Spain, south of the Alps (Italy) or around the Mediterranean. These objects are not mentioned in Roman literature or inscriptions nor depicted in visual media such as sculpture, wall paintings, or mosaics.

Characteristics of Roman dodecahedra

Dodecahedra are characterised by their openwork (hollow) 12-sided form. Each face is a pentagon with equilateral sides, pierced with a different-sized hole. Sometimes, faces are decorated with markings surrounding the holes or on the faces or edges. Each vertex, or corner where three sides meet, has a semi-spherical knob, totalling 20 when completely intact. All are roughly the size of an adult human fist, which, it should be noted, can vary widely, from 5cm to 11cm in diameter.

Dodecahedra of Roman Britain

The author's previous research has catalogued 32 dodecahedra from Roman Britain (from whole to fragments). This object from Norton Disney makes 33. Before the Norton Disney find, no examples of dodecahedra were represented from the Midlands (see Location and find context below). Approximately 130 dodecahedra (including fragments) are known in all of Europe. Examples from Roman Britain comprise about 25% of the European total. The author's current research is investigating this superset. In addition, new finds like Norton Disney are also regularly added to the total dataset.

Location and find context

The site in the East Midlands (Fig. 1) is ~700m from a Roman Villa and ~100m from an Iron Age ditch and embankment. A copper-alloy mounted deity (Mars?), known as the Norton Disney Rider God or Mars Thingus, was found (and possibly nighthawked) from a nearby field owned by the same landowner decades earlier. The rider god is currently in the British Museum (Johns 1990:446).

The site is elevated with a view over the landscape to the west and south. It is a strategic location straddling several geographic and political boundaries since ancient times. This object was uncovered by Richard Watts, local HER officer, in Trench 4 during the June 2023 dig season. Diggers were volunteers supervised by Allen Archaeology on behalf of NDHAG. Trench 4, before excavation, was described as a "quarry" infilled with debris as a "midden". Other finds include a box-flue tile fragment, grey-ware pottery, roof tile debris (CBM), and animal teeth. The soil was loose and sandy. The pit was not fully excavated to the bottom.

Figure 1: A map of dodecahedra of Roman Britain, as catalogued by the author as of 15 Sept 2023. Note that some find spots, e.g., Limerick, Ireland and London, are inaccurate because their find site is unknown, so their current whereabouts have been substituted. (Dodecahedra were, and still are, highly portable objects.) The Norton Disney find is indicated with a red arrow. Whole or nearly whole dodecahedra are star-shaped. Dog-bone shapes indicate fragments. Map © Lorena Hitchens, 2023.

Metrics

Dimensions

Table 1: Key dimensions of the Norton Disney dodecahedron

Height
Overall height 8 cm
Overall height without knobs 7 cm
Width
Overall width 8.6 cm
Overall width without knobs 7.5 cm
Weight 254 g
Knobs
Knob width (avg) 9-9.5 mm
Knob projection (avg) 8-8.5 mm
Side length of faces
Face A (sides) 27 mm
Face B (sides) 27 mm
Face C (sides) 27 mm
Face D (sides) 27 mm
Face E (sides) 27 mm
Face F (sides) 27 mm
Face G (sides) 27 mm
Face H (sides) 27 mm
Face I (sides) 27 mm
Face J (sides) 27 mm
Face K (sides) 27 mm
Face L (sides) 27 mm
Diameter of holes
Face A (opening) 29 mm
Face B (opening) 20.3 mm
Face C (opening) 13.4 mm
Face D (opening) 19.4 mm
Face E (opening) 20.4 mm
Face F (opening) 20 mm
Face G (opening) 27 mm
Face H (opening) 17.6 mm
Face I (opening) 17.5 mm
Face J (opening) 9.9 mm
Face K (opening) 16.2 mm
Face L (opening) 17 mm

Key to Faces

The author's system for recording faces of a dodecahedron is as follows (Fig. 2 & 3):

- The face with the largest hole is Face A. This is the "bottom" of the dodecahedron
- that sits on a surface.
- The face with the smallest hole, in the tier adjacent to Face A, is usually Face F,
- positioned to the right. (In the case of the Norton Disney object, Face C is actually the smallest-holed.)
- Face B on the bottom tier should then be the face directly facing the viewer.
- Face C is to the left of Face B, and so on, around to Face F, which is on the
- right-hand side of Face B.
- Face G is the "top" of the dodecahedron, opposite Face A.
- Face H is below Face G, on the right, still facing the viewer.
- Face I is to the left of Face H, and so on, around the top tier of the dodecahedron.

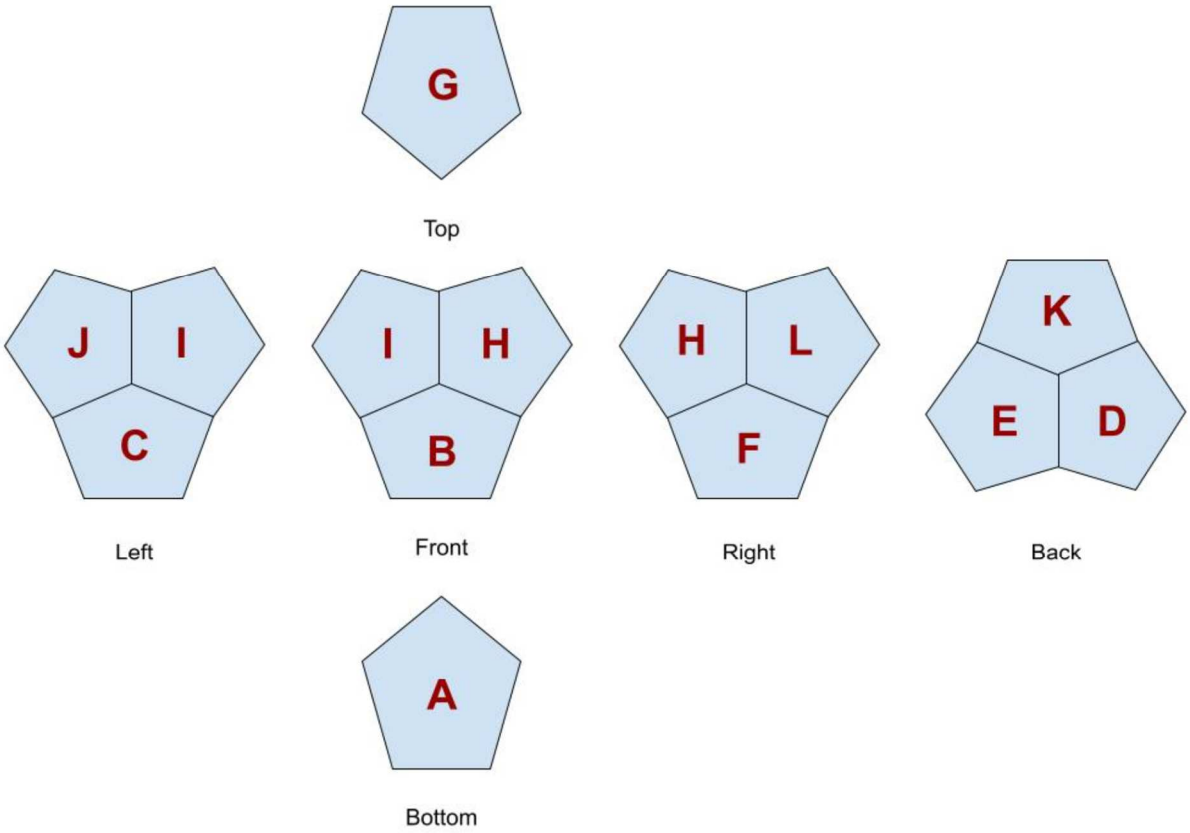

Figure 2: A key to reading the faces of the Norton Disney dodecahedron. Image: copyright Lorena Hitchens 2023.

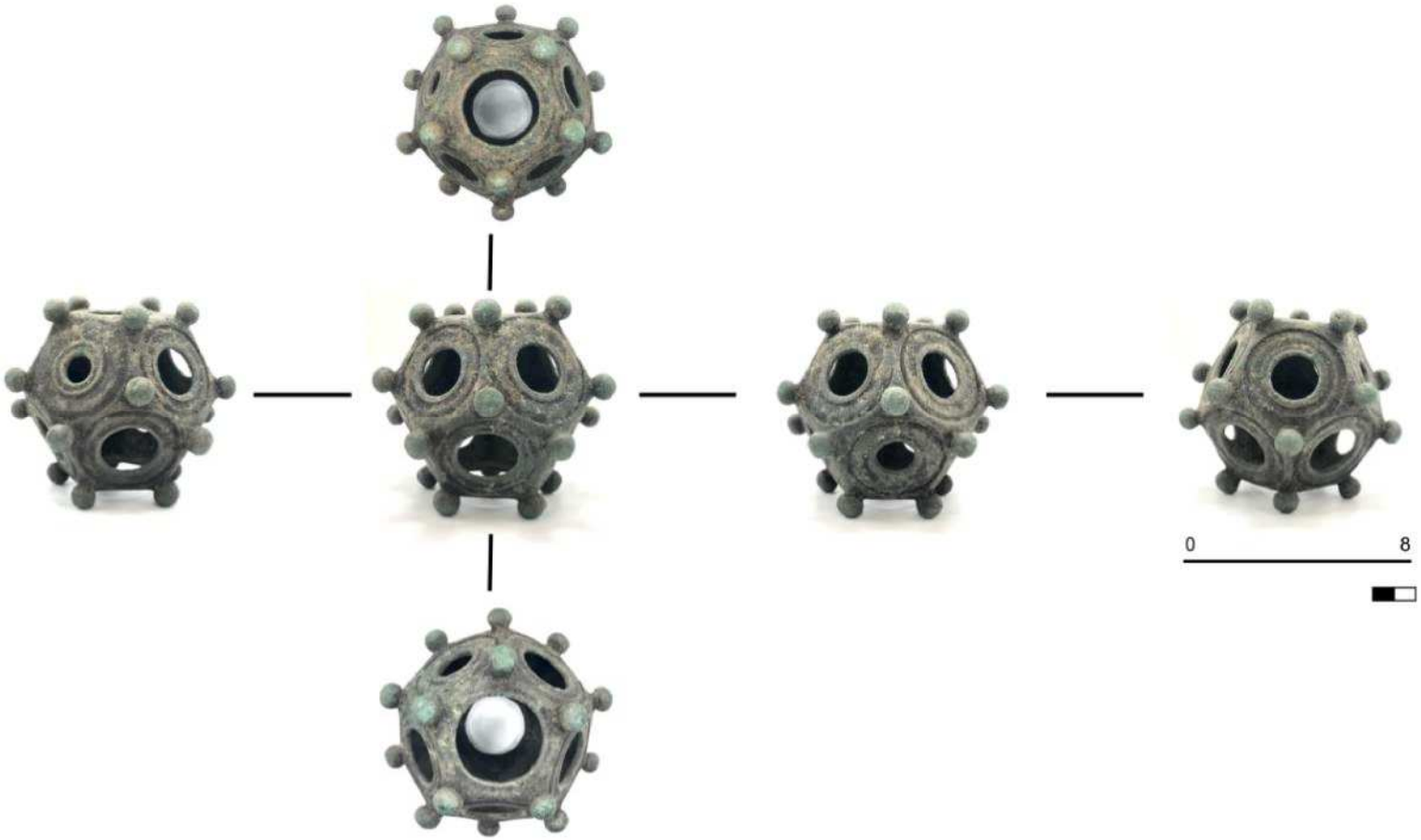

Figure 3: Composite photo of the Norton Disney dodecahedron, with scale. Image: copyright Lorena Hitchens 2023

Condition

Manufacturing damage/flaws

The casting is very high quality. No cracks, gaps, or voids from manufacturing are visible.

