CgMs HERITAGE
PART OF RPS

WRITTEN SCHEME OF INVESTIGATION for a PROGRAMME OF ARCHAEOLOGICAL WORKS

FOXLOW FARM
HARPUR HILL
BUXTON
DERBYSHIRE

Planning Ref: HPK/2013/0603
Condition No. 18

AUGUST 2017

Local Planning Authority:
HIGH PEAK BOROUGH COUNCIL

Site centred at:
NGR SK 068 713

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Report Status:
FINAL

Issue Date:
31 August 2017

CgMs Ref:
MF/23525/01

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APPENDIX A

1.0 INTRODUCTION AND SCOPE OF DOCUMENT

1.1 Introduction

1.1.1 Outline Planning permission has been granted by High Peak Borough Council for mixed used development the residential development of land at Foxlow Farm, Harpur Hill, Buxton, Derbyshire (HPK/2013/0603).

1.1.2 Condition 18 of the Outline Planning Permission relates to archaeology, and requires:

> *No phase of the development hereby permitted shall take place until a written scheme of archaeological investigation has been submitted to and approved in writing by the Local Planning Authority and until any pre-start element has been completed in accordance with the approved scheme. The scheme shall include an assessment of significance and research questions; and in particular:*
>
> *(a) The programme and methodology of site investigation and recording;*
>
> *(b) The programme for post investigation assessment;*
>
> *(c) Provision to be made for analysis of the site investigation and recording;*
>
> *(d) Provision to be made for publication and dissemination of the analysis and records of the site investigation;*
>
> *(e) Provision to be made for archive deposition of the analysis and records of the site investigation;*
>
> *(f) Nomination of a competent person or persons/organization to undertake the works.*
>
> *No part of the development hereby approved shall be occupied in any phase until the site investigation and post investigation assessment for that phase has been implemented in accordance with the approved written scheme of investigation and the provision to be made for analysis, publication and dissemination of results and archive deposition have been secured.*

1.1.3 This WSI has been written to comply with condition 18 of the planning permission.. It is designed to test the veracity of a geophysical survey undertaken in 2013as part of the outline application; to test the potential for archaeological features within the site; and to inform any further works that maybe required. If significant archaeological remains are uncovered a further WSI will need to be compiled

detailing the methodology by which the loss of any significant archaeological remains will be mitigated.

1.2 Site Location

1.2.1 The development site is located on the southern edge of Buxton. It is bordered by the A515 to the east and Harpur Hill Road to the west. Residential development lies to the north. The site is centred at OS National Grid Reference SK 068 713 (Figure 1).

1.2.2 The British Geological Survey (BGS) records the underlying solid geology of th majority of the development site as Limestone of the Bee Low Limestone Formation. Localised outcrops of Basaltic Lava (of the Upper Miller's Dale Lava Member) are recordedin the northwest part of the site and around Harpur Hill on the south-western edge (http:/mapapps.bgs.ac.uk/geologyofbritain/home.html).

2.0 ARCHAEOLOGICAL BACKGROUND AND ASSESSMENT OF SIGNIFICANCE

2.1 Introduction

2.1.1 The archaeological potential of the site was examined prior to planning permission being granted through programmes of archaeological desk-based study (CgMs 2013 – Report RB/14841), geophysical survey (Stratascan 2013 - Report J3323), and partial evaluation through excavation of shovel test-pits (Oxford Archaeology North 2014 – Job L10700 Report 1490).

2.2 Summary of DBA

2.2.1 After reviewing the existing information for the site and surrounding area, the DBA considered the site's potential for further archaeological remains in the following terms:

- Low to moderate potential for Mesolithic period and later prehistoric remains. This was on the basis of a Mesolithic flint scatter, found on Harpur Hill, and several other stone and metalwork find spots, as well as a small number of Bronze Age barrows, known from the vicinity of the site;

- Moderate potential for Bronze Age activity: the top of Fox Low, to the south of the development site, is known to contain the remains of two Bronze Age barrows. This along with the other Bronze Age finds and features is suggestive of the area being occupied at this time. With the exception of the barrow, there is no evidence to specifically indicate that Bronze Age remains are present within the site. However, it is considered to have moderate potential for remains of this period.

- Low to moderate potential for activity at the site during the Roman period. This is on the basis of the putative line of the Roman road from Buxton to Carsington/Derby, which crosses north-west to south-east through the eastern part of the site, running parallel to Ashbourne Road. Earthworks, recorded in several places, may trace the line of the road, but may actually relate to a post-medieval track, with the Roman road lying along the line of Ashbourne Road, that forms the eastern boundary of the site;

2.3 Geophysical Survey

2.3.1 The geophysical survey covered a larger site incorporating the whole of the current development site and further areas to the south.

2.3.2 The geophysical survey failed to reveal any anomalies that could be interpreted as surviving elements of the Roman road, or clear evidence for other large scale archeological features.

2.3.3 Within the current site, the survey identified a number of curvi-linear positive anomalies across the site, and a linear negative anomaly in the south-west part of the site which may potentially be of archaeological origin, although a more modern origin cannot be ruled out. There are also a number of widely spaced parallel linear responses in the north, which are indicative of ridge and furrow cultivation. The weak positive and negative anomalies may be of archaeological origin, however their amorphous shape would suggest they are likely to be of geological origin.

