LAND ADJACENT TO WESTHORP, GREATWORTH, NORTHAMPTONSHIRE

Bronze Age cremation, Iron Age enclosure, Roman inhumation and ditch

Report on Archaeological Mitigation Programme

Prepared for: Watson & Cox Construction

SLR Ref: 428_07089_00001

Version No: Final
April 2018

BASIS OF REPORT

CONTENTS

DOCUMENT REFERENCES

TABLES

FIGURES

APPENDICES

Summary

This report details a programme of archaeological mitigation work undertaken on land adjacent to Westhorp, Greatworth, Northamptonshire in 2017. It has been prepared by SLR Consulting Ltd (SLR) on behalf of Watson & Cox Construction. The main results of this phase of investigation revealed a Bronze Age cremation dated by radiocarbon determination to 1391-1131 BC, a second possible cremation dated between the 8th – 5th centuries BC, and a series of Iron Age ditches and pits which may have formed part of an enclosure, associated with shell-tempered and grog-tempered pottery. During the Roman period a large ditch, with a smaller parallel feature probably contemporary to it, were found together with an inhumation burial lying between. Pottery of 2nd- 3rd century date was found in the ditch, and the skeleton was scientifically dated between AD236-386.

1.0 Introduction

1.1 Planning background

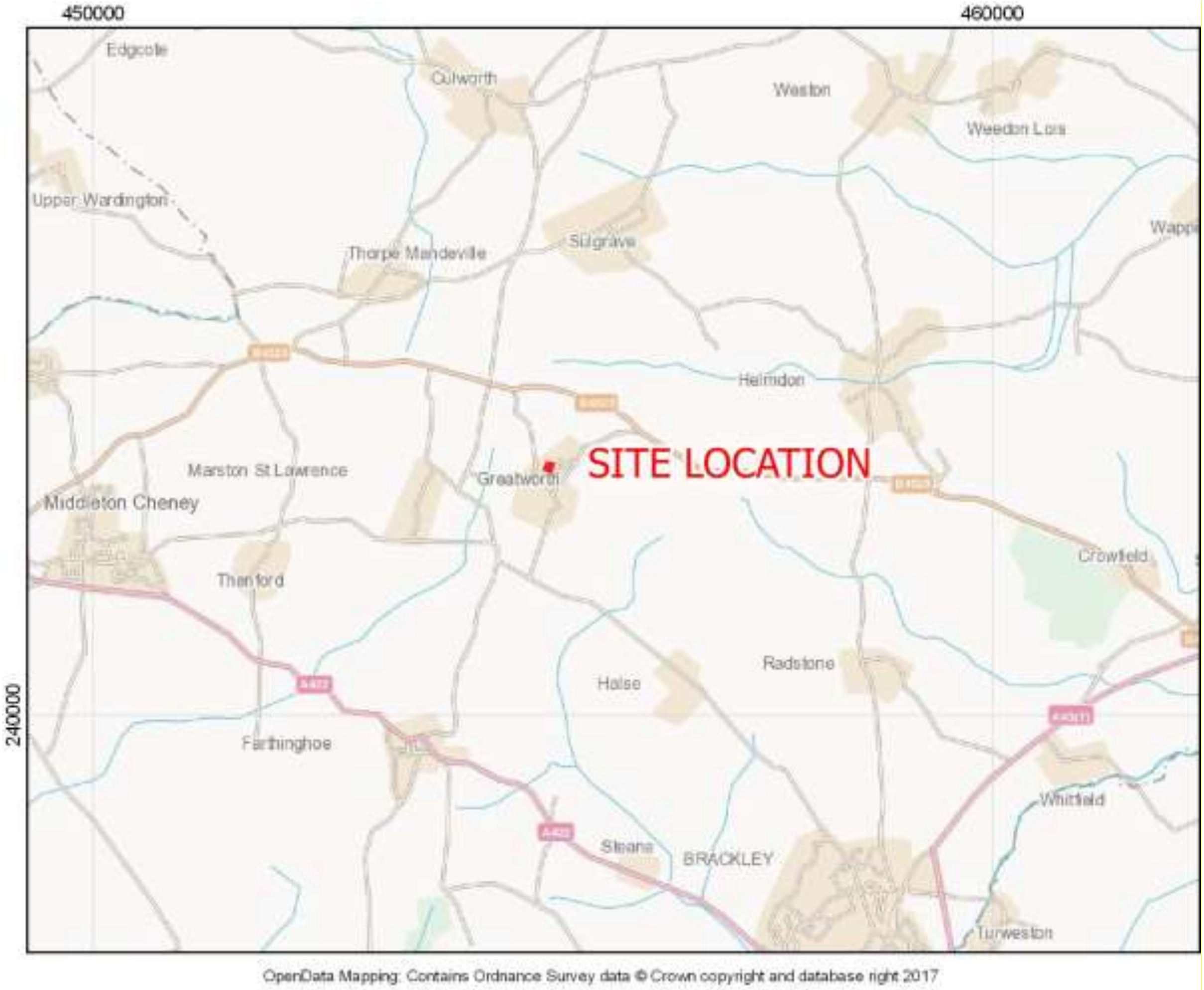
Grand Union Housing Group Ltd have been given planning permission (Ref: S/2015/0635/MAF) from South Northamptonshire Council to construct ten dwellings and to reconfigure the remaining area to include private gardens, communal landscaped areas, an access road and car parking. A condition of this permission was that a programme of archaeological evaluation be carried out as per a Written Scheme of Investigation (WSI) agreed by South Northamptonshire Council. This was carried out by Museum of London Archaeology in 2016 (MoLA 2016). Five ditches and a pit/ditch were identified in this phase of works and this led South Northamptonshire Council to require further works be carried out in the form of a ‘strip, map and sample’ exercise and a limited watching brief. This report documents the findings of these works.

1.2 Site description

The site is located on the western edge of Greatworth with agricultural fields to the west and north, and residential land to the east and south. The site is approximately 0.32 hectares and is roughly rectangular, orientated northeast to southwest (Figure 1).

The site has existed as agricultural farmland since at least 1883 (i.e. the date of the first available historical map). Residential development along Westhorp Road, to the south of the site, occurred in the 1970-80s. Peveril Road, Whitton Close and surrounding residential properties were developed to the east of the site around this time (Figure 2).

Figure 1: Site Location



2.0 Site Background

2.1 Geological and Topographic background

The site is situated at approximately 165m AOD and is relatively flat with a gentle (approximately 1m) slope to the south.

Glacial till at the site is recorded as brown silty clay and grey brown slightly sandy slightly gravelly clay. The gravel is recorded as limestone. In the north of the site, the glacial till comprises more granular deposits which may relate to the mapped Oadby Member. Glacial till is generally proven to depths between 0.7m and 1.8m.

The Rutland Formation (mudstone) underlays the majority of the site, with the Taynton Limestone Formation (limestone) mapped as present in the southernmost extent of the site[1]

[1] All geological information from GroundSure

2.2 Archaeological background

2.2.1 Pre-medieval

The only unequivocal record of prehistoric activity within the surrounding landscape is an area with unstratified pieces of worked flint recorded in the Northamptonshire HER as MNN18394, 370m to the south west of the site. This has led to the suggestion of prehistoric occupation locally (MNN 3442). The worked flint is not diagnostic, and therefore a wide date range of early Neolithic to late Bronze Age has been assigned to this asset.

A number of unstratified artefacts dating to the Roman period, including a bronze figure of an owl (MNN 116556) and scatters of pottery (MNN18302, MNN18392) have led to the suggestion of possible Romano-British settlements (MNN303, MNN304, MNN3438) all approximately 300m south or south east of the site.

2.2.2 Early medieval

A scatter of pottery sherds dating to the Saxon period (MNN116649) 400m to the south west of the site has led to the suggestion that there was a Romano-British to Saxon era settlement nearby. Near the area of the pottery scatter aerial photography has also recorded trackways and enclosures (MNN 3439). The area of pottery lies 280m to the west of the proposed development, with the area of the possible settlement being as close as 90m. A burial with associated metalwork and Saxon pottery was found during tree removal in St Peter’s churchyard (MNN18309), approximately 400m to the south east of the site. The relationship between the burial and finds is not clear.

Greatworth has an entry in the Domesday Book: ‘Of the Bishop of Bayeux’s fief, William holds two hides in Greatworth. There is land for five ploughs. In demesne is one [plough] and two slaves; and ten villans and five bordars with three ploughs. It was worth £4; now £3. Saewulf held it freely TRE.’ Although the Domesday Book was compiled after the conventional end of the Saxon period, it effectively records the landholding pattern at the end of the Saxon period. The reference to the landholder ‘William’ may refer to William Peverel, a favourite of William the Conqueror, listed as holding other nearby lands in the hundred. The record of Greatworth in the Domeday Book is recorded on Northamptonshire HER as MNN3397.

2.2.3 Medieval

Nearby cultural heritage assets dating to the medieval period either lie within the current area of Greatworth village or are closely associated with the historic core of the village.

St Peter’s Church (MNN105951, MNN8267), 400m to the south west has elements, including the chancel, dating to the 13th century, with the tower thought to date to the 14th century. The church has been modified in the 17th and 19th centuries. The church is a Grade II* listed building (DNN413).

The remains of ridge and furrow (MNN140092, MNN132536), evidence of medieval field systems, have been recorded to the west of the historic core of Greatworth: approximately 200 m to the southwest of the site. Other traces of agricultural activity included a paddock divided into a set of closes by low banks and scarps noted in post-war aerial photography (MNN18346). This area has now been completely built over. These features may also have been of post-medieval date.

A single unstratified find of possible medieval date, in the form of a copper alloy mount, probably originally attached to a leather article (MNN148671) is recorded approximately 200m to the north west of the site.

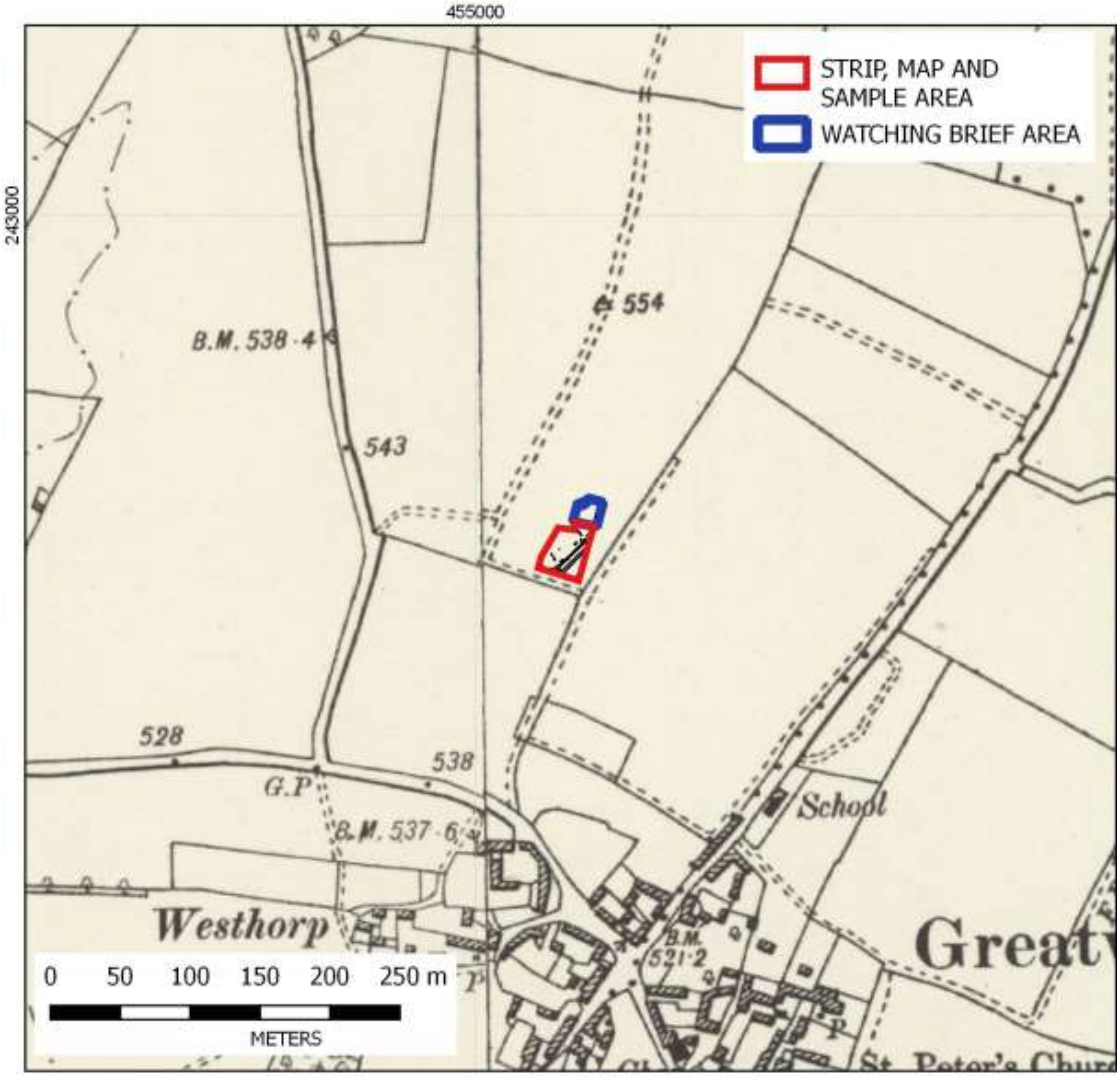
2.2.4 Post-medieval and modern periods

Post-medieval cultural heritage assets within the surrounding landscape primarily comprise 17th century headstones within the churchyard of St Peter’s and a number of domestic 17th and 18th century dwellings within Greatworth. A cluster of features dating from the 18th century surround Greatworth Manor, 500m to the south east. Although the current house at Greatworth Manor (MNN105962/DNN404) dates from the early 19th century, it is a replacement for an earlier house burnt down in 1793.

Nearly all of the modern heritage assets in the locality are houses located within the area of the historic core of Greatworth, the nearest part of which is 160 m to the southeast of the site. A number of boundary walls, an inn, chapel and a garage are also recorded. RAF Greatworth Wireless Transmission Station (MNN14564) lies 450 m to the north east of the site.

The agricultural nature of the land surrounding Greatworth is reflected in the presence of a small number of farmhouses and farm buildings (MNN161903-161905). The tithe map of 1845 shows the entire area as being enclosed by this date. By 1900, Greatworth village had yet to extend to the proximity of the site (Figure 2).