1. There is a small indent on Face L. Based on experimental archaeology by the author, this defect is likely to have occurred when the object was removed from the mould. A minor groove on the neck of the knob closest to this indent is likely related to the moment of the indent occurring (see item 7).
2. Face K has a particularly crisp, deep impression of the ring decoration. The inner surface of Face K reflects the ring. This likely resulted from a zealous impression of the ring die/stamp into the wax model.
3. Face E has a similar but less deep impression on the inside of its face.
4. The inner surface is otherwise unremarkable and smooth, with no burrs, bubbles, lumps, etc. from casting. This indicates that if the wax model had surrounded a solid dodecahedron first, the surface of that solid core was smoothed and polished before further steps in the lost wax casting process.
5. The knobs are robust and short-necked. All knobs are present (20). All knobs are undamaged and cast whole with the body.
6. No detected repairs or attachment points of knobs are visible.
7. All knobs are exceptionally regular in size. The knob width is slightly greater than the projection.
8. One knob on Face L (near the indent on Face L) has a very small groove where the neck meets the vertex (see item 1).

Condition/taphonomic processes

The condition is exceptional. A light protective grey-green patina covers the entire object evenly. There are no scrapes or gouges through the patina layer. There is no evidence of bronze disease. There is no serious or active corrosion, only an extremely light scatter of crystals on some faces, visible in the photos. [1]
Loose sandy soil still clings to the outer and inner surface of the object. Sandy soil compacted in the core of the dodecahedron was gently brushed out, collected and sealed in a plastic envelope. The author has retained this soil in case soil testing is desired later. There are no signs of wear or use other than the expected polish to the knobs from handling over time. There is no wear around the necks of the knobs, the edges of the holes, or on the inner surfaces of the object. The faces are crisp in their design motif.
[1] *It has been recommended by the author to the NDHAG association to consult with the Newark Museum with regard to humidity control during display and storage of the dodecahedron. The object must be kept dry to prevent future corrosion, which will first try to attack surface irregularities and the knobs, under humid conditions*.

Considering the excellent condition today, the object would have also been in excellent condition at the time of burial. However, it was not entirely "new" then because there is smoothing to the knobs beneath their patina, suggesting handling over time. The dodecahedron was well cared for by its keeper prior to deposition.

Elemental composition

XRF testing data

Gerry McDonnell tested the object with pXRF on 14 Sept 2023. Details regarding the device, settings, targets, calibration, etc., can be found in the separate specialist report from Gerry McDonell Archaeometals Consulting. The following results were communicated verbally to the author.

- Copper (Cu) 63%
- Lead (Pb) 26%
- Tin (Sn) 8%
- Zinc (Zn) 0.2%
- Iron (Fe) trace

Discussion

These elements are typical of late Romano-British 'leaded gunmetal' cast objects made of mixed recycled copper-alloy metal objects. The lead proportion is high even for typical leaded gunmetal. This may be a random result from the recycling of other metal objects/scrap or an intentional decision by the maker to add more lead. Lead helps the liquid metal "flow" well into nooks and crannies of 3-dimensional object moulds (Bayley and Butcher 2004:15).

Decreasing zinc availability from the mid-1st century AD onward could indicate, if cross-referenced with other dating methods, a later date for this object (Bayley, Crossley, and Ponting 2008:49). By the latter half of the Empire, zinc was nearly unavailable in Roman Britain, with zinc only present in copper-alloys due to the recycling of earlier brass objects. Iron can exist in trace amounts in other metal elements, or the iron trace detected by XRF may stem from surface contamination. In either case, the iron detected here is unlikely to result from any intentional alloying.

Impressions/discussion

Dating

Without further evidence from Allen Archaeology's report for Trench 4 or an overall site report, it is not possible to suggest a date for this dodecahedron's manufacture or deposition. Dodecahedra from Roman Britain are often without context or provenance. Only a very few (4 of 33) have reliable dating, to no earlier than the late third century.

Size/weight

This object appears to be the largest dodecahedron from Roman Britain that the author has *personally* evaluated. This is a robust dodecahedron. In theory, there is one from Roman Britain equal in size (8 cm; Carmarthen; currently in the SANL London), but the author has yet to confirm this personally. The weight of this Carmarthen example is heavier, allegedly 1044 g. Another example (Fishguard, currently in the British Museum) is allegedly even larger, at 11 cm, and weighing in at 553 g. However, this artefact is problematic due to varying dimensions recorded for it in 1846, 1923, and 1993.

Style type

The Norton Disney dodecahedron appears to most closely match the "**1b**" style (based on the 1907 typology developed by de Saint-Venant, later refined by Grenier in 1996, then Guggenberger in 1999). Type 1b is defined by a varying number of concentric rings per face, with up to 12 faces decorated;

the Norton Disney object is decorated on all 12 faces. Face A, with the largest hole, has one ring. Face J, the face with the smallest hole, has three rings; all other faces have two rings. There are no other markings or stamps inside or outside the object. The holes on the faces are graduated with slight differences in size (see Metrics, Table 1). The Norton Disney dodecahedron joins two other examples of type 1b from Roman Britain: Cornhill, London and Gill Mill, Ducklington, Oxfordshire.

Conclusions

The Norton Disney dodecahedron is an excellent example of a large, heavy, type 1b copper-alloy Roman dodecahedron. The workmanship of this object is very high quality. The preservation and condition are also excellent. This is the first example of a dodecahedron from the Midlands. So, the addition of this dodecahedron to the dataset for Roman Britain is of national importance. Its addition to the European dataset is of international interest.

In situ finds of dodecahedra are rare - this is only the third or fourth from Roman Britain overall – and the only one of those four to be found complete and undamaged. Further exploration of the site context in which the object was found is strongly recommended and highly anticipated for dating and social context purposes. Further laboratory testing, including 3D modelling, is recommended for research and the NDHAG group's use. Museum storage for conservation and security is recommended.

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Appendix 8: Hand-Held X-Ray Fluorescence Analysis of a Copper Alloy Romano-British Dodecahedron

By Dr Gerry McDonnell

Introduction

The dodecahedron (Plate 1) was recovered from a sealed Romano-British context during the 2023 excavation season at Norton Disney. The artefact was analysed in the as-excavated condition, i.e. it had been gently brushed clean, but no conservation treatment had been carried out. The dodecahedron has holes of different sizes, holes of the same diameter are on opposed faces. All the corners have ball-shaped protrusions. The dodecahedron was analysed by Hand-Held X-ray Fluorescence (HH-XRF). The aim of the analyses was to assess the bulk composition of the alloy, investigate whether the ball-shaped protrusions had a similar composition to the dodecahedron. If they were different, it would imply that they had been attached to the dodecahedron after casting. If the compositions were similar, it would imply that they were part of the original casting. A cursory examination of the dodecahedron, without the use of a magnifying lense, showed no clear evidence of casting defects or evidence for runners or risers.

Methodology

The instrument used was a Brüker S1 Turbosdr hand-held XRF instrument operating at 40kV. A beam of x-rays is generated in the instrument and focussed on the sample, the x-rays interact with the elements present in the sample resulting in the emission of secondary x-rays which are characteristic (in terms of their energy and wavelength) of the elements present in the sample. The energies of the secondary x-rays are measured, and a spectrum generated showing a level of background noise with peaks of the elements present superimposed on the background noise. Samples will have analysed for 30 live seconds; the spectrum is stored, and a normalised composition determined using a bespoke Brüker Fundamental Parameters Programme (R-Alloys FP). All elements heavier than calcium (Ca, Z=20), can be detected. The calculated two-sigma error on each element is calculated and overall show values of the order of +/- 0.2%. The data for the non-ferrous metal elements is normalised, noting that iron (Fe) is routinely detected, but derives from the corrosion products and not the original alloy. The data is generated in a comma delimited file and then exported to an Excel spreadsheet, where the data is examined, and relevant tables generated. The technique is non-destructive. The depth of penetration of the primary x-ray beam, and more importantly the emitted secondary x-rays is of the order of 10's of microns, hence the resultant spectra reflect the composition of the corrosion/tarnish layer and the base alloy. Equally if an artefact is e.g. plated, this will impact the resultant spectrum. The thicker the corrosion/tarnish/plating layer the greater impact on the spectrum.

