



Plate 205: Trench 81, looking northeast



Plate 206: Southwest facing section of [81001]



Plate 207: Oblique north facing section of [81003], [81005], [81007], [81011] and [81023]



Plate 208: Southwest facing section of [81014]



Plate 209: Northwest facing section of [81016]



Plate 210: Southeast facing section of [81019]



Plate 211: Northwest facing section of [81021]



Plate 212: Northwest facing section of [81025]



Plate 213: Trench 82, looking northeast



Plate 214: Northwest facing section of [82000]



Plate 215: Northwest facing section of [82002]



Plate 216: Northwest facing section of [82004]



Plate 217: Southeast facing section of [82006]



Plate 218: East facing section of [82008]



Plate 219: Northwest facing section of [82010]



Plate 220: Northwest facing section of [82012]



Plate 221: North facing section of [82014]



Plate 222: Southeast facing section of [82016]

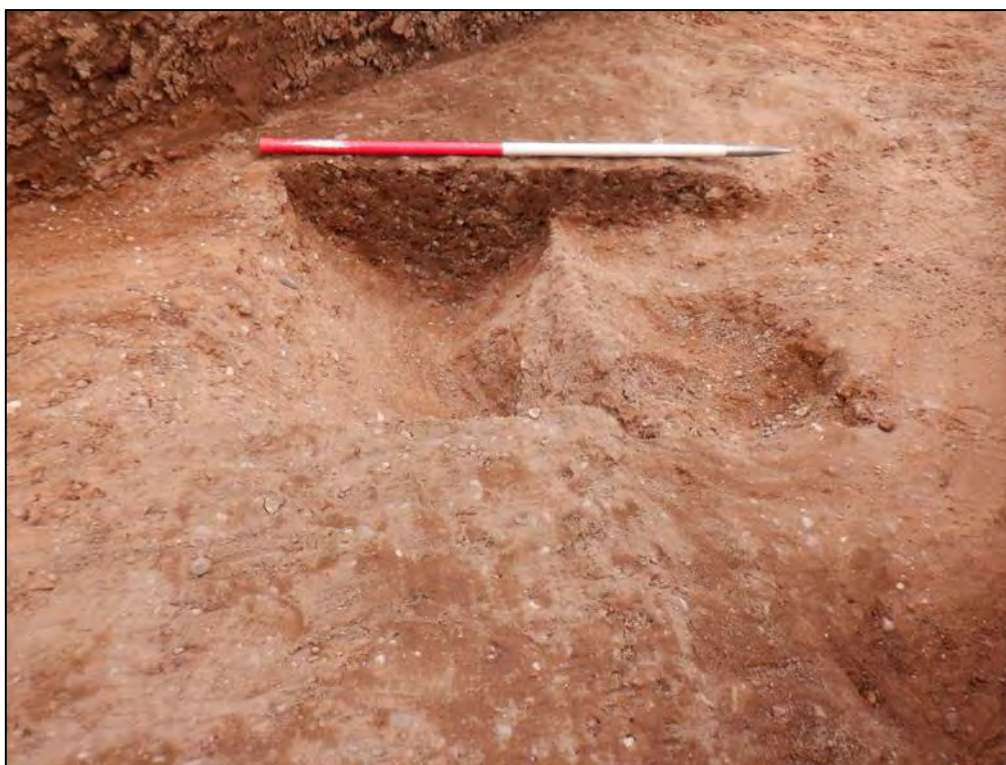


Plate 223: Northeast facing section of [82018] and [82022]



Plate 224: Northeast facing section of [82022]



Plate 225: Southeast section of [82024]



Plate 226: Southwest facing section of [82026]

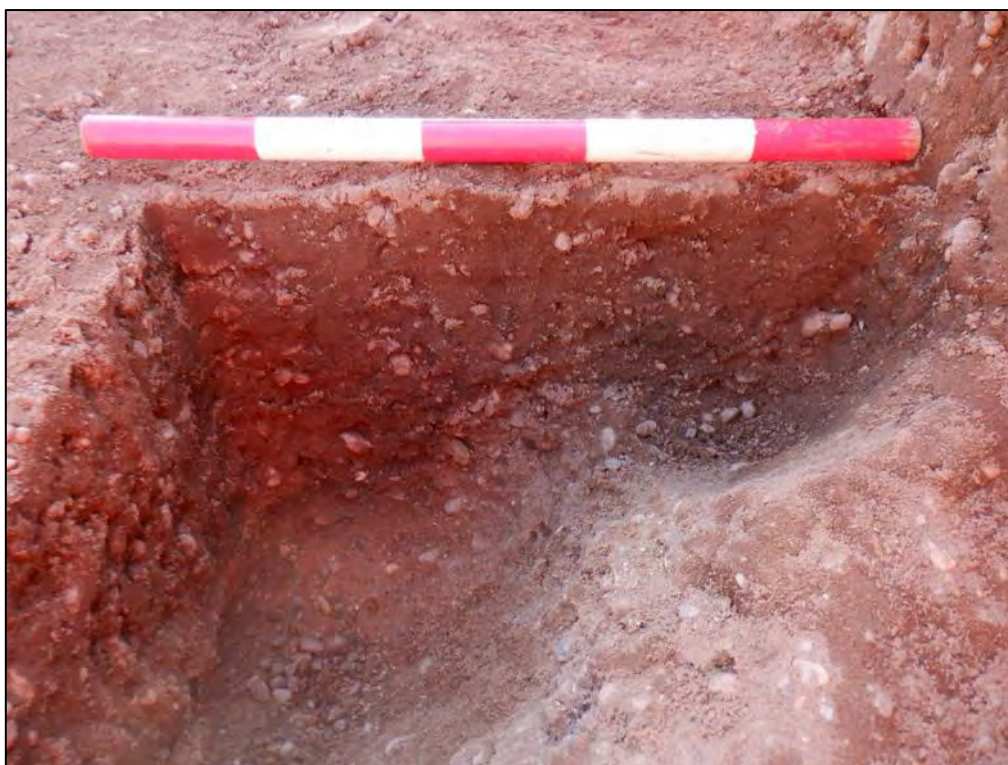


Plate 227: Northeast facing section of [82028]



Plate 228: Southeast facing section of [82030] and [82036]



Plate 229: Northeast facing section of [82032] and [82034]



Plate 230: Southeast facing section of [82038] and [82040]



Plate 231: Trench 83, looking west



Plate 232: Northwest facing section of [83000] and [83002]



Plate 233: Plan shot of [83004] and [83006] looking south



Plate 234: South facing section of [83008]



Plate 235: Trench 84, looking south



Plate 236: East facing section of [84000]



Plate 237: Trench 85, looking northwest



Plate 238: South east facing section of [85000]



Plate 239: South facing section of [85002]



Plate 240: Trench 86, looking north



Plate 241: Southwest facing section of [86000], [86002], [86004] and [86007]



Plate 242: South facing section of [86010] and [86012]



Plate 243: Trench 90, looking west



Plate 244: South-south-west facing section of ditch [90015]



Plate 245: South-south-east facing section of gully [90013]



Plate 246: North facing section of pit [90008]



Plate 247: South-south-west facing shot of spread [90003]



Plate 248: South-south-west facing section of pit [90006] and ditch [90004]



Plate 249: South facing section of ditch [90000]



Plate 250: Trench 91, looking northwest



Plate 251: Southeast facing section of [91000]



Plate 252: Trench 94, looking northwest



Plate 253: South southeast facing section of [94000]



Plate 254: Trench 96: looking east



Plate 255: North facing section of [96000]



Plate 256: Northeast facing section of ditch [96002]



Plate 257: Trench 98, looking south



Plate 258: West facing section of [98000]



Plate 259: Trench 103, looking east



Plate 260: Southeast facing section of [103000]



Plate 261: North west facing section of [103002]



Plate 262: Southeast facing section of [103004]



Plate 263: Trench 104, looking northwest



Plate 264: West-south-west facing section of ditch [104000]



Plate 265: Trench 105, looking north



Plate 266: Northeast facing section of gully [105000]



Plate 267: Trench 106, looking west



Plate 268: Northeast facing section of ditch [106000]



Plate 269: North facing section of ditch terminus [106004]



Plate 270: Northeast facing section of ditch [106006]



Plate 271: East facing section of pit (106002)



Plate 272: Southwest facing section of pit [106009]

Appendix II: Bulk Sample Results

Sample No.	Context No.	Small mammal bones	Large mammal bones	Burnt mammal bones	Pottery	Fired clay	Magnetic residues	Metal	Slag	Worked flint	Flint debitage	Charcoal	Charred plant remains	Other	No finds?	Flot?	Comments
1	15007						+ no hammerscale					++				CPR +	Iron staining
2	15001	+					+ no hammerscale										
3	15012						+ no hammerscale										
4	11005														YES	Charcoal +	
6	22007			+								+					
7	18003					+						+					
8	18013							Fe nail fragments ++	+			+					
9	26001														YES		Manganese
10	56009						+ no hammerscale					+++				CPR +	
11	50008														YES		
12	3007						+ no hammerscale					++					
13	53007														YES		
14	42006											++ (possibly some coal mixed in)		Possible very small fragments of leather with evidence of fine CuA pins. Mineralised and iron stained. Origin unknown. + Clay tobacco pipe stem +			
15	86005			++			+ no hammerscale					+++	++			CPR +	
16	86006			+			+ no hammerscale					++					
17	55008														YES		

Sample No.	Context No.	Small mammal bones	Large mammal bones	Burnt mammal bones	Pottery	Fired clay	Magnetic residues	Metal	Slag	Worked flint	Flint debitage	Charcoal	Charred plant remains	Other	No finds?	Flot?	Comments
18	81016						+ no hammerscale										
19	82011		Tooth fragments +													CPR +	
20	82013						+ hammerscale flake and spheroid									CPR +	
21	82027											+					
22	75011						+ no hammerscale					+					
23	75021		Tooth fragments +									+					
24	90003											++++				Charcoal ++	
25	90003											++++ (mineralised? Iron staining)					
26	106001														YES		
28	106005											+		Heat affected stone +			
29	106007														YES		
30	90003											++++		Heat affected stone +++		Charcoal +++	
31	90003											++				Charcoal +++	
33	90003											+++				Charcoal +	
37	15025														YES		
38	15025											+					
39	15025														YES		
40	15025			+								+					
41	15026			+													
500	25003			+	+ Iron Age							++					
501	25001											++					
502	12012														YES		
503	12003														YES	Charcoal +	
504	7001			+			+ no hammerscale					+	+				
505	7003														YES		

Sample No.	Context No.	Small mammal bones	Large mammal bones	Burnt mammal bones	Pottery	Fired clay	Magnetic residues	Metal	Slag	Worked flint	Flint debitage	Charcoal	Charred plant remains	Other	No finds?	Flot?	Comments
506	3012			++			+ no hammerscale					++	++			Charcoal +	
507	3029			+++			+ no hammerscale					+++	+++				
508	3029			+++			+ no hammerscale					+++	+++				
509	41012														YES		
510	3029			++			+ no hammerscale			++++	+++	++++	+++			Charcoal +	
511	3029			++		+	+ no hammerscale					+++	+++			Charcoal +	
512	90003											+++				Charcoal +	
513	83008						+ no hammerscale					+					
514	81002				+ Prehistoric/Iron Age							+	+			Possible CPR + Charcoal +	
515	79005						+ no hammerscale					+	+			CPR +	
516	79007						+ no hammerscale								YES		
517	79008														YES	CPR +	
518	79001											+				CPR +	
519	79003											+					
520	86003						+ no hammerscale								YES	Possible CPR +	
521	86006														YES	Possible CPR +	
522	80008														YES	Possible CPR +	
523	74001						+ no hammerscale					+					
524	75007						+ no hammerscale					+					
525	74010														YES		
526	74012						+ no hammerscale					+					
527	74023						+ no hammerscale					+				Charcoal +	
528	74025				+ Fragments							+	+				
529	64001														YES		
530	65001						+ no hammerscale								YES		
531	65003														YES		
532	65009						+ no hammerscale								YES		

Sample No.	Context No.	Small mammal bones	Large mammal bones	Burnt mammal bones	Pottery	Fired clay	Magnetic residues	Metal	Slag	Worked flint	Flint debitage	Charcoal	Charred plant remains	Other	No finds?	Flot?	Comments
533	74001												+			CPR + Charcoal +	
534	74027				+ Roman?												
535	72021											+					
536	72019												+				
537	72015											++					
538	72017		+									+					
539	106012														YES		
540	106011														YES		
541	106010											+				Possible CPR +	

Table 2: Bulk sample results. Key: + = occasional/<5, ++ = moderate/5-25, +++ = frequent/25-100, ++++ = abundant/>100

Archaeological Evaluation of land west of Kelham
Newark, Nottinghamshire.
Summary of Geoarchaeological Sampling and Recording



York Archaeology - Nottingham
Unit 1 Holly Lane, Chilwell, Nottingham NG9 4AB
Phone: +44 (0)115 8967400
yaenquiries@yorkat.co.uk www.yorkarchaeology.co.uk



KEY PROJECT INFORMATION

Project Name	Archaeological Evaluation of land west of Kelham, Newark
YA Project Code	3863
Report status	For client comment
Type of Project	Summary of geoarchaeological sampling and recording
Client	Archaeology Wales
Planning Reference	
OASIS ID	
NGR	SK 76640 55525
Authors	Richard Lowther
Illustrations	Richard Lowther
Editor	Kristina Krawiec
Report Number and Date	YA/2023/138 21/06/23
Version and Filename	Kelham_GA_sampling_v2.docx

Copyright Declaration:

York Archaeology give permission for the material presented within this report to be used by the archives/repository with which it is deposited, in perpetuity, although York Archaeology retains the right to be identified as the author of all project documentation and reports, as specified in the Copyright, Designs and Patents Act 1988 (chapter IV, section 79). The permission will allow the repository to reproduce material, including for use by third parties, with the copyright owner suitably acknowledged.

