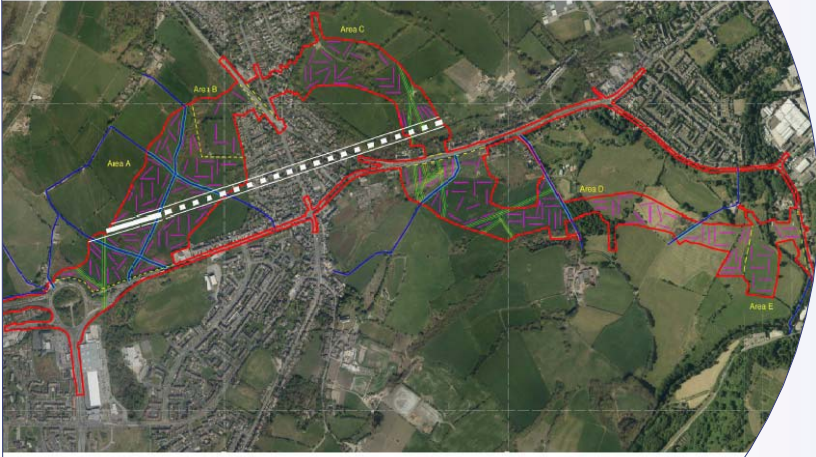


**A57 Link Roads  
TR010034**

**6.5 Environmental Statement  
Appendix 6.2 Archaeology Scope of Works and  
Written Scheme of Investigation**

APFP Regulation Regulation 5(2)(a)  
Planning Act 2008 Infrastructure Planning (Applications: Prescribed

Forms and Procedure) Regulations 2009



# A57 Trans-Pennine Upgrade Mottram Moor Link Road Scheme

## Written Scheme of Investigation: Archaeological Evaluation

April 2021

**Client: Balfour Beatty / Atkins**

Issue No: 01

Report Number: 2020/21 2111

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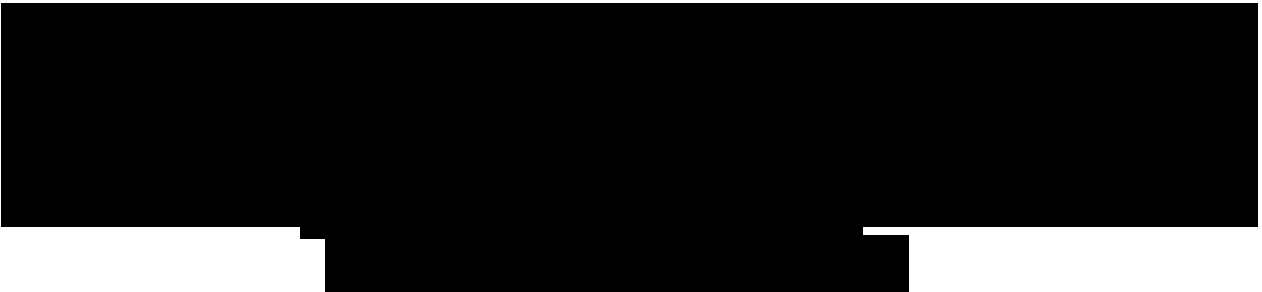
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# A57 Trans-Pennine Upgrade Mottram Moor Link Road Scheme

## *Written Scheme of Investigation: Archaeological Evaluation*

*Centred on SJ 98780 95700*

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# 1 INTRODUCTION

## 1.1 Project details

1.1.1 Oxford Archaeology North (OA North) has been commissioned by Atkins and Balfour Beatty, on behalf of Highways England, to undertake a programme of archaeological evaluation across the proposed A57 Trans Pennine Upgrade Mottram Moor Link Road Scheme (here after referred to as the Scheme; Fig 1). The following document represents an initial written scheme of works for a phased programme of investigation.

1.1.2 The evaluation will comprise a shovel-test pitting survey, mechanical/hand-excavated test pitting, trial trenching, and borehole/auger survey. These will be informed by the previous archaeological investigations on the Scheme (Balfour Beatty Atkins 2020; Arcadis 2018), including a UAV survey undertaken by OA at the end of 2020 and an electromagnetic (EM) survey (Magnitude Surveys 2020), which were specifically aimed at characterising the sub-surface geology/topography.

1.1.3 These surveys are concurrent with the Development Consent Order application for the Scheme (Planning Inspectorate scheme reference: TR010034) to inform detailed design and project delivery, in addition to any require mitigation proposals. The scheme of work has been agreed via consultation with Greater Manchester Archaeological Advisory Service (GMAAS) by Balfour Beatty Atkins (Balfour Beatty Atkins 2020).

1.1.4 The shovel-test pits (*Section 4.5*) cover two areas (A and E; Fig 2), respectively 19 ha and 3.6 ha. The trenches (*Section 4.6*) cover all viable areas of the Scheme and sample approximately 4% of this available area (Figs 2-5). All the 168 no. trenches are 50m x 2m. The trench array, as presented in these figures, should be considered as to some extent provisional. It has taken into account known services, public rights of way and ecological constraints, but the trenches may need to be repositioned slightly should other obstructions/constraints be encountered or if further archaeological information is obtained (*eg* from shovel-test pits *etc*). In addition to, or in substitution of certain trenches (depending upon the results of the shovel-test pit survey and the presence of any lithic sites) it could be desirable to excavate mechanical (2m x 2m)/hand-dug (1m x 1m) test pits for lithic retrieval (*Section 4.6*). This is to avoid damaging such sites, as per Historic England guidance (OA in prep). Either as part of the planned Ground Investigations (GI) work on the Scheme, or in addition to it, geoarchaeological borehole cores (*Section 4.8*) will be drilled at key locations to characterize areas of deep strata (*eg* alluvium and peat) and to retrieve samples. The GI works will also be monitored by a watching brief, if there is archaeological benefit to doing this *eg* if starter holes or pits will be excavated. If suitable deposits are identified hand-auger samples (*Section 4.9*) might also be retrieved for the purposes of pollen assessment/analysis.

1.1.5 All work will be undertaken in accordance Chartered Institute for Archaeologists *Standard and Guidance for Archaeological Field Evaluation* (CiFA 2014a). Given the nature of the geology of the Scheme and the potential for it to impact on prehistoric remains (OA North 2018), including those potentially sealed at depth below geological deposits, cognizance should also be given to the Historic England guidance documents: *Environmental Archaeology - A guide to the theory and practice of methods, from sampling and recovery to post-excavation* (2011), *Geoarchaeology: Using Earth Sciences to Understand the Archaeological*

*Record* (2015), *Deposit Modelling and Archaeology* (Carey *et al* 2018) and the Historic England draft guidance document *Managing Lithic Scatters* (Oxford Archaeology in prep).

## 1.2 Location, topography and geology

1.2.1 The Scheme lies between Brookfield and Hattersley, within the Tameside District of Greater Manchester and encroaching into Derbyshire at its eastern end (Fig 1). It begins to the west of and includes the M67/A57 roundabout and then curves north-east towards Roe Cross and Spout Green across the slopes of Harrop Edge. Crossing beneath Roe Cross Road (A6018), it curves to the south, towards the A57, between Mottram in Longdendale and Hattersley. It then continues south-eastwards towards Brookfield Road, crossing open land to the south of Hattersley and Hadfield.

1.2.2 The solid geology includes several types of sedimentary sandstones and mudstones of Carboniferous age, which form a fractured pattern across the study area. At the M67/A57 roundabout the bedrock comprises mudstones and siltstones of the Marsden Formation, and sandstones of Fletcher Bank Grit and Huddersfield White Rock formations. These are the dominant bedrocks with some mudstones and siltstones of the Rossendale formation, sandstones of the Rough Rock Flags, mudstones and siltstones of the Pennine Lower Coal Measures, and sandstones of the Woodhead Hill Rock in evidence around Mottram in Longdendale (BGS 2017).

1.2.3 Superficial deposits begin as Devensian Till (glacial deposits) around the M67/A57 roundabout with a small amount of clay, sand, and silt alluvium lying between the roundabout and Spout Green. The Devensian Till continues to dominate until the area close to Tara Brook Farm where head (periglacial, soliflucted) deposits can be found close to the River Etherow. Deposits of clay, silt and sand alluvium are found to the east of the river up to the Brookfield Road. The Devensian Till resumes to the east of Brookfield Road.

1.2.4 The bedrock geology, beneath the thick Till deposits, is folded and faulted and consequently varies across the route of the Scheme.

1.2.5 The topography is hilly with the lowest point at 120m above Ordnance Datum (AOD) and the highest point at 210m AOD, within Spout Green.

1.2.6 From the M67/A57 roundabout the land rises gently to the north and north-east, towards Spout Green following the line of a small stream, known as Hurstclough Brook, running south-west from Spout Green. Mottram Old Hall marks the highest point on the northern valley side and the land drops gently away from the hall towards the A57.

1.2.7 To the south of the A57 the topography is more gently undulating following the line of a small stream which flows east and south towards the River Etherow, the lowest point within the study area (120m AOD). The River Etherow which runs from the Peak District towards Stockport, to the south-west, crosses the Scheme at its eastern end. Multiple small unnamed streams and brooks, which rise in the surrounding higher land and flow towards the river, also cross it.

1.2.8 Larger hills surround the Scheme, with the Peak District National Park (443m AOD) located to the east and south-east, Harrop Edge (304m AOD) and Hollingworth Hall Moor (399m AOD) to the north, The Hague (235m AOD) to the south-west, and Higher Dinting (255m AOD) to the east.



## 2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND AND POTENTIAL

### 2.1 Archaeological and historical background

2.1.1 Details of the archaeological background to the Scheme have been described in full elsewhere (Arcadis 2018; Document Reference TRO10034/APP/6.7.1), from which the following has been summarised. The numbers associated with heritage assets quoted below derive from the gazetteer included in the DBA and the location figures have not been reproduced here.

2.1.2 The known human activity within the 500m study area around the Scheme began in the prehistoric period, with evidence of settlement and agriculture present on the slopes of Harrop Edge (125) and within Melandra Castle (SM1/144). A scatter of Mesolithic flints (140) was found within Melandra Castle; it is likely that the gravel hill above the River Etherow was a good site for prehistoric occupation due to the commanding views over the area and access to the productive river valley.

2.1.3 Peat deposits (202) have been described from within the study area, close to the River Etherow at Woolley Bridge (SK 00944 95567) but are considered of low value due to their limited extent and unknown condition. However, the deposits have the potential to inform on past environments and inferred human activity in the area.

2.1.4 Whilst evidence for the prehistoric period, within the 500m study area, is relatively sparse, evidence from the wider area suggests that the landscape was occupied and exploited in prehistory. Based on this evidence, there is a moderate to high potential for prehistoric activity within the study area.

2.1.5 Roman activity within the 500m study area is focused to the west and south of Tara Brook Farm (LB37; SK 00776 95680) close to the River Etherow and Melandra Castle (SM1/144; SK 00914 95028). In the wider study area, there is a general lack of Roman material, reflecting the marginal nature of the landscape. There is a moderate potential for Roman archaeological activity within the study area and a high potential to the west and south of Tara Brook Farm (LB37).

2.1.6 Most of the evidence from the medieval period relates to early settlement activity with some evidence of agriculture and industry. The most notable asset in the medieval period within the study area is Mottram Old Mill (84; SJ 98895 95965). The mill is thought to date to the medieval period based on documentary evidence, but no evidence of its medieval origins was discovered during investigations (RPS 2001). There have also been some small areas of potentially medieval ridge and furrow found through LiDAR within the 500m study area. There is a low potential for unknown archaeological activity from the medieval period within the study area.