Brief Metallurgical Background

To correctly interpret XRF data a brief explanation of copper alloy metallurgy and terminology is required. In the Roman period a wide range of copper alloys were in use (Bayley and Butcher, 2004p14), the major alloying elements were zinc, tin and lead. The names of the alloys are provided in Appendix 1. An alloy is a combination of a metallic element and another element, in most cases the other element is a metal; an alloy does not melt at one temperature, but over a range between the liquidus (the temperature above which the alloy is fully molten) and the solidus (below this the temperature the alloy is completely solid). The rapidity of cooling can influence properties of the alloy. The addition of another element (Zn, Sn, Pb etc) to copper has several major impacts depending on the amount of the alloying element. Firstly, it lowers the liquidous(melting) temperature, secondly it can change the mechanical properties (e.g. as evidence by the hardness of the alloy, tin bronze is harder than copper). Thirdly it changes the colour, for example an alloy containing a specified amount of copper, silver and gold will appear golden in colour, and hence cheaper (and harder) than pure gold. Fourthly it can alter

the viscosity and castability of the alloy, e.g. the addition of small amounts of lead (c. 2%), will increase the fluidity, but higher amounts decrease the fluidity. Fifthly specifically the addition of zinc can improve the quality of the casting by reducing the porosity (gas holes) in the casting. Sixthly the addition of heavier alloying elements (in particular lead) increases the density of the alloy. As an alloy freezes the resultant metallurgical microstructure is dependent on which and the amount of alloying elements are present. The microstructure of alloys on cooling is either granular, little equiaxed grains or dendritic, classically a christmas tree like crystal surrounded by a solid solution (a mixture of two or more metallic elements). The resultant microstructure influences the mechanical properties and the corrosion of the alloy. Of particular importance is lead as it is insoluble in copper in the liquid state (i.e. when fully molten liquid copper and liquid lead are present) and insoluble in the solid state so that on freezing an alloy of 95% copper and 5% lead will result in grains of copper surrounded by films of solid lead. As the lead content increases the percentage, thickness etc of the lead films increases. The factors make the study of archaeological alloys particularly challenging, as for example, many of the alloys fall outside the realm of modern metallurgy.

Results

Three different locations on the flat surfaces of the dodecahedron were analysed, the raw data indicated that the elements exceeding 1% include copper, lead tin and arsenic. However the arsenic Kα line overlies the lead Lα line, and due to the strength of this line the arsenic content is more difficult to determine. There was only a very slight peak at the position of the arsenic Kβ line, hence its concentration in the alloy is very low (probably = <0.1% and hence discounted from the data. The first table (Table1) provides the normalised data for elements returned as greater than 0.1%, including iron. The iron derives from the corrosion/tarnish layer, but is very low, it commonly occurs at higher levels (several percent) but indicates limited corrosion of the dodecahedron which may suggest that the burial conditions were predominantly anaerobic for long periods of time. Table 2 presents the normalised data excluding iron, this demonstrates that the alloy is a leaded tin bronze, and the alloy composition, i.e. excluding minor elements is presented in Table 3. Fourteen individual analyses were taken and the mean, maximum and minimum value of the minor elements were determined, which showed that the mean value for all minor elements, except zinc was 0.1%, and for zinc was 0.2, with a maximum value in one instance of 0.4%. Therefore all the remaining analyses are discussed in terms of the three major alloying elements. In all eleven ball-shaped protrusions were analysed and their mean ternary alloy composition is compared to the mean derived from the flat areas are compared in Table 4. This shows that the balls are significantly higher in lead, and slightly higher in tin and hence lower in copper compared to the flat areas. Alloys containing a high percentage of lead are prone to segregation of the heavier element (lead). If the alloy is retained in the liquid state in the crucible for a length of time, there will be a tendency for the lead to sink towards the bottom of the crucible. Then when the molten alloy is poured into the mould, the alloy entering the mould first will be low in lead, and the last volume to be poured will be richer in lead. It is not clear which 'way up' the dodecahedron was cast, hence two balls on four opposing faces were analysed, as these could be the first or last voids in the mould to be filled. The opposing faces with the largest hole and the smallest hole were analysed. One facet was labelled "A" and the other "B", for example the analysis would be identified as Ball 1 from large hole facet, Side A (Large Hole A Ball 1). The analyses of al the facet balls are presented in Table 5, and they have overall mean values of 62% copper, 29% lead and 9% tin. The mean values of the balls on the different facets are presented in Table 6, although there is a slight difference between the balls on the small holes facets, there is a large difference with balls on facet B of the large hole having a lower percentage of copper and higher tin plus lead percentage compared to facet A.

Discussion

The metallurgy of an artefact dictates the physical and mechanical properties of an artefact as well its colour and density. The metallurgy of an artefact is a function of its composition, and how it has been manufactured, e.g. cast into a hot mould or a cold mould. The HH-XRF analyses determines the composition of the artefact, but with the caveat that they were analyses of corroded surfaces. A wide range of alloys were exploited across the Roman Empire (see Appendix 1). The results clearly demonstrate that the dodecahedron was cast from (heavily) leaded tin bronze. The values obtained from the flat surface of the dodecahedron are consistent with a mean lead content of 17.5% (Table 4). The analyses of the balls are more varied and with a higher mean lead content (29%, Table 5). The data is plotted on a ternary (triangular) diagram (Figure 1), which clearly demonstrates that the flat surfaces are higher in copper than the balls. It also shows that the balls on the Large Hole Face B, have the highest tin plus lead content. However Ball 1 has high tin (11.6%) and lead (34.6%) contents, which is possibly due to segregation in the alloy and/or a result of corrosion.

There are no other published analyses of dodecahedra, to compare to this data. Bayley and Butcher (2004, p220-229) published 1065 analyses of roman brooches, of which 104 contained more than 17% Pb, and 26 of these had totals less than 97% suggesting one or more elements not analysed for were present e.g. arsenic or antimony. Thus there were 78 roughly comparable analyses, of which 24 contained a tin plus zinc total exceeding 10%, leaving 54 analyses (5% of Bayley and Butcher analyses) that were close to the composition of the dodecahedron, and are plotted on a ternary diagram (Figure2), with the dodecahedron plotted on the same diagram (Figure 3).This shows that the high lead tin bronze alloy of the dodecahedron is unusual but was used to manufacture brooches across Roman Britain.

The key question is why a high lead tin bronze alloy was used to manufacture the dodecahedron? A small amount of lead, c. 2%, added to a tin bronze increases the fluidity of the alloy, however additions in the high 20%, results in the copper (and tin) component of the alloy freezing leaving molten to freeze last as films around the copper rich grains. The only clear benefit is that the additions of high lead levels increases the weight of the artefact. The dodecahedron weighs 254 grams, and a back of the envelope calculation sows that if the lead content is reduced to 5%, compared to the mean value of 27%, and an increased tin content from 8% to 12%, the weight of the dodecahedron would be reduced by about 6% to 238grams, not a massive change.

In conclusion the dodecahedron is a single casting, manufactured from a heavily leaded tin bronze. The overall mean lead content of all analyses is 27%, but the mean derived from the flat areas of the dodecahedron is 16% and for all the balls 29.5%. It cannot, as yet, be determined if this difference indicates that the balls were cast separately, and either brazed/soldered on after the main dodecahedron piece was cast or cast on at a later stage. The difference could also reflect segregation and or corrosion effects and the balls were part of the original casting. There are only 33 brooch analyses published by Bayley and Butcher (2004, p220-229) that have a high lead content and a zinc content less than 0.4%. similar to the composition of the dodecahedron.

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Bayley, J. and Butcher, S., 2004. *Roman brooches in Britain: a technological and typological study based on the Richborough collection*. Society of Antiquaries of London.

Location	Fe	Co	Ni	Cu	Zn	Ag	Sn	Pb	Total
Area 1	0.7	0.1	0.2	73.9	0.4	0.1	6.7	17.9	100
Area 2	0.9	0.1	0.2	73.8	0.3	0.1	6.9	17.7	100
Area 3	0.8	0.1	0.1	75.6	0.3	0.1	6.9	16.1	100

Table 1 Analyses of the flat areas of the dodecahedron, including iron (weight %).

Location	Co	Ni	Cu	Zn	Ag	Sn	Pb	Total
Area 1	0.1	0.2	74.4	0.4	0.1	6.8	18.1	100
Area 2	0.1	0.2	74.5	0.3	0.1	7	17.9	100
Area 3	0.1	0.1	76.2	0.3	0.1	7	16.2	100

Table 2 Analyses of the flat areas of the dodecahedron, excluding iron (weight %).

Location	Cu	Sn	Pb	Total
Area 1	75	6.8	18.2	100
Area 2	75	7.1	18	100
Area 3	76.7	7	16.3	100
Mean	75.5	7	17.5	

Table 3 Normalised composition of the ternary alloy (weight %).

	Cu	Sn	Pb	Total
Flat	75.5	7	17.5	100
Balls	57.8	10	32.2	100

Table 4 Comparison of the ternary composition of the flat areas (3 readings) and the balls (11 readings (weight %).

Location	Cu	Sn	Pb	
Small Hole A Ball 1	62.3	8.7	29	100
Small Hole A Ball 2	69.3	9.1	21.7	100
Small Hole B Ball 1	58.7	8.6	32.6	100
Small Hole B Ball 2	65.7	7.6	26.7	100
Large Hole A Ball 1	61.9	7.9	30.2	100
Large Hole A Ball 2	66.1	7.9	26	100
Large Hole B Ball 1	53.7	11.6	34.6	100
Large Hole B Ball 2	57.8	10	32.2	100
Mean Values	61.9	8.9	29.1	

Table 5 Analyses of the balls on the different facets, (weight %).

Location	Cu	Sn	Pb	
Small Hole A	65.8	8.9	25.3	100
Small Hole B	62.2	8.1	29.7	100
Large Hole A	64	7.9	28.1	100
Large Hole B	55.8	10.8	33.4	100

Table 6 Mean values of the balls from the different facets (weight %).

Plate 1 The dodecahedron with one of the large holes uppermost.