Figure 2: Location of stripped areas plotted on historic mapping (survey 1900, reproduced scale approximately 1:5000)



Base map from National Library of Scotland http://www.nls.uk/

2.2.5 Undated

There is one heritage asset within the study area that is not dated. This relates to a human burial. The burial was uncovered during house building. The skeleton was orientated approximately east-west, and does not appear to have been accompanied by grave goods (MNN 25258, MNN 6483). This may indicate a Christian burial, but this is not certain. This site is the closest record to the development area, being approximately 60 m east-north-east.

3.0 Aims, Objectives and Methodology

3.1 Aims

The aims of the investigation were:

- To elucidate the form, nature and relationship of the features identified as a result of the previous archaeological evaluation on the site;
- to provide information on the presence/absence, location and characteristics of archaeological remains at the site;
- to identify archaeological risks to the proposed scheme; and
- to discharge Conditions 8 and 18 of the planning permission for the proposed scheme.

3.2 Objectives

The objectives of the archaeological investigation were:

- to establish the date, character and extent of any other archaeological deposits and features associated with former activity within the proposed development area;
- to recover artefacts to assist in the development of type series within the region; and
- to recover palaeoenvironmental material to determine local environmental conditions and economic activity.

3.3 Fieldwork methodology

Excavation areas and features were surveyed by Digital Global Positioning System (DGPS) and tied into the British National Grid.

The work was undertaken in accordance with Written Scheme of Investigation agreed with the Northamptonshire County Council Archaeological Advisor (SLR 2017). Topsoil stripping was undertaken using a toothless ditching bucket. Stripping of topsoil for both, the strip, map and record area, and the watching brief was undertaken under archaeological supervision. Overburden was removed down to the first archaeologically significant deposits or the top of the natural deposited strata.

Archaeological features have been excavated and recorded to the extent necessary to achieve the objectives of the archaeological evaluation. The evaluation trenches have been recorded on proforma recording sheets, suitably scaled plans and sections, and digital photography. The areas of investigation and the location of archaeological features are shown in Drawing 1. Detailed plans, sections and accompanying photographs are incorporated as figures in the text.

Contexts have been numbered continuously (see Context List in Appendix 1).

Palaeoenvironmental samples were taken from those deposits considered to have potential, and in accordance with Historic England guidelines. These comprised bulk sediment samples of up to 40 litres.

The human skeletal remains were recorded *in situ*, lifted and wrapped and stored in dry conditions prior to laboratory examination.

All artefacts and ecofacts were collected and recorded stratigraphically. All artefacts were labelled, packed and stored in appropriate materials and conditions to ensure that no deterioration occurs. All artefact/ecofact processing and storage was carried out in accordance with the CIfA 2014 *Standard and Guidance for the collection, documentation, conservation and research of archaeological materials.*

3.4 Post-Excavation methodology

3.4.1 Artefacts

Ceramic finds were examined by eye. The assessment was undertaken by Alex Beeby of Archaeological Project Services. The full assessment report forms Appendix 2.

3.4.2 Bone and Environmental Samples

Animal bones were examined by eye and under suitable low-scale magnification. The assessment was undertaken by Andy Bates, SLR Consulting Ltd. The assessment report forms Appendix 3.

The human remains, and presumed human cremation remains, were also examined by eye and under suitable low-scale magnification. The assessment was undertaken by Kate Griffiths of Formation Archaeology. The assessment report forms Appendix 4.

The environmental samples processed were kept in dry conditions prior to being floated using a modified Ankara flotation machine with heavy residue 250µm-aperture meshes and sieves. After flotation was completed, heavy residues were left to dry at room temperature. The dry residue contents were screened to isolate any artefacts and ecofacts that did not float. The flots were also left to dry at room temperature before being placed in clean bags.

All the flots were examined using a zoom stereomicroscope at magnification between 4.5x and 40x. During this process, the abundance of organic archaeological remains such as charcoal, wood, bones, insects, bryozoans, ostracods and daphnia was recorded using a relative scale

All preserved seeds, fruits, pods, glumes and rachises were identified to the most specific taxa (family, genus, species) possible using reference books and a reference collection.

The full palaeoenvironmental assessment report by Julie-Anne Bouchard-Perron of Nottingham University forms Appendix 5.

3.4.3 Radiocarbon dating

Three samples, two of charred seed and one of human tooth were selected for radiocarbon dating. Dating was by AMS, the charred seed samples being pre-treated by alternating acid/alkali/acid washing to remove carbonates and allocthonous humic acic from the sample, and the human tooth sample being subject to collagen extraction = the extract forming the actual dating sample. A $\delta13$C relative to PDB-1 standard figure was also measured for each sample and the resulting correction applied to the radiocarbon dates when they were calibrated using the INTCAL 13 database. Radiocarbon dating was undertaken by BetaAnalytic. The radiocarbon dating certificates form Appendix 6.

4.0 Results

4.1 Introduction

The strip, map and sample (SMS) was carried out at the Site between 24th April and 5th May 2017. A watching brief was carried out on a further small area on the 29th August.

Plate 1: Stripping in progress, Greatworth village in view, facing south-southwest

Plate 2: Watching brief area after stripping

The SMS area was an irregular shape measuring 1005 square metres. The overburden, comprised 0.3m brown silt clay (1) which may have represented an imported topsoil or plough soil. This overlay the original topsoil (2) which comprised 0.4m yellow brown silt clay. These were removed to reveal the natural yellow clay subsoil (3) and archaeological features below (Drawing 1).

The majority of the archaeological features uncovered were found in the SMS area, with a single small feature (Context **67**) being found within the area of the watching brief. Across the area of the archaeological investigation a total of 25 discrete features were observed, the majority being single-fill features. Dates from artefactual evidence or samples taken from radiocarbon dating have been obtained for six of the features.

Plate 3: Stripped area facing south-southwest

4.2 Condition

The area has been in either agricultural or horticultural use since at least the 19th century, and the presence of medieval and post-medieval ceramics in the topsoil on the site suggests agricultural manuring back into the medieval period. Plough scrapes and field drains relating to recent agricultural activity were recorded during investigations, mostly aligned in parallel with the main north east to south west orientation of the main field boundary, and the observed agricultural features mostly do not impact the archaeological features, though in a few cases drains on different alignments have cut through archaeological features (see Drawing 1).

4.3 Features

The two largest features within the area of stripping were two approximately parallel ditches, oriented south west to north east. The more easterly of these ditches (Contexts **12/57**, filled by Contexts **55**, **56**, **11** and **10**) was between 1.57 and 1.70m in width. The more westerly ditch (Contexts **14/20**), filled by Contexts **13** and **19**) was between 1.04 and 1.15m in width. Drawing 1 has feature numbers labelled in brackets, whilst fills are listed in Appendix 1.

Plate 4: Context 12 (southeastern ditch), facing southwest

Plate 5: Context 14 (northwestern ditch), facing southwest.

Two other linear features ran approximately parallel to the ditches, but were much smaller in scale: Context **5** to the southeast of the ditches and Context **37** to the northwest of the ditches, both being less than a metre in width, and being shallow single fill gullies. Two other linear features ran perpendicular to the large ditches on the northwestern side of the ditches, one in the southwestern corner of the stripped area (Context **8**) and one toward the northeastern corner of the stripped area (Context **22**). Both were less than 0.5m in width, and neither appearing to connect with the nearest ditch.

Plate 6: Context 8 with previous evaluation trench, facing southeast

Plate 7: Context 22, facing northwest

Located between the two ditches was a human inhumation. The surviving apparent grave cut (Context **63**) was well defined except for the northern most corner, but very shallow. The apparent loss of the northern corner probably reflects the impact of ploughing on the site. The grave cut was oriented approximately southwest to northeast. No artefacts, either grave goods or personal items, were found with the skeleton. The inhumation is described in greater detail in 4.7.

Plate 8: Context 63 (grave cut) and associated inhumation, facing southwest

Three other cut features with similar dimensions to the grave cut of the inhumation have also been recorded. One of these, Context **65**, is close to the grave, also located between the ditches, and on the same orientation as Context **63**. To the immediate northwest of the ditches is Context **54**, which shares the orientation of the ditches and the grave cut. Farther to the northwest, and on a different orientation, approximately northwest to southeast, is another shallow cut feature, Context **44**. It could be suggested that these may be the surviving bases of other grave cuts with no surviving bone, reflecting the poor survival of the bone in the positively identified inhumation. These features, however, are deeper than the inhumation burial, and other features of similar character have produced fragmentary animal bone, making it less likely that these features are graves where skeletal material has completely dissolved.

Two possible cremation burials were also identified, one relatively isolated from other archaeological features in an area of field drains, Context **61**, and one towards the northern limit of the original stripped area, close to a number of other archaeological features, Context **59**. Both possible cremations were further examined and dates were acquired. The cremations are dealt with in more detail in 4.7.

Plate 9: Context 61, cremation burial, facing southwest

Plate 10: Context 59, cremation, facing west

A number of other features in the form of small pits were recorded (Contexts **7**, **16**, **24**, **26**, **28**, **35**, **46**, **51**, **67**). With the exception of a small amount of animal bone in Context **52**, the fill of Context **51**, there were no finds in these features. All these features had a single fill.

In addition to the longer linear features described above, a number of shallow gullies were recorded (Contexts **18**, **32**, **40**, **47**, **49**). All these cut features have a single fill, generally of material clearly derived from the local topsoil, and only a single fill (Context 17, fill of Context **18**) contained any finds, in the form of six sherds of pottery (see 6.4).