2.1.7 During the post-medieval period the landscape began to develop with the expansion of settlement, the enclosure of the landscape, and the growth of industry across the study area. The largest proportion of the archaeological resource within the 500m study area dates to the post-medieval period. However, this resource is mostly the sites of former buildings or mills which form part of the historic development of the area. Further activity within the study area also includes quarrying and mining activity in the area close to Carrhouse farm (108; SK 00205 95405; 119; SK 00305 95105), social and political divisions in the form of earthwork

parish boundaries (171, 172; SK 00305 95105), and evidence of agricultural activity across the present landscape. There is a low potential for unknown archaeological activity for this period within the study area.

## 2.2 Potential

2.2.1 Overall Arcadis assessed that there is a low to moderate potential for unknown archaeological remains within the study area. The main areas of archaeological potential are: (a) The area between Carrhouse Lane and the River Etherow; (b) The area around Mottram Old Mill (84); and (c) The area on the lower slopes of Harrop Edge, where a higher potential for prehistoric activity is noted.

2.2.2 The former course of the River Etherow (170; SK 00820 95381) was identified within the Glossop Spur Environmental Statement (Mouchelparkman 2005) as lying partially within the study area. This exists as a palaeochannel, which is represented in the field boundaries within the modern landscape, and which crosses the Scheme on a north/south alignment. Its significance rests in its potential to provide information regarding the past landscapes and its use, and to preserve evidence for human activity.

2.2.3 Palaeochannels typically host organic-rich deposits with the potential to preserve waterlogged remains. They are also of great potential as sediment traps as they can preserve long-term pollen sequences allowing for the re-creation of past environments over many periods.

2.2.4 As well as palaeoenvironmental evidence there is a good potential for palaeochannels to contain archaeological remains. Localised water sources are often the foci for activity during periods of human habitation, including for example, animal management and water sources for human settlement as well as for discard of artefacts whether votive or otherwise (Brightman and Waddington 2011).

2.2.5 Despite the common occurrence of post-medieval activity within the 500m study area, it is possible that earlier landscape elements are preserved beneath the current agricultural areas. This is due to the historic integrity of the landscape from the 1840s or earlier. These elements may be represented by archaeology that cannot be identified in the LiDAR and/or AP analysis.

2.2.6 This includes the peat deposits (202), which lie to the east of the River Etherow at Woolley Bridge (SK 00944 95567). This is also the case for deposits of alluvial sediments, which occur adjacent to Hurstclough Brook to the east and the River Etherow to the west, and there is significant potential for earlier remains and land surfaces to exist sealed within the sediment body (*ibid*).

## 3 PROJECT AIMS

### 3.1 Shovel-pit survey and trench evaluation

3.1.1 The aims and objectives of the shovel-pit survey and archaeological trench evaluation are:

- To present a greater understanding of the archaeological resource potentially impacted by the Scheme;
- To ground truth the results of the previous archaeological surveys (Arcadis 2018; Balfour Beatty Atkins 2020);
- To determine the existence or absence of archaeological remains and establish the character and complexity of any remains by sample excavation;
- To attempt to establish the date of the deposits encountered through recovery of artefacts and radiocarbon dating *etc*;
- To establish the environmental significance of the deposits by targeted sampling, processing and assessment;
- To place any archaeological discoveries into the local, and where appropriate, regional/national context, and to assess the implications of any such discoveries for our current understanding of the development of settlement in the area;
- On the basis of the evaluation results, to inform the need for further archaeological mitigation of all or part of the evaluated areas.

### 3.2 Geoarchaeological Evaluation

3.2.1 In addition to the general aims and objectives of the trench evaluation detailed above, the geoarchaeological evaluation (boreholes and deeper test pits) will also seek:

- To gap fill the results of the geoarchaeological assessment (OA North 2018);
- To investigate additional areas within the draft order limits to enhance the geoarchaeological interpretation;
- To enhance the deposit model to provide further detail regarding the geoarchaeology of the Scheme;
- Recover samples suitable for palaeoenvironmental assessment and to carry this out to identify past vegetation patterns and hydrology, as well as indicators of past human activity (pollen, diatoms, plant remains, insects, microcharcoal *etc*);
- To date the peat and alluvial sequences identified during the geoarchaeological assessment and potentially other significant deposits that might be identified during the evaluation;
- To assess the potential significance of wetland dryland interfaces across the Scheme;
- To place the geoarchaeological resource into the local, and where appropriate regional/national context, and to assess the implications of any such discoveries for our understanding of past human activity in the area;
- On the basis of the results, to inform the need for further works to mitigate impacts by the Scheme to the geoarchaeological/archaeological resource.

3.2.2 The evaluation strategy will be informed by the recently released *North West Regional Research Framework: Research Agenda* (<https://researchframeworks.org/nwrf/research-agenda/>; accessed January 2021). The specific themes and questions that this presents will

help to determine the research direction of the evaluation. It is likely that many parts of the *Research Agenda* will be relevant, although precisely which will depend on the results of the evaluation. Given the Scheme’s potential for archaeology of the Mesolithic, Roman, and Industrial periods (*Section 2*), however, it is probable that these period sections will be of greatest relevance. Table 1 below identifies those questions for these periods that seem most pertinent, although this is unlikely to be an exhaustive list and other periods/questions could become relevant as the project progresses.

Research Agenda Period	Questions
Prehistoric	PH01, PH02, PH04, PH12-14, PH17-19, PH23-7, PH30-1, PH34, PH40, and PH51-2
Roman	RS03-4, R08, R11, R14, R21, and R24
Industrial	Ind04-5, Ind53, Ind60, Ind89, and Ind100

*Table 1: Pertinent questions from the Research Agenda*

## 4 PROJECT SPECIFIC EXCAVATION AND RECORDING METHODOLOGY

### 4.1 Scope of works

4.1.1 The evaluation will comprise several elements/phases (*Section 1.1.4*): shovel-test pitting, trenching, mechanical/hand-excavated test pitting, boreholes and auguring (*Sections 4.4-8*). These will be informed by the previous archaeological investigations on the Scheme (Balfour Beatty Atkins 2020; Arcadis 2018), including a UAV survey undertaken by OA at the end of 2020 and an electromagnetic (EM) survey (Magnitude Surveys 2020), which were specifically aimed at characterising the sub-surface geology/topography. Necessarily, the shovel-test pitting of Areas A and E (Figs 2, 3 and 5), will be undertaken prior to the trial trenching, so that the results of the former can be used to inform the latter and the trenching strategy amended accordingly (*Section 4.6*). The sequencing in which the mechanical/hand excavated test pits, boreholes and trenches takes place is not critical and they can occur in any order. The hand auguring will be undertaken at optimal locations to sample buried deposits identified during the course of the other works. The detailed methodology and sequence of works is described below (*Sections 4.4-8*).

### 4.2 Programme

4.2.1 It is anticipated that the initial fieldwork phase will take seven weeks to complete, by an Oxford Archaeology excavation team comprising a Project Officer, directing up to 14 project archaeologists, working in two-three gangs, under the management of Fraser Brown, Senior Project Manager. All fieldwork undertaken by Oxford Archaeology North is overseen by the Operations Manager, Dr Alan Lupton MCIfA.

4.2.2 The programme will be dependent on land access and permits to dig issued by the Principal Contractor Balfour Beatty and has been agreed with Highways England and the landowners. The various project elements will probably be undertaken concurrently, on different parts of the Scheme, although see *Section 4.1.1*.

4.2.3 A subsequent phase of evaluation is planned to take place towards the end of 2021. This will target those available areas of the Scheme that were not evaluated during the first phase.

### 4.3 Site specific methodology

4.3.1 A summary of OA's general approach to excavation and recording can be found in *Appendix A*. Standard methodologies for Geomatics and Survey, Environmental evidence, Artefactual evidence and Burials can also be found below (*Appendices B, C, D and E* respectively). These will be adhered to as is appropriate to the context and scope of the project (for example, some procedures or logistical arrangements might be slightly different, given that the project is being run from OA's Lancaster office).

### 4.4 Watching brief on Ground Investigations

4.4.1 A watching brief will be maintained on Ground Investigations (GI) works where this will be of archaeological benefit. This will include the monitoring of any Geotech test pits and any starter holes for borehole drilling. Geotech pits will be monitored from the side of the excavation and the archaeologist will not usually enter the excavation and will not enter any trenches which are deeper than 1m. The archaeologist will note the depths at which any

significant archaeological horizons, deposits, features or finds occur. They will make a photographic record of anything of significance. If the Geotechnical pit reveals sensitive and significant archaeological deposits, features or finds distributions, then, if safe and practicable, they should be given the opportunity to record them and collect finds and samples, before the pit excavation recommences. Alternatively, the Geotech pit could be stopped, backfilled and relocated nearby. Monitoring will stop once Pleistocene geology is encountered. The arisings of any starter pits will be scanned for finds. If significant finds or quantities of finds are present, the pit will be photographed and recorded to establish the context of these.

4.4.2 If the GI contractor will be opening sample cores on site, in key areas of deep stratigraphy, it would be beneficial for the archaeologist to be given access to the samples, to photograph the sediments and to record descriptions of any archaeologically significant horizons and the depths at which they occur (this could happen after the drillers had made their records, to cause minimal disruption to them). Additionally, whether or not the samples are opened on site, the borehole log data should be supplied to OA for incorporation into the geoarchaeological deposit model.

## 4.5 Shovel-test pit survey

4.5.1 A grid will be established over the survey area by an OA surveyor using a DGPS instrument (Figs 6 and 7). Flags will be set out to demarcated transects across this grid and at paced, approximate 10m intervals across the grid, small shovel pits (c0.25m by c0.25m in size) will be excavated to a maximum depth of 0.30m, typically representing the size of a sod of earth lifted by a shovel/spade blade. The soil component of the sod, below the turf, will be broken up and examined by eye for lithics and other artefacts and will be passed through a coarse-grade hand sieve. Those shovel pits that produce artefacts will be located using a DGPS, and the artefacts will be bagged and labelled by pit and retained for subsequent analysis. Post-medieval ceramics are typically dispersed across plough soil as a process of night soiling and their presence is not an indicator of an archaeological site; consequently, these will not be retained and shovel pits containing with them will not be surveyed unless there are also earlier artefacts. The reinstatement of each pit will involve backfilling the excavated soil, replacing the turf, and trampling it down. If any archaeological features are encountered, these will be recorded, to the extent that it is possible within the confines of the shovel pit, and the shovel pit will be three-dimensionally located. If resources permit this, it is possible that further shovel test pits will be excavated in the vicinity (*ie* initially at 5m intervals) in an attempt to define the extent of the scatter.

## 4.6 Trench evaluation

4.6.1 Trenches will be positioned, where practicable, based upon the plan given in Figures 2-5 of this WSI. It may be necessary/desirable to relocate trenches if obstructions/constraints are encountered or if further archaeological information comes to light. Any variations will be recorded by GPS and transferred to a digital plan of the site. Balfour Beatty will confirm the absence of any services through the issue of a permit to break ground.

4.6.2 Trenches will be excavated by machine, fitted with a toothless ditching bucket, and operated under archaeological supervision. The trenches will be reduced in spits not exceeding 0.20m. Excavation will proceed to the top of the first archaeological horizon, or,

geological deposit, or to 1m depth, whichever is encountered first. When excavating the trenches, the topsoil will be excavated first and stored along one side of the trench and the subsoil stored along the other side of the trench. When backfilling the trenches, the subsoil will be returned to the trench first, followed by the topsoil. The spoil and the exposed surfaces, including the tops of all archaeological features, will be scanned for finds. Particular care will be taken in the area of any lithic scatters identified by the shovel test pits, and a proportion of the arisings will be dry sieved in such cases.