Disclaimer:

This Report has been prepared solely for the person/party which commissioned it and for the specifically titled project or named part thereof referred to in the Report. The Report should not be relied upon or used for any other project by the commissioning person/party without first obtaining independent verification as to its suitability for such other project, and obtaining the prior written approval of York Archaeological Trust for Excavation and Research Limited ("YAT") (trading as York Archaeology). YAT accepts no responsibility or liability for the consequences of this Report being relied upon or used for any purpose other than the purpose for which it was specifically commissioned. Nobody is entitled to rely upon this Report other than the person/party which commissioned it. YAT accepts no responsibility or liability for any use of or reliance upon this Report by anybody other than the commissioning person/party.

© York Archaeological Trust for Excavation and Research Limited. Registered Office: 47 Aldwark, York YO1 7BX. A Company Limited by Guarantee. Registered in England No. 1430801. A Registered Charity in England & Wales (No. 09060) and Scotland (No. SC042846)

Abstract

This report presents the results of a geoarchaeological site visit carried out by York Archaeology during the archaeological evaluation undertaken by Archaeology Wales in association with the proposed development of a solar farm on land located to the west of Kelham, Nottinghamshire (centred on NGR SK 76640 55525).

The geoarchaeological recording demonstrated the survival of organic deposits in association with a LiDAR mapped palaeochannel and deflated burnt mound. Samples were recovered from the mound material and underlying channel sands and gravels which have the potential to provide important chronological and landscape data relating the feature.

Contents

1. INTRODUCTION	1
1.1. Site Background.....	1
1.2. Geology and Topography.....	1
1.3. Scope of Report	2
2. GEOARCHAEOLOGICAL BACKGROUND	2
2.1. Pleistocene (2.58 mya-10,000 BC) and Holocene (10,000 BC- present)	2
2.2. Archaeological context	3
2.3. Local Middle/Lower Trent Valley Archaeological context	3
2.4. Project Aims and Objectives	5
3. GEOARCHAEOLOGICAL METHODOLOGY	5
3.1 Fieldwork Methodology	5
3.2 Fieldwork constraints	6
3.3 Archive	6
4. RESULTS.....	7
4.1. Lithology	7
5. THE FINDS.....	9
5.1 Summary.....	9
6. THE ENVIRONMENTAL SAMPLES	10
6.1 Summary.....	10
7. DISCUSSION AND CONCLUSIONS	12
7.1 Discussion of deposits	12
7.2 Potential impact on deposits.....	13
7.3 Recommendations and conclusions	13

Acknowledgements

APPENDICES

Appendix 1: Troels-Smith

TABLES

Table 1:	Quantification of site paper archive
Table 2:	Quantification of artefact and environmental samples
Table 3:	Summary of samples retrieved from Trench 90
Table 4:	Summary of samples retrieved from the burnt mount area within Trench 90

FIGURES

Front Cover Image:	View of burnt mound area, facing southwest
Figure 1:	Mapped BGS bedrock and superficial deposits which lie in and around the site area
Figure 2:	Overview of archaeological finds and studies carried out around Newark
Figure 3:	Samples take within Trench 90. The broad area of the burnt mound deposit is also shown

1. INTRODUCTION

1.1. Site Background

- 1.1.1. York Archaeology (YA; formerly Trent & Peak Archaeology) were commissioned by Archaeology Wales to undertake geoarchaeological sampling and recording of a burnt mound feature and possible palaeochannel sequence during archaeological evaluation works. The evaluation was undertaken in association with the proposed development of a solar farm on land located to the west of Kelham, Nottinghamshire (centred on NGR SK 76640 55525).
- 1.1.2. The site was located to the west of the village of Kelham, Nottinghamshire and c.3.8km to the northeast of Newark-upon-Trent. The area is currently used for agricultural purposes; it encompasses 64 hectares, including two large, irregular fields and two smaller fields, bounded to the east by Broadgate Lane, to the north and west by a number of fields of small and medium size, and to the south by the A617.
- 1.1.3. In 2021, a Desk Based Assessment (Garcia Rovira 2021), and in 2022 a geophysical survey (Muller 2022), defined the heritage baseline and archaeological potential of the proposed development site. In doing so, it was established that human activity within the wider area was present from the early prehistoric period onwards, with a peak of activity observed during Iron Age/Roman period.
- 1.1.4. Within the vicinity of the site, Historic England's National Mapping Programme (NMP) recorded clusters of cropmarks which have been tentatively interpreted as concentrations of Iron Age and Roman activity. The geophysical surveys carried out within the site (Muller 2022) have confirmed the cropmarks. In order to assess the presence/absence and character of the archaeological resource of the area, 127 50m trenches undertaken by Archaeology Wales in May 2023.

1.2. Geology and Topography

- 1.2.1. The underlying geology of the site mapped by the British Geological Survey (BGS) as mudstone belonging to the Mercia Mudstone Group. This sedimentary bedrock was formed approximately 201 to 252 million years ago in the Triassic Period.
- 1.2.2. The bedrock is overlain with superficial deposits of sand and gravel belonging to the Holme Pierrepont Sand and Gravel Member. These deposits formed up to 2.6 million years ago in the Quaternary Period (BGS 2023).

1.3. Scope of Report

- 1.3.1. This report presents a summary of the geoarchaeological sampling and recording undertaken at the site carried out on 11th May 2023. The fieldwork and report were undertaken by Richard Lowther (Geoarchaeology Project Officer). The project was managed by Kristina Krawiec (Head of Geoarchaeology).

2. GEOARCHAEOLOGICAL BACKGROUND

2.1. Pleistocene (2.58 mya-10,000 BC) and Holocene (9700 BC- present)

- 2.1.1. The BGS maps the majority of the site as the Holme Pierrepont Sand and Gravel (HPPSG). This unit formed from meltwater enhanced glacial outwash and is Upper Devensian in age (MIS 2; 30-25ka BP; Bridgland et al., 2014: 179; Howard et al., 2011). Fluvial reworking of this during the Holocene unit is well known within the Middle Trent Valley and is attributed a separate formation, known as the Hemington Member Sand and Gravel (Bridgland et al., 2014). In smaller areas of the site, fine-grained alluvial sands, silts, and clays deposited during the Holocene are also mapped. Islands of mapped HPPSG, raised above the lower lying floodplain, have the potential to be foci for human activity.
- 2.1.2. The site is located within an area close to the boundary between the Middle and Lower Trent (Bridgland et al., 2014), a stretch of the Trent which is considered as being highly mobile during the Holocene is characterised by lateral migration and/or avulsion (Brown et al., 2013). This has left a series of incised palaeochannels and ridge and swale features across the landscape which are visible on Lidar imagery. The palaeochannels of the Trent have been subject to several phases of mapping using both aerial photographic and Lidar interpretation (Malone and Stein, 2015; 2017). Figure 01 shows mapped palaeochannels within the site potentially truncating and reworking the Holme Pierrepont Terrace. Palaeochannels are of great significance given that they often act as foci for human activity both when active and when abandoned, in addition to preserving material which has the potential to preserve palaeoenvironmental proxy evidence and waterlogged archaeological remains.
- 2.1.3. Nearby investigations at Langford, downstream from Newark, have demonstrated substantial reworking of the HPPSG during the Neolithic-Bronze Age as evidenced by the presence of dated bog oaks (c.2100 BC), human skulls and Bronze Age artefacts recovered from the aggregate (Garton et al., 1997). Reworking has also been demonstrated at Cromwell Quarry from the mid-Neolithic to Roman period (TPA, 2018). Sediment reworking during the Holocene increases the likelihood for

the burial of former land surfaces which may preserve archaeological features and artefacts.

2.2. Archaeological context

- 2.2.1. The nature and the potential impact of the proposed development on the archaeological/historic resource of the site and surrounding area has been examined through Historic England's National Mapping Programme, a DBA, with a site walkover, and a geophysical survey (Garcia Rovira 2021; Muller 2022). The text below summarises the results obtained with regards to the features recorded within the site itself.
- 2.2.2. Historic England's NMP has mapped the landscape development over time using tools such as aerial photography and Lidar imagery. The NMP has documented concentrations of cropmarks/soilmarks within the PDA. It has been suggested that some of the cropmarks present show settlement patterns dating to the Iron Age and Roman periods as well as post-medieval boundaries.
- 2.2.3. Cropmarks located towards the westernmost end of the development site were also observed in a field evaluation carried out by Phoenix Consulting Archaeological in 2015 at Flash Farm. A total of 47 trenches were carried out and a large proportion of the features present dated between the Bronze Age and Roman periods (Edwards 2015).
- 2.2.4. Between 2021 and 2022, AE also carried out a geophysical survey focused upon 56 hectares of land within the development site. The survey identified four areas with anomalies characteristic of archaeological features in Fields A, B and C. Many of these anomalies related to cropmarks/soilmarks recorded by the NMP. However, the survey also highlighted that Field B had a density of other archaeological anomalies, whilst cropmarks recorded by the NMP in Field D were enhanced, and finally it identified another linear anomaly that the NMP had not recorded.

2.3. Local Middle/Lower Trent Valley Archaeological context

Palaeolithic (650,000BC – 10,000BC)

- 2.3.1. The Farndon Fields Late Upper Palaeolithic (13,000-9,500 BC) site lies just south-west of Newark, adjacent to the confluence of the river Devon to the Trent (Figure 01). Multiple phases of investigation have unearthed over 300 struck items scattered over 15 hectares (Garton and Jacobi, 2009). This includes evidence of in-situ Late Upper Palaeolithic worked flints, attributed to the Creswellian culture, the British derivative of the European Final Magdalenian culture (c. 12,600–12,250 BC; Grant and Harding, 2014), and the Federmesser type (12,000-11,000 BC). The finds

indicate the presence of human activity throughout the Windermere Interstadial (12,700-10,700 BC) on wetland margins and elevated gravel terraces adjacent to river channels (Grant and Harding, 2014; Garton et al., 2020). The Farndon Fields site is of national and international significance.

Mesolithic (10,000BC – 4,000BC), Neolithic (4,000BC – 2,400BC) and Bronze Age (2,400 – 700BC)

- 2.3.2. Archaeological monitoring of the excavation of two gravel borrow pits within the grounds of Staythorpe Power Station (Figure 02) confirmed the presence of organic deposits within two palaeochannels, dating to the Mesolithic period (5710-5580 cal. BC). The works also saw the recovery of roe deer and aurochs remains, two of the animal bones bore cut marks. A well-preserved Mesolithic age human femur was also recovered, possibly representing intentional deposition within a palaeochannel, a very rare open-air site within the UK (Davies et al., 2001; Myers, 2006).
- 2.3.3. A series of archaeological investigations was undertaken on a large area of land east of the Late Upper Palaeolithic site of Farndon Fields. In addition to the LUP flint scatter, these works also identified Neolithic flint scatters and a burnt mound deposit (OA, 2008; OA, 2022a; 2022b).
- 2.3.4. A trial trench evaluation carried at Cromwell Quarry, located downstream of Newark, recorded evidence of human activity dating from the Mesolithic to the Bronze Age, including field systems. A series of boreholes, also identified Mesolithic to Bronze-Age in-channel sedimentation at three locations (Collins, 2018).
- 2.3.5. Long-term aggregate extraction at Langford Quarry has also produced artefacts dating to the Neolithic or Bronze Age recovered from the reworked HPPSG. Finds include four human skulls, bones from cattle, sheep, deer, aurochs, and dogs, along with lithics and several felled logs (Wilson, 1996; Garton et al., 1997). These items were recorded within a log-jam which also recorded several large bog oaks of Neolithic date.

Iron Age (700BC – AD 43)

- 2.3.6. A Scheduled Ancient Monument consisting of a series of barrows at North Muskham represent an Iron Age funerary monument (Joseph, 1953). A number of earthworks and cropmarks are recorded, representing up to ten sub-rectangular ditch enclosures. This type of Iron Age barrow is rare outside of eastern Yorkshire (Nottinghamshire County Council, 2019), with only one example excavated in the Trent valley (Aston-on-Trent; May, 1970).

2.4. Project Aims and Objectives

2.4.1. The aims of the project are as follows:

- To characterise the deposits recorded and depositional processes at the site;
- To assess how the deposits will be impacted by the proposed development;
- To assess options for mitigation.

2.4.2. Objectives to meet the aims:

- To make a lithological record of sediment sections exposed within Trench 90;
- To record and recover samples from deposits associated and underlying an interpreted burnt mound feature;
- To recover samples for the potential for future palaeoenvironmental assessment and dating;
- To provide recommendations for further work.

3. GEOARCHAEOLOGICAL METHODOLOGY

3.1 Fieldwork Methodology

3.1.1 All works were undertaken in accordance with the WSI as approved by the Local Authority Planning Archaeologist and to standards defined by *CIfA Guidelines for Recording of Archaeological Sites* (2019; 2020a; 2020b).

3.1.2 The work consisted of geoarchaeological recording and sampling support to an ongoing archaeological evaluation of the site carried out by Archaeology Wales. The works centred on recovering suitable samples from deposits and the wider strip of a burnt mound feature within and around Trench 90. Four small Kubiena tins, six bulk samples, and an OSL sample and associated moisture control samples were taken, with the samples located by GNSS by Archaeology Wales. The sample numbers follow those of Archaeology Wales' conventions.

3.1.3 A record of the sediments from Trench 90 were produced using the Troels-Smith (1955) system of sediment classification (Appendix 1). The scheme breaks down a sediment sample into four main components and allows the inclusion of extra components that are also present, but that are not dominant. Key physical properties of the sediment layers are darkness (Da), stratification (St), elasticity (El), dryness of the sediment (Sicc) and the sharpness of the upper sediment boundary (UB). A summary of the sedimentary and physical properties classified by Troels-

Smith (1955) and a stratigraphic breakdown of the deposits were recorded on proforma log sheets. The logs are supplemented by digital photography.

- 3.1.4 Samples retrieved from the site followed procedures set out within the *Historic England Guidelines for Environmental Archaeology and Geoarchaeology* (HE 2015a and HE 2015b). The consideration of preservation within the deposits was made with specific reference to Historic England's guidance document for *Preserving Archaeological Remains* (2016).

3.2 Fieldwork constraints

- 3.2.1 No fieldwork constraints were observed.