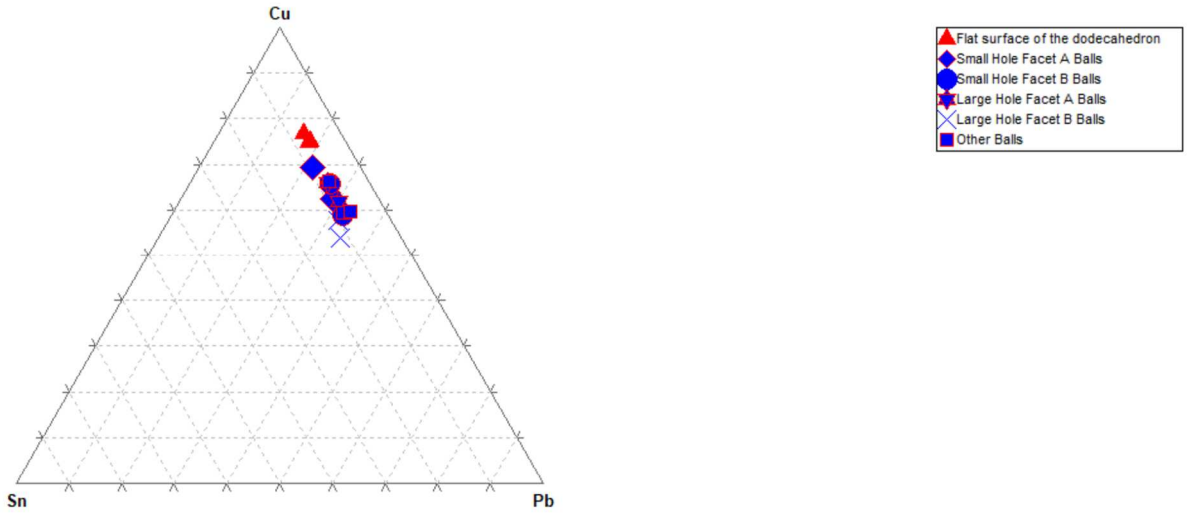


Figure 1 Ternary plot of the balls and the flat surfaces (weight %).

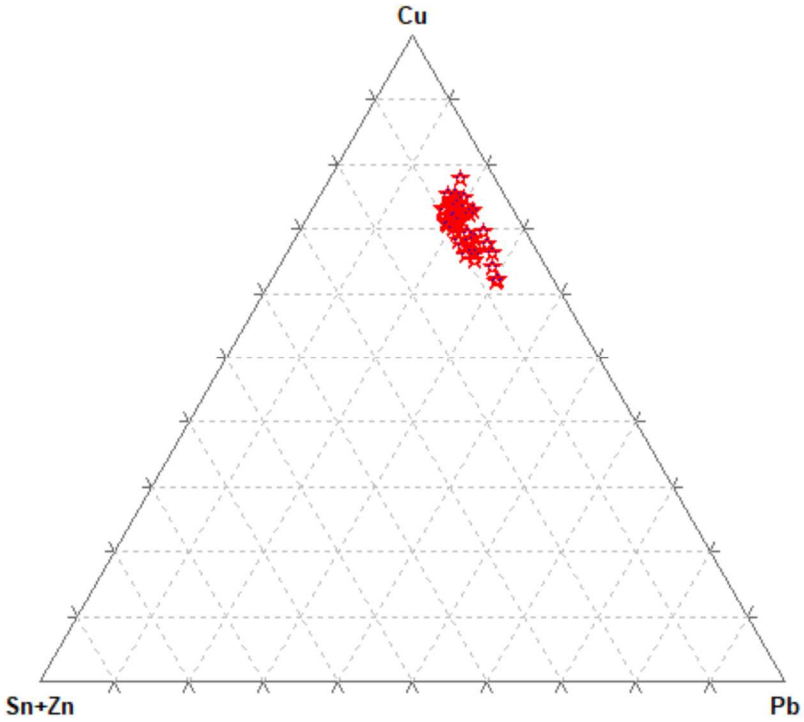


Figure 2 Ternary plot of the compatible data from Bayley and Boucher (2004).

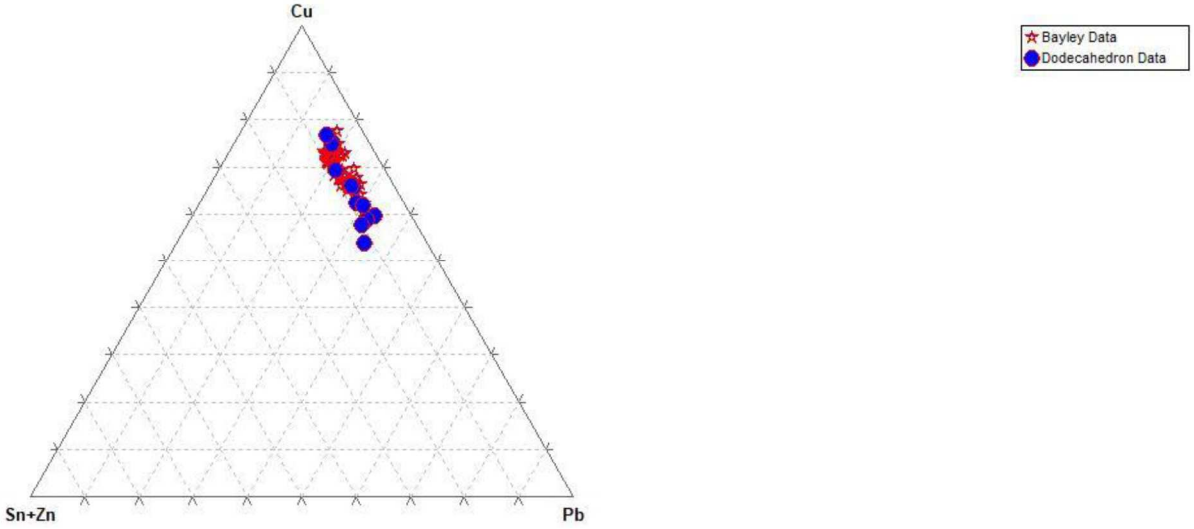


Figure 3 ternary plot of the data from Bayley and Butcher (2004) with the dodecahedron data.

Appendix 1

Nomenclature of major copper alloys used in antiquity.

Copper	Tin	Zinc	Lead	Arsenic	Name
y	y				Tin Bronze
y	y		y		Leaded Tin Bronze
y		y			Brass
y		y	y		Leaded Brass
y				y	Arsenical Bronze
y			y	y	Leaded Arsenical Bronze
y			y		Leaded Copper
y	y	y			Gunmetal
y	y	y	y		Leaded Gunmetal

Note the presence of an alloying element at low concentrations does not necessarily indicate deliberate alloying, e.g. selection of pieces of the different metals melted together to form an alloy. Natural alloys occur due to the presence of complex ores containing several metal elements, e.g. copper-arsenic ores, lead-zinc ores. Not all the alloys listed were used in the *Roman Period, e.g. Arsenical bronze.*

Appendix 9: Context Summary List

Trench 1

Context	Type	Description	Length (m)	Width (m)	Thickness (m)	Interpretation
100	Layer	Firm grey silty sand with occasional gravel			0.25	Topsoil
101	Cut	Linear, east to west aligned, fairly steeply sloping sides and concave base, contains 102	4.78	1.59	0.50	Cut of linear ditch
102	Fill	Friable, dark brownish grey silty sand with frequent small pebbles			0.50	Fill of [101]
103	Cut	Linear, north to south, east side steeply sloping, west side not seen, contains 104	2.85	0.75	0.45	Cut of linear ditch
104	Fill	Friable, dark brownish grey silty sand with frequent small pebbles			0.45	Fill of [103]
105	VOID					
106	VOID					
107	Cut	Linear, east to west aligned, steeply sloping sides, V-shaped base, contains 108	4.64	1.30	0.50	Cut of linear ditch, same as [111]
108	Fill	Firm, brownish grey silty sand with frequent small rounded pebbles			0.50	Fill of [107], same as 112
109	Cut	Linear, east to west aligned, fairly steeply sloping sides and concave base, contains 110	4.52	0.85	0.36	Cut of linear ditch, same as [113]
110	Fill	Firm, brownish grey silty sand with frequent small/medium rounded pebbles			0.36	Fill of [109], same as 114
111	Cut	Linear, east to west aligned, concave steep sides and concave base, contains 112	4.64	1.30	0.44	Cut of linear ditch, same as [107]
112	Fill	Firm, brownish grey silty sand with frequent small rounded pebbles			0.44	Fill of [111], same as 108
113	Cut	Linear, east to west aligned, very steep southern edge flat base and steep northern side. Contains 114	4.52	0.77	0.35	Cut of linear ditch, same as [109]
114	Fill	Firm, light brown silty sand with frequent small to medium pebbles			0.35	Fill of [113], same as 110
115	Cut	Linear, east to west aligned, concace sides and base, contains 116	5.24	2.11	0.80	Cut of linear ditch, same as [117]
116	Fill	Friable, mid brown sandy silt with very small pebbles			0.80	Fill of [115], same as 118
117	Cut	Linear, east to west aligned, gently sloping sides with a	5.24	2.15	0.68	Cut of linear ditch, same as [115]

Context	Type	Description	Length (m)	Width (m)	Thickness (m)	Interpretation
		sharp v-shaped base, contains 118				
118	Fill	Firm, mid brown silty sand with frequent small to medium pebbiles			0.68	Fill of [117], same as 116
119	VOID					
120	VOID					
121	Layer	Friable, mid brown sandy silt with frequent small pebbles			0.40	Buried soil
122	Layer	Friable sandy gravel				Natural geology
123	Cut	Linear, east to west aligned, steeply sloping sides and irregular base, contains 124	2.30	1.32	0.52	Possible terminal of ditch
124	Fill	Firm, light to mid brown silty sand with small to medium pebbles			0.52	Fill of [123]
125	Cut	Linear, northeast to southwest aligned, steeply sloping sides and concave base, contains 126	2.35	1.22	0.36	Possible terminal of ditch
126	Fill	Firm, light brown silty sand with frequent small to medium pebbles			0.36	Fill of [125]

Trench 2

Context	Type	Description	Length (m)	Width (m)	Thickness (m)	Interpretation
200	Layer	Firm grey silty sand with occasional gravel			0.35	Toposil
201	Layer	Friable sandy gravel				Natural geology
202	Cut	Unclear, fairly steeply sloping north edge, contains 203		0.38	0.22	Possible linear feature or pit, truncated by [229] and [228], truncated [206]
203	Fill	Friable, yellowish brown silty sand with frequent gravel			0.22	Fill of [202]
204	Cut	Linear, east to west aligned, moderately sloping sides and flat base, contains 205	5.12	2.46	0.56	Cut of linear ditch, same as [225]
205	Fill	Loose, dark brown silty sand, with small to medium pebbles			0.56	Deliberate deposit in [204], same as 233
206	Cut	Linear, east to west aligned, moderately sloping sides and flat base, contains 207		2.30	0.50	Cut of linear ditch
207	Fill	Friable, yellowish brown sandy silt and gravel			0.50	Fill of [206]
208	Cut	Linear, aligned east to west, concave sides and relatively flat base, contains 209	4.96	1.02	0.24	Cut of linear ditch