Figure 3: Feature Sections

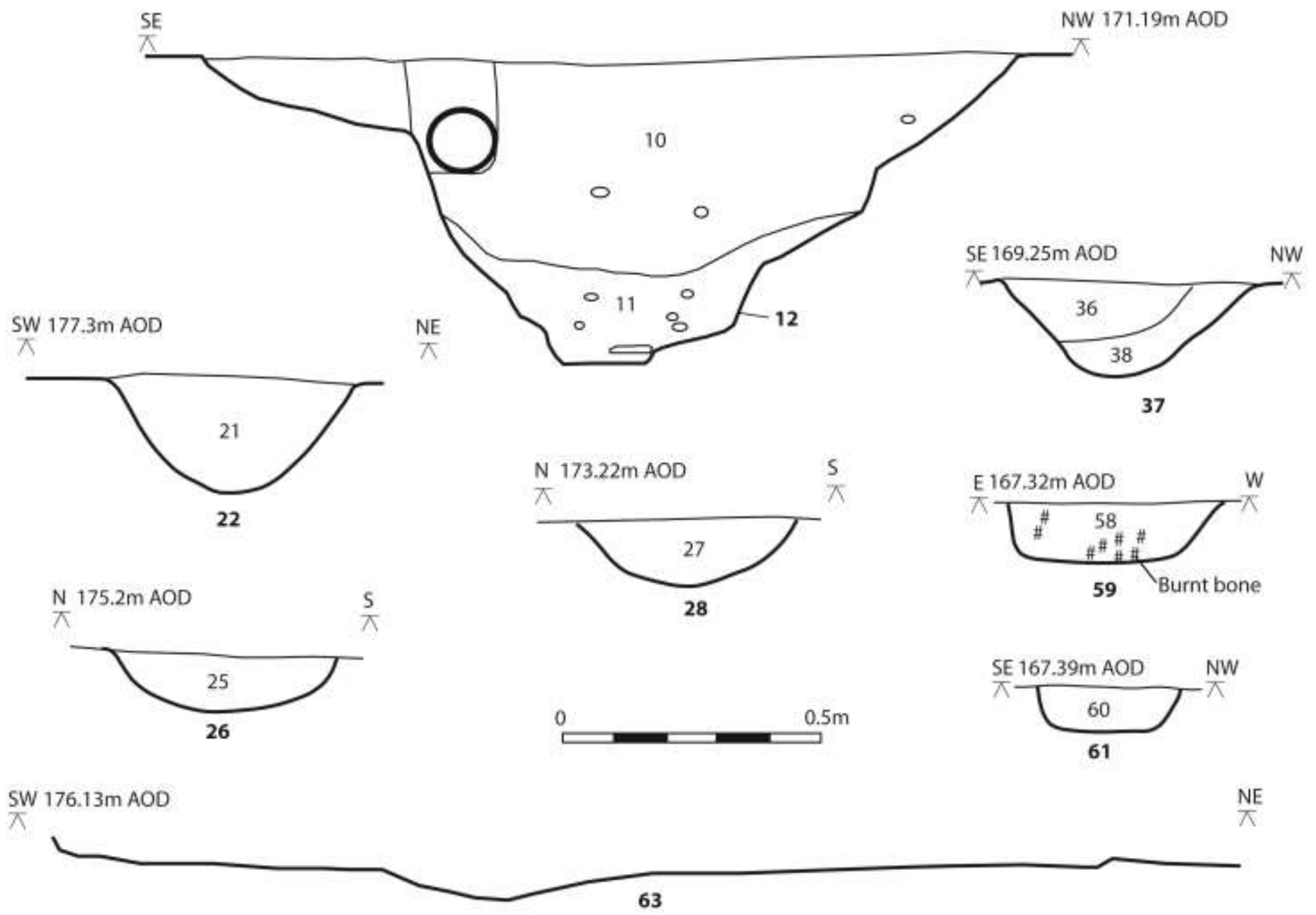


Figure 4: Feature Plans 1

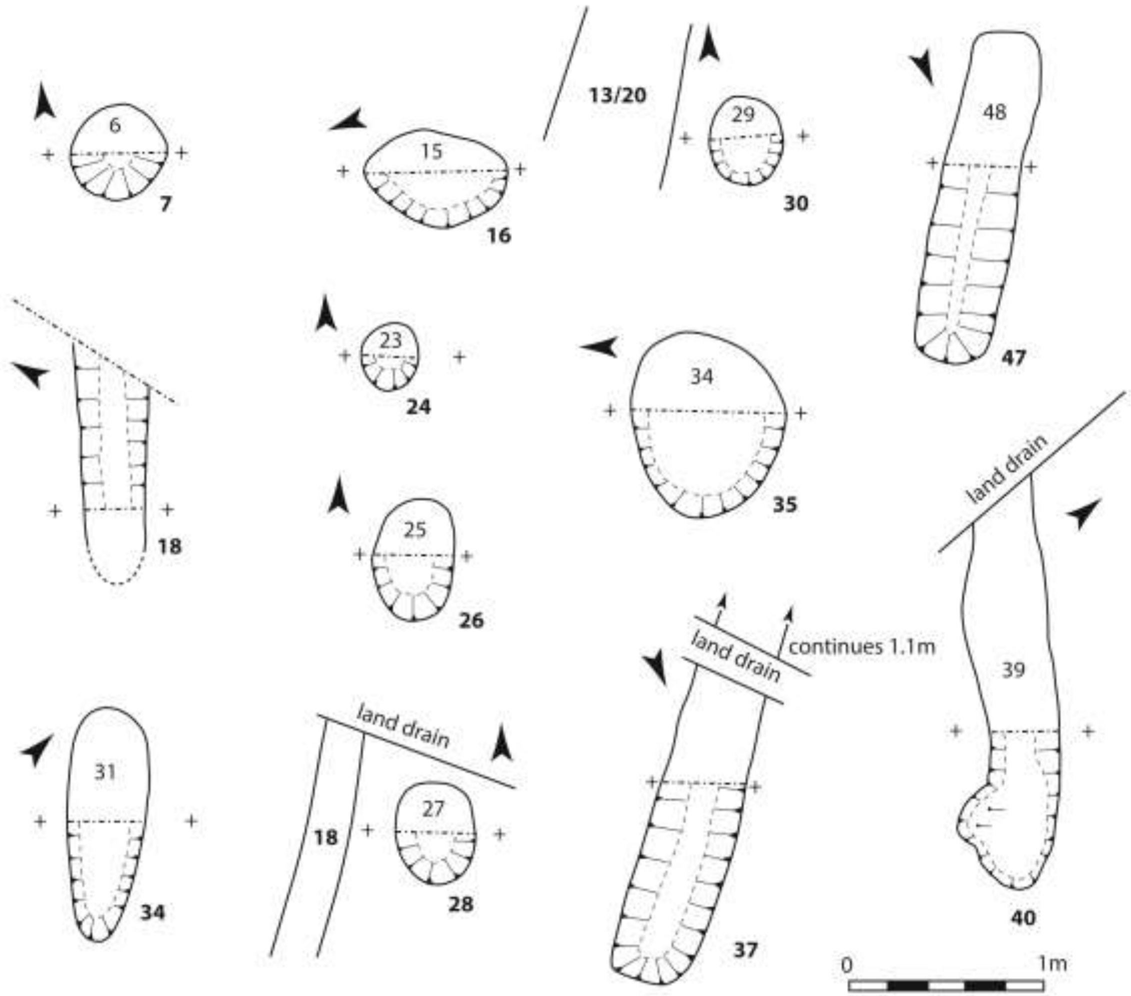


Figure 5: Feature Plans 2

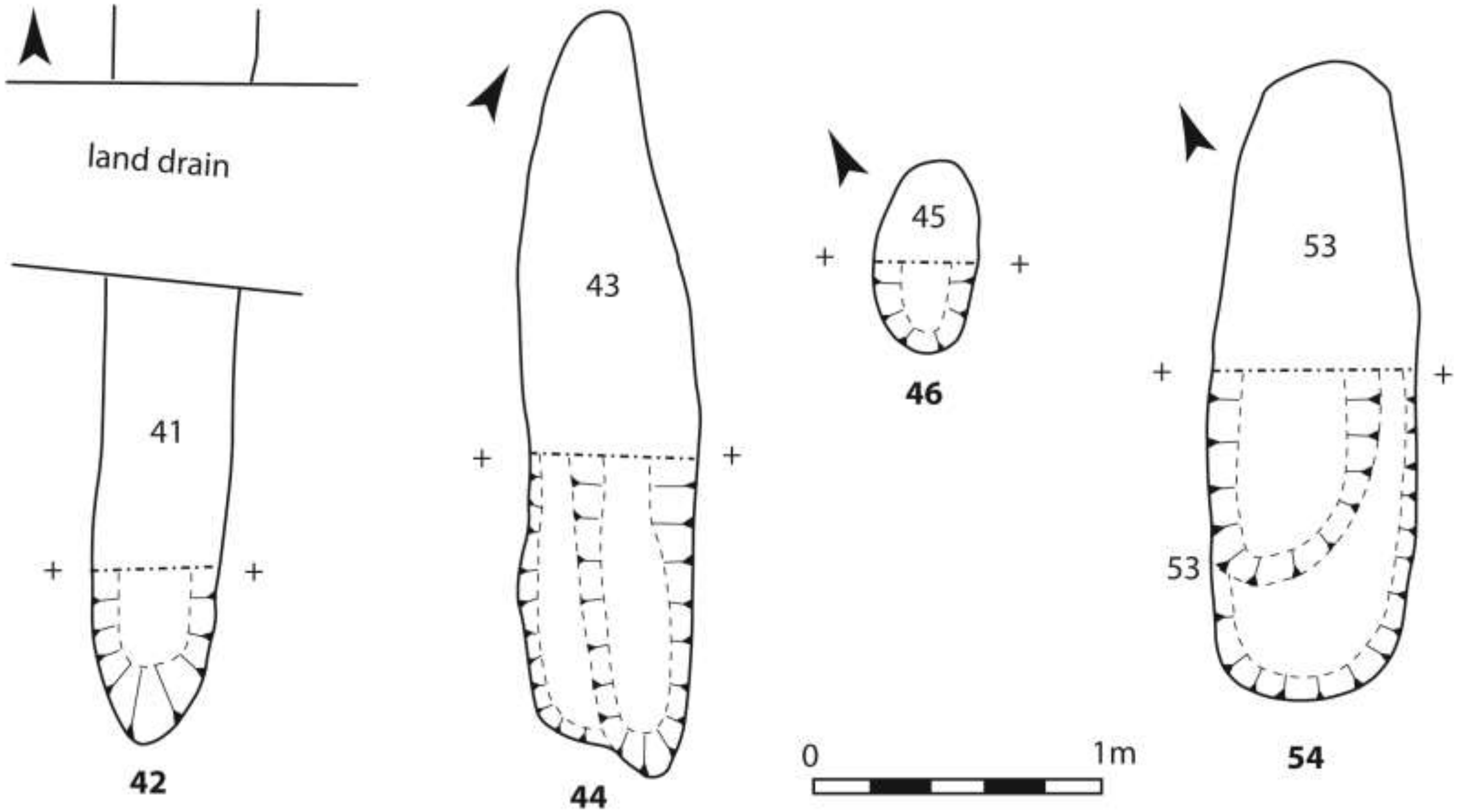
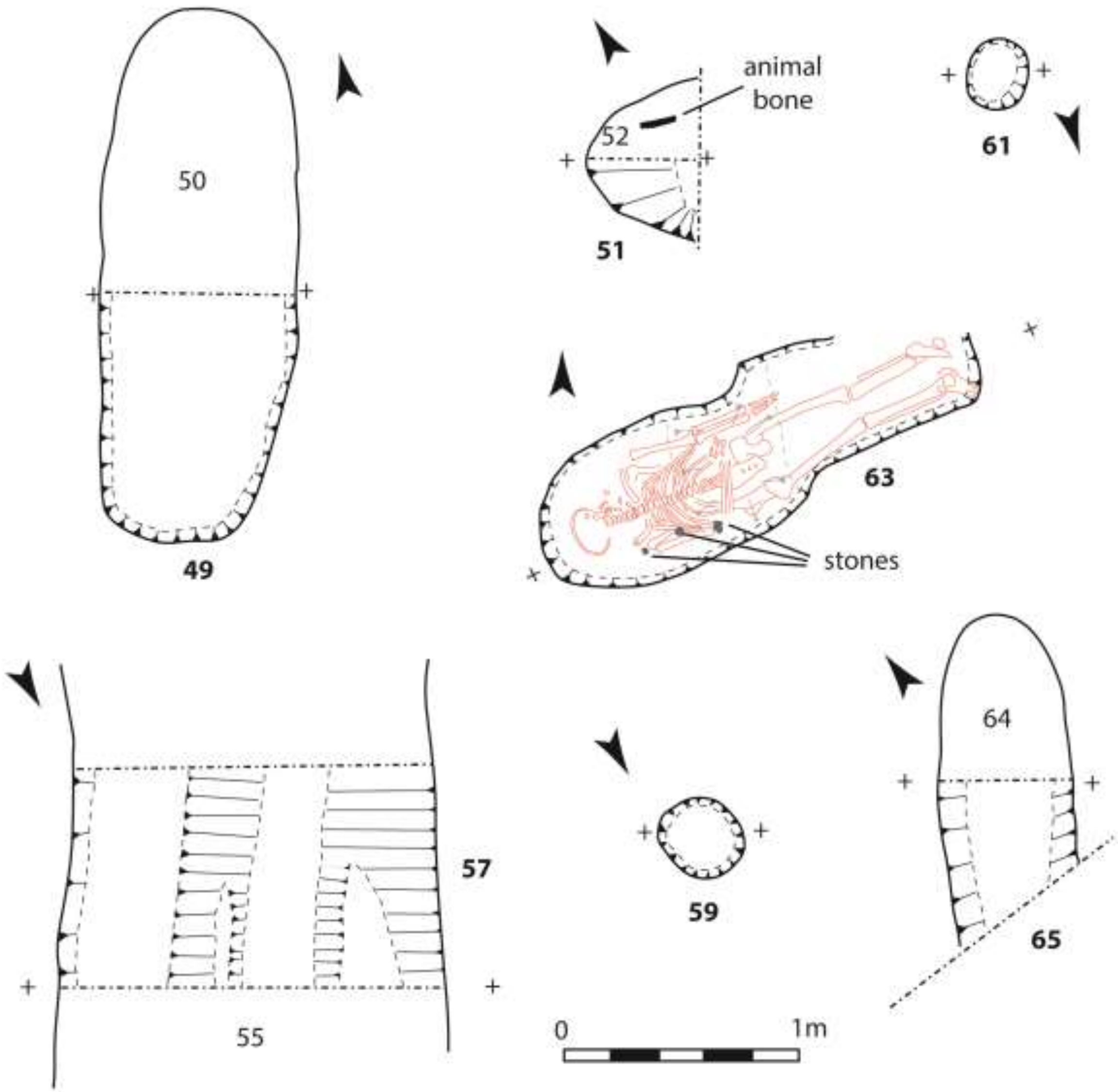


Figure 6: Feature Plans 3



4.4 Artefacts

Recovered artefacts were restricted to sherds of pottery and fragments of burnt clay.

Table 1: Pottery recovered from stratigraphic contexts.

Cut Context	Deposit Context	Ceramic Fabric	Form	Number of sherds
18	17	Iron Age grog tempered	Unknown	6
22	21	Iron Age grog tempered	Necked jar or bowl	1
37	36	Iron Age fine grog tempered	Carinated jar or bowl	2
57	56	Nene Valley colour coated ware	Beaker with barbotine decoration	4
61	60	Iron Age grog tempered	Unknown	2
61	60	Iron Age shell tempered	Unknown	4
67	66	Iron Age grog tempered	Unknown	2

Table 2: Pottery recovered from topsoil.

Ceramic Fabric	Form	Number of sherds
Iron Age grog tempered	Jar or bowl	1
Brown glazed earthernware	Bowl	1
Potterspury type ware	Open	1
Banbury Ware	Close	1

Table 3: Fired clay recovered from stratigraphic contexts.

Context	Ceramic Fabric	Number of fragments
60	Oxidised fired clay, sandy	1
60	Oxidised fired clay, fine	1

All the pottery was fragmentary and somewhat abraded. The majority of the pottery was recovered from ditches or gullies. The exception is the material recovered from the probable cremation fill (Context **60**) which included one of the largest number of pottery sherds of any of the features on the site, and was the only feature to contain more than one type of pottery fabric, as well as containing the only non-pottery fired clay on the site.

No finds were recovered from the inhumation burial, or from the other probable cremation burial on the site.

The pottery has been used to generate spot-dates, which are given below

4.5 Dating

4.5.1 Spot Dates

The pottery recovered from a number of contexts has been used to provide the spot dates in the table below.

Table 4: Spot dates.

Cut Context	Deposit Context	Date	Comment
N/A	1	16th-17th century AD	Topsoil
18	17	Late Iron Age	
22	21	Late 1st century BC to 1st Century AD	
37	36	Late 1st century BC to 1st Century AD	
57	56	Late 2nd to Mid 3rd Century AD	Southeastern of two main ditches
61	60	Iron Age	Probable cremation
61	66	Iron Age	

4.5.2 Radiocarbon Dating

Three radiocarbon dates were obtained, one from each of the possible cremations and one from the inhumation burial. The dates are presented in Table 5.

Table 5: Radiocarbon dates

Cut Context	Deposit Context	Material	Calibrated Date 95% probability	δ13C rel. VPDB-1	Laboratory Code
59	58	Charred seeds	1391-1337BC, 1322-1191BC, 1144-1131BC, 1177-1164BC	-21.6 ‰	Beta_484954
61	60	Charred seeds	774-482BC and 441-434BC	-24.3 ‰	Beta_484953
63	62	Tooth collagen	236-386AD	-19.8 ‰	Beta_486278

Each of the sample of charred seeds that was radiocarbon dated produced dates with a narrow range of variation (+/- 30 years), and in each case the dating sample was composed of multiple seeds. The narrow date range combined with the used of multiple seeds suggests that the dated material is probably contemporaneous with the formation of the features, rather than intrusive, and thus these dates are reliable.

4.6 Environmental

4.6.1 Charred Plant Remains

Samples from Contexts **36**, **58**, **60**, and **62** (two samples) were processed and examined for environmental remains. The samples from Context **62** were processed in order to recover any small bones from the skeleton and any associated small artefacts. Samples from Contexts **58** and **60**, the possible cremations, were selected as they appeared to be charcoal rich. The sample from Context **36** was selected as a comparison sample in order to check the general level for likely survival of environmental remains across the site.

The plant remains that were recovered were all charred material: the conditions on the site were not conducive to anoxic preservation. Contexts **36** and **62** produced no identifiable plant remains, though a few very small unidentifiable charcoal fragments were recovered.

Most of the material Context **58** yielded was small (approximately 5-10mm) fragments of oak (*Quercus* sp.), some of which was vitrified, indicating rapid high temperature combustion. One seed of bedstraw (*Galium* sp.) and two indeterminate seeds were also recovered. The paucity of seeds may well reflect the rapid and fairly complete level of combustion indicated by the vitrified oak charcoal.

Fragments of oak charcoal, including vitrified material were the most common components of the sample from Context **60**. Other wood charcoal fragments from also recovered, belonging to at least one species of diffuse porous tree taxon: these could not be more closely identified. A number of barley (*Hordeum* sp.) were identified in this sample, together with seeds of mallow (*Malva* sp.) and spikerush (*Eleocharis* sp.), the latter genera being wild plants, with spikerushes being associated with damp growing conditions.

The assemblages recovered from the samples are of insufficient size or quality to justify further analysis.

4.6.2 Animal Bone

A small assemblage of 103 animal bone fragments was recovered from four undated features. Of these fragments 10 were identified to species or a low order group. The full animal bone assessment report forms Appendix 3 and provides the number of individual specimens (NISP) by species and context.