3.3 Archive

- 3.3.1. The site archive is currently held at the offices of YA and will be deposited at Newark Museum in due course. The contents of the archive are tabulated below (Table 1).

Table 1: Quantification of site paper archive

Borehole/test pit sheets	0
Section sheets	0
Plans sheets	0
Colour photographs	0
B&W photos	0
Digital photos	46
Sample register	0
Drawing register	0
Watching brief forms	0
Trench Record forms	0

Table 2: Quantification of artefact and environmental samples

Bulk finds (quantity e.g. 1 bag, 1 box, 0.5 box 0.5 of a box)	0
Registered finds (number of)	0
Flots and environmental remains from bulk samples	0
Palaeoenvironmental specialists samples (e.g. columns, prepared slides)	4 kubiena tins, 6 bulk samples, OSL sample and moisture control
Waterlogged wood	0
Wet sieved environmental remains from bulk samples	0

4. RESULTS

4.1. Lithology

Trench Section

- 4.1.1. The basal unit within this section consisted of light orange-yellow clayey sand and subrounded to rounded gravel (coarse-grained alluvium) including flint and quartzite. The depth/elevation of the surface of this unit was 10.30m OD. The unit forms the base of a possible feature or channel excavated by Archaeology Wales.
- 4.1.2. The clayey sand and gravel unit was overlain by a 0.50m thick unit of waterlogged moderately humified organic silt-clay peat. This unit was not only deposited within the sectioned feature/channel area, but also as a thin skim present proximally within the section of the trench. The surface of this unit was reached at 10.80m OD. Three tins and associated bulk samples of this sediment were retrieved to allow for the potential of palaeoenvironmental analysis and radiocarbon dating.
- 4.1.3. The waterlogged organic sequence was overlain by a 0.08m thick unit of mid grey silt and clay (surface of 10.88m OD). This unit represents gradually accumulated fine-grained overbank flood inundation deposits (alluvium) that remain seasonally waterlogged. It is overlain by a desiccated 0.10m thick layer of stiff orange-brown oxidised and mottled slightly sandy silt and clay. This unit also represents overbank flood alluvium though by its mineralisation shows it lies permanently above the water table. The surface of this unit was reached at 0.30m BGL (10.98m OD).
- 4.1.4. The uppermost layer from the section represents a dark grey-brown modern and ploughed agricultural topsoil, which contained frequent root penetration. It was recorded as 0.30m thick.

Mound Area

- 4.1.5. The basal unit of the section taken within the burnt mound area consisted of the same coarse-grained alluvium recorded within the trench section. The depth/elevation of the surface of this unit was 10.57m OD. It was overlain by a thin skim of inorganic, seasonally waterlogged blue-grey slightly sandy silt-clay (alluvium), measuring 0.10m in thickness.
- 4.1.6. The interpreted burnt mound area makes up the uppermost deposit of the section, overlying the coarse and fine-grained alluvial deposits. It was found to contain frequent small-medium sized sub-angular to angular gravel and frequent charcoal fragments. The gravel was interpreted by the archaeological excavation as originating from thermally cracked stones, with the charcoal assumed to

originating from the fuel used to heat the stones. From the recorded section, this unit was 0.13m thick.

- 4.1.7. The extent of the burnt mound was difficult to discern, represented as a spread rather than a “mound” which seemed to merge with another deposit of dark grey-black silt-clay material around the margins of the extended trench area. The absence of angular (heat affected) stones (and possibly of charcoal?) within this unit distinguishes it from the burnt mound material.

5. THE FINDS

5.1 Summary

5.1.1. No finds were recovered during the sampling.

6. THE ENVIRONMENTAL SAMPLES

6.1 Summary

6.1.1. Four Kubiena tins, six associated bulk samples, and an OSL sample were recovered from the site and are suitable for further analysis. The details of each of the samples are listed below.

Table 3: Summary of samples retrieved from small peat filled feature/channel within Trench 90

Sample No.	Context	Sediment description	Depth within section (m BGL)	Depth (m OD)	Bulk sample depth range (m)	Associated with
32	90016	Dark brown-black friable moderately humified organic silty peat, with some root penetration from the upper. Ag2 Th2 Sh+	0.57-0.98	10.68-10.27	0.00-0.10	Tin 1
32	90016	Dark brown-black friable moderately humified organic silty peat, with some root penetration from the upper. Ag2 Th2 Sh+	0.57-0.98	10.68-10.27	0.10-0.20	Tin 1/2
32	90016	Dark brown-black friable moderately humified organic silty peat, with some root penetration from the upper. Ag2 Th2 Sh+	0.57-0.98	10.68-10.27	0.20-0.30	Tin 2/3
32	90016	Dark brown-black friable moderately humified organic silty peat, with some root penetration from the upper. Ag2 Th2 Sh+	0.57-0.98	10.68-10.27	0.30-0.40	Tin 3

Table 4: Summary of samples retrieved from the burnt mound area within Trench 90

Sample No.	Context	Sediment description	Depth from top of excavated area (m)	Depth (m OD)	Bulk sample depth range (m)	Associated with
34		Dark grey-black clast supported sub-angular to angular medium gravel with some sand and silt, charcoal rich - Burnt mound material	0.00-0.13	10.94-10.81	0.00-0.13	Tin 4
34		Blue-grey occasionally mottled orange silt-clay - Fine-grained Alluvium	0.13-0.23	10.81-10.71	0.13-0.23	Tin 4

Sample No.	Context	Sediment description	Depth from top of excavated area (m)	Depth (m OD)	Bulk sample depth range (m)	Associated with
35/36		Yellow-orange silt-clay sand with rounded-subrounded gravel - Coarse grained Alluvium	0.23-0.44	10.57	n/a	OSL and associated moisture control sample

7. DISCUSSION AND CONCLUSIONS

7.1 Discussion of deposits

- 7.1.1 The site lies primarily on the Holme Pierrepont Terrace, the older, Late Devensian (30-25 ka BP) terrace gravels which lies topographically above the wider and more commonly reworked Trent Valley floodplain. As such, it is likely that large parts of the wider site remain intact of fluvial reworking and therefore have a high potential for the preservation of multi-period archaeology ranging from the Late Upper Palaeolithic to early modern period. The elevated, drier land of the terrace may be considered an advantageous site for settlement, with the lower lying adjacent Trent floodplain only a short distance away providing a rich resource for any potential settlers. This has been demonstrated with the Late Upper Palaeolithic occupation of Farndon Fields (Garton and Jacobi, 2009; Garton et al., 2020), located c. 3.50km away on the south bank of the Trent which also lies on the Holme Pierrepont Terrace.
- 7.1.2 The discovery of a burnt mound at the edge of a LiDAR mapped palaeochannel (Trench 90), adds another location to the increasing number of burnt mounds recorded through archaeological evaluation within the Trent Valley. These locations include Willington, Derbyshire (Beamish, 2009), Gonalston, Nottinghamshire (Elliot and Knight 1998), and immediately east adjacent to Farndon Fields (OA, 2008; 2022a; b). These features often have associated oak troughs and post holes, with the heated stones placed within the trough to warm water (Beamish and Ripper, 2000). Thermoluminescence undertaken at (one of) the Gonalston burnt mounds returned a late Neolithic-Early Bronze Age date (QTLs-THM-35 2720+/-30 cal. BC, QTLs-THM-22 1940+/-30 cal. BC), which correlates with the general age of such features nationally. This may give a broad a similar Neolithic-Bronze Age period of deposition for the mound evaluated on site. Analysis of the OSL sample taken from the sands and gravels which may relate to the channel underlying the burnt mound, in addition to dating material from the mound itself, would provide a minimum age of channel activity/terrace age for this site, in turn providing a maximum age for the mound deposition on the site area. Dating the underlying gravels may also provide further information relating the LUP potential of the site.
- 7.1.3 Organic sediments recorded and sampled within Trench 90 originate from a small (c. 0.50m width) and fairly steep sided cut within the mapped Holme Pierrepont Terrace. It seems more likely that organic sediments have infilled into a man-made feature cut into the gravels rather than a much wider shallower gradient channel than is mapped. The retrieved samples allow for the possibility of discerning an age

of this deposit, through dating and palaeoenvironmental assessment, which could be associated with the burnt mound deposit.

- 7.1.4 Organic sediments have though been recorded within the same palaeochannel mapped partly within Trench 90, south of the site area, directly underlying the surface ploughsoil during borehole recording as part of the A46 survey (YA, pers comm). This suggests there may be intact waterlogged organic deposits in areas as yet unevaluated within the mapped palaeochannel area. This may also include potential preservation of organic sediments within another palaeochannel north of Trench 90 (Figure 03). The organic deposits from this site have a high potential for preserving early-mid post-glacial (Holocene) landscape change, inferred from the nearby dating undertaken within two palaeochannels at Staythorpe power station. Middle Mesolithic age determinations were recorded from organic sediments which truncate the topographically elevated BGS mapped Holme Pierrepont Terrace, in addition to recovering human occupation evidence (Davies et al., 2001; Myers, 2006; Figure 02).
- 7.1.5 Organic sediments dating from the Early-Middle Holocene are fairly rare in the Trent Valley due to the Trent's frequency of lateral migration, including its considered anastomosing (multi-channel) profile throughout the Middle Holocene, which has led to frequent sediment reworking. Should similar ages to those from Staythorpe be returned in this area away from the more frequently reworked wider floodplain, this would further aid in improving our limited understanding early Post-glacial landscapes and environmental change within the East Midlands.

7.2 Potential impact on deposits

- 7.2.1 The planning application of the site is to entail the development of a solar powered farm. The impact depths of truncation of the site are currently unknown.
- 7.2.2 The incidence of shallow depth organic silt-clay peat deposits within the palaeochannel south of the site, of probable Post-Glacial age and with a high potential for archaeological remains, indicates that any further evaluation of the site area within and marginal to the channel area(s) be further investigated/monitored to mitigate any loss of environmental and archaeological remains.

7.3 Recommendations and conclusions

- 7.3.1 Multi-proxy palaeoenvironmental analysis of waterlogged organic sediments, including those sampled within this stage of investigation, or from deposits possibly revealed and sampled from future stages, will be able to reconstruct

local/regional landscape change through history in addition to any indicative human influence on the landscape.

- 7.3.2 This analysis would also aid in answering a greater range of regional research objectives as listed in the East Midlands Historic Environment Research Framework (EMHERF; <https://researchframeworks.org/emherf/>).

BIBLIOGRAPHY

Beamish, M.G., 2009. Island visits: Neolithic and Bronze Age activity on the Trent Valley floor. excavations at Egginton and Willington, Derbyshire, 1998–1999. *Derbyshire Archaeological Journal*, 129, pp.17-172.

Beamish, M. and Ripper, S., 2000. Burnt mounds in the East Midlands. *Antiquity*, 74(283), pp.37-37.

BGS. 2023. Superficial and Bedrock geology. *Geology of Britain viewer* [online]. Available at: https://geologyviewer.bgs.ac.uk/?_ga=2.12208884.1985785610.1687428725-533062606.1687428725

Bridgland, D.R, Howard, A.J, White M.J and White, T.S. 2014. *Quaternary of the Trent*. Oxbow Books: Oxford & Philadelphia.

Brown, A.G., Toms, P.S., Carey, C.J., Howard, A.J. and Challis, K. 2013. Late Pleistocene–Holocene river dynamics at the Trent-Soar confluence, England, UK. *Earth Surface Processes and Landforms*, 38(3), 237-249.

Collins, C. 2018. Cromwell North: An Archaeological Trial Trench Evaluation and Borehole Survey. Nottingham: Trent & Peak Archaeology unpublished report.

Chartered Institute for Archaeologists (CIfA), 2019. Code of conduct, Chartered Institute for Archaeologists.

Chartered Institute for Archaeologists (CIfA), 2020, Standard and guidance for archaeological field evaluation, Chartered Institute for Archaeologists.

Chartered Institute for Archaeologists (CIfA), 2020, Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials. Chartered Institute for Archaeologists.

Chartered Institute for Archaeologists (CIfA), 2020, Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives. Chartered Institute for Archaeologists.

Davies, G., Buckland, P., Chamberlain, A., Richards, M., Tweddle, J. and Tyers, I. 2001. A palaeoenvironmental study and watching brief on borrow pits at Staythorpe Power Station, Staythorpe, Nottinghamshire. Arcus, Sheffield.

Edwards. 2015. Flash Farm, Averham, Nottinghamshire Trial Trenching.

Elliot, L. & Knight, D. 1998. A burnt mound at Holme Dyke, Gonalston, Nottinghamshire. *Transactions of the Thoroton Society of Nottingham* 102, 15–21

Garcia Rovira, I. 2021. Land at Kelham Newark, Desk Based Assessment. AE Report 2027.

Garton, D, Howard, A.J and Pearce, M. 1997. Archaeological investigations at Langford quarry, Nottinghamshire 1995-1996. *Tarmac Papers vol. 1*.

Garton, D. and Jacobi, R.M., 2009. An Extensive Late Upper Palaeolithic Flint Scatter at Farndon Fields, Near Newark, Nottinghamshire. *Archaeological Journal*, 166(1), pp.1-38.

Garton, D., Barton, N. and Bateman, M.D., 2020. Farndon Fields, Newark, Nottinghamshire: Windermere Interstadial deposits with potential for Late Upper Palaeolithic human activity. *Mercian Geologist*, 20(1).

Grant, M.J. and Harding, P. 2014. Farndon Fields, Nottinghamshire: in situ multi-phased Late Upper Palaeolithic activity on the floodplain. *PAST: Newsletter of the Prehistoric Society*, 76, 2-3.

Historic England. 2011. Environmental Archaeology. A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation (second edition). Swindon. Historic England.

Historic England. 2015b. Geoarchaeology: Using earth sciences to understand the archaeological record. Swindon. Historic England.

Historic England. 2016. Preserving archaeological remains: Decision-taking for sites under development. Swindon. Historic England.

Historic England. 2020. Deposit Modelling and Archaeology: Guidance for mapping buried deposits. Swindon. Historic England.