Context	Type	Description	Length (m)	Width (m)	Thickness (m)	Interpretation
209	Fill	Friable, yellowish brown sandy silt and gravel			0.24	Fill of [208]
210	Cut	Unclear, fairly steeply sloping north edge, contains 211		0.35	0.33	Cut of possible ditch, truncates [228], truncated by [208]
211	Fill	Friable, yellowish brown sandy silt and gravel			0.33	Fill of [210]
212	Cut	Linear, east-northeast to west-southwest aligned, moderately steep sides, slightly concave base, contains 213	4.85	1.70	0.80	Cut of linear ditch, same as [244]
213	Fill	Friable, mid brownish grey silty sand with small to medium pebbles			0.80	Fill of [212], same as 245
214	Cut	Linear, east to west aligned, concave sides and base, contains 215		1.66	0.28	Cut of linear ditch, same as [252]
215	Fill	Moderately compact, mid brown sandy silt with occasional pebbles			0.28	Fill of [214], same as 253
216	Cut	Linear, east to west aligned, concave sides and uneven base, contains 217	4.41	1.90	0.58	Cut of linear ditch, same as [223]
217	Fill	Friable, light greyish brown slightly silty sand with frequent small pebbles			0.58	Fill of [216], same as 224
218	Cut	Linear, east to west aligned, steep sides and rounded base, contains 219	4.28	1.94	0.73	Cut of linear ditch, same as [237]
219	Fill	Friable, dark brownish grey silty sand with frequent small to medium pebbles			0.73	Fill of [218], same as 238
220	Cut	Sub-circular, truncated by southern end of trench, not fully excavated	1.34	0.51		Cut of pit
221	Fill	Friable, yellowish brown sandy silt and gravel				Fill of [220]
222	Fill	Friable, yellowish grey sandy gravel			0.42	Fill of [228]
223	Cut	Linear, east to west aligned, concave sides and flat base, contains 224	4.41	2.24	0.51	Cut of linear ditch, same as [216]
224	Fill	Firm to friable, mid brownish grey, silty sand with frequent small pebbles			0.51	Fill of [223], same as 217
225	Cut	Linear, east to west aligned, steeply sloping south side, stepped north side, contains 233	5.12	2.05	0.60	Cut of linear ditch, same as [204]
226	Cut	Linear, east to west aligned, steeply sloping sides and flattish base, contains 227	2.16	1.39	0.32	Cut of possible ditch terminus

Context	Type	Description	Length (m)	Width (m)	Thickness (m)	Interpretation
227	Fill	Friable, mid greyish brown sandy silt			0.32	Fill of [226]
228	Cut	Unclear, fairly steeply sloping north side, contains 222		0.45	0.42	Possible ditch cut, truncated by [210], truncated [202]
229	Cut	Linear, northwest to southeast aligned, concave sides and base, contains 230	5.51	2.30	0.45	Cut of linear ditch, same as [242]
230	Fill	Friable, greyish brown slightly silty sand and gravel			0.45	Fill of [229], same as 243
231	Cut	Linear, northwest to southeast aligned, fairly steeply sloping sides and v-shaped base, contains 232	5.43	1.26	0.32	Cut of linear ditch
232	Fill	Friable, greyish brown slightly silty sand and gravel			0.32	Fill of [231]
233	Fill	Moderately loose, mid brown sandy silt with occasional pebbles			0.60	Fill of [225]
234	Layer	Friable, mid brownish grey silty sand with small to medium pebbles			0.26	Buried soil
235	Cut	Linear, north to south aligned, moderately steep sides and uneven base, contains 236		2.61	0.58	Cut of linear ditch
236	Fill	Loose, dark brown silty sand, with small to medium pebbles			0.58	Fill of [235]
237	Cut	Linear, east to west aligned, steep sides and flat base, contains 238	4.28	1.72	0.91	Cut of linear ditch, same as [218]
238	Fill	Loose, dark brownish grey sandy silt with small to medium pebbles			0.91	Fill of [237], same as 219
239	Layer	Very well compacted gravel layer	2.71	1.00		Possible trackway
240	Cut	Linear, east to west aligned, steeply sloping sides and concave base, contains 241	4.46	0.40	0.40	Cut of linear ditch
241	Fill	Friable, light brownish grey sandy silt with occasional small pebbles			0.40	Fill of [240]
242	Cut	Linear, northwest to southeast aligned, steeply sloping south side, stepped north side, contains 243	5.51	1.72	0.51	Cut of linear ditch, same as [229]
243	Fill	Friable, mid brownish grey silty sand with small to medium pebbles			0.51	Fill of [242], same as 230
244	Cut	Linear, west-southwest to east-northeast aligned, steeply sloping south side,	4.85	1.13	0.48	Cut of linear ditch, same as [212]

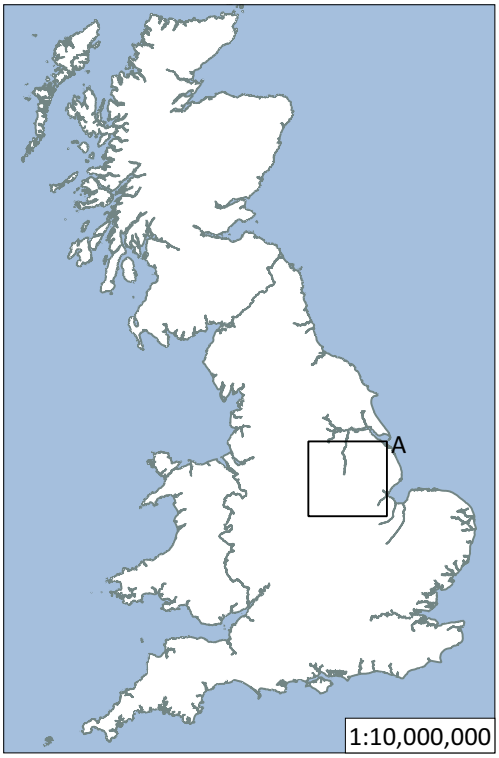
Context	Type	Description	Length (m)	Width (m)	Thickness (m)	Interpretation
		north side truncated, contains 245				
245	Fill	Friable, mid brownish grey silty sand with small to medium pebbles			0.48	Fill of [244], same as 213
246	Cut	Linear, east to west aligned, steep sides, flat base, contains 247	4.40	0.34	0.25	Cut of possible beam slot
247	Fill	Fairly loose, mid brown sandy silt with occasional small pebbles			0.25	Fill of [246
248	Cut	Linear, east to west aligned, near vertical sides and slightly rounded base, contains 249	4.40	0.22	0.21	Cut of possible beam slot
249	Fill	Fairly loose, mid brown sandy silt with occasional small pebbles			0.21	Fill of [248]
250	Cut	Linear, roughly east to west aligned, shallow south side, north side truncated, base uneven, contains 251		0.86	0.16	Cut of linear ditch
251	Fill	Moderately loose, orange brown silty sand with some pebbles			0.16	Fill of [250]
252	Cut	Linear, east to west aligned, concave sides and base, contains 253		1.66	0.28	Cut of linear ditch, same as [214]
253	Fill	Moderately compact, mid brown sandy silt with occasional pebbles			0.28	Fill of [252], same as 215
254	Layer	Very well compacted gravel layer		2.52	0.19	Possible trackway
255	Cut	Linear, north to south aligned, vertical sides and flat base, contains 256		0.19	0.26	Cut of possible beam slot
256	Fill	Fairly loose, mid brown sandy silt with occasional small pebbles			0.26	Fill of [255]
257	Layer	Loose, dark brown silty sandy gravel		2.52	0.35	Possible redeposited material on top of trackway
258	Layer	Loose, dark brown silty sandy gravel		2.71	0.35	Possible redeposited material on top of trackway