The animal bone was generally in a good condition, with little erosion to the bone surface, but highly fragmented by predominantly old breaks. It is likely that a high percentage of unidentified fragments are shaft splinters of the identifiable material.

Finds of animal bone were restricted to Context **52**, the fill of a pit (Context **51**), indication a NISP of 61 and to the fills of the more southeasterly of the two large ditches (Context **12/57**), a few in the lower fill (Contexts **11** and **56**, NISPS 1 and 5 respectively) but mostly in the upper fill (Context **55**), with the NISP being 36. Where species could be identified, cattle was the most common (total NISP 5), with single individuals of pig and sheep/goat also being identified.

The epiphyseal fusion was recorded for three specimens of cattle bone, from which age estimates could be made. A single bone had butchery marks upon it, those of dismembering and filleting marks upon a pig tibia from Context **55**.

The bone was assessed having limited potential for further analysis.

4.7 Human Remains

4.7.1 Inhumation Burial

The skeleton from Grave **63** was poorly preserved, with the skeleton's right hand side generally being a little better preserved than the left side, which corresponds to the definition of the grave cut. Although individual skeletal elements were clearly observable during excavation, the majority of the bone fragmented badly when lifted.

Due to the state of preservation, it was not possible to apply accurate osteometrics or to use degenerative changes in joint surfaces to estimate age at death.

The skeleton has been tentatively identified as male on the basis of the robustness of the right femoral head, which survived in better condition, and the on basis of the general proportions of the skeleton. Other more normal indicators such as pelvic architecture or skull morphology could not be employed.

The best preserved element of the skeleton was the teeth. These were used to make an age estimation based on dental attrition, which placed the skeleton in the 17-25 year age range. A small carious lesion was observed in one of the molars.

In the course of obtaining a radiocarbon date, the δC13 and δN15 relative to the laboratory standard VPDB-1 content was measured. The δC13 relative to VPDB-1 is sufficiently low to suggest a small marine component to the diet of the individual. The δN15 measurement of +15 ‰ indicates a protein rich diet.

4.7.2 Cremation Burials

Two of the small pits (Contexts **59** and **61**) were identified as possible cremation burials. The identification was made on the basis of the relatively high content of charred material and the presence of burnt bone. The fill of each of the features were subject to processing as environmental samples (see 6.6.1 for the results of the assessment of the charred plant material). After processing, the sample from Context **58** was found not to contain any fragments of burnt bone of sufficient size to allow identification to species, and no further assessment was undertaken on this sample. Although larger fragments of burnt bone were found in the sample from Context **60**, these were also found not to be diagnostic in terms of species. The colouration of the bone from this sample has led to the tentative suggestion that this bone was incompletely oxidised, perhaps having been burnt at a temperature of approximately 600^{o}C. This is consistent with the slightly greater level of survival of charred seeds noted in the charred plant remains assessment.

The full report on the human remains forms Appendix 4.

5.0 Discussion

5.1 General comments

The majority of features are shallow, not directly dated, and there are no formal stratigraphic relationships between features, making a clear statement of the chronology and formation of the site difficult. In addition to Bronze Age, and Early Iron Age, cremations, it is apparent that there was significantly more human activity over the later Iron Age and into Romano-British times, with pottery and radiocarbon dates covering these periods. In particular one of the main ditches (Context **57**) contains pottery dated to the mid 2nd to mid 3rd century and the inhumation burial dates to 236-386AD. Many of these dated features and a number of the other features were clustered within the northern part of the initial strip map and record area though many of the associated features did not have morphological characteristics, or contain artefactual or environmental evidence, that were useful in evaluating their original function.

The two main ditches (contexts **14/20** and **12/57**) were also found in the course of the previous evaluation (MoLA 2016). Context **14/20** widens to the southwest: as recorded in the earlier evaluation (Trench 4) it formed two separate narrower ditches. The features noted in Trench 2 of the earlier evaluation had widths approximately matching those of contexts **14/20** and **12/57**, however their profiles and orientation did not match those recorded in the excavation reported here.

5.2 Ditches and possible enclosures

A number of linear features were revealed, some of which might have been empty graves, or more likely short stretches of gully. A large ditch ran northeast – southwest in the southern part of the site, with a parallel ditch to the west of it. At the northern end of the SMS area a series of small ditches form a right-angled feature, possibly an enclosure of Iron Age date (contexts **18**, **37** and **22**). The large Roman ditch (context **12/57**) and its parallel ditch (context **14/20**) respect the alignment of the earlier Iron Age enclosure, and a series of pits and short linear features also respect this general orientation (contexts **16**, **28**, **26**, **24**, **47**, **49**, **54**, **46**, and **7**) on the western side of the paired ditches. The remaining linear features (contexts **8**, **40**, **44**, **32** and **35**) correspond to the northwest – southeast return on the Iron Age enclosure (context **22**). All of this strongly suggests a planned element to organization of the landscape at the site. Taken as a pair, the largest ditches (Contexts 12/57 and 14/20) may delineate a trackway. Such a trackway would run approximately parallel with the footpath that runs along the eastern boundary of the site, and which can be seen on the historic mapping. It is reasonable to speculate that this indicates a degree of continuity in the landscape, with the current footpath migrating slightly to the east over time (Figure 2).

5.3 Burial rituals

The single Middle Bronze Age date pertains to one of the cremations (Context **58**). This feature is located in a relatively dense area with archaeological features, these are either undated or date to the later Iron Age or early Romano-British periods. The functionally similar features, i.e. the other cremation (Early to Mid Iron Age) and the inhumation (Romano-British) are situated some distance away (27+ m).

Although the presence of three burials with widely differing dates may be an example of long term continuity of the area for burial practice, it is difficult to place the single burial from each period in context: cremation burials without urns are known from the Middle Bronze Age in the East Midlands, but generally seem to occur in cemeteries (Clay 2006), Early Iron Age burials of any type have been noted as rare (Willis 2006), and so both of these burials seem somewhat anomalous.

By contrast, an apparently isolated rural Romano-British inhumation appears to be common across the East Midlands (Taylor 2006). The lower fill of the southeastern ditch (Context **56**) contains ceramic dating to the mid 2nd to mid 3rd century AD, which, particularly allowing for a degree of residuality for the ceramic, would suggest that the ditch would have been a feature of the landscape when the inhumation burial was deposited. Locations of burial in or near the edge of a rural enclosure forms part of a pattern of burials noted across England (Pearce 1999). This may indicate that the ditches originally formed part of a rural enclosure or settlement, although whether that would have lain to the southeast of the ditches, in the area of the current settlement of Greatworth, or whether to the northwest is uncertain. The quantities of bone fragments recovered from the southeastern ditch and the adjacent pit (Context **51**) may relate either to dumping of domestic refuse or the remains of ritual or funerary feasting associated with the nearby inhumation: in the absence of other evidence, particularly relating to possible structures, these two possibilities cannot be distinguished. The nearest previous discovery of an inhumation was approximately 80m east-north-east of the stripped area (SLR 2015). This was undated, orientated east to west and appeared to have no grave goods. This combination of lack of grave goods and orientation could be taken to indicate a Christian burial, though the lack of grave goods has, however, a parallel with the burial reported here. In the absence of more detailed evidence on the previously discovered burial it is not possible to determine the cultural or religious affiliation of the previous burial and thus its relationship with the Romano-British burial under consideration here.

5.4 Osteological evidence

Although the skeleton was too poorly preserved to allow detailed osteological or palaeopathological analysis, the individual has been tentatively sexed as male and assigned an age range of 17-25 years, and a carious lesion in one of the molars has been identified. The isotope analysis undertaken as part of the radiocarbon dating of the skeleton has also produced evidence concerning diet. As noted above, the isotope signal identified some marine input to the diet, and indicated a high protein diet. Although the diet of the Roman non-elite has long been believed to be a diet with little input of animal foods, analysis of skeletons from a number of Roman sites in Britain containing individuals thought to come from a range of social backgrounds indicates that some marine input and considerably more protein than is consistent with a low animal product intake appears to have been normal in Romano-British populations (Cummings 2008). The δC13 measurement for the Greatworth skeleton is within the normal range of variation for the sampled populations, though in the upper half for marine food intake. Although the normal range for δN15 in the sampled populations indicates a considerable intake of animal foods, the measurement for the Greatworth skeleton is still unusually high, potentially indicating high protein intake.

5.5 Conclusions

The programme of AMS radiocarbon dating of the inhumation burial and the consequent isotope analyses has meant that the investigations at Greatworth have contributed, albeit in limited fashion, to Research Objective 5C (application of scientific dating techniques to Roman period sites) and Research Objective 5D (application of scientific analysis to human remains).

6.0 References

Clay, P., 2006 'The Neolithic and Early to Middle Bronze Age.', in ed. Cooper, N. *The Archaeology of East Midlands: An Archaeological Resource Assessment and Research Agenda* Leicester Archaeology Monographs No. 13, University of Leicester, Leicester.

Cummings, C. 2008 'Meat Consumption in Roman Britain: The Evidence from Stable Isotopes'. In eds. Dreissen, M., Heeren, S., Hendriks, J, Kemmers, F. and Visser, R. *TRAC 2008: Proceedings of the Eightheenth Annual Theoretical Roman Archaeology Conference* Oxbow Books, Oxford.

MoLA, 2016, *Trial trench evaluation on land at Westhorp, Greatworth, Northamptonshire* Rport No: 16/168

Pearce, J. 1999, 'The Dispersed Dead: Preliminary Observations on Burial and Settlement Space in Rural Roman Britain'. In eds. Baker, P., Forcey, C., Jundi, S., and Witcher, R. *TRAC 98: Proceedings of the Eighth Annual Theoretical Roman Archaeology Conference* Oxbow Books, Oxford.

SLR 2015 *Land Adjacent to Westhorp, Greatworth, Northamptonshire, OX17, Archaeological Written Scheme of Investigation.*SLR Ref: 402-03847-00004.

SLR 2017 *Land Adjacent to Westhorp, Greatworth, Northamptonshire, OX17, Archaeological Written Scheme of Investigation.* SLR Ref: 428.07089.00001

Taylor, J., 2006 'The Roman Period.', in ed. Cooper, N. *The Archaeology of East Midlands: An Archaeological Resource Assessment and Research Agenda* Leicester Archaeology Monographs No. 13, University of Leicester, Leicester.

Willis, S., 2006 'The Later Bronze Age and Iron Age.', in ed. Cooper, N. *The Archaeology of East Midlands: An Archaeological Resource Assessment and Research Agenda* Leicester Archaeology Monographs No. 13, University of Leicester, Leicester.

APPENDIX 01

Context Register

Context	Fill of	Length (m)	Width (m)	Depth (m)	Description	Interpretation
1	N/A	N/A	N/A	0.3	Brown Silt Clay	Imported topsoil
2	N/A	N/A	N/A	0.4	Dark yellow brown silt clay	Topsoil
3	N/A	N/A	N/A	N/A	Yellow Clay	Natural Subsoil
4	5	7.7+	0.85	0.2	Dark yellow brown silt clay	Upper fill of Ditch 1. Same as 10
5	N/A	7.7+	0.85	0.2	NE-SW orientated gully, 40-50 deg sides, concave base	Cut of gully, runs parallel with larger ditches
6	7	0.5	0.5	0.1	Firm yellow brown silt clay	Fill of pit
7	N/A	0.5	0.5	0.1	Circular, 30-40 degree sides, concave base	Cut of pit
8	N/A	5.2+	0.43	0.11	Linear, gradual sloping sides to rounded base	Cut of gully
9	8	5.2+	0.43	0.11	Yellow brown silt clay	Fill of gully. Derivative of surrounding natural subsoil
10	12		1.57	0.42	Firm red silt clay	Secondary fill of ditch.
11	12		0.8	0.18	Firm yellow grey silty clay	Primary fill of ditch
12	N/A		1.57	0.59	Linear, 50-70 deg stepped sides, flat base	Cut of Ditch (Ditch 1)
13	14		1.04	0.27	Firm yellow grey silty clay	Fill of ditch
14	N/A		1.04	0.27	Linear, 35 deg sides, rounded base	Cut of ditch (Ditch 2)
15	16	0.73	0.54	0.14	Yellow grey silt clay	Alluvial fill of pit
16	N/A	0.73	0.54	0.14	Oval, 45 deg sides, flat base	Cut of pit
17	18	1.1	0.38	0.12	Firm grey brown silt clay	Fill of gully
18	N/A	1.1	0.38	0.12	Linear, 40-45 deg sides, concave base	Cut of gully
19	20		1.15	0.28	Firm red brown silt clay	Primary fill of ditch
20	N/A		1.15	0.32	Linear, stepped sides, flat base	Cut of ditch (Ditch 2)
21	22	8.1+	0.47	0.23	Firm red brown silt clay	Fill of gully
22	N/A	8.1+	0.47	0.23	Linear, steep (60-70 deg) sides, concave base	Cut of gully
23	24	0.38	0.3	0.6	Firm dark yellow brown silt clay	Fill of pit

Context	Fill of	Length (m)	Width (m)	Depth (m)	Description	Interpretation
24	N/A	0.38	0.3	0.6	Circular, gradual (30 deg) sides, concave base	Cut of pit
25	26	0.62	0.44	0.11	Firm grey brown silt clay	Fill of pit/posthole
26	N/A	0.62	0.44	0.11	Oval, gradual (30-40deg) sloping sides, flat base	Cut of pit/posthole
27	28	0.6	0.44	0.12	Firm grey brown silt clay	Fill of pit/posthole
28	N/A	0.6	0.44	0.12	Oval, gradual (30-40deg) sloping sidesm, flat base	Cut of pit/posthole
29	30	0.42	0.42	0.05	Firm grey silty clay	Fill of pit/posthole
30	N/A	0.42	0.42	0.05	Circular, gradual (30 deg) sides, flat base	Cut of pit/posthole
31	32	1.2	0.4	0.07	Red brown silt clay	Fill of pit/tree bole
32	N/A	1.2	0.4	0.07	Oval, gradual (30-40deg) sloping sides, concave base	Cut of pit/tree bole
33	20		0.33	0.04	Firm yellow grey silt clay	Fill of ditch, derivative of natural subsoil
34	35	0.95	0.8	0.2	Firm red brown silt clay	Fill of possible pit
35	N/A	0.95	0.8	0.2	Sub circular, steep (50-60deg) sides, flat base	Cut of possible pit
36	37	4	0.37	0.13	Brown grey silt clay	Secondary fill of shallow gully
37	N/A	4	0.37	0.36	Linear, 45 deg sides, rounded base	Cut of gully
38	37	4	0.53	0.36	Firm yellow grey silt clay	Primary fill of gully
39	40	2.1	0.32	0.1	Firm grey brown silt clay	Fill of gully
40	N/A	2.1	0.32	0.1	Linear, gradual (30-40 deg) sloping sides, uneven base	Cut of gully
41	42	2.6+	0.45	0.09	Firm grey brown silt clay	Fill of gully
42	N/A	2.6+	0.45	0.09	Linear, gradual (30-40 deg) sloping sides, uneven base	Cut of gully
43	44	2.7	0.6	0.14	Firm grey brown silt clay	Fill of gully
44	N/A	2.7	0.6	0.14	Linear, steep (40-50 deg) sides, irregular base	Cut of gully
45	46	0.64	0.34	0.12	Firm grey brown silt clay	Fill of pit
46	N/A	0.64	0.34	0.12	Oval, v steep (60 deg) sides,	Cut of pit