Historic England. 2022. Radiocarbon Dating and Chronological Modelling: guidelines and best practice. Swindon. Historic England.

Howard, A.J., Carney, J.N., Greenwood, M.T., Keen, D.H., Mighall, T., O'Brien, C. and Tetlow, E., 2011. The Holme Pierrepont sand and gravel and the timing of Middle and Late Devensian floodplain aggradation in the English Midlands. *Proceedings of the Geologists' Association*, 122(3), pp.419-431.

Knight, D. 1994. Archaeological investigations prior to the construction of a replacement water main between Newark and Kelham, Notts: Summary of fieldwalking, Geophysical survey, and trial excavations. Trent and Peak Archaeological Trust, Nottingham. Unpublished report.

Malone, S., Stein, S. 2017. *Mapping the Palaeochannels of the Trent Catchment. Stage 2. Derbyshire, Leicestershire, Lincolnshire, North Lincolnshire, Staffordshire and Warwickshire* Trent & Peak Archaeology: Nottingham.

May, J. 1970. An Iron Age square enclosure at Aston upon Trent, Derbyshire: a report on excavations in 1967. *Derbyshire Archaeological Journal*, 90, 10-21.

Muller, J. 2022. Land to the west of Kelham, Nottinghamshire. AE Report 2092.

Myers, A.M. 2006. An archaeological resource assessment and research agenda for the Mesolithic in the East Midlands. In: Cooper, N.J., ed. 2006. *The Archaeology of the East Midlands: an archaeological resource assessment and research agenda*. Ch.2, pp.51-68. University of Leicester.

Nottinghamshire County Council. 2019. *Historic Environment Record* [online]. Nottingham: Nottinghamshire County Council.

Oxford Archaeology (OA) South, 2008. Land south of Newark: Archaeological evaluation Report. Unpublished OA report.

Oxford Archaeology (OA) North, 2022a. Newark Phases 2-3: Geoarchaeological Watching Brief Report. Unpublished OA report.

Oxford Archaeology (OA) North, 2022b. Newark Phases 2-3: Fieldwalking Report. Unpublished OA report.

Priest, V. and Knight, D. 1997. Newark to Kelham replacement water main: Archaeological watching brief. Trent and Peak Archaeological Trust, Nottingham. Unpublished report.

Stein, S and Malone, S. 2017. *Mapping the Palaeochannels of the Trent Catchment. Stage 2. Derbyshire, Leicestershire, Lincolnshire, North Lincolnshire, Staffordshire and Warwickshire*. Trent & Peak Archaeology: Nottingham.

TPA. 2018. *Archaeological Monitoring and Paleoenvironmental Assessment at Cromwell Quarry (Phases 1-7), Cromwell, Nottinghamshire*. Unpublished Trent & Peak Archaeology report 164/2019.

Troels-Smith, J. 1955. Karakterisering af løse jordarter (characterisation of unconsolidated sediments). *Denmarks Geologiske Undersøgelse*, Series IV/3, 10, 73.

Wilson, R.J.A. 1996. *From River Trent to Raqqa: Nottingham University Archaeological Fieldwork in Britain, Europe and the Middle East, 1991-1995*. Nottingham: University of Nottingham.

ACKNOWLEDGEMENTS

YA would like to thank Archaeology Wales for commissioning the work.

FIGURES

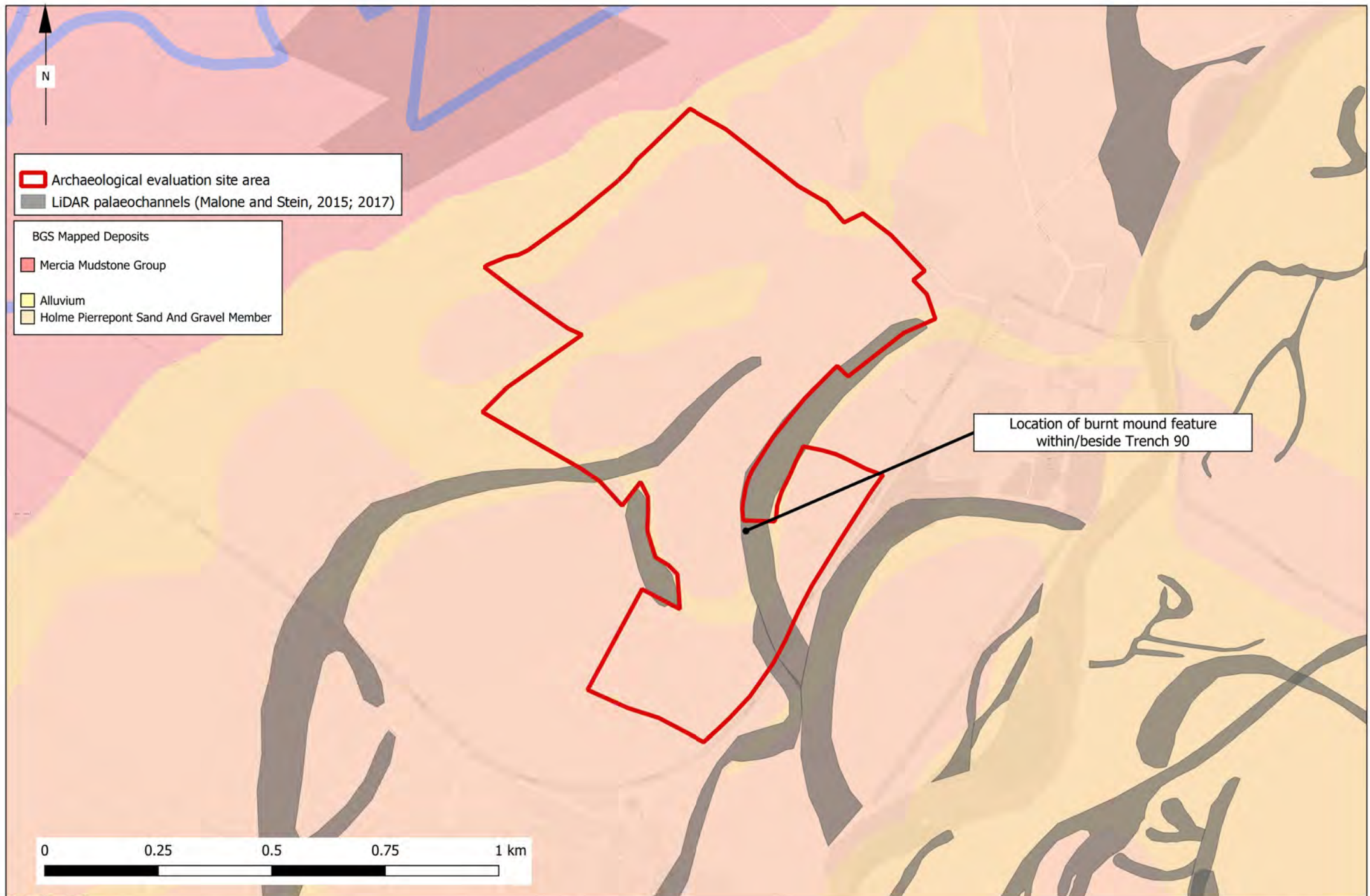


Figure 01: Mapped BGS Bedrock and Superficial deposits which lie in and around the site area
Archaeological evaluation of land west of Kelham

Scale of map at A3 - 1:7500
Drawn by: RL

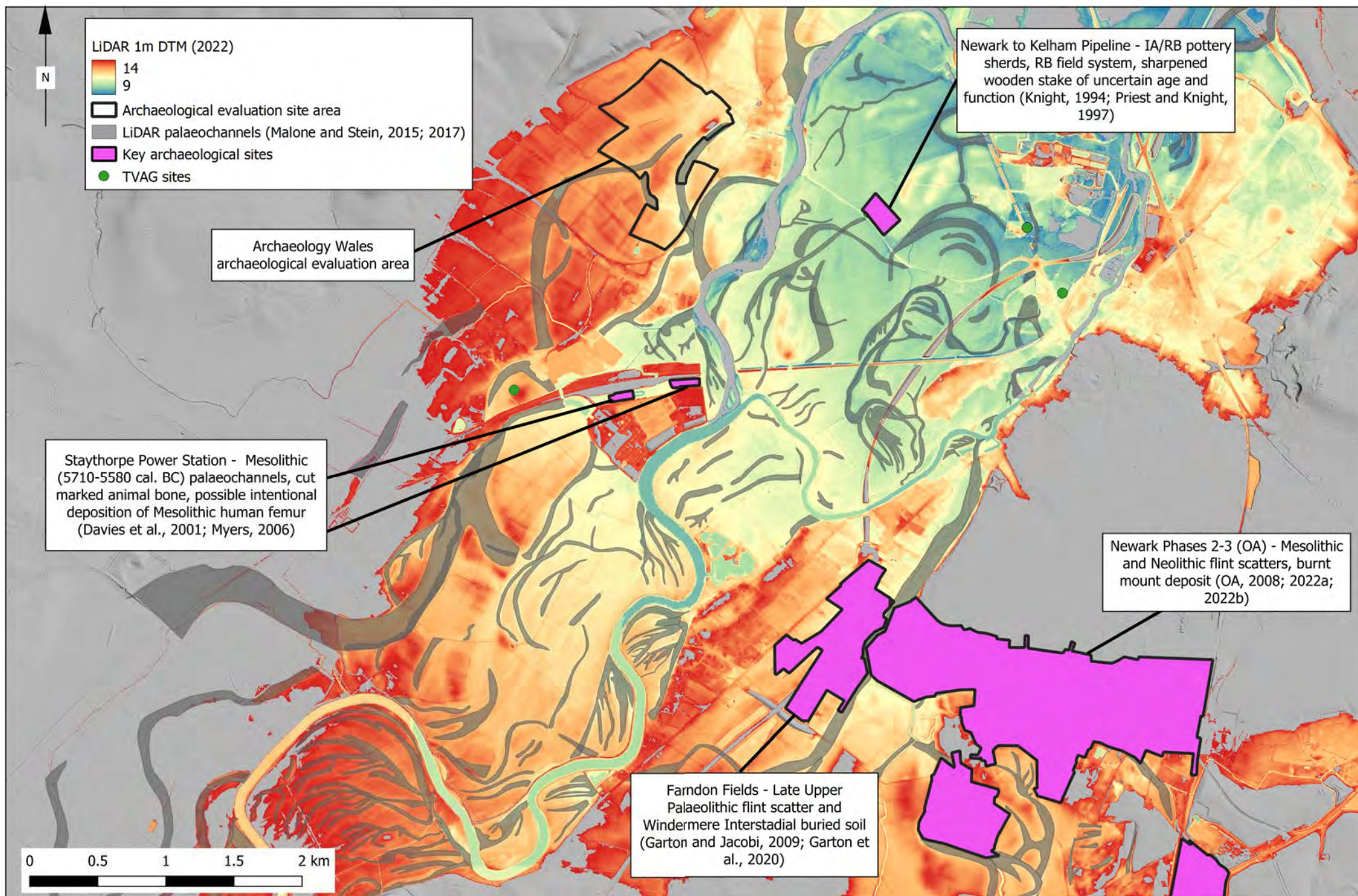


Figure 02: Overview of archaeological finds and studies carried out around Newark
Archaeological evaluation of land west of Kelham

Scale of map at A3 - 1:25000
Drawn by: RL

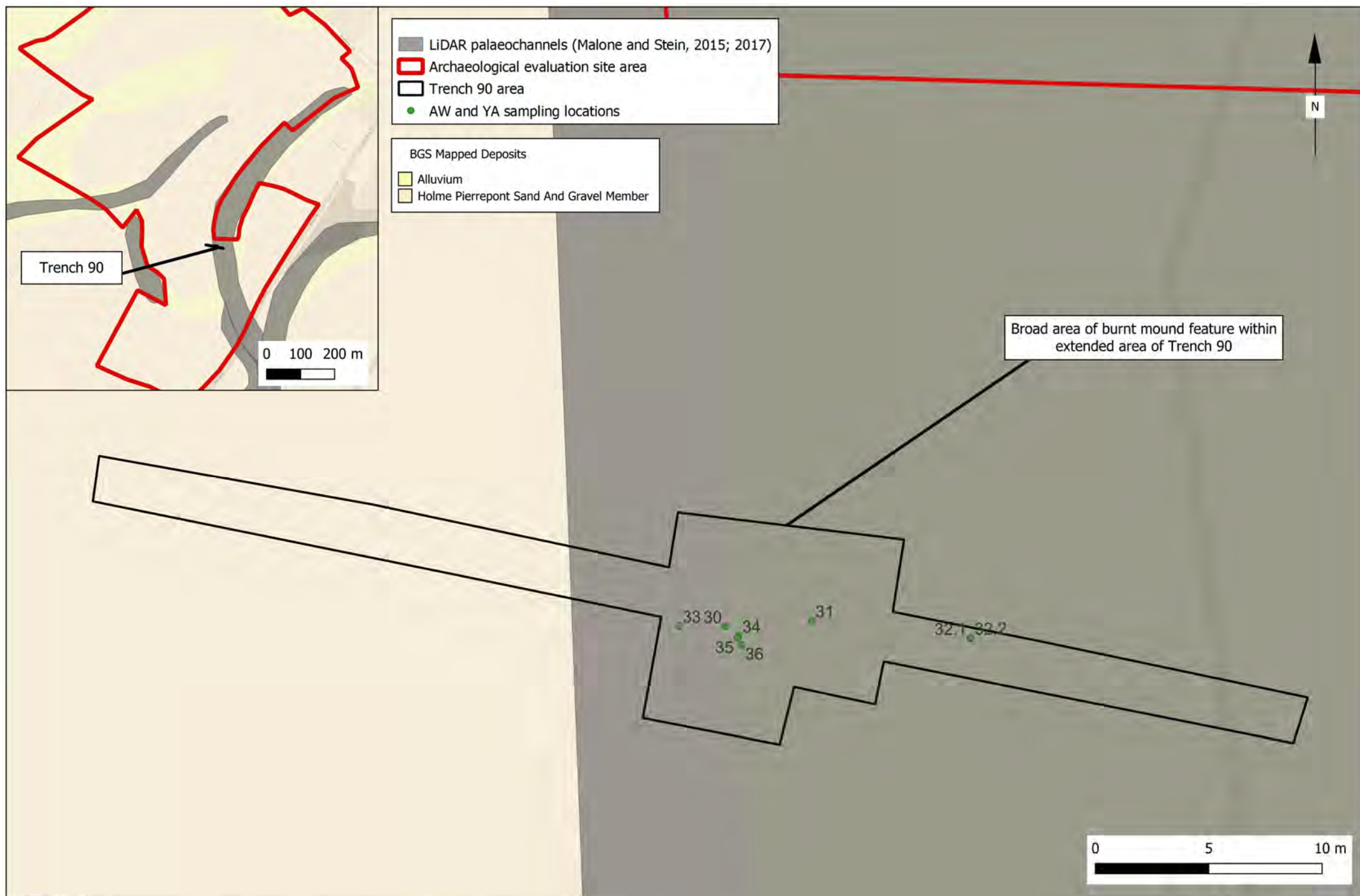


Figure 03: Samples taken within Trench 90. The broad area of the burnt mound deposit is also shown.
Archaeological evaluation of land west of Kelham