4.6.3 Overall, the strategy for investigation will aim to record the thickness and broad character of the Holocene sedimentary sequences and any archaeological remains within or beneath them. Within trenches where alluvial/colluvial/organic peaty deposits are encountered extending more than 1m below the ground level, if practicable, deeper mechanically-excavated test-pits (2m x 2m sondages) in the ends of the trenches will be extended downwards through the geological strata, ideally until a significant archaeological horizon or Pleistocene deposits are encountered (although these sondages will never exceed 3m in depth). These will not be entered by the archaeologists, unless archaeology is revealed. If archaeology is revealed these may be stepped to permit entry, but only then if it is safe to do so and only to a maximum depth of 1m (deeper excavations will not be entered). The deposits will be logged and, if desirable, sampled for finds and environmental remains. If flooding, ground stability or health and safety issues became a concern, then trenches/test pits will be backfilled immediately following recording.

4.6.4 Careful stripping of trenches by machine under archaeological supervision should leave a surface that can be planned and photographed without the need for further hand-cleaning. Any areas left obscured or unclear after machine-stripping will be hand-cleaned before photographing and planning, unless the trench is too deep to permit this.

4.6.5 Discrete deposits will generally be excavated by hand, unless otherwise agreed with GMAAS. Should thick sterile or well-dated recent deposits be encountered, these may be excavated by machine under archaeological supervision.

4.6.6 All investigated archaeological deposits and features will be recorded on *pro forma* context sheets and in plan and section. Where a trench is devoid of archaeological features, no profile of the trench will be drawn. However, recording of the level of the ground prior to excavation, the depth of identified deposits (topsoil and subsoil) and the level of the base of the excavation will take place. Deposit logs of sondages through any deep strata will also be recorded. This will include a description of colour, compaction, texture, sorting, structure, inclusions (including abundance, shape and material), recording will be carried out on a sediment logging *pro forma* similar to that used for boreholes (see also *Section 4.9.3*). A photographic record of the archaeological evaluation will be taken for all the trial trenches including working shots.

## 4.7 Deep trenching

4.7.1 In addition to the standard trenches recorded above, it could be desirable to excavate deeper trenches, to sample areas of deeper geology, such as alluvium/colluvium/peat, for example, if palaeochannels are detected. Ground conditions will determine the methodology employed for these deep trenches. If the geology is sufficiently stable and ground conditions are dry enough, after an assessment and in consultation with Balfour Beatty, it might be

possible to step or batter the trenches to permit entry. If this is not the case, then the archaeologists will not step the trenches and will record them from outside. Trenches will not be excavated beyond 2m depth. If the deposits are deeper, they will be sampled in 2m x 2m sondages that will not be entered by the archaeologists.

## 4.8 Mechanical/hand-excavated test pits

4.8.1 In areas where the shovel-test pitting identifies potential concentrations of flaked lithics, which could indicate topsoil/subsoil lithic scatters or stratified prehistoric sites, it might be desirable to undertake further investigations within mechanical/hand-excavated test pits. The test-pits will be positioned in arrays designed to define and characterise such sites *eg* at 5m centres over their apparent extents. Initially a 2m x 2m mechanical excavation will be made using a mechanical excavator, in a similar manner to the trenches. The depth of the mechanical excavation will depend on the nature of the subsurface strata, but the aim would be to remove topsoil, and possibly subsoil, to expose the relevant strata for hand excavation in smaller 1m x 1m test pits. The arisings will be carefully scanned for any lithic material that they contain and a proportion will be dry hand-sieved. Any features will be excavated and recorded in the normal manner and the deposit sequence will be recorded in the same manner as in the trenches (*Section 4.5.6*). The benefit of test pits rather than trenches is that they are less destructive and reduce the risk of inadvertently destroying the sites during evaluation.

## 4.9 Boreholes

4.9.1 Borehole drilling with core retrieval will be carried out on targeted sequences, which demonstrate significantly increased depth that cannot suitably be evaluated by test pitting. The purpose of the drilling will be to retrieve a continuous sequence of cores for detailed sediment description, palaeoenvironmental assessment and radiocarbon dating. It might be possible to retrieve such 'window sample' cores during the course of GI investigations for the road or it might require a separate phase of GI investigation for archaeological purposes. A watching brief will be maintained on trial pits or geotech pits excavated by the GI teams, to retrieve any archaeological finds thereby disturbed.

4.9.2 The boreholes will be drilled using a prospection Dando-type tracked terrier rig. The cores will be a minimum of 60mm in diameter to allow sufficient sediment for palaeoenvironmental and radiocarbon dating work. The boreholes will be backfilled with bentonite pellets.

4.9.3 Following fieldwork, the borehole cores will be returned to OA premises where they will be extruded, photographed and recorded. The lithological data from the boreholes, along with that from the test pits will be input into geological modelling software Rockworks17, to allow correlation of stratigraphic units, the production of cross sections and 3-d plots of thicknesses and surfaces. This will be integrated into the existing geological model (OA North 2018) to enhance it.

## 4.10 Auger samples

4.10.1 Following fieldwork, the borehole cores will be returned to OA premises where they will be extruded, photographed and recorded. The lithological data from the boreholes, along



4.10.2 In optimal locations, for example, if waterlogged sequences of buried peat or organic-rich sediments are detected. It could be desirable to retrieve hand-auger cores for palaeoenvironmental and radiocarbon dating. As, if viable, these usually provide better-quality cores than samples retrieved mechanically. Initially, a standard hand-operated Eijkelkamp soil auger will be used to profile the deposits and identify the best position for a core to be retrieved using a Russian-type auger (to a maximum depth of c6m, assuming the sediments permit this and there are no obstructions). A GPS will record each location in three dimensions. Each profile will be recorded on a summary *pro forma* sheet and significant layers identified. Relative depths will be noted and a description of the deposits using standard terminology (including colour, texture, compaction and inclusions) will be made.

## 4.11 Palaeoenvironmental assessment

4.11.1 Palaeoenvironmental sampling of the sediments will be undertaken in a selection of the trenches and test pits, according to the character, perceived stratigraphical and chronological significance of the strata under investigation. Sequences containing peat, organic deposits, occupation horizons and/or buried soils are considered a high priority for sampling. The strategy and methodology for the sampling, recording, processing, assessment, analysis and reporting of deposits with environmental archaeology potential will be in accordance with Historic England Centre for Archaeology Guidelines *Environmental Archaeology - A guide to the theory and practice of methods, from sampling and recovery to post-excavation* (2011).

4.11.2 A range of suitable archaeological features will also be sampled if these are present. These bulk samples (like those from the sediments; *Section 4.10.1*) will comprise up to 40 litres to float and wet sieve for the recovery of microartefacts, small mammal bones, charcoal and charred plant remains (CPR). If suitable deposits are identified, bulk samples of 10 litres each, will also be retrieved for the assessment of waterlogged plant remains, wood species and insects from each context or incrementally in thick homogenous layers. The choice of interval will be dependent on whether the sediments appear to be homogenous or have built up quickly. The presence of bedding structures and palaeosols will necessitate finer resolution sampling.

4.11.3 Ideally, complete palaeoenvironmental sequences will also be retrieved in the drilled cores, Russian-type hand auger samples and/or in monolith samples. These being particularly suitable for detailed sediment description, assessment of microfossils (*eg* pollen, diatoms) and potential radiocarbon dating.

4.11.4 All samples will be assigned a separate sample number and their location surveyed and accurately marked on the accompanying section drawing. Monoliths will be photographed *in situ*.

4.11.5 Following preliminary stratigraphic assessment, a representative selection of cores/monoliths will be sub-sampled for palaeoenvironmental assessment and range finding radiocarbon dates. Selection of the number and location of samples for radiocarbon dating and palaeoenvironmental assessment will be carried out in discussion with the client, GMAAS and the Historic England Regional Science Advisor. No analysis will be carried out at this stage, both the assessment and the dating are intended to assess the level of preservation, provide preliminary taxonomic information and a basic chronological framework. Radiocarbon dating

will likely target either artefacts, short-lived single-entity samples or humin/humic organic sediment fractions.

4.11.6 A sample log will be created for each of the selected boreholes clearly showing the location of subsamples, depth below ground level and depth in mOD, with detailed sediment descriptions.

## 4.12 General

4.12.1 All finds will be retained, bagged and marked with the site code and context number, unless bulk deposits of finds of recent date are encountered, in which case only a sufficient sample to characterise and date them will be retained.

4.12.2 If human remains are encountered, they will be left *in situ* until a License for the Removal of Human Remains has been obtained from the Ministry of Justice. The archaeological advisor to the LCC shall also be informed. Should preservation *in situ* not be possible, then as a minimum excavation will follow the relevant guidance (*Appendix E*).

4.12.3 All potential graves will be scanned with a metal detector prior to excavation.

4.12.4 Any finds or environmental remains will be recovered, processed and assessed in accordance with Historic England guidelines (2011) and the archaeological contractor's standard procedures.

4.12.5 Bulk finds will be bagged by context. Small finds (special finds), including (if practicable) *in-situ* flintworking deposits, will be 3-dimensionally recorded on site and will be bagged and registered individually.

4.12.6 Should finds of sensitivity or value be located, a conservator will be called to site to advise or supervise recovery from the ground. GMAAS will be informed immediately and a site meeting convened. Appropriate security arrangements for protection of any such remains while still subject to recording in the ground will be made.

4.12.7 Finds, discovered by the archaeological contractor, falling under the statutory definition of Treasure (as defined by the Treasure Act of 1996 and its revision of 2002) will be reported immediately to the relevant Coroner's Office, the Finds Liaison Officer (FLO) for Greater Manchester, the landowner and the Historic Environment Officer. A Treasure Receipt (obtainable from either the FLO or the DCMS website) must be completed and a report submitted to the Coroner's Office and the FLO within 14 days of understanding the find is Treasure. Failure to report within 14 days is a criminal offence. The Treasure Receipt and Report must include the date and circumstances of the discovery, the identity of the finder (put as unit/contractor) and (as exactly as possible) the location of the find.

## **5 PROJECT SPECIFIC REPORTING AND ARCHIVE METHODOLOGY**

### **5.1 Programme**

5.1.1 The report will be completed within a six months of the completion of fieldwork, with preliminary results being made available to inform further archaeological mitigation of all or part of the evaluated areas, which would be developed in agreement with GMAAS, prior to construction commencing. Some interim reporting may be available, as required, prior to the DCO decision being made, however this would be limited and it should be noted that the Cultural Heritage assessment to be submitted in the Environmental Impact Assessment for the DCO application will be informed by non-intrusive surveys and the desk-based assessment.

5.1.2 Bound copies of the completed report(s) can be provided to Balfour Beatty Atkins on request, and a copy of the report in Adobe Acrobat (.pdf) format will also be provided.

### **5.2 Content**

5.2.1 The content of this report will be as defined in Appendix F.

### **5.3 Specialist input**

5.3.1 OA has a large pool of internal specialists, as well as a network of external specialists with whom OA have well established working relationships. A general list of these specialists is presented in *Appendix G*; in the event that additional input should be required, an updated list of specialists can be supplied.

### **5.4 Archive**

5.4.1 The survey archive will be deposited with rest of the project archive following completion of the project overall.

5.4.2 A summary of OA's general approach to documentary archiving can be found in *Appendix H*.

## **6 HEALTH AND SAFETY**

### **6.1 Roles and responsibilities**

6.1.1 The Senior Project Manager, Fraser Brown, has responsibility for ensuring that safe systems of work are adhered to on site. He delegates elements of this responsibility to the Project Officer, Becky Wegiel, who implements these on a day to day basis.