Context	Fill of	Length (m)	Width (m)	Depth (m)	Description	Interpretation
					concave base	
47	N/A	1.55	0.41	0.08	Linear, steep (45 to 60 deg) sides, flat base	Cut of gully
48	47	1.55	0.41	0.08	Yellow grey silt clay	Fill of gully
49	N/A	2.6	0.91	0.04	Linear, steep (45 deg) sides, flat abse	Cut of gully
50	49	2.6	0.91	0.04	Light grey silt clay	Fill of gully
51	N/A	0.6	0.5	0.12	Half oval, sides 20 deg at west, 45 deg at east, concave base	Cut of pit
52	51	0.6	0.5	0.12	Grey brown silt clay	Fill of pit
53	54	2.2	0.72	0.15	Firm brown grey silt clay	Fill of pit/tree bole
54	N/A	2.2	0.72	0.15	Oval, gradual (30-40 deg) sides, uneven base	Cut of pit/tree bole
55	57		1.7	0.46	Firm yellow brown silt clay	Secondary fill of ditch
56	57		0.53	0.16	Firm yellow grey silt clay	Primary fill of ditch
57	N/A		1.7	0.62	Linear, very steep (60-80 deg) stepped sides, concave base	Cut of Ditch (Ditch 1)
58	59	0.38	0.38	0.12	Charcoal rich black silt clay, occasional burnt bone	Burnt fill of pit
59	N/A	0.38	0.38	0.12	Sub circular, near vertical sides, sloping base	Cut of pit
60	61	0.29	0.28	0.1	Black silt clay mixed with ash and burnt clay	Burnt fill of pit
61	N/A	0.29	0.28	0.1	Circular, near vertical sides, rounded base	Cut of pit
62	63	2.05	0.7	0.08	Firm yellow brown silt clay	Fill of grave cut
63	N/A	2.05	0.7	0.08	Sub oval/rectangle, varying sloping (30-60 deg) sides, concave base	Grave cut
64	65	1.3	0.6	0.31	Firm yellow brown silt clay	Fill of possible grave cut
65	N/A	1.3	0.6	0.31	Sub oval, steep (40-50 deg) sides, concave base	Possible grave cut
66	67	0.9	0.7	0.09	Firm grey brown clay silt	Fill of pit

Context	Fill of	Length (m)	Width (m)	Depth (m)	Description	Interpretation
67	N/A	0.9	0.7	0.09	Sub oval, gradual sloping sides, flat base	Cut of pit

APPENDIX 2

Finds Assessment

GREATWORTH - CERAMIC REPORT

IRON AGE AND ROMAN POTTERY

By Alex Beeby

Introduction

All the material was recorded at archive level in accordance with the guidelines laid out by Darling (2004). The pottery was recorded using the codes and system developed for the City of Lincoln Archaeological Unit (Darling and Precious, 2014). A total of 22 sherds from 7 vessels, weighing 66 grams was recovered from the site.

Methodology

The material was laid out and viewed in context order. Sherds were counted and weighed by individual vessel within each context. The pottery was examined visually and using x20 magnification. This information was then added to an Access database. An archive list of the pottery is included in Table 1 below.

Condition

The pottery is in a fragmentary and abraded state.

Results

Table 1, Roman Pottery Archive

Cxt	Cname	Full Name	Sub Fabric	Form	Decor	Alter	Comments	NoS	NoV	W(g)
1	IAGROG	Iron Age grog tempered		JAR OR BOWL	WM	ABR	BASE WITH FTM; SOAPY	1	1	24
1	ZDATE						L1BC-1AD			
17	IAGROG	Iron Age grog tempered		UNKNOWN		ABR	BSS; FAIRLY FINE; SOAPY	6	1	6
17	ZDATE						LIA			
21	IAGROGF	Iron Age fine grog tempered		NECKED JAR OR BOWL	WM OR WF		BS NECK; BURNISHED EXTRNALLY; SHORT NECKED VESSEL WITH CURVED RIM	1	1	3
21	ZDATE						L1BC-1AD			
36	IAGROGF	Iron Age fine grog tempered		CARINATED JAR OR BOWL		ABR	BSS; NECKED AND CARINATED; SOAPY; ES6	2	1	0
36	ZDATE						L1BC-1AD			
56	NVCC	Nene Valley colour coated ware		BEAKER WITH BARBOTINE DECORATION	BARB; ROUL	ABR	BSS; HUNT CUP?; FAIRLY LARGE VESSEL?	4	1	9
56	ZDATE						L2-M3C			

Cxt	Cname	Full Name	Sub Fabric	Form	Decor	Alter	Comments	NoS	NoV	W(g)
60	IAGROG	Iron Age grog tempered	MICA; SHELL ?	UNKNOWN	HM	LEACH ; ABR	BS; BURNT OUT CHAFF/ORGANICS?; ES2	2	1	13
60	IASH	Iron Age shell tempered		UNKNOWN		SOOT ED OBRE AK; ABR; LEACH	BSS	4	1	7
60	DATE						IRON AGE			
66	IAGROG	Iron Age grog tempered	MICA	UNKNOWN		ABR	BSS	2	1	4
66	DATE						IRON AGE			
							Total	**22**	**7**	**66**

Provenance
Pottery was recovered from gully fills (17) within [18], (21) in [22], (36) within [37] as well as ditch fill (56) in [57] and pit fills (60) in [61] and (66) in [67]. A single sherd was also recovered from the topsoil (1).

Range
The bulk of the pottery is grog tempered in the local later Iron Age tradition and the assemblage includes both handmade and wheelmade vessel types. A necked jar or bowl from gully [21] and a carinated jar or bowl from gully [37] in a fine grog tempered fabric (IAGROGF) fall within the typical range of 'Belgic' vessel styles commonly produced across the East Midlands and South Eastern England from around the later 1st century BC, until the mid to late 1st century AD . A piece of similar type and date, from a vessel with a fine, wheel turned footring, also came from the topsoil (1), whilst additional small fragments from a single vessel in a smooth and 'soapy' textured grog tempered fabric (IAGROG) also came from gully [18]..

Fragments in a shell tempered fabric (IASH) and pieces from a handmade vessel in a grog tempered ware (IAGROG) from pits [61] and ditch [057] are too abraded and fragmentary to be diagnostic, but a most likely also Iron Age in date, quite possibly contemporary with the Belgic type vessels mentioned above.

Sherds from a single vessel in Nene Valley colour coated ware (NVCC), from ditch [57], are typologically much later in date. This vessel is a barbotine decorated beaker dated to between the later 2nd and mid 3rd century AD.

Potential
The pottery should be retained as part of the site archive. The pieces are in stable condition and should pose no problems for long term storage. There is no potential for further work.

Summary
This pottery assemblage includes 'Iron Age tradition' and later Iron Age/conquest period Belgic style pottery types as well as single example of a much later, Roman dated vessel.

POST ROMAN POTTERY
By Alex Beeby

Introduction
All the material was recorded at archive level in accordance with the guidelines laid out in Slowikowski *et al.* (2001). The pottery codenames (Cname) are in accordance with the Post Roman county type series for

Northamptonshire (CTS), Blinkhorn (unpublished). An additional concordant code (Cname) for the Post Roman type series for Lincolnshire (Young et al, 2005) has also been recorded to allow the archive to be included within the Post Roman pottery database held by the Heritage Trust of Lincolnshire. A total of five sherds from four vessels, weighing 32 grams was recovered from the site.

Methodology
The material was laid out and viewed. Sherds were counted and weighed by individual vessel. The pottery was examined visually and using x20 magnification. This information was then added to an Access database. An archive list of the pottery is included in Table 2 below. The pottery ranges in date from the medieval to the post-medieval period.

Condition
The pottery is fragmentary but not overly abraded.

Results
Table 2, Post Roman Pottery Archive

Cxt	CTS Code	Cname	Full Name	Form	Part	Date	Comment	NoS	NoV	W(g)
1	F407	BERTH	Brown glazed earthenware	Bowl	BS	16th-17th	Potterspury?	1	4	4
1	F329	POTST	Potterspury type ware	Open	BS	15th-16th				
1	F329	POTST	Potterspury type ware	Closed	BS			1	1	5
1	F301	OX234	Banbury ware	Closed	BSS	11th-13th		2	1	2
							Total	**5**	**4**	**32**

Provenance
All of the pottery came from the topsoil (1).

Range
There are five sherds including pieces in medieval Banbury ware (F301/OX324), later medieval Potterspury ware (F329/POTST) and Brown glazed earthenware (F407/BERTH). These are common local types and may have been deposited during manuring activities.

Potential
There is no potential for further work. The sherds should be retained as part of the site archive and should pose no problems for long term storage.

FIRED CLAY
By Alex Beeby

Introduction
All the material was recorded at archive level in accordance with the guidelines laid out by the Archaeological Ceramic Building Materials Group (2002).

Methodology
The material was laid out and viewed. Fragments of fired clay were counted and weighed within each context. This information was then added to an Access database. An archive list of the fired clay is included in Table 3 below.

Condition
The fired clay is abraded and fragmentary.

Results

Table 3, Fired Clay Archive

Context	Class	Name	Fabric	Comment	Date	Fragments	W(g)
60	FCLAY	Fired Clay	Oxidised; fine sandy	Streaked/poorly mixed; abraded; no original surfaces	Undated	1	5
60	FCLAY	Fired Clay	Oxidised; fine	Abraded flake; area of rough surface - sooted?	Undated	1	2
					Total	**2**	**7**

Provenance
The fired clay was recovered from fill (60) within pit [61].

Range
There are two fragments of fired clay. The pieces are undiagnostic and undatable.

Potential
There is no potential for further work. The items should be retained as part of the site archive and should pose no problems for long term storage.

SPOT DATING

The dating in Table 4 is based on the evidence provided by the finds detailed above.

Table 4, Spot dates

Cxt	Date	Comments
1	16th-17th century	Topsoil
17	Late Iron Age	
21	Late 1st century BC to 1st century AD	
36	Late 1st century BC to 1st century AD	
56	Late 2nd to mid 3rd century AD	
60	Iron Age	
66	Iron Age	

ABBREVIATIONS

ACBMG	Archaeological Ceramic Building Materials Group
BS/S	Body sherd/s
CXT	Context
Decor	Decoration
HM	Handmade
NoS	Number of sherds
NoV	Number of vessels
W (g)	Weight (grams)
WM/WF	Wheelmade/Wheel finished

REFERENCES

~ 2002, *Minimum Standards for the Recovery, Analysis and Publication of Ceramic Building Material*, version 3.2 [internet]. Available at <http://www.tegula.freeserve.co.uk/acbmg/CBMGDE3.htm >

Blinkhorn, P., unpublished, *Northamptonshire Ceramic Type Series (CTS)*

Darling, M. J., 2004, 'Guidelines for the Archiving of Roman Pottery', *Journal of Roman Pottery Studies* 11, 67-74

Darling, M.J, & Precious, B.J., 2014, *A Corpus of Roman pottery from Lincoln* (Oxford)

Davey, P. J., 1981, Guidelines for the processing and publication of clay pipes from excavations, *Medieval and Later Pottery in Wales* 4**,** 65-88

Friendship-Taylor, R.M, 1999, *Late La Tene Pottery of the Nene and Welland Valleys, Northamptonshire*. BAR British Series 280

Schmid, E, 1972 *Atlas of Animal Bones for Prehistorians, Archaeologists and Quaternary Geologists* (Amsterdam, London, New York: Elsevier)

Slowikowski, A. M., Nenk, B., and Pearce, J., 2001, *Minimum Standards for the Processing, Recording, Analysis and Publication of Post-Roman Ceramics*, Medieval Pottery Research Group Occasional Paper 2

Young, J., Vince, A.G. and Nailor, V., 2005, *A Corpus of Saxon and Medieval Pottery from Lincoln* (Oxford)

APPENDIX 3

Animal Bone Assessment

1.0 GREATWORTH ANIMAL BONE ASSESSMENT

1.1 Introduction and Methodology

A small assemblage of 103 animal bone fragments was recovered from four undated features. Of these fragments 10 were identified to species or a low order group. Identification was completed using reference material held by the author and reference to Halstead and Collins (1995).

1.2 Quantification and Condition:

The animal bone was generally in a good condition, with little erosion to the bone surface, but highly fragmented by predominantly old breaks. It is likely that a high percentage of unidentified fragments are shaft splinters of the identifiable material. Table 1 provides the number of individual specimens (NISP) by species and context.

Table 1 NISP by Species and Deposit (Feature)

Species	11 (≈56) (Ditch 12/57)	52 (Pit 51)	55 (Ditch 12/57)	56 (Ditch 12/57)	Total
Cattle	1	3	1		**5**
Pig			1		**1**
Sheep/Goat			1		**1**
Cattle/Red Deer				3	**3**
Large Mammal		13	13		**26**
Unidentified Mammal		45	20	2	**67**
Total	**1**	**61**	**36**	**5**	**103**

The epiphyseal fusion was recorded for three specimens of cattle bone, from which age estimates could be made. A single bone had butchery marks upon it, those of dismembering and filleting marks upon a pig tibia from deposit 55.

1.3 Potential

The bone has limited to no potential for further analysis. A full record of the material should be retained with the site archive, and assuming the features remain undated, the material maybe discarded.

1.4 Bibliography

Halstead, P, and Collins, P, 1995 Sheffield animal bone tutorial: Taxonomic identification of the principle limb bones of common European farmyard animals and deer: a multimedia tutorial, Archaeology Consortium, TL TP, University of Glasgow

Silver, IA, 1969 The ageing of domestic animals, in DR Brothwell and ES Higgs Science in Archaeology, 283 – 302, London

APPENDIX 4

Human Remains Assessment

Table of Contents

Table of Figures

Bibliography

Bass William M. 2005. *Human Osteology: a laboratory and field manual.* Missouri Archaeological Society.

Brothwell, D. R. 1981. *Digging up bones.* Cornell University Press.