Scale of map at A3 - 1:150
Drawn by: RL

Appendix 1

Troels-Smith

Darkness	Degree of Stratification	Degree of Elasticity	Degree of Dryness
nig.4 black	strf.4 well stratified	elas.4 very elastic	sicc.4 very dry
nig.3	strf.3	elas.3	sicc.3
nig.2	strf.2	elas.2	sicc.2
nig.1	strf.1	elas.1	sicc.1
nig.0 white	strf.0 no stratification	elas.0 no elasticity	sicc.0 water

	Sharpness of Upper Boundary
lim.4	< 0.5mm
lim.3	< 1.0 & > 0.5mm
lim.2	< 2.0 & > 1.0mm
lim.1	< 10.0 & > 2.0mm
lim.0	> 10.0mm

	Sh	<i>Substantia humosa</i>	Humous substance, homogeneous microscopic structure
I Turfa	Tb	<i>T. bryophytica</i>	Mosses +/- humous substance
	Tl	<i>T. lignosa</i>	Stumps, roots, intertwined rootlets, of ligneous plants
	Th	<i>T. herbacea</i>	Roots, intertwined rootlets, rhizomes of herbaceous plants
II Detritus	Dl	<i>D. lignosus</i>	Fragments of ligneous plants >2mm
	Dh	<i>D. herbosus</i>	Fragments of herbaceous plants >2mm
	Dg	<i>D. granosus</i>	Fragments of ligneous and herbaceous plants <2mm >0.1mm
III Limus	Lf	<i>L. ferrugineus</i>	Rust, non-hardened. Particles <0.1mm
IV Argilla	As	<i>A. steatodes</i>	Particles of clay
	Ag	<i>A. granosa</i>	Particles of silt
V Grana	Ga	<i>G. arenosa</i>	Mineral particles 0.6 to 0.2mm
	Gs	<i>G. saburralia</i>	Mineral particles 2.0 to 0.6mm
	Gg(min)	<i>G. glareosa minora</i>	Mineral particles 6.0 to 2.0mm
	Gg(maj)	<i>G. glareosa majora</i>	Mineral particles 20.0 to 6.0mm
	Ptm	<i>Particulaetestaemollosorum</i>	Fragments of calcareous shells

Physical and sedimentary properties of deposits according to Troels-Smith (1955)

Written Scheme of Investigation

For an Archaeological Evaluation

at land west of Kelham, Nottinghamshire

Prepared for: Sirius Planning Ltd

Project No: 2797

31.01.23



Contents	Page
<i>Summary</i>	3
1. Introduction and planning background	3
2. Site Description	4
3. Archaeological background	4
4. Objectives	4
5. Timetable of works.....	5
5.1. Fieldwork.....	5
5.2. Report delivery	5
6. Fieldwork.....	5
6.1. Detail.....	5
6.2. Recording.....	7
6.3. Finds.....	7
6.4. Environmental sampling strategy.....	8
6.5. Human remains.....	8
6.6. Specialist advisers	8
7. Monitoring	9
8. Post-fieldwork programme	10
8.1. Archive assessment.....	10
8.2. Reports and archive deposition.....	11
9. Staff	12
Additional Considerations	12
10. Health and Safety.....	12
10.1. Risk assessment	12
10.2. Other guidelines.....	12
11. Community Engagement and Outreach	12
12. Insurance	12
13. Quality Control	13
13.1. Professional standards.....	13
13.2. Project tracking	13
14. Arbitration	13
15. References.....	13

Figure 1. Site location

Figure 2. Development boundary

Figure 3. NMP cropmarks/soilmarks

Figure 4. Geophysical survey results

Figure 5. Trench layout

Figure 6. Trenches overlaid on NMP plan

Summary

This Written Scheme of Investigation (WSI) details a programme of intrusive trial trench evaluation to be undertaken by Archaeology England Ltd (AE) at the request of Sirius Planning Ltd.

The field evaluation will cover 1.50% of the overall proposed development area (PDA), targeting geophysical anomalies and cropmarks/soilmarks previously evidenced within the PDA. 102x 50m trenches will be cut throughout the PDA.

All work will be undertaken in accordance with the standards and guidelines of the Chartered Institute for Archaeologists (2020).

1. Introduction and planning background

- 1.1.1. This WSI details the methodology for a programme of intrusive trial trench evaluation to be undertaken in association with the proposed development of a solar farm on land located to the west of Kelham, Nottinghamshire (centered on NGR SK 76640 55525).
- 1.1.2. In 2021, a Desk Based Assessment (Garcia Rovira 2021), and in 2022 a geophysical survey (Muller 2022), helped defining the heritage baseline and archaeological potential of the proposed development site. In doing so, it was established that human activity within the wider area was present from early prehistory onwards, with a peak of activity observed during Iron Age/Roman chronologies.
- 1.1.3. Within the PDA, Historic England's National Mapping Programme (NMP) has recorded clusters of soil and cropmarks which have been tentatively interpreted as concentrations of Iron Age and Roman activity. The geophysical surveys carried out within the PDA (see Muller 2022) have allowed confirming the archaeological nature of the soil and cropmarks and offered further detail. In order to assess the presence/absence and character of the archaeological resource of the area, 127 x 50m trenches will be cut within the PDA.
- 1.1.4. The methodology set out in this WSI has been agreed with Matthew Adams, Historic Environment Officer to Lincolnshire County Council. It has been recommended that an intrusive archaeological evaluation of the development area is undertaken prior to the determination of the planning application to assess the impact of the proposed development on the archaeological resource.
- 1.1.5. This WSI has been prepared by Jessica Woolley BA (Hons) MA, Assistant Supervisor, Archaeology England Ltd (henceforth - AE) at the request of Sirius Planning Ltd.
- 1.1.6. All work will be undertaken to the standards and guidance set by the Chartered Institute for Archaeologists (2020).

2. Site Description

- 2.1.1. The site is located to the west of the village of Kelham, Nottinghamshire and c. 3.8km to the northeast of Newark-upon-Trent. The area is currently used for agricultural purposes; it encompasses 64 hectares, including two large, irregular fields and two smaller fields, bounded to the east by Broadgate Lane, to the north and west by a number of fields of small and medium size, and to the south by the A617.
- 2.1.2. The underlying geology of the site is comprised of mudstone belonging to the Mercia Mudstone Group. This sedimentary bedrock was formed approximately 201 to 252 million years ago in the Triassic Period. The bedrock is overlain with superficial deposits of sand and gravel belonging to the Holme Pierrepont Sand and Gravel Member. These deposits formed up to 2.6 million years ago in the Quaternary Period (BGS 2023).

3. Archaeological background

- 3.1.1. The nature and the potential impact of the proposed development on the archaeological/historic resource of the site and surrounding area has been examined through Historic England's National Mapping Programme, a DBA, with a site walkover, and a geophysical survey (Garcia Rovira 2021; Muller 2022). The text below summarises the results obtained with regards to the features recorded within the site itself.
- 3.1.2. Historic England's NMP has mapped the landscape development over time using tools such as aerial photography and LiDAR imagery. The NMP has documented concentrations of cropmarks/soilmarks within the PDA. It has been suggested that some of the cropmarks present show settlement patterns dating to the Iron Age and Roman periods as well as post-medieval boundaries (Figure 3).
- 3.1.3. Cropmarks located towards the westernmost end of the development site were also observed in a field evaluation carried out by Phoenix Consulting Archaeological in 2015 at Flash Farm. Out of the 47 trenches, a large proportion of the features present dated between the Bronze Age and Roman period (Edwards 2015).
- 3.1.4. Between 2021 and 2022, AE also carried out a geophysical survey focused upon 56 hectares of land within the development site. The survey identified four areas with anomalies characteristic of archaeological features in Fields A, B and C. Many of these anomalies related to cropmarks/soilmarks recorded by the NMP. However, the survey also highlighted that Field B had a density of other archaeological anomalies, whilst cropmarks recorded by the NMP in Field D were enhanced, and finally it identified another linear anomaly that the NMP had not recorded (Figure 4).

4. Objectives

- 4.1.1. This WSI sets out a program of works to ensure that the intrusive trial trench evaluation will meet the standard required by The Chartered Institute for

Archaeologist's *Standard and Guidance for Archaeological Field Evaluation* (2020).

- 4.1.2. The objective of the intrusive trial trench evaluation will be to locate and describe, by means of strategic trial trenching, archaeological features that may be present within the development area. The work will elucidate the presence or absence of archaeological material, its character, distribution, extent, condition and relative significance. The work will include an assessment of regional context within which the archaeological evidence rests and will aim to highlight any relevant research issues within national and regional research frameworks.
- 4.1.3. The intrusive trial trench evaluation will result in a report that will provide information of sufficient detail to allow informed planning decisions to be made which can safeguard the archaeological resource. Preservation in situ will be advocated where at all possible, but where engineering or other factors result in loss of archaeological deposits, preservation by record will be recommended.

5. Timetable of works

5.1. Fieldwork

- 5.1.1. The work is proposed to start on the 20th of February 2023. Archaeology England will update Matthew Adams, Historic Environment officer to Lincolnshire County Council with the exact date.

5.2. Report delivery

- 5.2.1. The report will be submitted to Sirius Planning Ltd and to Matthew Adams, within three months of the completion of the fieldwork. A copy of the report will also be sent to the regional HER.

6. Fieldwork

6.1. Detail

- 6.1.1. The work will be undertaken to meet the standard required by The Chartered Institute for Archaeologist's *Standard and Guidance for Archaeological Field Evaluation* (2020).
- 6.1.2. The archaeological project manager in charge of the work will satisfy him/herself that all constraints to ground works have been identified, including the siting of live services and Tree Preservation Orders.
- 6.1.3. The agreed evaluation areas will be positioned to maximise the retrieval of archaeological information and to ensure that the archaeological resource is understood.
- 6.1.4. It is proposed that 102 (50m) trenches will be machine-excavated within the planned development area (Figure 5-6). The exact positioning of the trenches will

depend on the position of any extant services or other obstructions that come to light during the initial phase of ground works. The locations and dimensions of the trenches will be agreed with Matthew Adams, Historic Environment officer to Lincolnshire County Council prior to the commencement of works. 1200m contingency has been agreed to evaluate areas which do not yield conclusive results after the main evaluation trenches have been cut.

6.1.5. The evaluation trenches (Trenches 1-102) will be excavated to the top of the archaeological horizon by a machine fitted with a toothless grading bucket under close archaeological supervision. All areas will be subsequently hand cleaned using pointing trowels and/or hoes to prove the presence, or absence, of archaeological features and to determine their significance. Once the

6.1.6. The excavation of the minimum number of archaeological features will be undertaken, to elucidate the character, distribution, extent and importance of the archaeological remains. In some instances where a number of features clearly evidence components of a single structure, only a sample selection of features will be excavated, advocating preservation *in situ*. In every instance, the sample selection will be agreed prior excavation with Matthew Adams, Historic Environment officer to Lincolnshire County Council.

6.1.7. As a minimum, small discrete features will be fully excavated, larger discrete features will be half-sectioned (50% excavated) and long linear features will be sample excavated along their length - with investigative excavations distributed along the exposed length of any such feature and to investigate terminals, junctions and relationships with other features. Should this percentage excavation not yield sufficient information to allow the form and function of archaeological features/deposits to be determined full excavation of such features/deposits will be required.

6.1.8. Sufficient excavation will be undertaken to ensure that the natural horizons are reached and proven, where this can be practically and safely achieved. If safety reasons preclude manual excavation to natural, hand augering may be used to try to assess the total depth of stratification within each area. The depth of the excavation will conform to current safety requirements. If excavation is required below 1.2m the options of using shoring will be discussed with the client and Matthew Adams, Historic Environment officer to Lincolnshire County Council.

6.1.9. Where potentially significant archaeological features be encountered during the course of the evaluation then Matthew Adams, Historic Environment officer to Lincolnshire County Council and the client will be informed at the earliest possible opportunity. Matthew Adams may subsequently request that further archaeological work is undertaken in order to fully evaluate areas of significant archaeological activity. Such work may require the provision of additional time and resources to complete the archaeological investigation.

6.2. Recording

- 6.2.1. A site code will be allocated ahead of any fieldwork commencing. This code will be used to label all sheets, plans and other drawings; all context and recording sheets and other elements forming the archive.
- 6.2.2. Recording will be carried out using AE recording systems (pro-forma context sheets etc) using a continuous number sequence for all contexts.
- 6.2.3. Plans and sections will be drawn to a scale of 1:50, 1:20 and 1:10 as required and related to Ordnance Survey datum and published boundaries where appropriate.
- 6.2.4. All features identified will be tied into the OS survey grid and fixed to local topographical boundaries.
- 6.2.5. Photographs will be taken in digital format with an appropriate scale, using a 12MP camera with photographs stored in Tiff format.
- 6.2.6. Sections containing significant deposits, including half sections, will be drawn at an appropriate scale, usually 1:10 or 1:20. All sections will be related to the Ordnance Datum using spot heights and registers of sections and plans will be kept.
- 6.2.7. Upon completion of each significant feature at least one sample section will be drawn, including a profile of the top of natural deposits (extrapolated from cut features etc. if it has not been fully excavated). The stratigraphy will be recorded, even if no archaeological deposits have been identified.
- 6.2.8. At least one section of the trenches will be drawn/photographed.