6.1.2 The Director with responsibility for Health and Safety at OA is Dan Poore Tech IOSH (Chief Business Officer).

### **6.2 Method statement and risk assessment**

6.2.1 A summary of OA's general approach to health and safety can be found in Appendix I. A risk assessment has also been undertaken and approved and will be kept on site, along with OA's standard Health and Safety file, which will contain all relevant health and safety documentation.

6.2.2 The Health and Safety file will be available to view at any time.

### **6.3 Monitoring of works**

6.3.1 All archaeological works will be monitored on behalf of Highways England by Atkins in their capacity as cultural heritage consultants appointed to formulate the Mitigation Strategy for the Scheme. The work will also be monitored by the Greater Manchester Archaeological Advisory Service (GMAAS), who will be given advance notice of the commencement of the evaluation.

6.3.2 The GMAAS will have free access to the site (subject to Health and Safety considerations) and all records to ensure the works are being carried out in accordance with this WSI and all other relevant standards. The frequency of monitoring visits will depend on the archaeology found and the GMAAS's requirements.

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## OA STANDARD FIELDWORK METHODOLOGY APPENDICES

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The following methods and terms will apply, where appropriate, to all OA fieldwork unless varied by the accompanying detailed Written Scheme of Investigation.

Copies of all OA internal standards and guidelines referred to below are available on request.

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### APPENDIX A GENERAL EXCAVATION AND RECORDING METHODOLOGY

#### A.1 Standard methodology – summary

##### *Mechanical excavation*

- A.1.1 An appropriate mechanical excavator will be used for machine excavation. This will normally be a JCB or 360° tracked excavator with a 1.5 m to 2 m wide toothless ditching bucket. For work with restricted access or working room a mini excavator may be used.
- A.1.2 All mechanical excavation will be undertaken under direct archaeological supervision.
- A.1.3 All undifferentiated topsoil or overburden of recent origin will be removed down to the first significant archaeological horizon, in successive, level spits.
- A.1.4 Following mechanical excavation, all areas that require examination or recording will be cleaned using appropriate hand tools.
- A.1.5 Spoil heaps will be monitored in order to recover artefacts to assist in the analysis of the spatial distribution of artefacts. Modern artefacts will be noted but not retained.
- A.1.6 After recording, evaluation trenches and test pits will usually be backfilled with excavated material in reverse order of excavation, and compacted as far as is practicable with the mechanical excavator. Area excavations will not normally be backfilled.

##### *Hand excavation*

- A.1.7 All investigation of archaeological levels will usually be by hand, with cleaning, examination and recording both in plan and section.
- A.1.8 Within significant archaeological levels the minimum number and proportion of features required to meet the aims of the excavation will be hand excavated. Pits and postholes will usually be subject to a 50% sample by volume. Linear features will be sectioned as appropriate. More complex features such as those associated with funerary activity will usually be subject to 100% hand excavation.
- A.1.9 In the case of evaluations, it is not necessarily the intention that all trial trenches will be fully excavated to natural stratigraphy, but the depth of archaeological deposits across the site will be assessed. The stratigraphy of a representative sample of the evaluation trenches will be recorded even where no archaeological deposits have been identified. Any excavation, both by machine and by hand, will be undertaken with a view to avoiding damage to any archaeological features or deposits, which appear to be worthy of preservation in situ.

## **Recording**

- A.1.10 Written descriptions will be recorded on proforma sheets comprising factual data and interpretative elements.
- A.1.11 Where stratified deposits are encountered a Harris matrix will be compiled during the course of the excavation.
- A.1.12 Plans will normally be drawn at 1:100, but on urban or deeply stratified sites a scale of 1:50 or 1:20 will be used. Detailed plans will be at an appropriate scale. Burials will be drawn at scale 1:10 or recorded using geo-referenced digital photography.
- A.1.13 The site grid will be accurately tied into the National Grid and located on the 1:2500 or 1:1250 map of the area.
- A.1.14 A register of plans will be kept.
- A.1.15 Long sections of showing layers will be drawn at 1:50. Sections of features or short lengths of trenches will be drawn at 1:20.
- A.1.16 A register of sections will be kept.
- A.1.17 Generally, all sections will be tied in to Ordnance Datum.
- A.1.18 A full photographic record, illustrating in both detail and general context the principal features and finds discovered will be maintained. The photographic record will also include working shots to illustrate more generally the nature of the archaeological work.
- A.1.19 Photographs will be recorded on OA Photographic Record Sheets.

## **A.2 Relevant industry standards and guidelines**

- A.2.1 The Chartered Institute for Archaeologists Standard and Guidance notes relevant to fieldwork are:
- Standard and Guidance for Archaeological Field Evaluation
  - Standard and Guidance for Archaeological Excavation
  - Standard and Guidance for an Archaeological Watching Brief.
- A.2.2 These will be adhered to at all times.

## **A.3 Relevant OA manual and other supporting documentation**

- A.3.1 All fieldwork will be undertaken in accordance with the requirements of the OA Field Manual (ed. D Wilkinson 1992), and the revised OA fieldwork manual (publication forthcoming).
- A.3.2 Further guidance is provided to all excavators in the form of the OA 'Fieldwork Crib Sheets - a companion guide to the Fieldwork Manual'. These have been issued ahead of formal publication of the revised Fieldwork Manual.

## APPENDIX B GEOMATICS AND SURVEY

### B.1 Standard methodology - summary

- B.1.1 The aim of OA methodology is to provide comprehensive survey cover of all investigation areas. Additionally, it is designed to provide coverage for any areas, beyond the original scope of the project, which arise as a result of further work. It provides digital plans of all required elements of the project and locates them within an overall grid.
- B.1.2 It also maintains all necessary survey data and ensures that the relevant information is copied into the primary record, in order to ensure the integrity of the project archive. Furthermore, it ensures that all core data is securely stored and backed up. It establishes accurate project reference systems utilising a series of control stations and permanent base lines.
- B.1.3 The survey will be conducted using a combination of Total Station Theodolite (TST) survey utilising Reflectorless Electronic Distance Measurement (REDM) where appropriate, hand-measured elements and GPS (Global Positioning System), or photogrammetry.
- B.1.4 Before the main work commences, a network of control stations will be laid out encompassing the area. Control stations will be tied in to known points or existing features using rigorous metric observation. The control network will be set in using a TST to complete a traverse or using techniques as appropriate to ensure sufficient accuracy. A GPS, or other appropriate method, will be used to orientate the control network to National Grid or other recognised coordinate system.
- B.1.5 All control stations will be checked by closed traverse and/or GPS, as appropriate. The accuracy of these control stations will be accessed on a regular basis and re-established accordingly. All stations will be recorded on Survey Control Station sheets.
- B.1.6 Each control station will be marked with a PGM (Permanent Ground Marker). Witness diagrams will include the full 3-D co-ordinates generated, a sketch diagram and measurements to at least three fixed details, written description of the mark and a photograph of the control point in its environs.
- B.1.7 Prior to entry into the field all equipment will be checked, and all pre-survey information will be logged onto the field computer and uploaded onto survey equipment as appropriate. The software in the field computer will be verified and all cabling between the GPS and/or TST and computer will be checked. Prior to conducting the survey, the site will be reconnoitred for locations for a viable control network and check the line of sight and any possible hindrance to survey. Daily record sheets will be kept to record daily tasks and conditions.
- B.1.8 All spatial data will be periodically downloaded onto a field computer, and backed up onto CD, or DVD. It will be cleaned, validated and inspected.
- B.1.9 All survey data will be documented on daily survey record sheets. Information entered on these sheets includes key set up information (Instrument height etc.) as well as daily variables and errors/comments. All survey data will be digitally recorded in a raw



format and translated during the download process this shall allow for any errors to be cross referenced with the daily survey record and corrected accordingly.

- B.1.10** A weekly summary of survey work will be produced to access development and highlight problems. This information also will be recorded on the weekly survey journal. Technical support for the survey equipment and download software shall be available at all times. In those instances, where sites are remotely operated, all digital data will be backed up regularly and a copy returned to Oxford on a weekly basis.
- B.1.11** A site plan will initially be created by a rapid survey of relevant archaeological features by mapping their extent using a combination of TST and GPS. This will form the basis for deciding excavation strategy and will be updated as the excavation clarifies the extent of, and relationships between, archaeological features.
- B.1.12** Excavated archaeological interventions and areas of complex stratigraphy will be hand drawn. At least two Drawing Points (DPs) will be set in as a baseline and measurements taken off this by tape and offset. The hand drawn plans will be referenced to the digitally captured pre-site plan by measuring in the DPs with a TST or GPS. These hand drawn elements will then be scanned in, geo-referenced using the DPs as reference points and digitised following OA's digitising protocols. For further details on hand planning procedure please refer to the fieldwork guidelines.
- B.1.13** Where appropriate photogrammetry or rectified photography may be used to record standing structures or burials. This will be carried out in line with Standard OA procedures for photogrammetry or rectified photography.
- B.1.14** Survey data recorded in the field will be downloaded using appropriate downloading software, and saved as an AutoCAD Map DWG file, or an ESRI Shapefile. These files will be regularly updated and backed up with originals being stored on an OA server in Oxford.
- B.1.15** All drawings will be composed of closed polygons, polylines or points in accordance with the requirements of GIS construction and OA Geomatics protocols. Once created, additional GIS/CAD work will normally be carried out at the local OA central office or at on-site remote locations when appropriate. Support for all GIS/CAD work will be available from OA's Oxford Office during normal office hours. The aim of the GIS/CAD work is to produce workable draft plans, which can be produced as stand-alone products, or can be readily converted to GIS format. Any hand-drawn plans will be scanned and digitised on site in the first instance. Subsequent plans will be added to the main drawing as it develops.
- B.1.16** All plan scans will be numbered according to their plan site number. Digital plans will be given a standard new plan number taken out from the site plan index.
- B.1.17** All digital data will be backed up incrementally on CD or DVD. On each Friday the entire data directory will be backed up and returned to Oxford where it will be copied onto the OA projects server. Each CAD drawing will contain an information layout which will include all the relevant details appertaining to that drawing. Information (metadata) on all other digital files will be created and stored as appropriate. At the end of the survey all raw measurements will be made available as hard copy for archiving purposes.

## **B.2 Relevant industry standards and guidelines**

- B.2.1 Historic England (2007) Understanding the Archaeology of Landscapes A Guide to Good Recording Practice.
- B.2.2 Historic England (2015), Metric Survey Specifications for Cultural Heritage.
- B.2.3 Historic England (2016), Understanding Historic Buildings A Guide to Good Recording Practice.
- B.2.4 Historic England (2017), Photogrammetric Applications for Cultural Heritage. Guidance for Good Practice.

## **B.3 Relevant OA manual and other supporting documentation**

- B.3.1 OA South Metric Survey, Data Capture and Download Procedures
- B.3.2 OA South Digitising Protocols
- B.3.3 OA South GIS Protocols
- B.3.4 These will be superseded by the OA South Geomatics Manual (in progress).