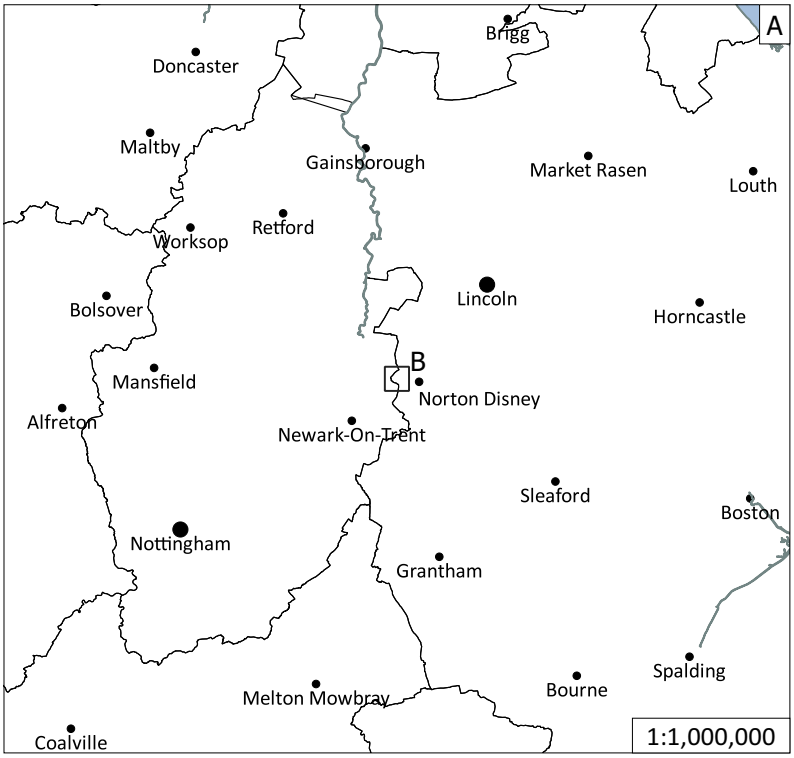
Trench 3

Context	Type	Description	Length (m)	Width (m)	Thickness (m)	Interpretation
300	Layer	Firm grey silty sand with occasional gravel			0.29	Topsoil
301	Layer	Friable, mid brownish grey silty sand with small to medium pebbles			0.21	Buried soil
302	Layer	Friable sandy gravel				Natural geology
303	Cut	Very shallow, concave sides and base, contains 304		0.40	0.09	Cut of small pit
304	Fill	Friable, mid/dark grey silty sand and gravel			0.09	Fill of [303]
305	Cut	Unclear, shallow sides and flattish base, contains 306		1.20	0.14	Cut of small pit
306	Fill	Friable, yellowish brown sand and gravel			0.14	Fill of [305]
307	Cut	Unclear, fairly steeply sloping side and uneven base, contains 308		1.50	0.24	Cut of small pit
308	Fill	Friable, mid greyish brown sand and gravel			0.24	Fill of [307]
309	Layer	Friable, dark greyish brown silty sand		7.16	0.17	Spread of material above small pits
310	Fill	Friable, mid greyish brown sand and gravel			0.26	Fill of [319]
311	Cut	Unclear, concave sides and base, contains 312		0.36	0.23	Cut of small pit
312	Fill	Friable, mid greyish brown sand and gravel			0.23	Fill of [311]
313	Cut	Unclear, concave sides and base, contains 314		1.00	0.42	Cut of pit, truncated by [315]
314	Fill	Friable, plae greyish brown sand and gravel			0.42	Fill of [313]
315	Cut	Unclear, fairly steeply sloping side and uneven base, contains 316		1.70	0.40	Cut of pit, truncates [313] and [317]
316	Fill	Friable, mid greyish brown sand and gravel			0.40	Fill of [315]
317	Cut	Unclear, slightly concave base		1.25	0.40	Cut of probable pit, truncated by [315]
318	Fill	Friable, greyish brown slightly silty sand and gravel			0.40	Fill of [317]
319	Cut	Unclear, gently sloping sides, uneven base, contains 310		2.24	0.26	Cut of probable pit, truncated by [307]
320	Cut	Linear, aligned north to south, very steeply sloping sides and rounded base, contains 321	4.00	1.08	0.56	Cut of linear ditch
321	Fill	Friable, mid/dark brown sandy silt			0.56	Fill of [320]
322	Cut	Linear, north to south aligned, not excavated	1.43	1.30		Likely terminal of ditch

Trench 4

Context	Type	Description	Length (m)	Width (m)	Thickness (m)	Interpretation
400	Layer	Fairly loose, very dark greyish brown silty sand with fairly frequent small pebbles			0.20	Topsoil
401	Layer	Fairly loose, mid brownish grey silty sand with fairly frequent small pebbles			0.22	Buried soil
402	Layer	Friable sandy gravel				Natural geology
403	Cut	Sub-circular, fairly steeply sloping sides, base not excavated, contains 404	10.85	4.67	2.00	Cut of former quarry pit
404	Fill	Friable, mid greyish brown sandy silt with occasional gravel			2.00	Fill of [403]
405	Cut	Linear, north to south aligned, concave shallow sides and flat base, contains 406		1.55	0.22	Cut of linear ditch
406	Fill	Fairly loose, dark greyish brown silty sand			0.22	Fill of [405]





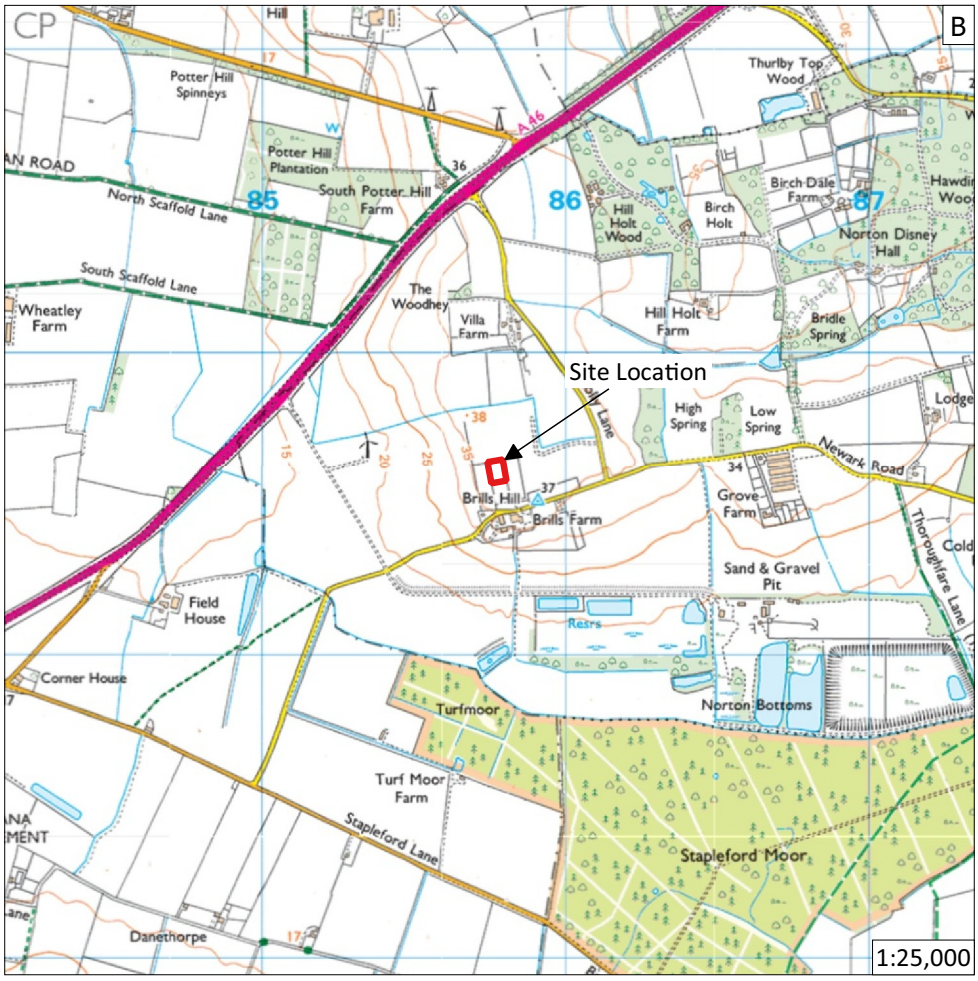


Figure 1: Site location outlined in red

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Scale	1:10,000,000 1:1,000,000 1:25,000 @ A4
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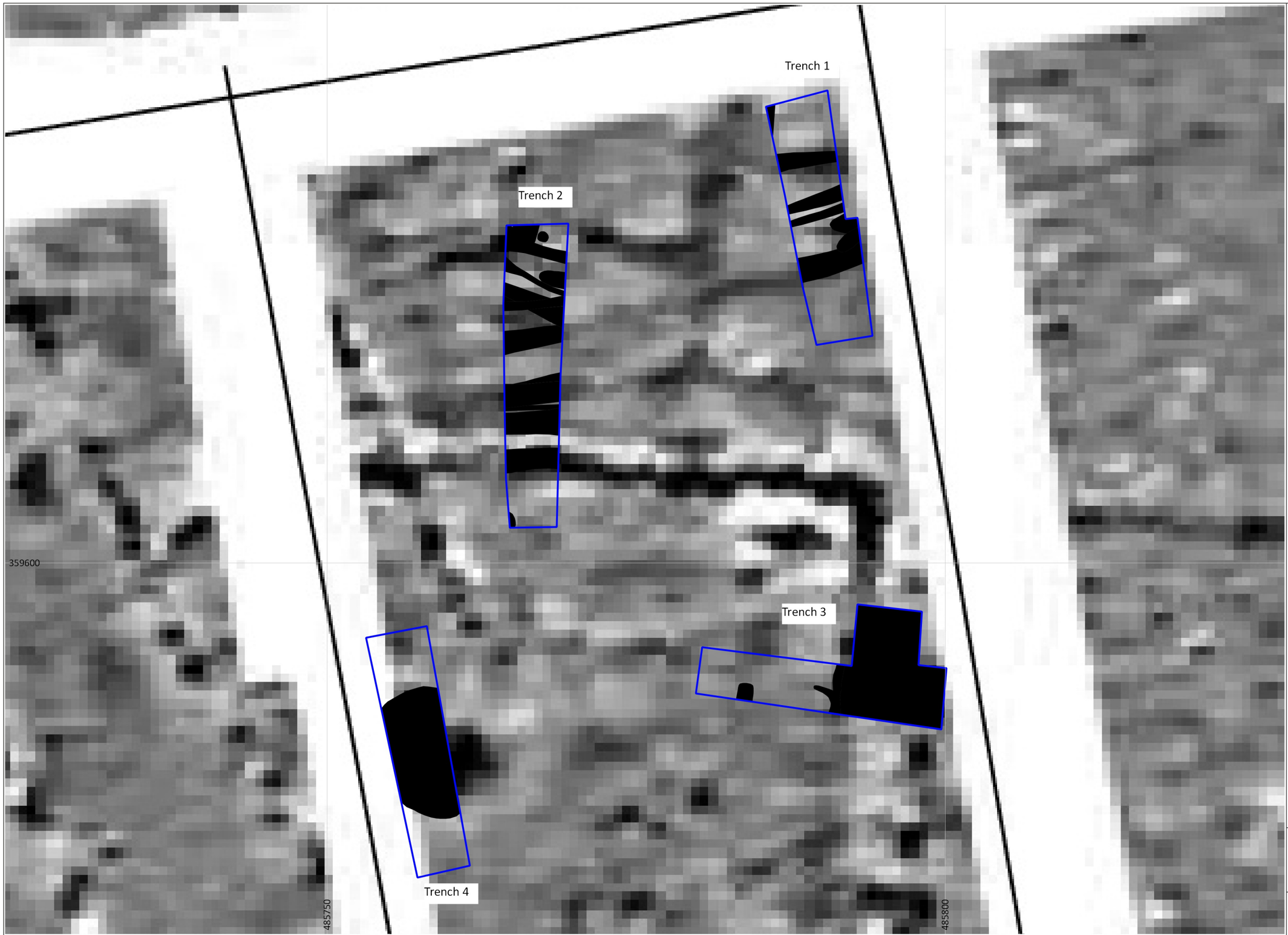