6.3. Finds

- 6.3.1. Artefacts from topsoil and subsoil and unstratified contexts will be noted but not retained unless they are of intrinsic interest. All artefacts will be collected from stratified excavated contexts except for large assemblages of post-medieval or modern material. Such material may be noted and not retained, or (if appropriate), a representative sample may be collected and retained.
- 6.3.2. All identified finds, artefacts, industrial and faunal remains will be collected and retained. Certain classes of building material can sometimes be discarded after recording if an appropriate sample is retained.
- 6.3.3. Excavated material will be examined in order to retrieve artefacts to assist in the analysis of the spatial distribution of artefacts.
- 6.3.4. All finds, where appropriate, shall be washed. All pottery and other finds where appropriate, shall be marked with the site code and context number. Marking of finds will follow the requirements of the local museum.
- 6.3.5. The finds assemblage will be retained for deposition with the site archive at the appropriate museum. Marking of finds will follow the requirements of the local museum.
- 6.3.6. All finds which constitute Treasure under the 1996 Treasure Act for England and Wales will be reported to the coroner within 14 days of discovery.

6.3.7. Should finds that require immediate conservation be encountered, they will be exposed, lifted, cleaned, conserved, marked, bagged, and boxed in accordance with the guidelines set out in the United Kingdom Institute for Conservation Guideline No. 2 22. Appropriate guidance set out in the Museums and Galleries Commissions *Standards in the Museum Care of Archaeological Collections* 23 and the current ClfA guidelines 24 will also be followed. Packaging of all organic finds and metalwork will follow the UKIC/Rescue guidelines, *First Aid for Finds* 25. Any necessary, conservation and treatment of metalwork will be arranged in conjunction with specialist conservators. Any necessary, conservation and treatment of metalwork will be arranged in conjunction with specialist conservators (normally Phil Parkes at Cardiff University).

6.4.Environmental sampling strategy

6.4.1. Deposits with a significant potential for the preservation of palaeoenvironmental material will be sampled, by means of the most appropriate method (bulk, column etc).

6.4.2. AE will draw up a site-specific sampling strategy alongside a specialist environmental archaeologist. All environmental sampling and recording and will follow English Heritage's *Guidelines for Environmental Archaeology* (2nd Edition 2011).

6.5.Human remains

6.5.1. In the event that human remains are encountered, their nature and extent will be established, and the coroner informed. All human remains will be left in situ and protected during backfilling. Where preservation in situ is not possible the human remains will be fully recorded and removed under conditions that comply with all current legislation and include acquisition of licenses and provision for reburial following all analytical work. Human remains will be excavated in accordance with the Chartered Institute for Archaeologist's *Excavation and Post-Excavation Treatment of Cremated and Inhumed Human Remains: Technical Paper Number 13* (2004).

6.6.Specialist advisers

6.6.1. In the event of certain finds, features or sites being discovered, AW will seek specialist opinion and advice. A list of specialists is given in the table below although this list is not exhaustive.

Artefact type	Specialist
Lithics	Dr Julie Birchenall (Freelance)
Animal bone	Dr Richard Madgwick (Cardiff University) Dr Hannah Russ (Freelance)

Artefact type	Specialist
CBM, heat affected clay, Daub etc.	Dr Siân Thomas (Archaeology Wales) Dr Phil Mills (Freelance) Sandra Garside Neville (Freelance)
Clay pipe	Charley James Martin (Archaeology Wales)
Glass	Rowena Hart (Archaeology Wales)
Cremated and non-cremated human bone	Malin Holst (University of York) Dr Richard Madgwick (Cardiff University)
Metalwork	Dr Rhiannon Philp (Archaeology Wales) Dr Kevin Leahy (PAS/University of Leicester) Quita Mould (Freelance)
Metal work and metallurgical residues	Dr Tim Young (GeoArch)
Neo/BA pottery	Dr David Mullin (Freelance) Dr Alex Gibson (Bradford University)
IA/Roman pottery	Dr Jane Timby (Freelance)
Roman Pottery	Dr Siân Thomas (Archaeology Wales) Dr Peter Webster (Freelance)
Medieval and Post Medieval Pottery	Paul Blinkhorn (Freelance)
Charcoal (wood ID)	Dana Challinor (Freelance)
Waterlogged wood	Professor Nigel Nayling (University of Wales - Lampeter) Damian Goodburn (MOLA) Mike Bamforth (Freelance)
Marine Molluscs	Dr Rhiannon Philp (Archaeology Wales)
Pollen	Dr Rhiannon Philp (Archaeology Wales)
Charred and waterlogged plant remains	Wendy Carruthers (Freelance) Kath Hunter Dowse (Freelance)

7. Monitoring

7.2.1. Matthew Adams, Historic Environment officer to Lincolnshire County Council will be contacted approximately five days prior to the commencement of archaeological site works, and subsequently once the work is underway.

7.2.2. Any changes to the WSI that AE may wish to make after approval will be communicated to Matthew Adams, Historic Environment officer to Lincolnshire County Council, for approval on behalf of Planning Authority.

7.2.3. Representatives of Lincolnshire County Council will be given access to the site so that they may monitor the progress of the field evaluation. No area will be backfilled, until Matthew Adams, Historic Environment officer to Lincolnshire County Council has had the opportunity to inspect it, unless permission has been given in advance. Matthew Adams will be kept regularly informed about developments, both during the site works and subsequently during post-excavation.

8. Post-fieldwork programme

8.1. Archive assessment

Site archive

8.1.1. An ordered and integrated site archive will be prepared in accordance with: *Management of Research Projects in the Historic Environment (MoRPHE)* (Historic England 2006) upon completion of the project.

8.1.2. The site archive (including artefacts and samples) will be prepared in accordance with the National Monuments Record agreed structure and, in compliance with ClfA Guidelines *Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives* (2020). The site archive will be subjected to selection to establish those elements that will be retained for long term curation. The selection strategy will be agreed with all stakeholders and will be detailed in the Selection Strategy and Data Management Plan.

Analysis

8.1.3. Following a rapid review of the potential of the site archive, a programme of analysis and reporting will be undertaken. This will result in the following inclusions in the final report:

- a front cover to include the NGR,
- a concise, non-technical summary of the results,
- the circumstances of the project and the dates on which the fieldwork was undertaken,
- description of the methodology, including the sources consulted,
- the historical background of the development area,
- results of the fieldwork,
- a statement, where appropriate, of the implications of the results,

- a copy of this project design, and indications of any agreed departure from that design,
- the report will also include a complete bibliography of sources from which data has been derived, and a list of any further sources identified but not consulted,
- a site location plan related to the national grid,
- plans, figures and photographs as appropriate,
- plan showing the positions of where any survey photographs were taken,
- coordinates of relevant sites if archaeological remains have been discovered.

8.2.Reports and archive deposition

Report to client

- 8.2.1.** Copies of all reports associated with the archaeological trenched evaluation, together with inclusion of supporting evidence in appendices as appropriate, including photographs and illustrations, will be submitted to Sirius Planning Ltd and Lincolnshire County Council.

Additional reports

- 8.2.2. After an appropriate period has elapsed, copies of all reports will be deposited with the relevant county Historical Environment Record, the National Monuments Record and, if appropriate, Historic England.

Summary reports for publication

- 8.2.3. Short archaeological reports will be submitted for publication in relevant journals; as a minimum, a report will be submitted to the annual publication of the regional CBA group or equivalent journal.

Notification of important remains

- 8.3.4. Where it is considered that remains have been revealed that may satisfy the criteria for statutory protection, AE will submit preliminary notification of the remains to Historic England.

Archive deposition

- 8.3.5. The final archive (site and research) will be deposited at the relevant Local Authority museums service. Arrangements will be made with the receiving institution before work starts.

- 8.3.6. Although there may be a period during which client confidentiality will need to be maintained, copies of all reports and the final archive will be deposited no later than six months after completion of the work.

- 8.3.7. Copies of all reports, the digital archive and an archive index will be deposited with the National Monuments Record, Historic England.

- 8.3.8. Wherever the archive is deposited, this information will be relayed to the HER. A summary of the contents of the archive will be supplied to Lincolnshire County Council.

- 8.3.9. An OASIS project reporting form will be produced when the project is completed.

Finds deposition

8.3.10. The finds, including artefacts and ecofacts, excepting those which may be subject to the Treasure Act, will be deposited with the same institution, subject to the agreement of the legal landowners.

9. Staff

9.1.1. The project will be managed by Irene Garcia Rovira (AE Project Manager) and the fieldwork will be led by Sian Thomas (AW Project Officer). Any alteration to staffing before or during the work will be brought to the attention of Sirius Planning Ltd and Matthew Adams of Lincolnshire County Council.

Additional Considerations

10. Health and Safety

10.1. Risk assessment

10.1.1. Prior to the commencement of work AE will carry out and produce a formal Health and Safety Risk Assessment in accordance with The Management of Health and Safety Regulations 1999. A copy of the risk assessment will be kept on site and be available for inspection on request. A copy will be sent to the client (or their agent as necessary) for their information. All members of AE staff will adhere to the content of this document.

10.2. Other guidelines

10.2.1. AE will adhere to best practice with regard to Health and Safety in Archaeology as set out in the FAME (Federation of Archaeological Managers and Employers) health and safety manual Health and Safety in Field Archaeology (2002).

11. Community Engagement and Outreach

11.1.1. Wherever possible, AE will ensure suitable measures are in place to inform the local community and any interested parties of the results of the site investigation work. This may occur during the site investigation work or following completion of the work. The form of any potential outreach activities may include lectures and talks to local groups, interested parties and persons, information boards, flyers and other forms of communication (social media and websites), and press releases to local and national media.

11.1.2. The form of any outreach will respect client confidentiality or contractual agreements. As a rule, outreach will be proportional to the size of the project.

11.1.3. Where outreach activities have a cost implication these will need to be negotiated in advance and in accordance with the nature of the desired response and learning outcomes.

12. Insurance

12.1.1. AE is fully insured for this type of work and holds Insurance with Aviva Insurance Ltd and Hiscox Insurance Company Limited through Towergate

Insurance. Full details of these and other relevant policies can be supplied on request.

13. Quality Control

13.1. Professional standards

13.1.1. AE works to the standards and guidance provided by the Chartered Institute for Archaeologists. AE fully recognise and endorse the Chartered Institute for Archaeologists' Code of Conduct (2019) and the Standard and Guidance for an Archaeological Field Evaluation (2020) currently in force. All employees of AE, whether corporate members of the Chartered Institute for Archaeologists or not, are expected to adhere to these Codes and Standards during their employment.

13.2. Project tracking

13.2.1. The designated AE manager will monitor all projects in order to ensure that agreed targets are met without reduction in quality of service.

14. Arbitration

14.1.1. Disputes or differences arising in relation to this work shall be referred for a decision in accordance with the Rules of the Chartered Institute of Arbitrators' Arbitration Scheme for the Institute for Archaeologists applying at the date of the agreement.

15. References

- AAF, 2007, Archaeological Archives: A Guide to best practice in creation, compilation, transfer and curation: Archaeological Archive Forum (2007).
- Archaeological Resource Centre. 2021. Archaeological Archives Standard. April 2021
- Barber, B., Carver, J., Hinton, P. and Nixon, T. 2008, Archaeology, and development. A good practice guide to managing risk and maximising benefit. Construction Industry Research and Information Association Report C672
- Brickley, M. and Mckinley, J. 2004. Guidelines to the Standards for Recording Human Remains. Chartered Institute for Archaeologists.
- British Geological Survey (BGS), 2023, Geology of Britain viewer. Available online at: <http://mapapps.bgs.ac.uk/geologyofbritain/home/html> [Accessed 31/01/23]
- Campbell, G., Moffett, L. and Straker, V. 2011 (2nd Ed.). Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post- excavation

- Chartered Institute for Archaeologists (CIfA), 2019. Code of conduct, Chartered Institute for Archaeologists
- Chartered Institute for Archaeologists (CIfA), 2020, Standard and guidance for archaeological field evaluation, Chartered Institute for Archaeologists
- Chartered Institute for Archaeologists (CIfA), 2020, Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials. Chartered Institute for Archaeologists
- Chartered Institute for Archaeologists (CIfA), 2020, Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives. Chartered Institute for Archaeologists
- Department of Culture, Media and Sports (DCMS), 2008, The Treasure Act 1996 Code of Practice (England and Wales)
- Edwards. 2015. Flash Farm, Averham, Nottinghamshire Trial Trenching
- Eiteljorg, H., Fernie, K., Huggett, J. and Robinson, D. 2002, CAD: A guide to good practice. Archaeology Data Service (York)
- Garcia Rovira, I. 2021. Land at Kelham Newark, Desk Based Assessment. AE Report 2027.
- Historic England 2011. Environmental Archaeology: A Guide to the Theory and Practice of Methods, from sampling and recovery to post excavation (second edition). Centre for Archaeology Guideline. Nottingham: Nottingham Archaeological Monographs
- Historic England (HE) 2015a, Management of Research Projects in the Historic Environment. The MoRPHE Project Managers' Guide. Historic England (Swindon)
- Kelly, H. 2021. Heritage Environment Baseline Conditions Report. Appendix 7.1. Glassthorpe Solar Farm. EDF Renewables. Heritage Archaeology P00082.01A.02
- Leigh, D., Watkinson, D. and Neal, V. 1998. First Aid for Finds: Practical Guide for Archaeologists. United Kingdom Institute for Conservation of Historic & Artistic Works, Archaeology Section
- Mckinley, J. and Roberts, C. 2003. Excavation and Post-Excavation Treatment of Cremated and Inhumed Human Remains - Technical Paper. Institute of Field Archaeologists.
- Ministry of Housing, Communities & Local Government (MHCLG) 2019. National Planning Policy Framework, Department for Communities, and Local Government
- Muller, J. 2022. Land to the west of Kelham, Nottinghamshire. AE Report 2092.