## APPENDIX C ENVIRONMENTAL EVIDENCE

### C.1 Standard methodology – summary

- C.1.1 Different environmental and geoarchaeological sampling strategies may be employed according to established research targets and the perceived importance of the strata under investigation. Where possible an environmental specialist(s) will visit the site to advise on sampling strategies. Sampling methods will follow guidelines produced by Historic England and Oxford Archaeology. A register of samples will be kept. Specialists will be consulted where non-standard sampling is required (e.g. TL, OSL or archaeomagnetic dating) and if appropriate will be invited to visit the site and take the samples.
- C.1.2 Geoarchaeological sampling methods are site specific, and methodologies will be designed in consultation with the geoarchaeological manager on a site by site basis.
- C.1.3 Bulk soil samples, where possible of 40 litres or 100% of a deposit if less is available, will be taken from potentially datable features and layers for flotation for charred plant remains and for the recovery of small bones and artefacts. Larger soil samples (up to 100L) may be taken for the complete recovery of animal bones, marine shell and small artefacts from appropriate contexts. Smaller bulk samples (general biological samples) of 10-20 litres will be taken from any waterlogged deposits present for the recovery of macroscopic plant remains and insects. Series of incremental 2L samples may be taken through buried soils and deep feature fills for the recovery of snails and/or waterlogged plant remains, depending on the nature of the stratigraphy and of the soils and sediments. Columns will be taken from buried soils, peats and waterlogged feature fills for pollen and/or phytoliths, diatoms, ostracods and foraminifera if appropriate. Soil samples will be taken for soil investigations (particle size, organic matter, bulk chemistry, soil micromorphology etc.) and possibly for metallurgical analysis in consultation with the appropriate specialists.
- C.1.4 Bulk samples from dry deposits will be processed by standard water flotation using a modified Siraf-style machine and meshes of 0.25mm (flot) and 0.5 or 1mm depending on sediment type and like modes of preservation (residue). Heavy residues will be wet sieved, air dried and sorted. Samples taken exclusively for the recovery of bones, marine shell or artefacts will be wet sieved to 2mm. Waterlogged samples (1L sub-sample) and snail samples (2L) will be processed by hand flotation with flots and residues collected to 0.25mm (waterlogged plants) and 0.5mm (snails) respectively; these flots and residues will be sorted by the specialist. Samples specifically taken for insects, pollen, other microflora and microfauna, metallurgy and soil analysis will be submitted as whole earth to the appropriate specialists or processed following their instructions.

### C.2 Relevant industry standards and guidelines

- C.2.1 Historic England 2010. Waterlogged Wood: Guidelines on the recording, sampling, conservation and curation of waterlogged wood.
- C.2.2 Historic England 2011. Environmental Archaeology. A guide to the theory and practice of methods, from sampling and recovery to post excavation, (2nd ed)

- C.2.3 Historic England 2004. Dendrochronology: Guidelines on Producing and Interpreting Dendrochronological Dates.
  - C.2.4 Historic England 2006. Archaeomagnetic Dating. Guidelines for Producing and Interpreting Archaeomagnetic Dates.
  - C.2.5 Historic England 2008. Luminescence Dating. Guidelines on Using Luminescence Dating in Archaeology.
  - C.2.6 Historic England 2008. Guidelines for the Curation of Waterlogged Macroscopic Plant and Invertebrate Remains.
  - C.2.7 Historic England 2014. Animal Bones and Archaeology. Guidelines for Best Practice.
  - C.2.8 Historic England, 2015. Archaeometallurgy. Guidelines for Best Practice.
  - C.2.9 Historic England 2015 Geoarchaeology. Using Earth Sciences to Understand the Archaeological Record.
- C.3 Relevant OA manual and other supporting documentation**
- C.3.1 Oxford Archaeology 2005. Environmental Sampling Guidelines, 2nd ed.

## APPENDIX D ARTEFACTUAL EVIDENCE

### D.1 Standard methodology - summary

- D.1.1 Before a site begins arrangements concerning the finds will be discussed with the Head of Finds. Information will be provided by the project manager about the nature of the site, the expected size and make-up of the finds assemblage and any site specific finds retrieval strategies. On-site requirements will be discussed and a conservator appointed who can be called on to make site visits if required. Special requirements regarding particular categories of material will be raised at this early stage for instance the likelihood of recovering assemblages of waterlogged material, large timbers, quantities of structural stone or ceramic building material. Specialists may be required to visit sites to discuss retrieval strategies.
- D.1.2 The project manager will supply the Head of Finds with contact details of the landowner of the site so that consent to deposit any finds resulting from the investigation can be sought.
- D.1.3 The on-site retrieval, lifting and short term packaging of bulk and small finds will follow the detailed guidelines set out in the OA Finds Manual (sections 2 and 3), First Aid for Finds and the UKIC conservation guidelines No.2.
- D.1.4 All finds recovered from site will be transported to an OA regional office for processing; local sites will return finds at the end of each day, away based sites at the end of each week. Special arrangements can be discussed for certain sites with the department manager before the start of a project. Larger long running sites may in some instances set up on-site processing units to deal with the material from a particular site.
- D.1.5 All finds qualifying as Treasure will be removed to a safe place and reported to the local Coroner according to the procedures relating to the Treasure Act (1996), and the Treasure (Designation) Order 2002. Where removal cannot be effected on the same working day as the discovery, suitable security measures will be taken to protect the finds from theft.
- D.1.6 Each box of finds will be accompanied by a finds context checklist itemising the finds within each box. The number of bags of finds from each context and individual small find from each context will be recorded. A member of the processing team will check the list when it arrives in the department. There are separate forms for finds recovered from fieldwalking.
- D.1.7 The processing programme is reviewed on a weekly basis and priorities are worked out after discussions with the Head of Fieldwork and the Head of Post-excavation. Project managers will keep the Head of Finds informed of any pressing deadlines that they are aware of. All finds from evaluations are dealt with as a matter of priority.
- D.1.8 All bulk finds are washed (where appropriate), marked, bagged and boxed by the processing team according to the guidelines set out in section 4 and 5 of the OA Finds Manual, First-aid for finds and the UKIC guidelines No.2. They must also take into account the requirements of the receiving museum. Primary data recording count and weight of fragments by material from each context is recorded on the site database.

- D.1.9 Unstable and sensitive objects are recorded onto the database and then packaged and stored in controlled environments according to their individual requirements. The advice of a conservator will be sought for sensitive objects in need of urgent conservation. All metalwork will be x-rayed prior to assessment (and to meet the requirements of most receiving museums).
- D.1.10 Finds recovered from the environmental sample processing will be incorporated into the main assemblage and added to the database.
- D.1.11 On completion of the processing and data entry a finds file for each archaeological investigation will be produced, a summary of which is available for the project manager. The assemblage is allocated an OA number for storage purposes. Bulk finds are stored on a roller racking system, metals in a secure controlled storage and organic finds are refrigerated where possible.
- D.1.12 The movement of finds in and out of the department storage areas is strictly monitored and recorded. Carbon copy transit forms exist to record this information. Finds will not be removed from storage without the prior knowledge of the Head of Finds.
- D.1.13 Finds information summarised in the finds compendium is used to assess the finds requirements for the post excavation stages of the project. The Finds department holds a list of all specialists used by OA (see below) both internal and external.
- D.1.14 On completion of the post excavation stage of the project the department prepares the finds assemblage for deposition with the receiving museum. Discussions will be held with the museum, the excavator and the head of finds to finalise any selection, retention or discard policy. Most museums issue strict guidelines for the preparation of archives for deposition with their individual labelling, packaging and recording requirements.

## **D.2 Relevant industry standards and guidelines**

- D.2.1 UKIC, 1983, Packaging and Storage of Freshly-Excavated Artefacts from Archaeological Sites. Conservation Guidelines No.2. Archaeology Section, United Kingdom Institute for Conservation.
- D.2.2 UKIC, 1988, Excavated Artefacts and Conservation: UK sites Revised Edition. Conservation Guidelines No.1. Archaeology Section, United Kingdom Institute for Conservation.
- D.2.3 Society of Museum Archaeologists, 1993, Selection, retention and dispersal of Archaeological Collections. Download available via <http://www.socmusarch.org.uk/publica.htm>
- D.2.4 Watkinson, D E & Neal, V, 1998, First Aid for Finds (3rd edition). RESCUE & UKIC

## **D.3 Relevant OA manual and other supporting documentation**

- D.3.1 Allen, L, and Cropper, C (internal publication only) Oxford Archaeology Finds Manual.

## APPENDIX E HUMAN REMAINS

### E.1 Standard methodology - summary

- E.1.1 Human remains will not be excavated without a relevant licence/faculty and, where applicable (for example, a post medieval cemetery), a risk assessment from the local environmental officer.
- E.1.2 All human remains will be treated with due care and regard to the sensitivities involved, and will be screened from the public throughout the course of the works.
- E.1.3 Excavation will be undertaken in accordance with ClfA (Roberts and McKinley 1993), Historic England (2018) and the Advisory Panel on the Archaeology of Burials in England (APABE, 2015, 2017). For crypts and post-medieval burials, the recommendations set out by the ClfA (Cox 2001) and by the Association of Diocesan and Cathedral Archaeologists and APABE (2010) are also relevant.
- E.1.4 In accordance with recommendations set out in the Historic England and Church of England (2005) and updated by the Advisory Panel on the Archaeology of Burials in England (2017), skeletons will not be excavated beyond the limits of the trench, unless they are deemed osteologically or archaeologically important.
- E.1.5 Where any soft tissue survives and/or materials (for example, inner coffins, mattresses and other paddings) soaked in body liquor, no excavation or handling of the remains will take place until an appropriate risk assessment has been undertaken. Relevant protocols (i.e. Cox 2001) for their excavation, recording and removal will be adhered to.
- E.1.6 OA does not excavate or remove modern burials (those less than 100 years old) and does not remove or open sealed lead coffins. Appropriate PPE (e.g. chemical suit, latex gloves) will be worn by all staff when working with lead coffins.
- E.1.7 Graves and their contents will be hand excavated in plan. Each component (for example, skeleton, grave cut, coffin (or remains of), grave fill) will be assigned a unique context number from a running sequence. A group number will also be assigned to all of these, and small finds numbers to features such as coffin nails, hobnails and other grave goods (as appropriate).
- E.1.8 Soil samples will be normally taken during the excavation of inhumations, usually from the region of the skull, chest, right hand, left hand, abdomen and pelvis, right foot and left foot. Infants (circa. less than 5 years) will normally be recovered as bulk samples. Soil samples will also be taken from graves that appear to contain no human bone.
- E.1.9 Burials (including the skeleton, cremation, coffin fittings, coffin, urn, grave goods / other) will be recorded by photographic and written record using specialised pro forma context sheets, although these records may only include schematic representations of the location and position of the skeletons, depending on the nature and circumstances of the burial.
- E.1.10 Where necessary, hand drawn plans (usually at 1:10, sometimes 1:5) will be made, especially of contexts where required details cannot be adequately seen using photography (for example, urned cremations; undisturbed hob nails).