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Date	19/07/2023

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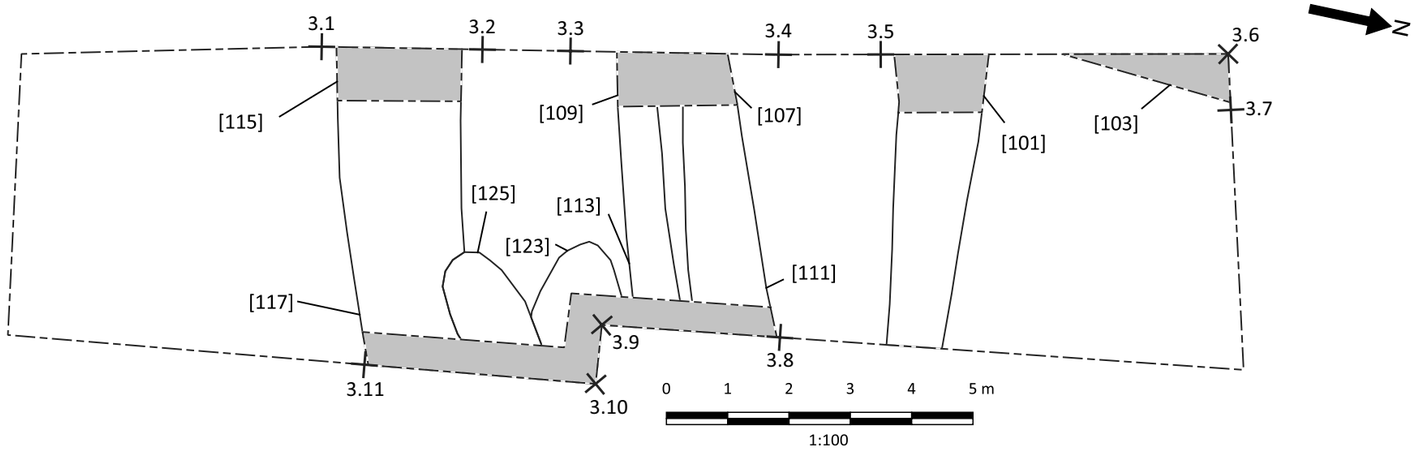
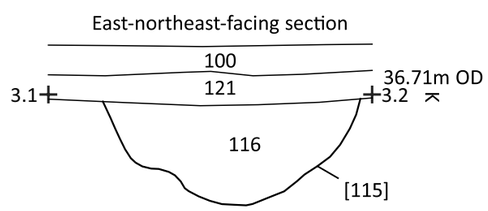
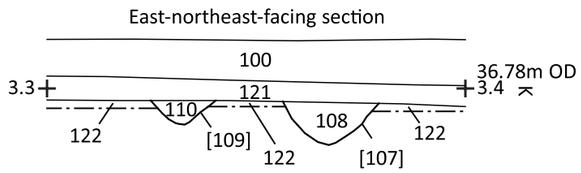
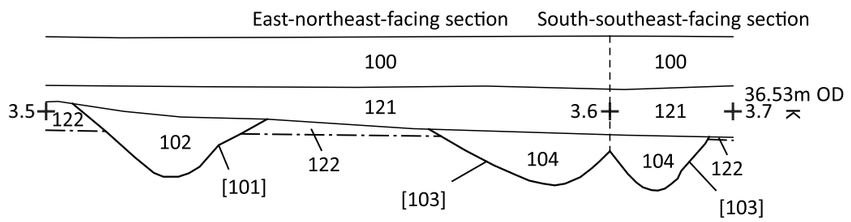
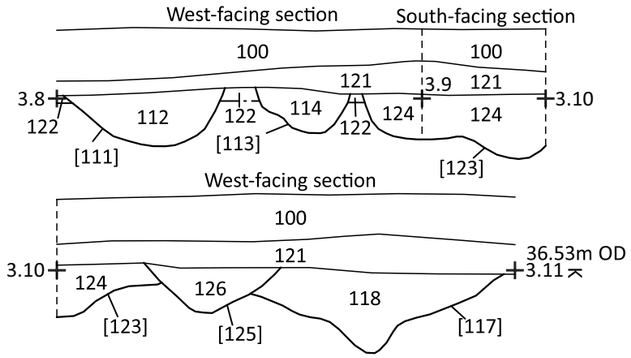
Figure 2: Archaeological features superimposed over geophysical survey

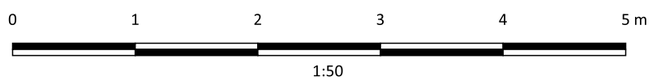












Site Code	NDBF 23
Scale	1:100 and 1:50 @ A3
Drawn By	R Evershed
Date	26/07/2023

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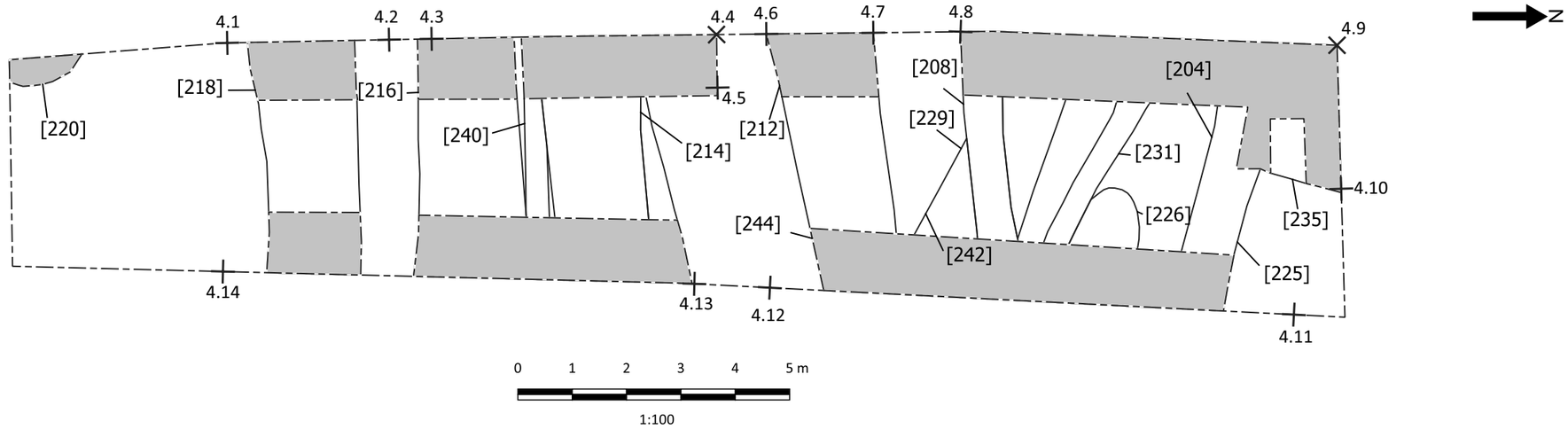
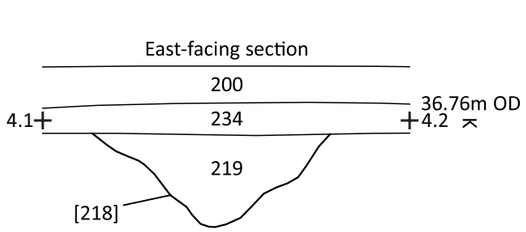
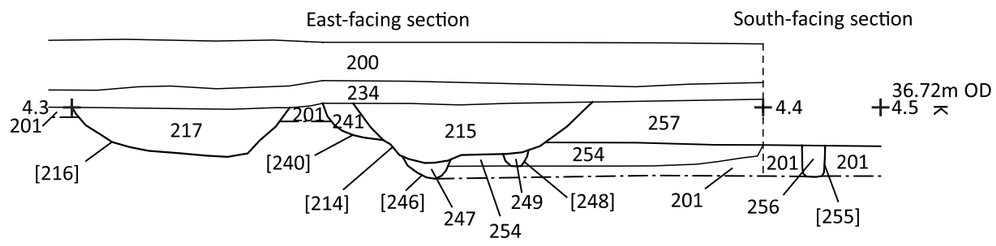
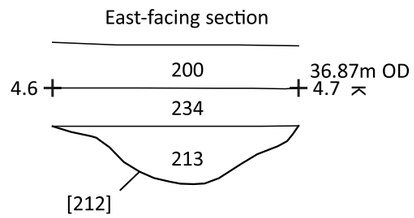
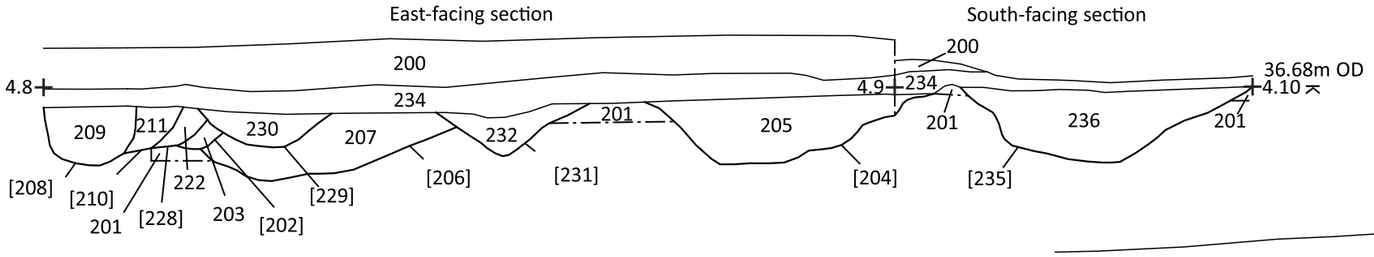
Figure 3: Trench 1 Plan and Sections