- Museum and Galleries Commission. 1992. Standards in the Museum Care of Archaeological Collections. London.
- Standards in the Museum Care of Archaeological Collections (Museums and Galleries Commission 1992)
- Selection, Retention and Dispersal of Archaeological Collections; Guidelines for use in England, Wales and Northern Ireland (Society of Museum Archaeologists 1993)
- Walker, K. 1990. Guidelines for the preparation of excavation archives for long-term storage. UKIC Archaeology Section, London.

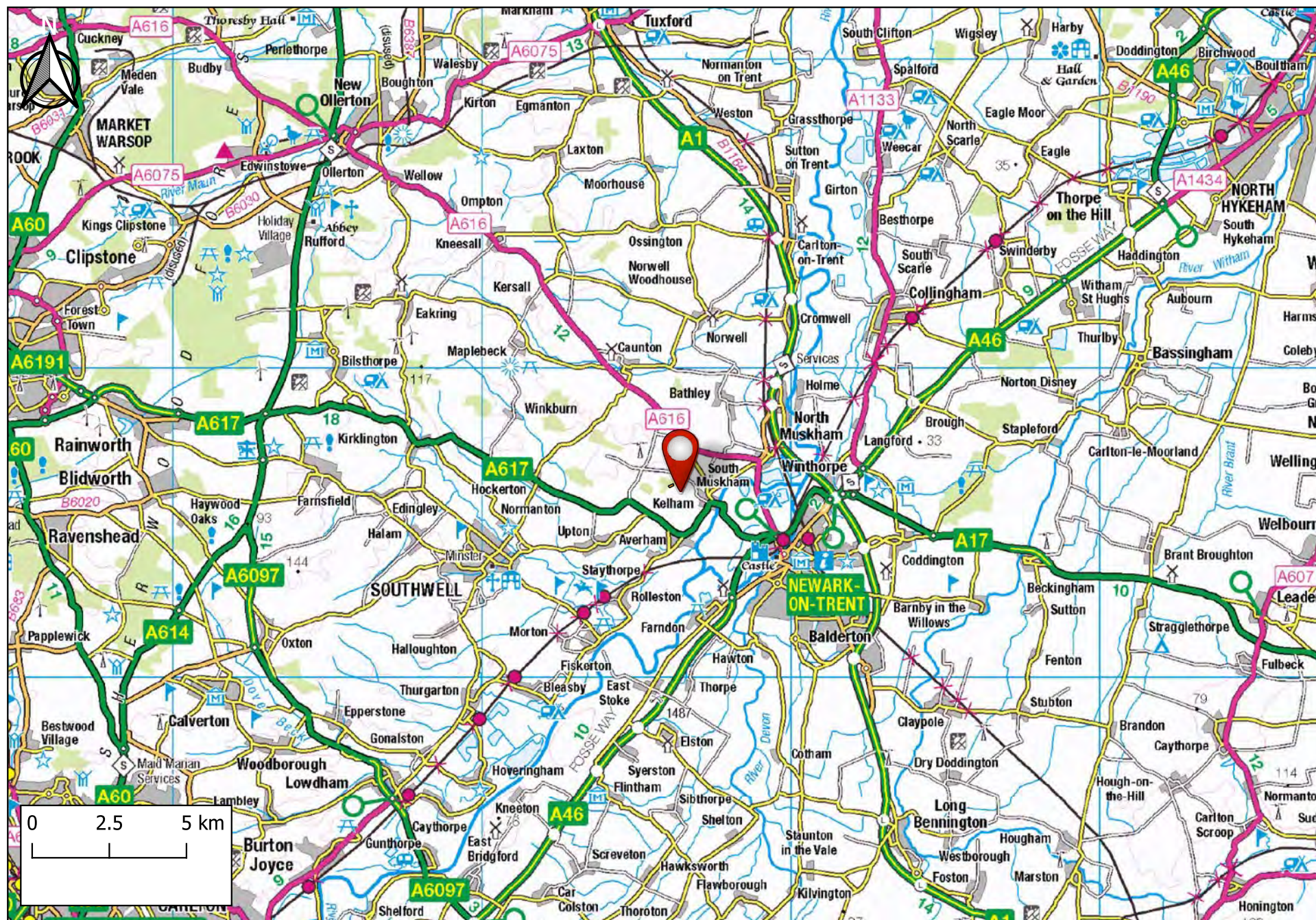


Figure 1. Location of site.

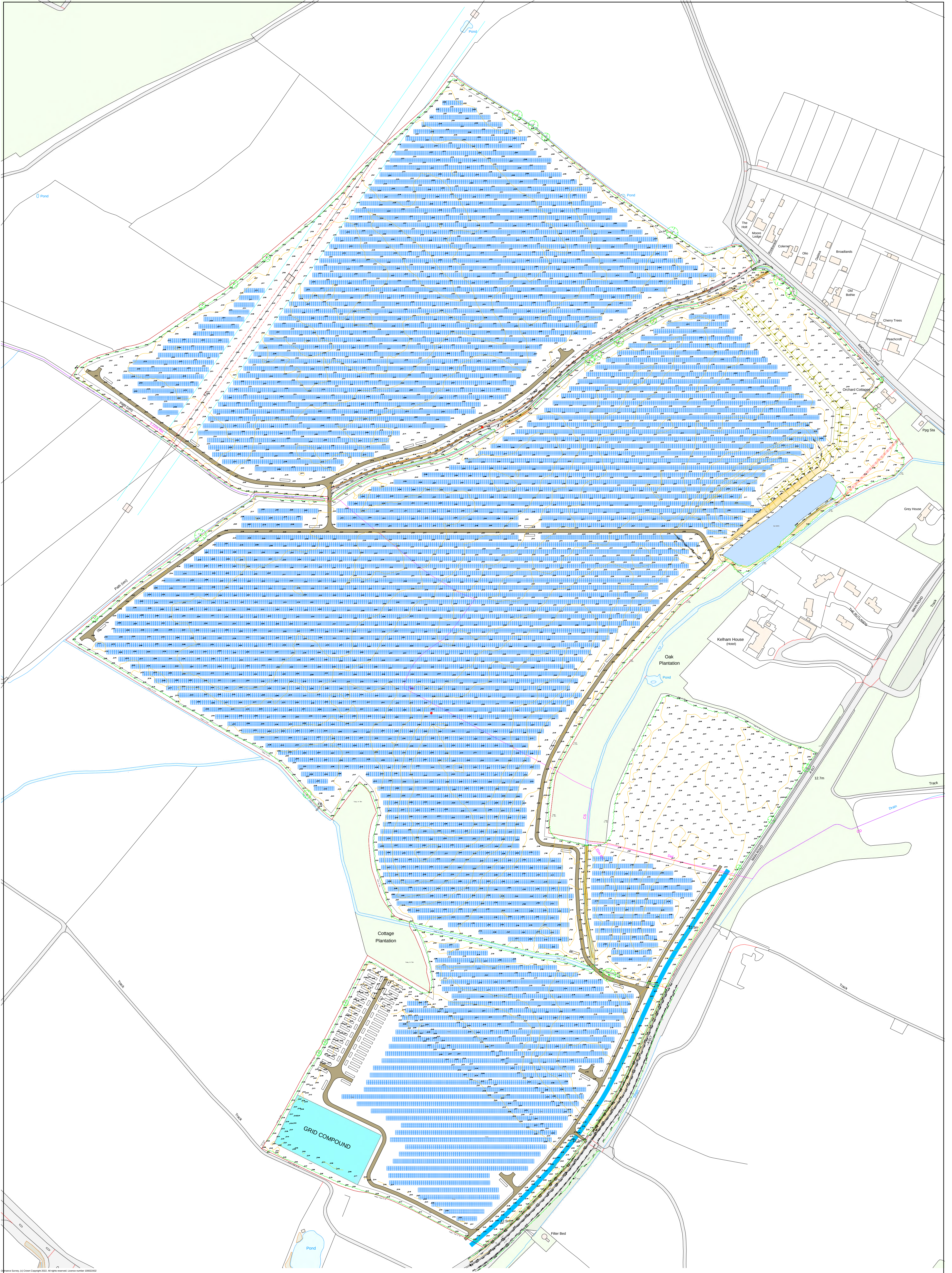


Figure 2. Proposed development design

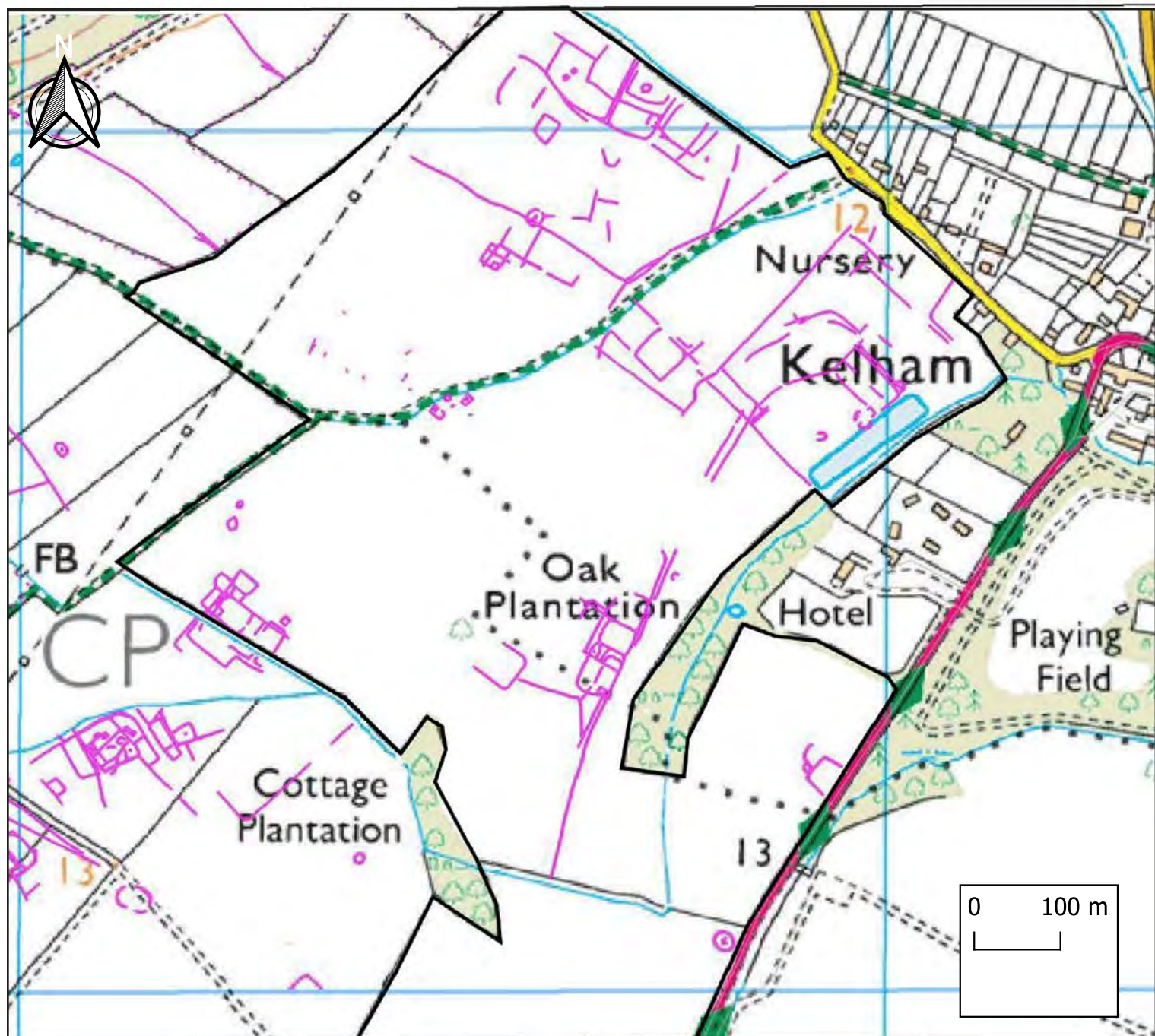


Figure 3. NMP soilmarks/cropmarks

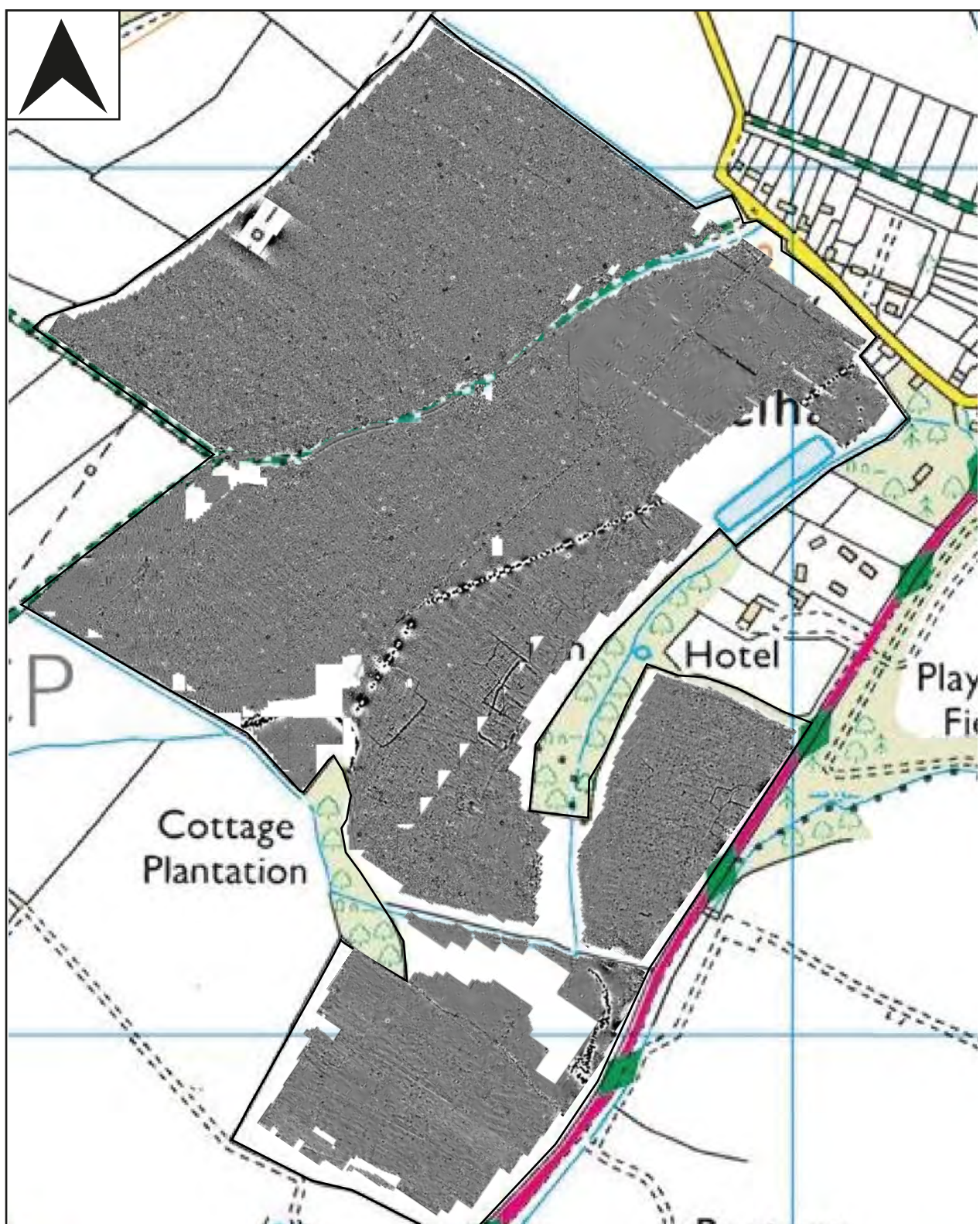


Figure 4. Results processed $\pm 3nT$ (Stage 1-3)