- E.1.11 Levels will be taken. For inhumations this will be on the skull, pelvis and feet as a minimum.
- E.1.12 Human remains that are exhumed will be bagged and labelled according to skeletal region and carefully packed into suitable containers (for example, acid free cardboard boxes) and transported to a suitable storage location. Any associated coffins and coffin fittings will be contained with the human remains wherever possible.
- E.1.13 Unurned cremations will not usually be half sectioned, but excavated in spits and/or quadrants (i.e. large deposits or spreads), or recovered as a bulk sample.
- E.1.14 Wherever possible, urned cremations will be carefully bandaged, recovered whole and will be excavated in spits in the laboratory, as per the recommendations of McKinley (2004, 2017).
- E.1.15 Unless deemed osteologically or archaeologically important disarticulated bone / charnel will be collected and reserved for re-burial if immediate re-internment as close to its original position is not practicable. In some instances, a rapid scan of this material may be undertaken by a qualified osteologist, if deemed relevant.
- E.1.16 If undisturbed, pyre sites will normally be excavated in quadrants, at the very least in 0.5 m blocks of 0.5 m spits.
- E.1.17 Pyre debris dumps will be half sectioned or quadrant and will be subject to 100% sampling.
- E.1.18 Wooden and lead coffins and any associated fittings, including fixing nails will be recorded on a pro forma coffin recording sheet. All surviving coffin fittings will be recorded by reference to Reeve and Adams (1993) and the unpublished master catalogue that is being compiled by OA. Where individual types cannot be paralleled, they will be drawn and/ or photographed and assigned a style number. Biographical details obtained from legible departum plate inscriptions will be recorded and further documentary research will be made.
- E.1.19 Funerary structures, such as brick shaft graves and/or vaults will be recorded by photogrammetry or hand-drawn at a scale of 1:10 or 1:20, as appropriate. Location, dimensions and method of construction will be noted, and the structure added to the overall trench plan.
- E.1.20 Memorials, including headstones, revealed within the areas of development will be recorded irrespective of whether they are believed to be in situ.
- E.1.21 Where required, memorials will be accorded an individual context number and will also be included as part of the grave group, if the association with a burial is clear.
- E.1.22 Memorials will be recorded on pro-forma context sheets, based on and following the guidelines set out by Mytum (2002), and will include details of:
- Shape
  - Dimensions
  - Type of stone used



- Condition, completeness and fragmentation of stones, no longer in original positions
- Iconography (an illustration may best describe these features)
- Inscription (verbatim record of inscription; font of the lettering)
- Stylistic type

## **E.2 Relevant industry standards and guidelines**

- E.2.1 Advisory Panel on the Archaeology of Burials in England, 2013, Science and the Dead. A guideline for the destructive sampling of archaeological human remains for scientific analysis. English Heritage Publishing.
- E.2.2 Advisory Panel on the Archaeology of Burials in England, 2017 Guidance for Best Practice for the Treatment of Human Remains Excavated from Christian Burial Grounds in England
- E.2.3 Advisory Panel on the Archaeology of Burials in England, 2015 Large Burial Grounds. Guidance on sampling in archaeological fieldwork projects
- E.2.4 Association of Diocesan and Cathedral Archaeologists and APABE. 2010 Archaeology and Burial Vaults. A guidance note for churches. Guidance Note 2
- E.2.5 British Association of Biological Anthropology and Osteoarchaeology. 2010a Code of Practice
- E.2.6 British Association of Biological Anthropology and Osteoarchaeology. 2010b Code of Ethics
- E.2.7 Cox, M, 2001 Crypt archaeology. An approach. ClfA Paper No. 3
- E.2.8 English Heritage, 2002 Human Bones from Archaeological Sites. Guidelines for producing assessment documents and analytical reports
- E.2.9 Historic England, 2018 The Role of the Human Osteologist in an Archaeological Fieldwork Project. Swindon, Historic England
- E.2.10 McKinley, J, and Roberts, C, 1993 Excavation and post-excavation treatment of cremated and inhumed human remains, ClfA Technical Paper No. 13
- E.2.11 McKinley, J, 2004 Compiling a skeletal inventory: cremated human bone. In Brickley, M, and McKinley, J (eds) Guidelines to the Standards for Recording Human Remains, ClfA Technical Paper No. 7. 9-13
- E.2.12 McKinley, J, 2017 Compiling a skeletal inventory: cremated human bone. In Mitchell P, and Brickley, M (eds) Updated Guidelines to the Standards for Recording Human Remains, ClfA 14-19
- E.2.13 Mitchell P, and Brickley, M (eds) Updated Guidelines to the Standards for Recording Human Remains, CIFA 2017
- E.2.14 Mytum, H, 2000 Recording and Analysing Graveyards. CBA Handbook No. 15.
- E.2.15 Reeve, J, and Adams, M, 1993 The Spitalfields Project. Volume I – The Archaeology Across the Styx. CBA Research Report No. 85

E.2.16 The Human Tissue Act 2004

**E.3 Relevant OA manual and other supporting documentation**

- E.3.1 Loe, L, 2008 The Treatment of Human Remains in the Care of Oxford Archaeology. Oxford Archaeology internal policy document
- E.3.2 Excavating and recording of buried human remains. Oxford Archaeology internal guidelines document

## APPENDIX F REPORTING

### F.1 Standard methodology - summary

F.1.1 For Watching Briefs and Evaluations, the style and format of the report will be determined by OA, but will include as a minimum the following:

- A location plan of trenches and/or other fieldwork in relation to the proposed development.
- Plans and sections of features located at an appropriate scale.
- A section drawing showing depth of deposits including present ground level with Ordnance Datum, vertical and horizontal scale.
- A summary statement of the results.
- A table summarising the features, classes and numbers of artefacts contained within, spot dating of significant finds and an interpretation.
- A reconsideration of the methodology used, and a confidence rating for the results.
- An interpretation of the archaeological findings both within the site and within their wider landscape/townscape setting.

F.1.2 For Excavations, a Post-Excavation Assessment and Project Design will generally be prepared, as prescribed by Historic England Management of Research Projects in the Historic Environment (MoRPHE) 2006, Section 2.3. This will include a Project Description containing:

- A summary description and background of the project.
- A summary of the quantities and assessment of potential for analysis of the information recovered for each category of site, finds, dating and environmental data. Detailed assessment reports will be contained within appendices.
- An explicit statement of the scope of the project design and how the project relates to any other projects or work preceding, concurrent with or following on from it.
- A statement of the research aims of the fieldwork and an illustrated summary of results to date indicating to what extent the aims were fulfilled.
- A list of the project aims as revised in the light of the results of fieldwork and the current post-excavation assessment process.

F.1.3 A section on Resources and Programming will also be produced, containing:

- A list of the personnel involved indicating their qualifications for the tasks undertaken, along with an explanation of how the project team will communicate, both internally and externally.
- A list of the methods which will be used to achieve the revised research aims.

- A list of all the tasks involved in using the stated methods to achieve the aims and produce a report and research archive in the stated format, indicating the personnel and time in days involved in each task. Allowance should be made for general project-related tasks such as monitoring, management and project meetings, editorial and revision time.
- A cascade or Gantt chart indicating tasks in the sequence and relationships required to complete the project. Due allowance will be made for leave and public holidays. Time will also be allowed for the report to be read by a named academic referee as agreed with the County Archaeological Officer, and by the County Archaeological Officer.
- A report synopsis indicating publisher and report format, broken down into chapters, section headings and subheadings, with approximate word lengths and numbers and titles of illustrations per chapter. The structure of the report synopsis should explicitly reflect the research aims of the project.

F.1.4 The Project Design will be submitted to the County Archaeological Officer or equivalent for agreement.

F.1.5 Under certain circumstances (e.g. with very small mitigations), and as agreed with the County Archaeological Officer or equivalent, a formal Assessment and Project Design may not be required and either the project will continue straight to full analysis, or a simple Project Proposal (MoRPHE 2006 Section 2.1) will be produced prior to full analysis. This proposal may include:

- A summary of the background to the project
- Research aims and objectives
- Methods statement outlining how the aims and objectives will be achieved
- An outline of the stages, products and tasks
- Proposed project team
- Estimated overall timetable and budget if appropriate.

F.1.6 Once the post-excitation Project Design or Project Proposal has been accepted, the County Archaeological Officer or his appointed deputy will monitor the progress of the post-excitation project at agreed points. Any significant variation in the project design will be agreed with the County Archaeological Officer.

F.1.7 The results of the project will be published in an appropriate archaeological journal or monograph. The appropriate level of publication will be dependent on the significance of the fieldwork results and will be agreed with the County Archaeological Officer. An OASIS (Online Access to the Index of Archaeological Investigations) form will be completed for each project as per Historic England guidelines.

## F.2 Relevant industry standards and guidelines

F.2.1 Oxford Archaeology (OA) adheres to the national standards in post-excitation procedure as outlined in Historic England's Management of Research Projects in the Historic Environment (MoRPHE; EH 2006). Furthermore, all post-excitation projects

take into account the appropriate regional research frameworks as well as national research agendas such as the Framework for Historic Environment Activities & Programmes in Historic England (SHAPE; EH 2008).

## APPENDIX G LIST OF SPECIALISTS REGULARLY USED BY OA

G.1.1 Below are two tables, one containing 'in-house' OA specialists, and the other containing a list of external specialists who are regularly used by OA.

### Internal archaeological specialists used by OA

Specialist	Specialism	Qualifications
[REDACTED]	Early Prehistoric pottery	BA, PGDip, MLitt, MCIfA
[REDACTED]	Iron Age and Roman pottery	BA, FSA, MCIfA
[REDACTED]	Medieval and Post Medieval pottery, Clay Pipe and CBM	BA (Hons), MCIfA
[REDACTED]	CBM and Fired Clay	BA (Hons), MSc
[REDACTED]	Roman Pottery	BA (Hons), MA, MCIfA
[REDACTED]	Metalwork and Glass	BA (Hons)
[REDACTED]	Metalwork and worked bone	BA (Hons), PGDip
[REDACTED]	Worked stone artefacts	BA, PhD, MCIfA
[REDACTED]	Architectural Stone	BA, FSA
[REDACTED]	Fish and Bird Bone	BA (Hons), MA, D.Phil, MCIfA, FSA Scot
[REDACTED]	Pollen	BSc, MSc
[REDACTED]	Animal bone	BA (hons), MA, MSc, FZG, SAC Dip (ecology)
[REDACTED]	Charred and waterlogged plant remains and charcoal	BSc (Hons), MA
[REDACTED]	Charred plant remains, charcoal and pollen	BA (Hons), PhD, MCIfA
[REDACTED]	Geoarchaeology and land snails	BA (Hons), MSc
[REDACTED]	Geoarchaeology	BA (Hons), MSc, ACIfA
[REDACTED]	Animal Bone	BSc, PhD
[REDACTED]	Archaeological archive deposition	BA (Hons Dunelm)
[REDACTED]	Flint	BSc, MCIfA
[REDACTED]	Human Bone	D.Phil, BA, MCIfA
[REDACTED]	Human Bone	MSc, BSc
[REDACTED]	Human Bone	MSc, BA
[REDACTED]	Human Bone	D.Phil, MSc, BSc

### External archaeological specialists regularly used by OA

Specialist	Specialism	Qualifications
[REDACTED]	Slag	BA (Hons)
[REDACTED]	Leather	BA, MA

Specialist	Specialism	Qualifications
[REDACTED]	Identification of Medieval Textiles	FSA, Dip.Acc
[REDACTED]	Conservation	BSc (Hons), BA, MSc
[REDACTED]	Conservation	BA, MA, MAAIS
[REDACTED]	Soils, especially Micromorphology	BA (Hons), MSc, PhD
[REDACTED]	Charcoal	MA, MSc
[REDACTED]	Diatoms	BSc, MSc, PhD
[REDACTED]	Insects	BA (Hons), MA, PhD
[REDACTED]	Phytoliths and pollen	BSc (Hons), D.Phil
[REDACTED]	Metalworking Slag	BSc (Hons), PhD
[REDACTED]	Charred and waterlogged plant remains	BA (Hons)
[REDACTED]	Pollen	PhD
[REDACTED]	Ostracods and Foraminifera	BA (Hons), PhD
[REDACTED]	Soil Chemistry	MA, PhD
[REDACTED]	Geoarchaeology	BSc, PhD
[REDACTED]	Dendrochronology	D.Phil, FSA
[REDACTED]	Optically Stimulated Luminescence Dating	PhD
[REDACTED]	Clay Pipe	BA, PhD, MCIfA
[REDACTED]	Flint	BSc, PhD, FSA Scot, MCIfA
[REDACTED]	Ancient Woodwork	BA, PhD