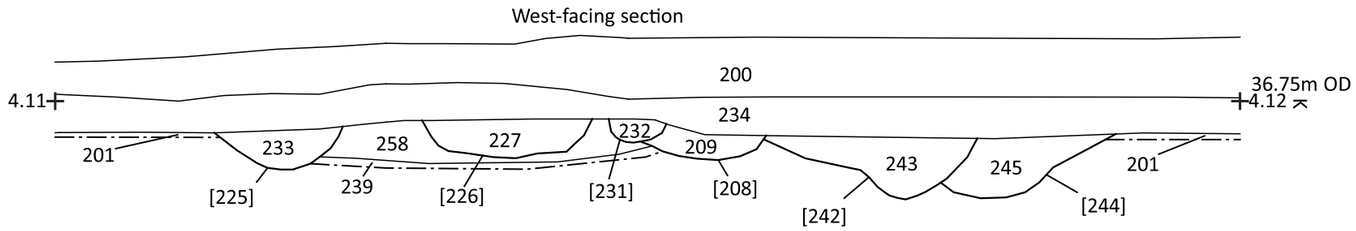


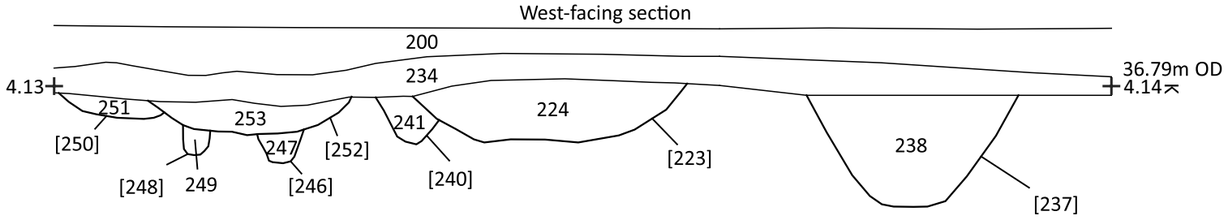












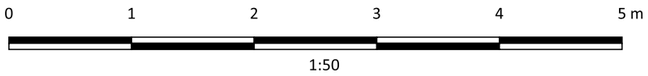


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Figure 4: Trench 2 Plan and Sections

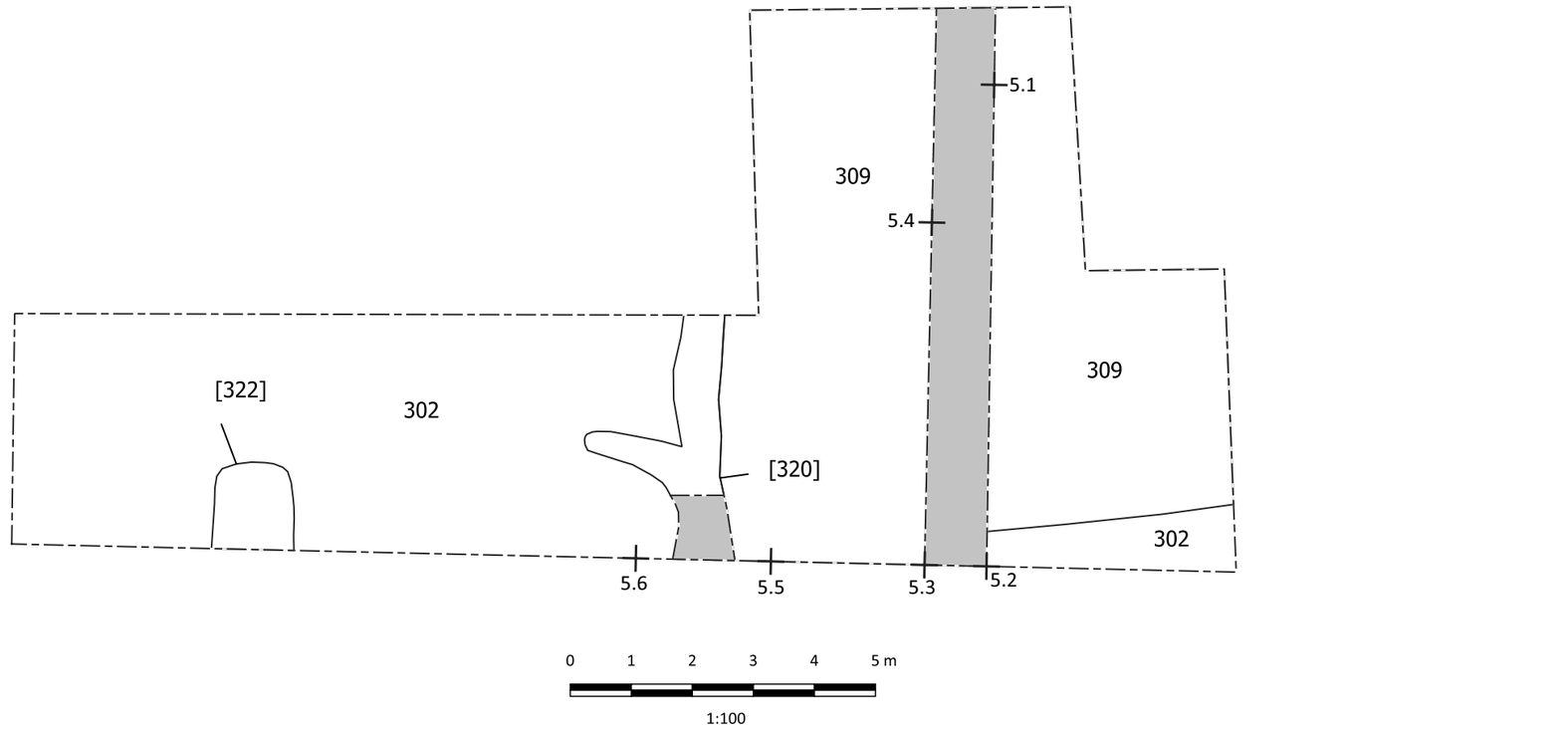

Figure 5: Trench 3 Plan and Sections

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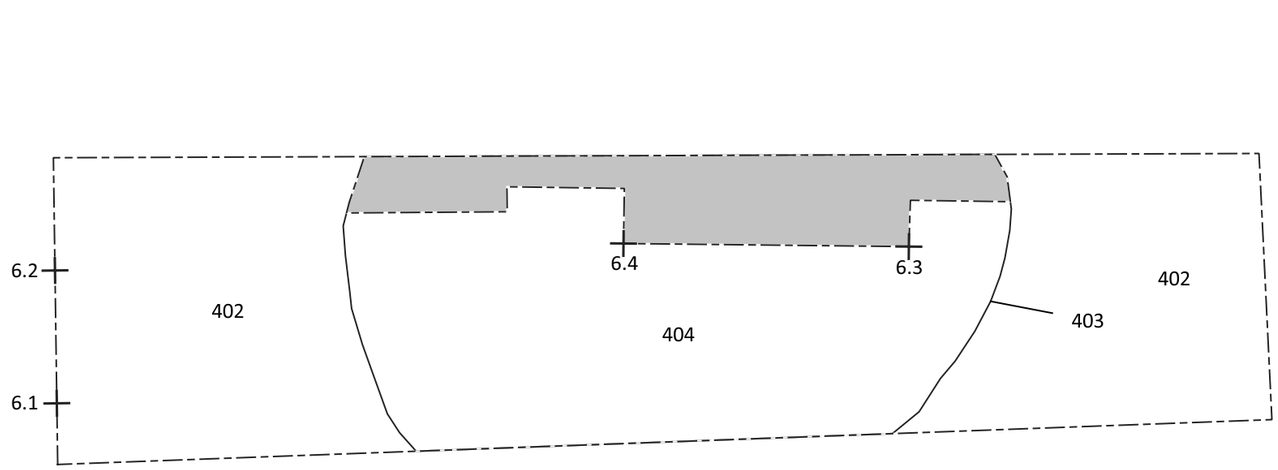
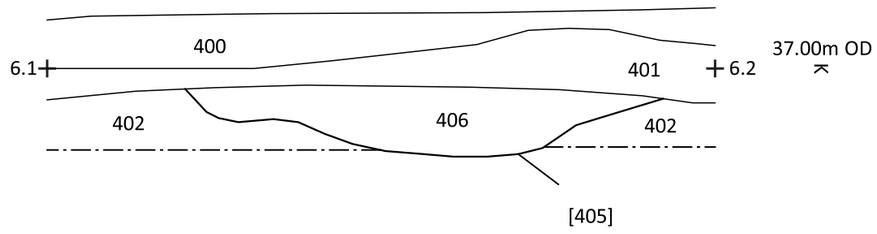
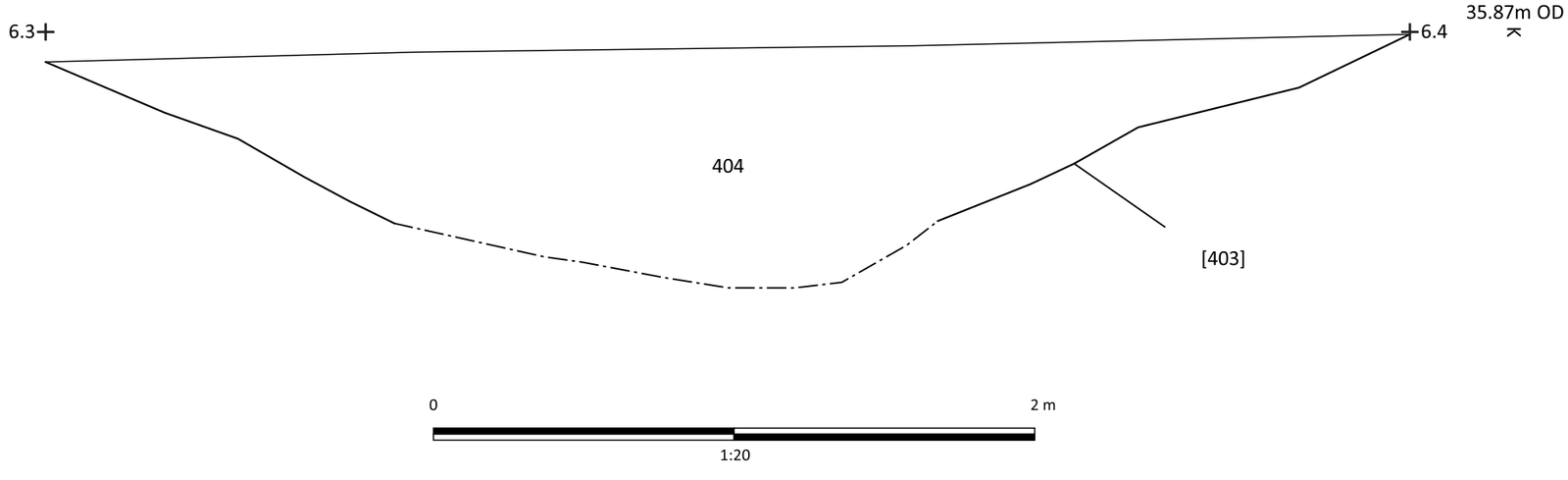


South-southeast-facing section



East-northeast-facing section



Site Code	NDBF 23
Scale	1:100 and 1:20 @ A3
Drawn By	R Evershed
Date	27/07/2023

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Figure 6: Trench 4 Plan and Sections

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