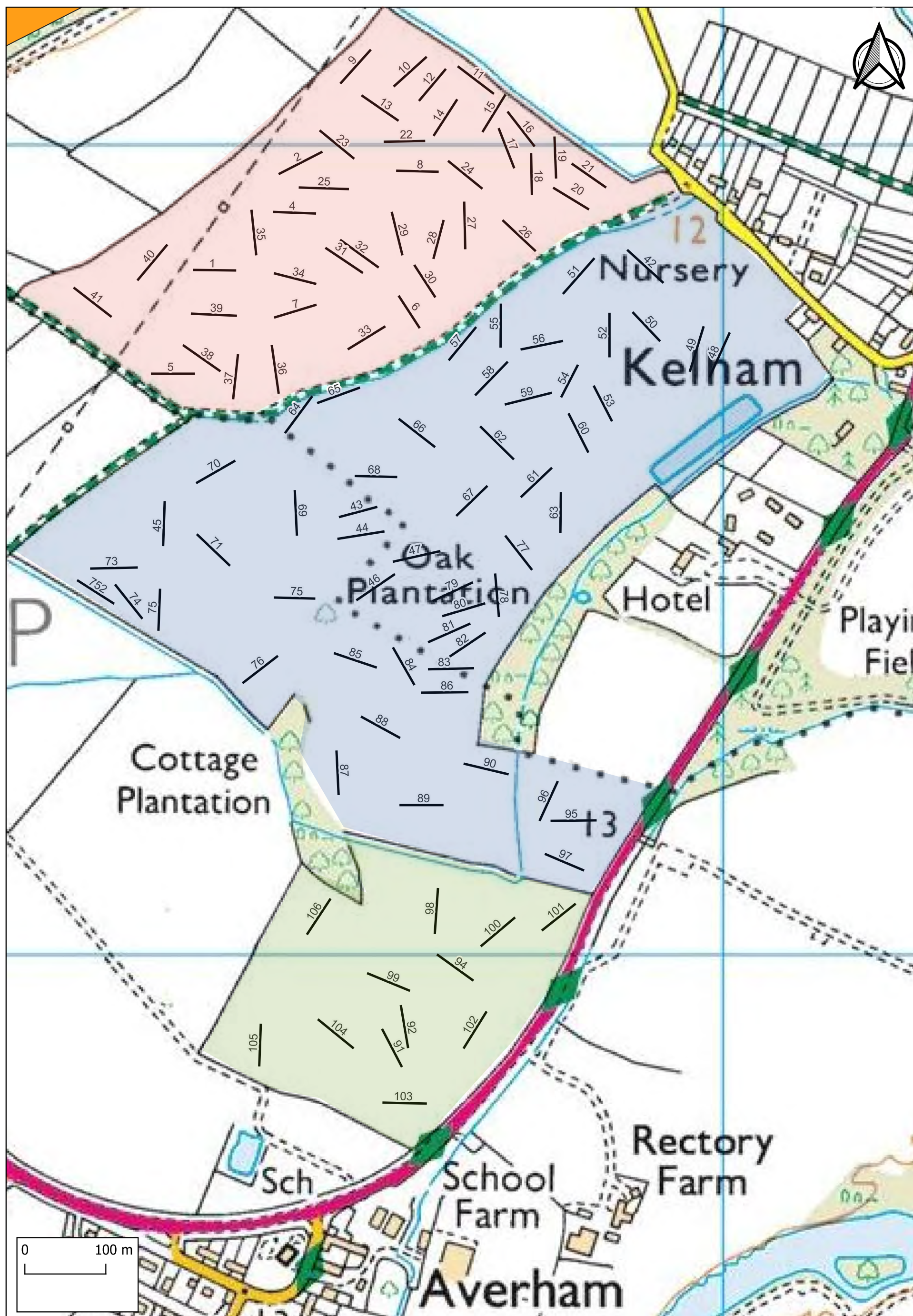


Figure 5. Trench layout



Figure 6. Trenches overlaid on NMP plan (1 of 3)

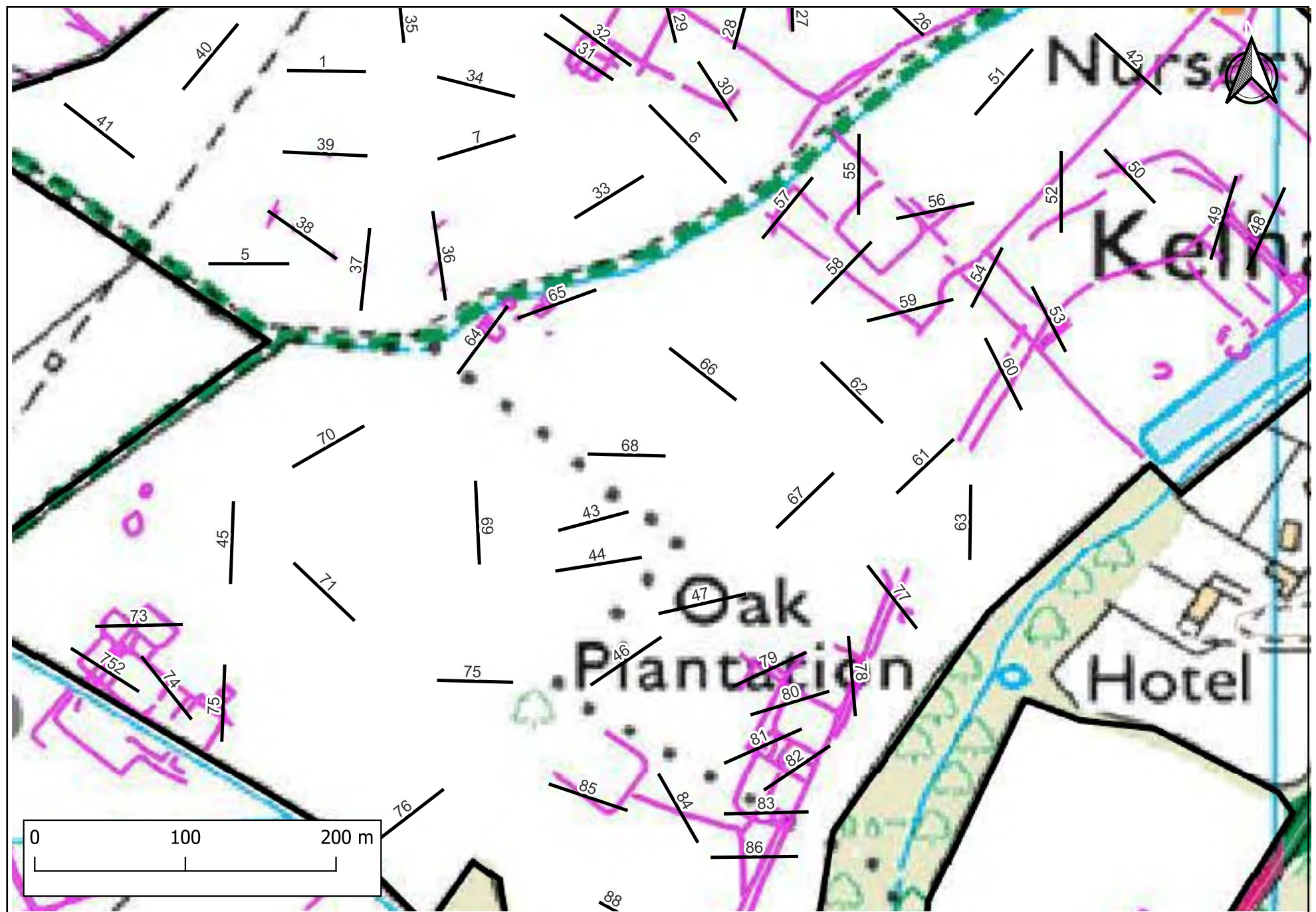


Figure 6. Trenches overlaid on NMP plan (2 of 3)

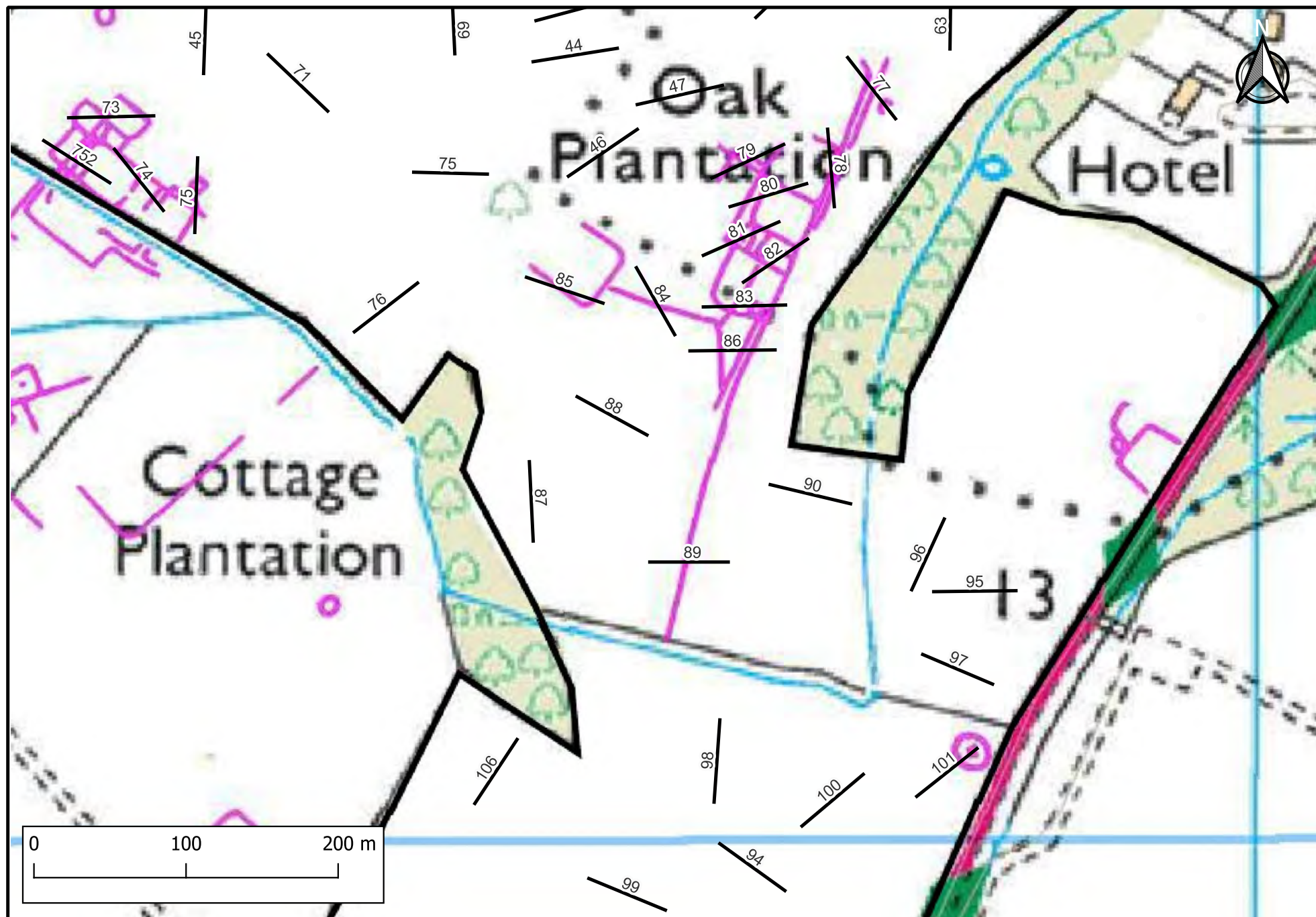


Figure 6. Trenches overlaid on NMP plan (3 of 3)



Archaeology England Limited

Main Office, Unit D11.6 Treforest Industrial Estate
Pontypridd - CF37 5UR

Tel: +44 (0) 1686 440371

Email: admin@arch-england.co.uk

Web: arch-wales.co.uk

Archaeology England Limited is a company with limited liability registered in England and Wales, No. 8458349, and is a wholly owned subsidiary of Archaeology Wales Limited.