## APPENDIX H DOCUMENTARY ARCHIVING

### H.1 Standard methodology – summary

- H.1.1 The documentary archive constitutes all the written, drawn, photographic and digital records relating to the set up, fieldwork and post-excavation phases of the project. This documentary archive, together with the artefactual and environmental ecofact archive collectively forms the record of the site. The report is part of the documentary archive, and the archive must provide the evidence that supports the conclusions of the report, but the archive may also include data which exceeds the limitations of research parameters set down for the report and which could be of significant value to future researchers.
- H.1.2 At the outset of the project OA Archive department will contact the relevant local receiving museum or archive repository to notify them of the imminent start of a new fieldwork project in their collecting area. Relevant local archiving guidelines will be observed and site codes, which integrate with the receiving repository, will be agreed for labelling of archives and finds.
- H.1.3 Where there is currently no receiving museum for the project archive, although responsibility for the archive ultimately lies with the client, OA will hold the archive on their behalf for a period of up to 3 years after completion of the report, after which time (in the event that a suitable depository has not been secured) provision for further storage of the archive will be made in agreement with Oxford Archaeology, the client and the relevant planning archaeologist.
- H.1.4 During the course of the project the Archive department will assist the Project Manager in the management of the archive including the cataloguing and development technique suitable for photographic archive requirements.
- H.1.5 The hard copy site archive will be security copied by scanning to PdFA and a copy of this will be housed on the OA Archive Server. A full digital copy of the archive, including scanned hard copy and born digital data, will be deposited with and made publicly available on-line through the ADS. A further copy will be maintained on the OA server and if requested a copy on disk will also be sent to the receiving museum with the hard copy. This will act as a safeguard against the accidental loss and the long-term degeneration of paper records and photographs.
- H.1.6 Born digital data will only be printed to hard copy for the receiving museum where practical. Archive elements that need maintaining in digital form will be sent to ADS in accordance with Arches Standard and ADS guidelines. A copy will be sent to the receiving museum by CD and back-up copies will be stored on the OA digital network. In most cases a digital copy of the report will be included in the OASIS project library hosted by ADS.
- H.1.7 Prior to deposition the Archive department will contact the museum regarding the size and content of the archive and discuss any retention and dispersal policies which may be applicable in line with local and SMA Guidelines ' Selection, Retention & Dispersal of Archaeological Collections' 1993.



- H.1.8 The site archive will then be deposited with the relevant receiving museum or repository at the earliest opportunity unless further archaeological work on the site is expected. The documentary archive will include correspondence detailing landowner consent to deposit the artefacts and any copyright licences in accordance with the receiving museum guidelines. Deposition charges will be required from the client as part of the project costs but the level of the fee is set by the receiving body, and may be subject to change during the lifespan of the project. Changes to archiving charges beyond OA's control will be passed across to the client.
- H.1.9 Oxford Archaeology will retain full copyright of any commissioned reports, tender documents or other project documents, under the Copyright, Designs and Patents Act 1988 with all rights reserved; excepting that it will provide the receiving repository or museum for the archive with a full licence for use to the client in all matters directly relating to the project as described in the Written Scheme of Investigation, and in line with the relevant receiving body guidelines.
- H.1.10 OA will advise the receiving repository or museum for the archive of 3<sup>rd</sup> party materials supplied in the course of projects which are not OA's copyright.
- H.1.11 OA undertakes to respect all requirements for confidentiality about the client's proposals provided that these are clearly stated. It is expected that such conditions shall not unreasonably impede the satisfactory performance of the services required. Archaeological findings and conclusions can be kept confidential for a limited period but will be made publicly available in line with the above procedure either after a specified time period agreed with the client at the outset of the project, or where no such period is agreed, after a reasonable period of time. It is expected that clients respect OA's general ethical obligations not to suppress significant archaeological data for an unreasonable period.

## **H.2 Relevant industry standards and guidelines**

- H.2.1 At the end of the project the site archive will be ordered, catalogued, labelled and conserved and stored according to the following national guidelines:
- H.2.2 The 2014 EAC Guidelines A Standard and Guide to the Best Practice for Archaeological Archiving in Europe (GB) Perrin K, Brown E et al.
- H.2.3 The 2014 CIFA Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives.
- H.2.4 The 2011 AAF guide Archaeological Archives A Guide to Best Practice in Creation, Compilation, Transfer and Curation. Brown D.
- H.2.5 The UKIC's Guidelines for the preparation of excavation archives for long-term storage.
- H.2.6 The MGC's Standards in the museum care of archaeological collections.
- H.2.7 Local museum guidelines such as Museum of London Guidelines: (<http://www.museumoflondonarchaeology.org.uk/English/ArchiveResearch/DeposRe> source) will be adopted where appropriate to the archive collecting area.
- H.2.8 The site archive will be prepared to at least the minimum acceptable standard defined in Management of Archaeological Projects 2, Historic England 1991.

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## **H.3 Relevant OA manual and other supporting documentation**

### **H.3.1 The OA Archives Policy.**

## **APPENDIX I                    HEALTH AND SAFETY**

### **I.1        Standard Methodology - summary**

- I.1.1 All work will be undertaken in accordance with the current OA Health and Safety Policy, the OA Site Safety Procedures Manual, a site-specific Risk Assessment and, if required, Safety Plan or Method Statement. Copies of the site-specific documents will be submitted to the client or their representative for approvals prior to mobilisation, and all relevant H and S documentation will always be available on site. The Health and Safety documentation will be read in conjunction with the project WSI.
- I.1.2 Where a project falls under the Construction (Design and Management) Regulations (2015), all work will be carried out in accordance with the Principal Contractor's Construction Phase Plan (CPP).

### **I.2        Relevant industry standards and guidelines**

- I.2.1 All work will be carried out according to the requirements of all relevant legislation and guidance, including, but not exclusively:
  - I.2.2 The Health and Safety at Work Act (1974).
  - I.2.3 Management of Health and Safety at Work Regulations (1999).
  - I.2.4 Manual Handling Operations Regulations 1992 (as amended).
  - I.2.5 The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (2013).
  - I.2.6 The Construction (Design and Management) Regulations (2015).
  - I.2.7 Relevant OA manual and other supporting documentation
  - I.2.8 The OA Health and Safety Policy.
  - I.2.9 The OA Site Safety Procedures Manual.
  - I.2.10 The OA Risk Assessment templates.
  - I.2.11 The OA Method Statement template.
  - I.2.12 The OA Construction Phase Plan template.