IFA Papers No.7. 2004. *Guidelines to the Standards for Recording Human Remains.* M. Brickley & J. I. McKinley, Editors.

SLR. 2017. *Land adjacent to Greatworth, Northamptonshire OX17*. Unpublished.

Weiss, K. M. 1972. On the systematic bias in skeletal sexing. *American Journal of Physical Anthropology.* 37:239-250.

Greatworth Skeletal Assessment. December 2017.

Kate Griffiths. MA.

1.0 Introduction

1.1 Instruction

This assessment report has been undertaken by Kate Griffiths of Formation Archaeology Ltd. on behalf of SLR Consulting.

Figure 1. Site map of SMS area showing grave cut [63]. (SLR, 2017)

1.2 Site Information

The site, (NGR 445527 247060) is located on land on the western edge of Greatworth, Northamptonshire, OX17. The site measures approximately 0.32 hectares, is orientated northeast / southwest at a height of approximately 165m AOD. Grave cut [63] is located roughly central at the southwest perimeter of the site. (See figure 1 above).

1.3 The Assemblage

The assemblage consists of one articulated human skeleton and three bulk sample residues, one of which appears to be burnt.

1.4 Acknowledgements

The author would like to thank SLR Consulting for commissioning this assessment report.

2.0 Methods

Due to the condition of the bone it was only possible to apply minimal osteological techniques to the assemblage. It was not possible to observe pathologies, apply metrics or estimate stature, although a tentative attempt has been made to assign sex and estimate age at death of the articulated remains. A brief summary of the methods used follows below.

2.1 Assignment of sex and age estimation.

There are a variety of methods available to the osteologist to assign sex and estimate the age of archaeological human remains. However, as mentioned above, the condition of skeleton 01 meant only very basic visual observations could be applied. It was not possible to assign sex using morphological observations of the skull and pelvis, but in general the male skeleton is more robust than the female skeleton and this can particularly be observed in the femoral and humeral heads (Bass 2005: 19). There is, however, an overlap between the sexes in morphology (Brothwell 1981: 59), and due to the fragmentary nature of much archaeological material it has been suggested that there is a 12% bias in favour of the identification of males (Weiss 1972).

Similarly, there are various means of assessing age at death, and ideally a combination of criteria based on degenerative changes in joint surfaces and dental attrition (wear) are used. The recovered joint surfaces however, were not sufficiently well preserved for these methods and so age estimation has been based solely on the level of dental attrition observed. Opinions differ as to the efficacy of this method as different populations have different rates of attrition and this will also vary within populations due to factors such as diet and tooth structure (Bass 2005:18). However, Brothwell (1981) has observed that rates of wear in British populations do not show much variation from the Neolithic to the medieval periods, and this study uses his charts to assess the levels of tooth wear for the skeleton in this assemblage.

3.0 Osteological Analysis

3.1 Skeleton (01)

Figure 2. Skeleton 01. Looking NW.

3.1.1 Description

Skeleton (01) was the articulated remains of an adult in the supine position and orientated approximately NNE –SSW, located in grave cut [63]. The cranial remains consisted of the occipital bone, a partial mandible and nine teeth. The tooth assemblage consisted of an upper left first incisor and first premolar, a lower right canine and lower left first and second premolars and upper and lower right first and second molars. Both scapulae were recovered, as were the clavicles, although these totally fragmented on lifting. All the arm bones were present although in an extremely fragmented state, except for an intact portion of distal humerus shaft measuring 73.5 mm. A selection of fragmented carpals and phalanges were recovered from both hands, including the right hamate and two distal phalanges. The vertebral column and ribs were also highly fragmented and it was not possible to assess the sex of the individual from pelvic morphology, again due to the state of preservation. The lower long bones were in a similar state to those of the upper body although a reasonably complete right femoral head was recovered still articulated with the acetabulum. The bones of both feet were present although fragmented to an unrecognisable degree excepting the right talus which was recovered in a reasonably intact state.

3.1.2 Bone condition and recovery

The right side of skeleton (01) was generally better preserved than the left. The bone was, however, all highly eroded and although individual skeletal elements were clearly observable on excavation (See fig.2), the majority badly fragmented when lifted.

3.1.3 Determination of sex

Due to the state of preservation of the skeletal remains a tentative assignment of sex is based solely on the robustness of the right femoral head and talus. Due to the incomplete state of these skeletal elements it was not possible to apply accurate osteometrics, but given the size of the remaining portions this individual was probably male (See figure 3 below).

Figure 3. Right femoral head and talus.

3.1.4 Estimation of age

The age estimation of this individual is based on Brothwell's (1981) molar wear charts, and these place skeleton (01) in the 17-25 year age bracket. (See figure 3 below).

Figure 4. Lower right first and second molars showing dental wear and carious lesion.

3.1.5 Pathology

A small carious lesion was observed between the labial cusps of the lower right second molar. (See figure 4 above).

3.2 Bulk Sample Residues

3.2.1 Sample no. 2. Context no. (60)

This residue consisted of burnt bone fragments weighing a total of 5g, the largest of which measures 22.88 x 16.2 mm. The fragmentary state of the burnt bone means it is not possible to positively identify the remains as human or animal. The bluish grey colour, however, suggests that it was incompletely oxidised and therefore burnt up to around 600 degrees centigrade (McKinley, 2004:11).

Archaebotanical analysis of other residue from this context have been tentatively dated to the early middle ages (Bouchard-Perron and Francis, 2017).

3.2.2 Sample no. 18. Context no. (62)

This residue was recovered from the abdominal region of skeleton (01) and weighs a total of 18g. The largest fragment measures 22.89 x 16.64mm and given the location of the sample the fragments are highly likely to be part of skeleton (01) recovered from the surrounding soil matrix.

3.2.3 Sample no. 19. Context no. (62)

This residue was recovered from the cervical region of skeleton (01) and weighs a total of 2g. None of the fragments exceed 5mm in size, and again are likely to belong to skeleton (01).

4.0 Conclusions

This assessment report tentatively concludes that skeleton (01) is an adult male aged between 17-25 years. The orientation of the skeleton (NNE-SSW) indicates that this is a pre-Christian era inhumation, as does the distance from any recorded Christian burial ground in the vicinity. The date of burial of this skeleton is uncertain but is highly likely to be pre-Christian, and the provisional ceramic dating from surrounding contexts should be taken into account when dating this individual.

APPENDIX 5

Palaeoenvironmental Remains Assessment

GREATWORTH

Archaeobotanical analysis

Carbonised mallow (Malva sp.) remains from (60)

Julie-Anne Bouchard-Perron, PhD

Robert Francis, MSc

Report

2017

Introduction

Following an evaluation of the archaeological potential of a site on the western edge of Greatworth (Northamptonshire), five samples were sent to Trent and Peak Archaeology for archaeobotanical analysis. The current report provides a detailed account of the methodology used to investigate the sample contents, an overview of the results obtained and a discussion of their overall significance.

Methodology

Processing

The samples processed were kept in dry conditions prior to being floated using a modified Ankara flotation machine with heavy residue 250µm-aperture meshes and sieves. As this apparatus recycles water it was cleaned daily to prevent cross-contamination. When the flotation was completed, heavy residues were left to dry at room temperature. Once dry the residue contents were screened to isolate any artefacts and ecofacts that did not float. The flots were also left to dry at room temperature before being placed in clean bags.

Sorting, identifying and quantifying seeds and fruits

All the flots were examined using a zoom stereomicroscope at magnification between 4.5x and 40x. During this process, the abundance of organic archaeological remains such as charcoal, wood, bones, insects, bryozoans, ostracods and daphnia was recorded using a relative scale (Table 1). These records are provided in Appendix A.

= 10 items	x
10 to 100 items	xx
100 to 250 items	xxx
=250 items	AB

Table 1. Abundance scale used

All preserved seeds, fruits, pods, glumes and rachises were identified to the most specific taxa (family, genus, species) possible using reference books (Cappers et al. 2006; Cappers and Bekker 2013; Jacomet 2006) and a modest reference collection. Fragmented remains were quantified using a technique known as “total count” where the fragments are grouped to constitute the equivalent of a complete specimen and counted as 1. To provide grounds for comparison between the samples of different volumes, the densities of botanical remains were calculated by dividing the total quantity of preserved seeds and fruits in each sample by the volume of sediment sampled.

Presentation

For the sake of clarity, the common English names of the taxa identified are used in this report. They follow the nomenclature suggested in the *New Flora of the British Isles* (Stace 2010) as do the Latin names used in the results tables (Appendix A). When identification was uncertain, the abbreviation “cf.” was added prior the taxonomic level.

Results

Preservation

All the samples examined contained modern-looking seeds of goosefoot (*Chenopodium* sp.). Given their appearance, low density and the absence of other types of modern-looking organic elements such as insects remains, daphnia or ostracods, it seems unlikely that waterlogged conditions prevailed in the sampled deposits. As such, it can be concluded that the goosefoot remains are not ancient and that only carbonised or mineralised archaeobotanical material is likely to have survived and be identified in the samples.

Contexts 36 and 62

Respectively associated to a gully secondary fill and a grave, contexts 36, 62 shared the same particularity: they only yielded very few organic remains. In fact, only a few unidentifiable bone fragments were recorded in flot 36 while some small charcoal pieces were observed in flots 36 and one of the samples from 62. This paucity, combined with a complete absence of plant remains, greatly hampers interpretation.

Contexts 58 and 60

Contexts 58 and 60 were tentatively dated to the early Middle Ages and were both located in the same pit. The composition of their flots made them very distinctive from the other contexts analysed as they comprised very high densities of charcoal. Most of the charcoal pieces observed were relatively small, that is less than 5 to 10mm long. A quick scan revealed that most of the charcoal from context 58 is probably oak (*Quercus* sp.). Evidence of vitrification was also noted on many pieces suggesting specific combustion or taphonomic conditions of the wood; one of which could be rapid combustion at high temperature. They might also explain why so few carbonised seeds were recorded in this context. Indeed, flot 58 only yielded a single specimen of bedstraw and two remains in a poor state. Unfortunately, the archaeobotanical evidence gathered about this context cannot sustain further interpretation.

Like flot 58, flot 60 contained several fragments of vitrified oak charcoal. However, those were observed along with charcoal fragments of at least one diffuse porous tree taxa. This may indicate multiple depositional origins or that the activity that led to the deposition of charcoal in contexts 58 and 60 is not the same. Either alternative may explain the greater density of carbonised seeds found in flot 60 which yielded both cereal grains and wild plant remains. Although all the remains observed were in a poor state it seems likely that most of the grains observed were barley (*Hordeum* sp.). Barley grains are frequently identified in British medieval sites and historical documents suggest the cereal was commonly used for human and animal consumption (Moffett 2006:45). In flot 60, barley grains were identified among low densities of wild plant including mallow (*Malva* sp.) and spikerush (*Eleocharis* sp.). Although it seems likely the carbonised grains recorded were deposited following food-related activities, there is not enough data to specifically identify such activities or determine the depositional pathways followed by the wild plant remains observed. It seems likely that the interpretive value of charcoal assemblages from flots 58 and 60 is similarly limited even if they comprise charcoal fragments in sufficient quantities to justify further analysis.

Bibliography

Cappers, R. and Bekker, R.,
2013. A Manual for the Identification of Plant Seeds and Fruits, Barkhuis Publishing and Groningen University Library, Groningen.

Cappers, R., Bekker, R. and Jans, J.,
2006. Digitale Zadenatlas van Nederland: Digital Seed Atlas of the Netherlands, Barkhuis Publishing and Groningen University Library, Groningen.

Jacomet, S.,
2006. Identification of cereal remains from archaeological sites, Unpublished handbook available at:
https://ipna.unibas.ch/archbot/pdf/Cereal_Id_Manual_engl.pdf

Moffett, L.,
2006. The Archaeology of Medieval Plant Foods, in: Woolgar, C., Serjeantson, D., Waldron, T. (Eds.), Food in Medieval England: Diet and Nutrition, Oxford University Press, Oxford, pp. 41-55.

Stace, C.
2010. New Flora of the British Isles. Cambridge University Press, Cambridge.

APPENDIX 6

Radiocarbon Dating Certificates

Beta Analytic
RADIOCARBON DATING

Beta Analytic Inc
4985 SW 74 Court
Miami, Florida 33155
Tel: 305-667-5167
Fax: 305-663-0964
beta@radiocarbon.com

Mr. Darden Hood
President

Mr. Ronald Hatfield
Mr. Christopher Patrick
Deputy Directors

ISO/IEC 2005:17025-Accredited Testing Laboratory

January 29, 2018

Dr. Stephen Lancaster
SLR Consulting
Stirling Business Center
Wellgreen
Suite 68
Stirling, Stirlingshire FK8 2DZ
United Kingdom

RE: Radiocarbon Dating Results

Dear Dr. Lancaster,

Enclosed are the radiocarbon dating results for two samples recently sent to us. As usual, the method of analysis is listed on the report with the results and calibration data is provided where applicable. The Conventional Radiocarbon Ages have all been corrected for total fractionation effects and where applicable, calibration was performed using 2013 calibration databases (cited on the graph pages).

The web directory containing the table of results and PDF download also contains pictures, a cvs spreadsheet download option and a quality assurance report containing expected vs. measured values for 3-5 working standards analyzed simultaneously with your samples.

Reported results are accredited to ISO/IEC 17025:2005 Testing Accreditation PJLA #59423 standards and all chemistry was performed here in our laboratory and counted in our own accelerators here. Since Beta is not a teaching laboratory, only graduates trained to strict protocols of the ISO/IEC 17025:2005 Testing Accreditation PJLA #59423 program participated in the analyses.

As always Conventional Radiocarbon Ages and sigmas are rounded to the nearest 10 years per the conventions of the 1977 International Radiocarbon Conference. When counting statistics produce sigmas lower than +/- 30 years, a conservative +/- 30 BP is cited for the result. The reported d13C values were measured separately in an IRMS (isotope ratio mass spectrometer). They are NOT the AMS d13C which would include fractionation effects from natural, chemistry and AMS induced sources.

When interpreting the results, please consider any communications you may have had with us regarding the samples.

The cost of the analysis was charged to the VISA card provided. Thank you. As always, if you have any questions or would like to discuss the results, don't hesitate to contact us.

Sincerely ,

Darden Hood
Digital signature on file

Beta Analytic
RADIOCARBON DATING

Beta Analytic Inc
4985 SW 74 Court
Miami, Florida 33155
Tel: 305-667-5167
Fax: 305-663-0964
beta@radiocarbon.com

Mr. Darden Hood
President

Mr. Ronald Hatfield
Mr. Christopher Patrick
Deputy Directors

ISO/IEC 2005:17025-Accredited Testing Laboratory

REPORT OF RADIOCARBON DATING ANALYSES

Stephen Lancaster	Report Date: January 29, 2018
SLR Consulting	Material Received: January 17, 2018

Laboratory Number	Sample Code Number	Conventional Radiocarbon Age (BP) or Percent Modern Carbon (pMC) & Stable Isotopes Calendar Calibrated Results: 95.4 % Probability High Probability Density Range Method (HPD)	
Beta - 484953	**GW_60_1**	**2480 +/- 30 BP**	IRMS δ13C: -24.3 o/oo

(94.9%)	**774 - 482 cal BC**	**(2723 - 2431 cal BP)**
(0.5%)	**441 - 434 cal BC**	**(2390 - 2383 cal BP)**

Submitter Material: Charred seeds
Pretreatment: (charred material) acid/alkali/acid
Analyzed Material: Charred material
Analysis Service: AMS-Standard delivery
Percent Modern Carbon: 73.44 +/- 0.27 pMC
Fraction Modern Carbon: 0.7344 +/- 0.0027
D14C: -265.62 +/- 2.74 o/oo
Δ14C: -271.55 +/- 2.74 o/oo(1950:2017)
Measured Radiocarbon Age: (without d13C correction): 2470 +/- 30 BP
Calibration: BetaCal3.21: HPD method: INTCAL13

Results are ISO/IEC-17025:2005 accredited. No sub-contracting or student labor was used in the analyses. All work was done at Beta in 4 in-house NEC accelerator mass spectrometers and 4 Thermo IRMSs. The "Conventional Radiocarbon Age" was calculated using the Libby half-life (5568 years), is corrected for total isotopic fraction and was used for calendar calibration where applicable. The Age is rounded to the nearest 10 years and is reported as radiocarbon years before present (BP), "present" = AD 1950. Results greater than the modern reference are reported as percent modern carbon (pMC). The modern reference standard was 95% the 14C signature of NIST SRM-4990C (oxalic acid). Quoted errors are 1 sigma counting statistics. Calculated sigmas less than 30 BP on the Conventional Radiocarbon Age are conservatively rounded up to 30. d13C values are on the material itself (not the AMS d13C). d13C and d15N values are relative to VPDB-1. References for calendar calibrations are cited at the bottom of calibration graph pages.

Beta Analytic
RADIOCARBON DATING

Beta Analytic Inc
4985 SW 74 Court
Miami, Florida 33155
Tel: 305-667-5167
Fax: 305-663-0964
beta@radiocarbon.com

Mr. Darden Hood
President

Mr. Ronald Hatfield
Mr. Christopher Patrick
Deputy Directors

ISO/IEC 2005:17025-Accredited Testing Laboratory

REPORT OF RADIOCARBON DATING ANALYSES

Stephen Lancaster	Report Date: January 29, 2018
SLR Consulting	Material Received: January 17, 2018

Laboratory Number	Sample Code Number	Conventional Radiocarbon Age (BP) or Percent Modern Carbon (pMC) & Stable Isotopes Calendar Calibrated Results: 95.4 % Probability High Probability Density Range Method (HPD)	
Beta - 484954	**GW_58_2**	**3020 +/- 30 BP**	IRMS δ13C: -21.6 o/oo

(73.1%)	**1322 - 1191 cal BC**	**(3271 - 3140 cal BP)**
(18.9%)	**1391 - 1337 cal BC**	**(3340 - 3286 cal BP)**
(2.0%)	**1144 - 1131 cal BC**	**(3093 - 3080 cal BP)**
(1.4%)	**1177 - 1164 cal BC**	**(3126 - 3113 cal BP)**

Submitter Material:	Charred seeds
Pretreatment:	(charred material) acid/alkali/acid
Analyzed Material:	Charred material
Analysis Service:	AMS-Standard delivery
Percent Modern Carbon:	68.66 +/- 0.26 pMC
Fraction Modern Carbon:	0.6866 +/- 0.0026
D14C:	-313.37 +/- 2.56 o/oo
Δ14C:	-318.91 +/- 2.56 o/oo(1950:2017)
Measured Radiocarbon Age:	(without d13C correction): 2960 +/- 30 BP
Calibration:	BetaCal3.21: HPD method: INTCAL13

Results are ISO/IEC-17025:2005 accredited. No sub-contracting or student labor was used in the analyses. All work was done at Beta in 4 in-house NEC accelerator mass spectrometers and 4 Thermo IRMSs. The "Conventional Radiocarbon Age" was calculated using the Libby half-life (5568 years), is corrected for total isotopic fraction and was used for calendar calibration where applicable. The Age is rounded to the nearest 10 years and is reported as radiocarbon years before present (BP), "present" = AD 1950. Results greater than the modern reference are reported as percent modern carbon (pMC). The modern reference standard was 95% the 14C signature of NIST SRM-4990C (oxalic acid). Quoted errors are 1 sigma counting statistics. Calculated sigmas less than 30 BP on the Conventional Radiocarbon Age are conservatively rounded up to 30. d13C values are on the material itself (not the AMS d13C). d13C and d15N values are relative to VPDB-1. References for calendar calibrations are cited at the bottom of calibration graph pages.

Calibration of Radiocarbon Age to Calendar Years

(High Probability Density Range Method (HPD): INTCAL13)

(Variables: d13C = -24.3 o/oo)

Laboratory number **Beta-484953**

Conventional radiocarbon age **2480 ± 30 BP**

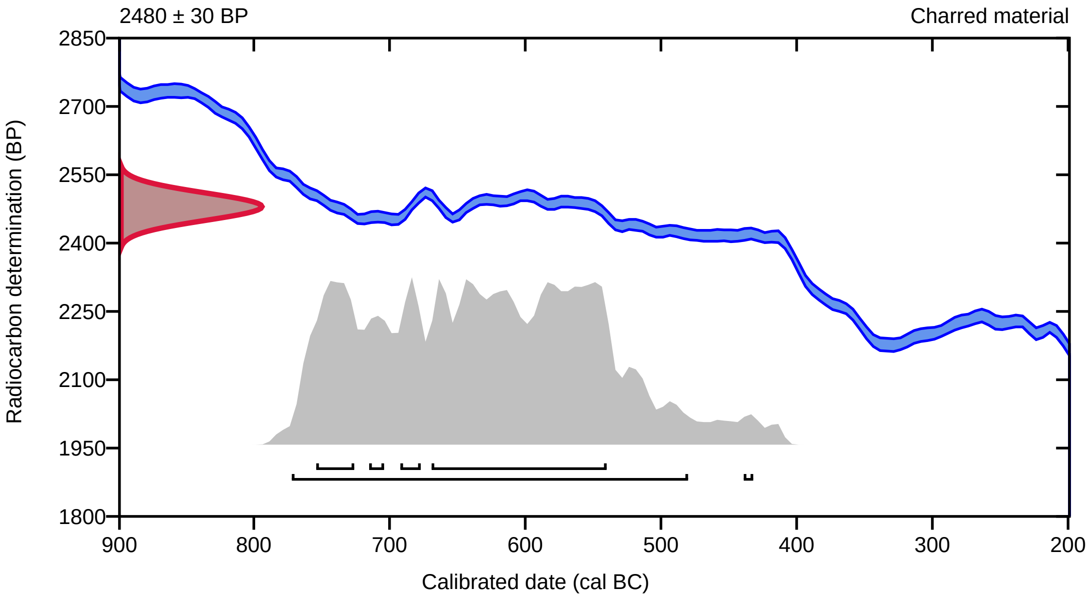
95.4% probability

(94.9%)	774 - 482 cal BC	(2723 - 2431 cal BP)
(0.5%)	441 - 434 cal BC	(2390 - 2383 cal BP)

68.2% probability

(47.9%)	671 - 542 cal BC	(2620 - 2491 cal BP)
(11.1%)	756 - 728 cal BC	(2705 - 2677 cal BP)
(5.6%)	694 - 679 cal BC	(2643 - 2628 cal BP)
(3.6%)	717 - 706 cal BC	(2666 - 2655 cal BP)

GW_60_1



Database used

INTCAL13

References

References to Probability Method

Bronk Ramsey, C. (2009). Bayesian analysis of radiocarbon dates. Radiocarbon, 51(1), 337-360.

References to Database INTCAL13

Reimer, et.al., 2013, Radiocarbon55(4).

Calibration of Radiocarbon Age to Calendar Years

(High Probability Density Range Method (HPD): INTCAL13)

(Variables: d13C = -21.6 o/oo)

Laboratory number **Beta-484954**

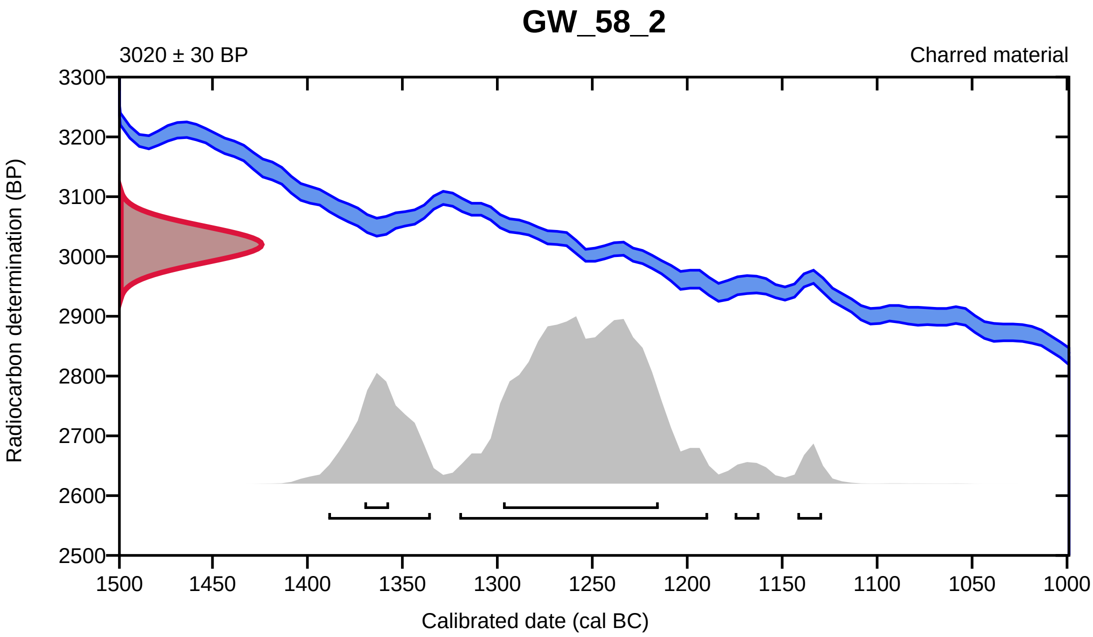
Conventional radiocarbon age **3020 ± 30 BP**

95.4% probability

(73.1%)	1322 - 1191 cal BC	(3271 - 3140 cal BP)
(18.9%)	1391 - 1337 cal BC	(3340 - 3286 cal BP)
(2%)	1144 - 1131 cal BC	(3093 - 3080 cal BP)
(1.4%)	1177 - 1164 cal BC	(3126 - 3113 cal BP)

68.2% probability

(61.2%)	1299 - 1217 cal BC	(3248 - 3166 cal BP)
(7%)	1372 - 1359 cal BC	(3321 - 3308 cal BP)



Database used

INTCAL13

References

References to Probability Method

Bronk Ramsey, C. (2009). Bayesian analysis of radiocarbon dates. Radiocarbon, 51(1), 337-360.

References to Database INTCAL13

Reimer, et.al., 2013, Radiocarbon55(4).

Beta Analytic Radiocarbon Dating Laboratory
4985 S.W. 74th Court, Miami, Florida 33155 • Tel: (305)667-5167 • Fax: (305)663-0964 • Email: beta@radiocarbon.com

Beta Analytic
RADIOCARBON DATING

Beta Analytic Inc
4985 SW 74 Court
Miami, Florida 33155
Tel: 305-667-5167
Fax: 305-663-0964
beta@radiocarbon.com

Mr. Darden Hood
President

Mr. Ronald Hatfield
Mr. Christopher Patrick
Deputy Directors

ISO/IEC 2005:17025-Accredited Testing Laboratory

Quality Assurance Report

This report provides the results of reference materials used to validate radiocarbon analyses prior to reporting. Known-value reference materials were analyzed quasi-simultaneously with the unknowns. Results are reported as expected values vs measured values. Reported values are calculated relative to NIST SRM-4990B and corrected for isotopic fractionation. Results are reported using the direct analytical measure percent modern carbon (pMC) with one relative standard deviation. Agreement between expected and measured values is taken as being within 2 sigma agreement (error x 2) to account for total laboratory error.

Report Date: January 29, 2018
Submitter: Dr. Stephen Lancaster

QA MEASUREMENTS

Reference 1

Expected Value: 129.41 +/- 0.06 pMC

Measured Value: 129.43 +/- 0.37 pMC

Agreement: Accepted

Reference 2

Expected Value: 0.44 +/- 0.10 pMC

Measured Value: 0.45 +/- 0.03 pMC

Agreement: Accepted

Reference 3

Expected Value: 96.69 +/- 0.50 pMC

Measured Value: 96.72 +/- 0.30 pMC

Agreement: Accepted

COMMENT: All measurements passed acceptance tests.

Validation: Darden Hood

Date: January 29, 2018

Beta Analytic
RADIOCARBON DATING

Beta Analytic Inc
4985 SW 74 Court
Miami, Florida 33155
Tel: 305-667-5167
Fax: 305-663-0964
beta@radiocarbon.com

Mr. Darden Hood
President

Mr. Ronald Hatfield
Mr. Christopher Patrick
Deputy Directors

ISO/IEC 2005:17025-Accredited Testing Laboratory

February 18, 2018

Dr. Stephen Lancaster
SLR Consulting
Stirling Business Center
Wellgreen
Suite 68
Stirling, Stirlingshire FK8 2DZ
United Kingdom

RE: Radiocarbon Dating Results

Dear Dr. Lancaster,

Enclosed is the radiocarbon dating result for one sample recently sent to us. As usual, specifics of the analysis are listed on the report with the result and calibration data is provided where applicable. The Conventional Radiocarbon Age has been corrected for total fractionation effects and where applicable, calibration was performed using 2013 calibration databases (cited on the graph pages).

The web directory containing the table of results and PDF download also contains pictures, a cvs spreadsheet download option and a quality assurance report containing expected vs. measured values for 3-5 working standards analyzed simultaneously with your samples.

The reported result is accredited to ISO/IEC 17025:2005 Testing Accreditation PJLA #59423 standards and all pretreatments and chemistry were performed here in our laboratories and counted in our own accelerators here in Miami. Since Beta is not a teaching laboratory, only graduates trained to strict protocols of the ISO/IEC 17025:2005 Testing Accreditation PJLA #59423 program participated in the analysis.