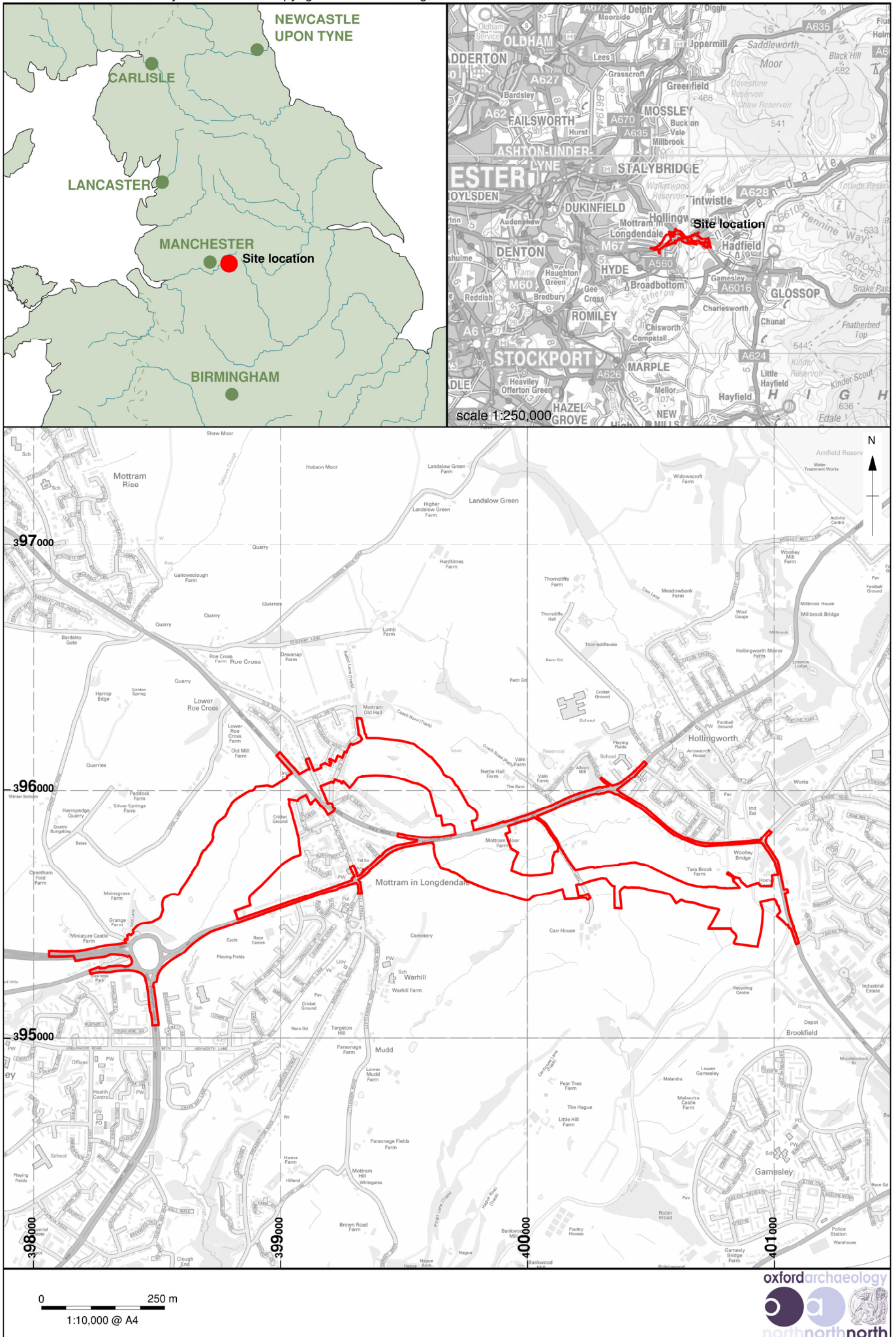


Figure 1: Site location

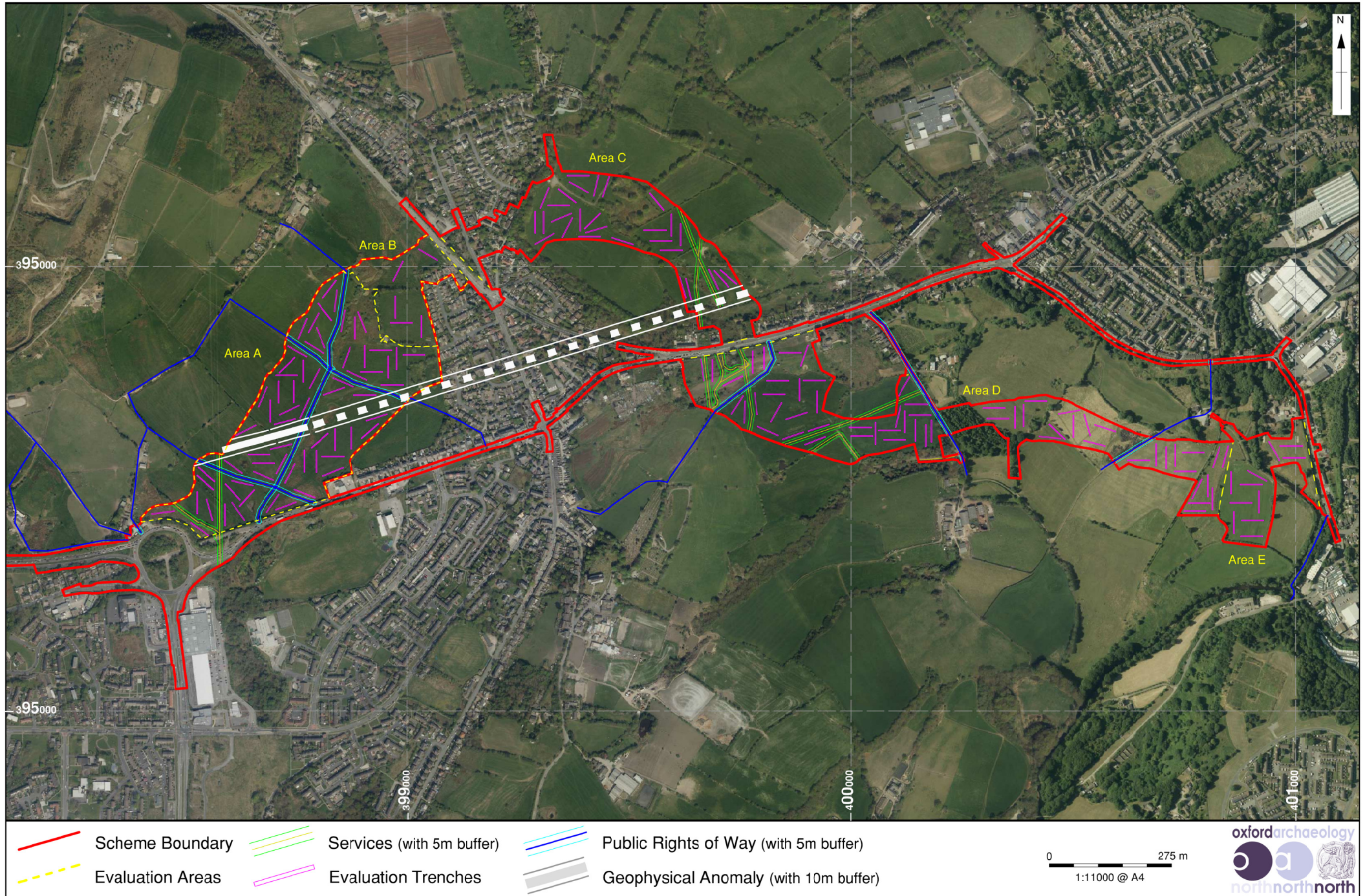


Figure 2: Proposed Evaluation Trenches

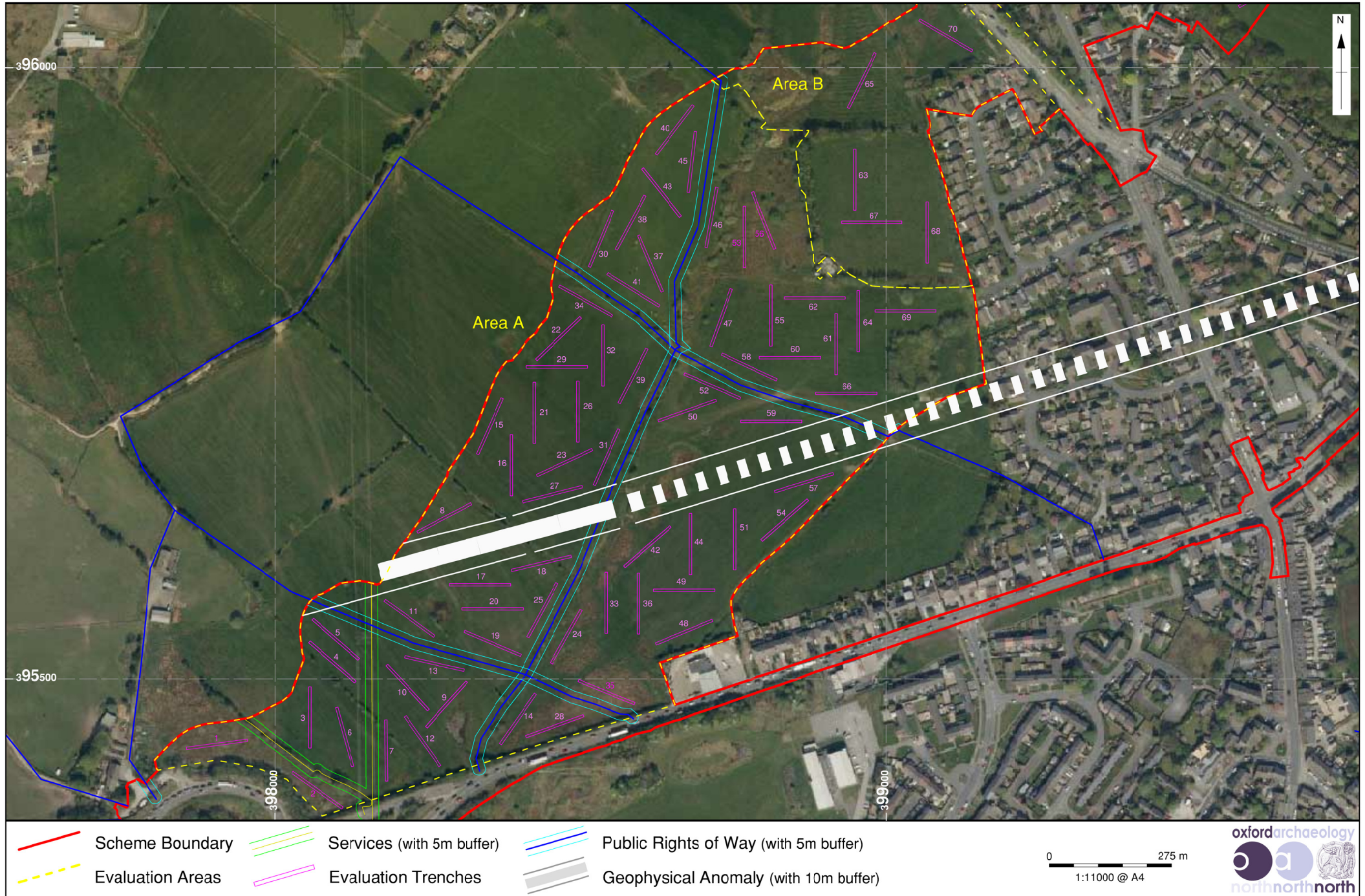


Figure 3: Proposed Evaluation Trenches (west)

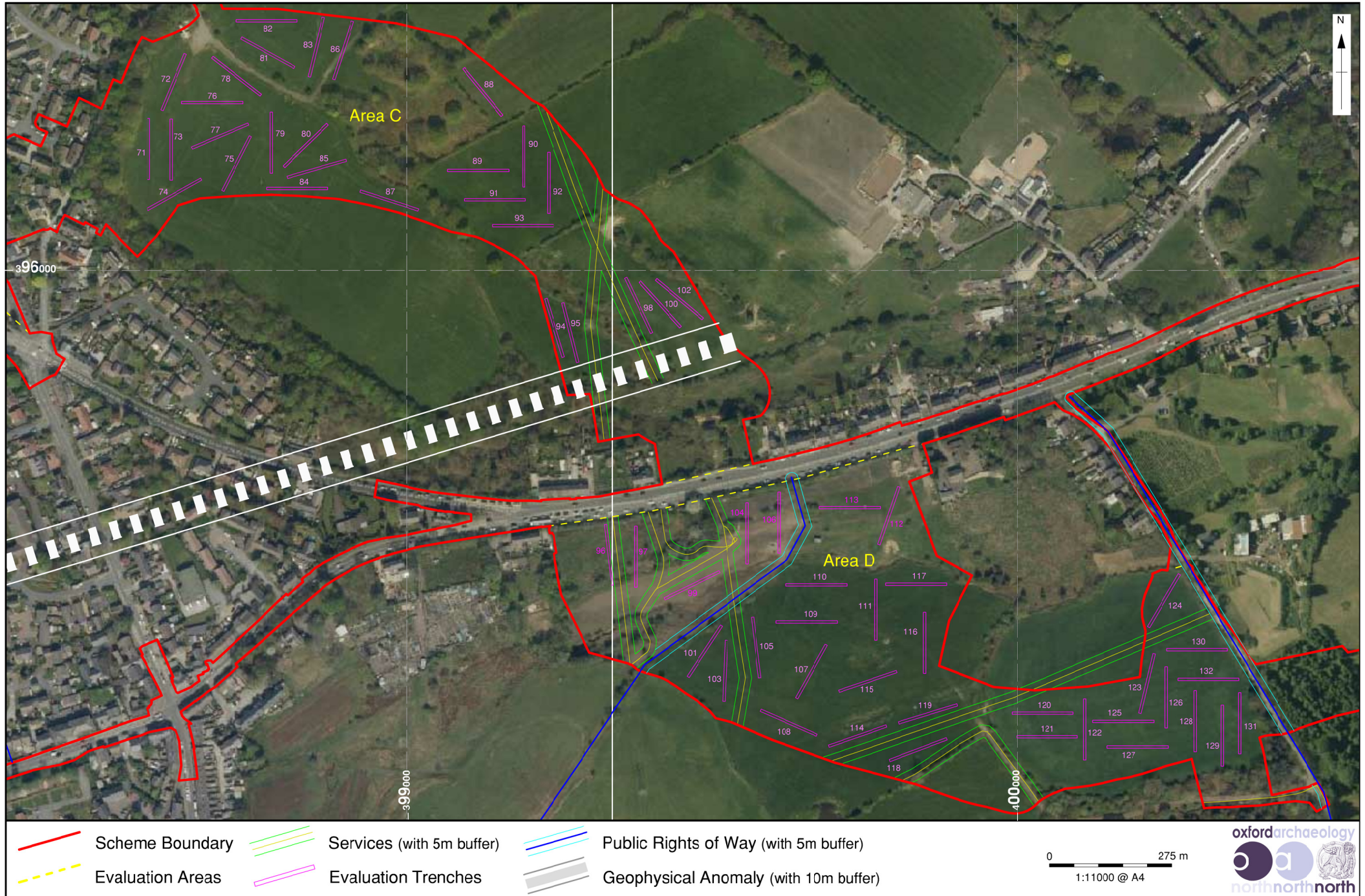


Figure 4: Proposed Evaluation Trenches (central)






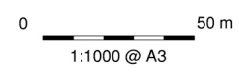
Figure 5: Proposed Evaluation Trenches (east)





Area A

-  Scheme Boundary
-  Evaluation Areas
-  Electricity Pylon Buffer



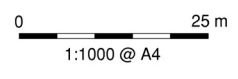
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Area A: Proposed shovel pit locations



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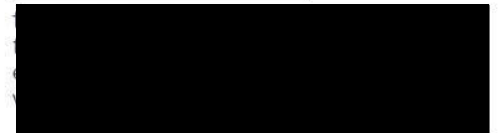
- Scheme Boundary
- - - Evaluation Areas



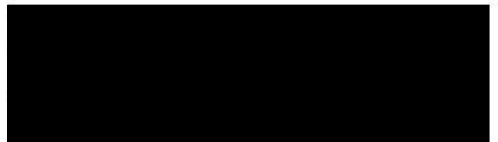
Area E: Proposed shovel pit locations



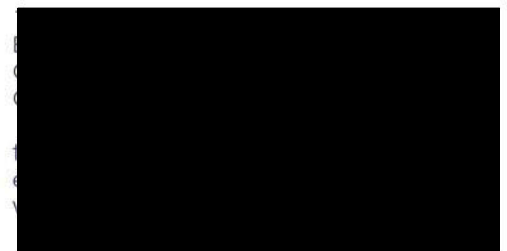
Head Office/Registered Office/  
OA South



OA North



OA East



Director: [Redacted]  
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