As always Conventional Radiocarbon Ages and sigmas are rounded to the nearest 10 years per the conventions of the 1977 International Radiocarbon Conference. When counting statistics produce sigmas lower than +/- 30 years, a conservative +/- 30 BP is cited for the result. The reported d13C was measured separately in an IRMS (isotope ratio mass spectrometer). It is NOT the AMS d13C which would include fractionation effects from natural, chemistry and AMS induced sources.

When interpreting the result, please consider any communications you may have had with us regarding the sample. As always, your inquiries are most welcome. If you have any questions or would like further details of the analysis, please do not hesitate to contact us.

The cost of the analysis was charged to the VISA card provided. Thank you. As always, if you have any questions or would like to discuss the results, don't hesitate to contact us.

Sincerely ,

Darden Hood
Digital signature on file

Beta Analytic
RADIOCARBON DATING

Beta Analytic Inc
4985 SW 74 Court
Miami, Florida 33155
Tel: 305-667-5167
Fax: 305-663-0964
beta@radiocarbon.com

Mr. Darden Hood
President

Mr. Ronald Hatfield
Mr. Christopher Patrick
Deputy Directors

ISO/IEC 2005:17025-Accredited Testing Laboratory

REPORT OF RADIOCARBON DATING ANALYSES

Stephen Lancaster — Report Date: February 18, 2018

SLR Consulting — Material Received: January 30, 2018

Laboratory Number	Sample Code Number	Conventional Radiocarbon Age (BP) or Percent Modern Carbon (pMC) & Stable Isotopes Calendar Calibrated Results: 95.4 % Probability High Probability Density Range Method (HPD)	
Beta - 486278	**GW_62_3**	**1740 +/- 30 BP**	IRMS δ13C: -19.8 o/oo IRMS δ15N: +12.0 o/oo

(95.4%) 236 - 386 cal AD (1714 - 1564 cal BP)

Submitter Material:	Tooth
Pretreatment:	(tooth collagen) collagen extraction; with alkali
Analyzed Material:	Tooth collagen
Analysis Service:	AMS-Standard delivery
Percent Modern Carbon:	80.52 +/- 0.30 pMC
Fraction Modern Carbon:	0.8052 +/- 0.0030
D14C:	-194.75 +/- 3.01 o/oo
Δ14C:	-201.25 +/- 3.01 o/oo(1950:2017)
Measured Radiocarbon Age:	(without d13C correction): 1660 +/- 30 BP
Calibration:	BetaCal3.21: HPD method: INTCAL13
Carbon/Nitrogen:	CN : 3.2 %C: 41.88 %N: 15.22

Results are ISO/IEC-17025:2005 accredited. No sub-contracting or student labor was used in the analyses. All work was done at Beta in 4 in-house NEC accelerator mass spectrometers and 4 Thermo IRMSs. The "Conventional Radiocarbon Age" was calculated using the Libby half-life (5568 years), is corrected for total isotopic fraction and was used for calendar calibration where applicable. The Age is rounded to the nearest 10 years and is reported as radiocarbon years before present (BP), "present" = AD 1950. Results greater than the modern reference are reported as percent modern carbon (pMC). The modern reference standard was 95% the 14C signature of NIST SRM-4990C (oxalic acid). Quoted errors are 1 sigma counting statistics. Calculated sigmas less than 30 BP on the Conventional Radiocarbon Age are conservatively rounded up to 30. d13C values are on the material itself (not the AMS d13C). d13C and d15N values are relative to VPDB-1. References for calendar calibrations are cited at the bottom of calibration graph pages.

Calibration of Radiocarbon Age to Calendar Years

(High Probability Density Range Method (HPD): INTCAL13)

(Variables: d13C = -19.8 o/oo)

Laboratory number **Beta-486278**

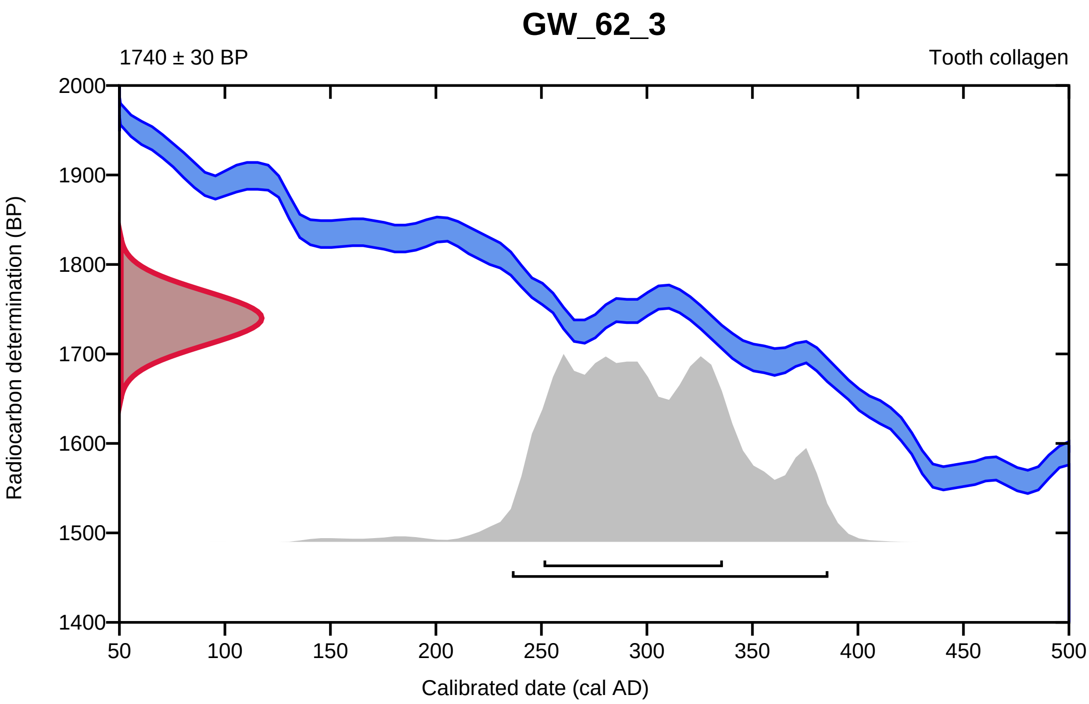
Conventional radiocarbon age **1740 ± 30 BP**

95.4% probability

(95.4%) 236 - 386 cal AD (1714 - 1564 cal BP)

68.2% probability

(68.2%) 251 - 336 cal AD (1699 - 1614 cal BP)



Database used

INTCAL13

References

References to Probability Method

Bronk Ramsey, C. (2009). Bayesian analysis of radiocarbon dates. Radiocarbon, 51(1), 337-360.

References to Database INTCAL13

Reimer, et.al., 2013, Radiocarbon55(4).

Beta Analytic
RADIOCARBON DATING

Beta Analytic Inc
4985 SW 74 Court
Miami, Florida 33155
Tel: 305-667-5167
Fax: 305-663-0964
beta@radiocarbon.com

Mr. Darden Hood
President

Mr. Ronald Hatfield
Mr. Christopher Patrick
Deputy Directors

ISO/IEC 2005:17025-Accredited Testing Laboratory

Quality Assurance Report

This report provides the results of reference materials used to validate radiocarbon analyses prior to reporting. Known-value reference materials were analyzed quasi-simultaneously with the unknowns. Results are reported as expected values vs measured values. Reported values are calculated relative to NIST SRM-4990B and corrected for isotopic fractionation. Results are reported using the direct analytical measure percent modern carbon (pMC) with one relative standard deviation. Agreement between expected and measured values is taken as being within 2 sigma agreement (error x 2) to account for total laboratory error.

Report Date: February 19, 2018
Submitter: Dr. Stephen Lancaster

QA MEASUREMENTS

Reference 1

Expected Value:	0.44 +/- 0.10 pMC
Measured Value:	0.45 +/- 0.02 pMC
Agreement:	Accepted

Reference 2

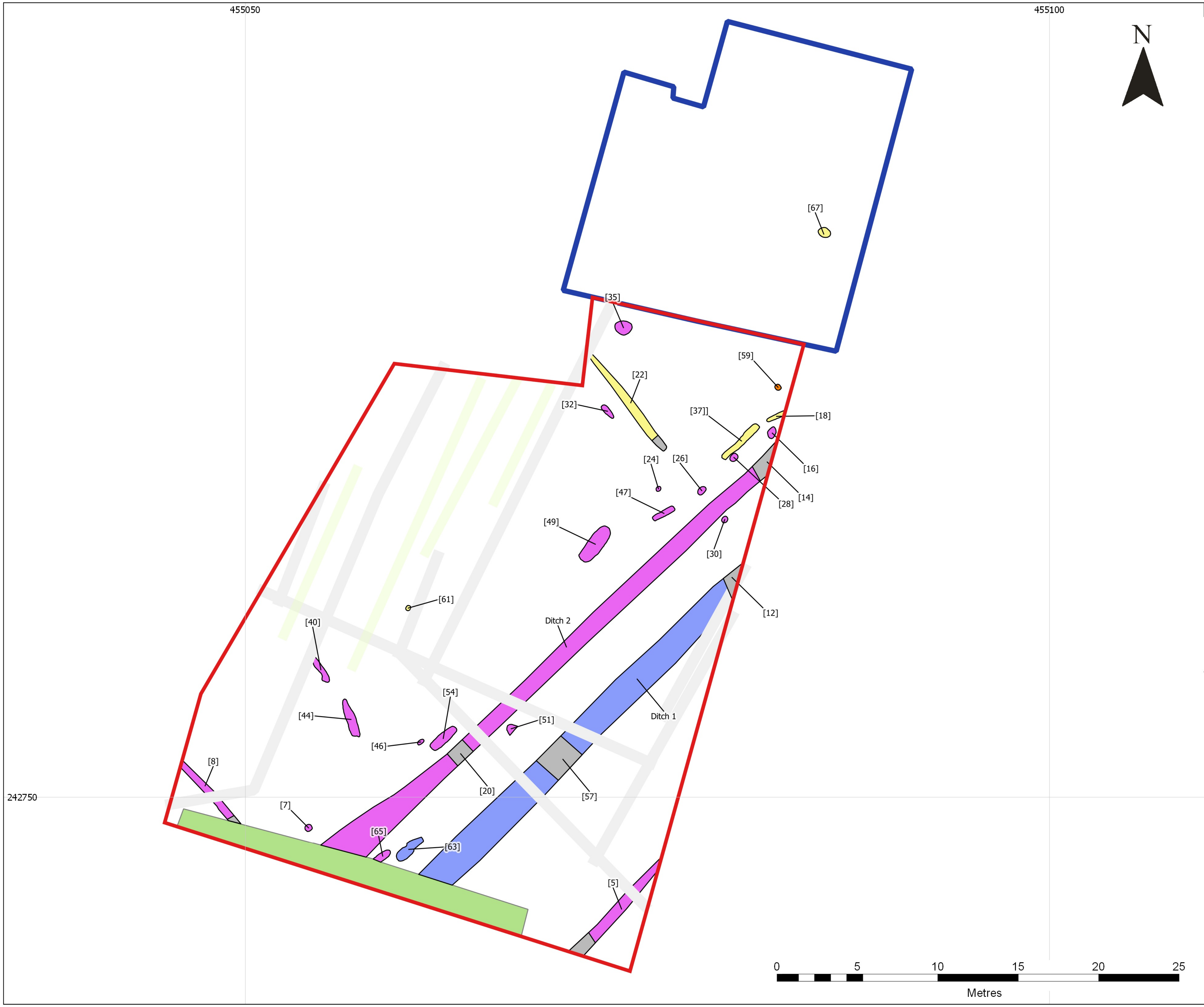
Expected Value:	96.69 +/- 0.50 pMC
Measured Value:	96.80 +/- 0.28 pMC
Agreement:	Accepted

Reference 3

Expected Value:	129.41 +/- 0.06 pMC
Measured Value:	129.54 +/- 0.35 pMC
Agreement:	Accepted

COMMENT: All measurements passed acceptance tests.

Validation: Darden Hood   Date: February 19, 2018



LEGEND

- SMS AREA
- WATCHING BRIEF AREA
- UNDATED FEATURE
- ROMANO BRITISH FEATURE
- IRON AGE/ ROMANO BRITISH FEATURE
- IRON AGE FEATURE
- BRONZE AGE FEATURE
- CUTTING
- PLOUGH SCRAPE
- DRAIN
- MOLA TEST TRENCH

Watson & Cox CONSTRUCTION

SLR global environmental solutions

ASPECT HOUSE
ASPECT BUSINESS PARK
BENNERLEY ROAD
NOTTINGHAM NG6 8WR

T: +44 (0)115 964 7280
www.slrconsulting.com

WESTHORP, GREATWORTH

ARCHAEOLOGICAL MITIGATION WORKS

EXTENT OF ARCHAEOLOGICAL MITIGATION INVESTIGATIONS AND LOCATION OF FEATURES

DRAWING 1

Scale	Date
1:225 @ A3	MARCH 2018

_Westhorp_Greatworth_ExtentOfArchaeologicalMitigationInvestigationsAndLocationOfFeatures

EUROPEAN OFFICES

United Kingdom

AYLESBURY
T: +44 (0)1844 337380

BELFAST
T: +44 (0)28 9073 2493

BRADFORD-ON-AVON
T: +44 (0)1225 309400

BRISTOL
T: +44 (0)117 906 4280

CAMBRIDGE
T: + 44 (0)1223 813805

CARDIFF
T: +44 (0)29 2049 1010

CHELMSFORD
T: +44 (0)1245 392170

EDINBURGH
T: +44 (0)131 335 6830

EXETER
T: + 44 (0)1392 490152

GLASGOW
T: +44 (0)141 353 5037

GUILDFORD
T: +44 (0)1483 889800

LEEDS
T: +44 (0)113 258 0650

LONDON
T: +44 (0)203 805 6418

MAIDSTONE
T: +44 (0)1622 609242

MANCHESTER
T: +44 (0)161 872 7564

NEWCASTLE UPON TYNE
T: +44 (0)191 261 1966

NOTTINGHAM
T: +44 (0)115 964 7280

SHEFFIELD
T: +44 (0)114 245 5153

SHREWSBURY
T: +44 (0)1743 23 9250

STAFFORD
T: +44 (0)1785 241755

STIRLING
T: +44 (0)1786 239900

WORCESTER
T: +44 (0)1905 751310

Ireland

DUBLIN
T: + 353 (0)1 296 4667

France

GRENOBLE
T: +33 (0)6 23 37 14 14