2.4 **Evaluation**

2.4.1 The evaluation comprised two elements, a shovel pitting exercise to retrieve any artefacts present within the topsoil or subsoil, and excavation of four trenches targeted in order to test for the presence/absence of the Roman road.

2.4.2 A total of 744 shovel pits were excavated, distributed evenly on a 10m grid over the available parts of the site [four fields in the east half of the site],. This was adopted as a useful technique for determining the relative distribution of struck-lithic finds over a large survey area. In addition, four mechanically-excavated trenches tested for the presence/absence of the Roman road between Carsington/Derby, or any other evidence for this along its putative line, where this passed through the site. Because of a standing field boundary, none of the trenches could provide a full cross-section of the earthwork bank.

2.4.3 The shovel pit survey did not find any significant concentrations of worked lithic material, indicative of prehistoric activity foci. There was no evidence for the Roman road or any other archaeology in the evaluation trenches.

3.0 RESEARCH DESIGN

3.1 Aims and Objectives

3.1.1 The general aim of the current programme of archaeological works are to:

- test the veracity of the previous geophysical & test-pit surveys;
- determine the location, extent, date, character, condition, significance and quality of the any archaeological remains that are present;
- assess the artefactual and environmental potential of any archaeological deposits encountered;
- inform the formulation of further measures to mitigate impacts of the proposed development on surviving archaeological remains;
- produce a site archive for deposition with an appropriate museum and to provide information for accession to the Derbyshire HER.

3.2 Research Framework

3.2.1 The programme of archaeological investigation will be conducted within the general research parameters and objectives defined by '*East Midlands Heritage: A research Agenda and Strategy for the Historic Environment'* (compiled on behalf of the region's historic environment community by D. Knight, B. Vyner and C. Allen) and the earlier Archaeological Resource Assessment and Research Agenda for the East Midlands '*The Archaeology of the East Midlands*' edited by N. Cooper (2006).

3.2.2 The investigation will also take account of the national research programmes outlined in English Heritage's '*Strategic Framework for historic Environment Activities and Programmes in English Heritage* (SHAPE)' first published in 2008.

3.3 Standards

3.3.1 All work will be undertaken in accordance with professional best practice, and the Code of Conduct and the Standards and Guidance issued by the Chartered Institute for Archaeologists (CIfA). Of particular relevance It has been designed in accordance with the following:

- Management of Archaeological Projects (English Heritage, 1991);
- Code of Conduct (Chartered Institute for Archaeologists, updated 2014);
- Standard and Guidance for Archaeological Field Evaluations (Chartered Institute for Archaeologists, updated 2014)
- Standard and Guidance for Archaeological Excavation (Chartered Institute for Archaeologists, updated 2014)

4.0 STRATEGY

4.1 The programme of archaeological works will include two fieldwork methods: a fresh geophysical survey of the development site and machine-excavation of a series of trial trenches.

4.2 The geophysical survey will re-survey the parts of the development site covered in the 2013 geophysical survey, using a cart-based survey method. Re-survey of the northernmost field in July 2017 as a sample exercise indicated a reasonable consistency of findings although with some variation in the precise position of identified anomalies in the two survey datasets. Resurvey of the full development site will seek to provide a more precise and accurately-positioned plot of magnetic anomalies within the site.

4.3 A programme of trial trenching will target potential archaeological features identified through the re-survey, will test a sample of features interpreted as probable geological features - in order to confirm their interpretation, and will provide testing of 'blank' areas. It is intended that this trial trenching will involve excavation of 20-25no 30m trenches. The precise location of trenches will be determined following review of the geophysical re-survey data.

4.4 A series of trial trenches will also be excavated across the earthwork bank on the putative line of the Roman road. A total of 4no 30m long trenches will be excavated in order to provide a series of cross-sections of the earthwork and seek to confirm it's dating & interpretation. Indicative locations for these trenches are shown in Figure 2.

4.5 The fieldwork progress and results will be reviewed and discussed with Derbyshire County Council's Archaeologist (advisor to High Peak Borough Council).

4.6 If significant archaeological remains are uncovered, a further WSI will be compiled detailing the methodology by which the loss of any significant archaeological remains will be mitigated.

4.7 A written report will be prepared detailing the findings of the archaeological investigation, and the project data will be ordered into an archive and deposited with Buxton Art Gallery and Museum to ensure the long-term preservation of the archaeological information.

4.8 Any variations to this strategy will be discussed and agreed with Derbyshire County Council's Archaeologiston behalf of High Peak Borough Council prior to their implementation.

5.0 METHODS STATEMENT

5.1 Pre-Commencement

5.1.1 Buxton Museum and Art Gallery will be contacted to arrange for the project archive to be created and deposited in accordance with their deposition and archiving standards. At this stage a Project Initiation Form will be submitted by the appointed Archaeological Contractor to the Museum and to Derbyshor County Council's Archaeologist.

5.1.2 All works will be archived under an accession number (**TBC)** to be obtained by the Archaeological Contractor, who will complete the required archive deposition forms.

5.1.3 At the start of work (immediately before fieldwork commences) an OASIS online record will be initiated and key fields completed on Details, Location and Creators forms.

5.1.4 The LPA and Derbyshire County Council's Archaeologist will be given a minimum of 1 week's notice of commencement of works on site

5.2 Geophysical Survey

5.2.1 The geophysical survey will comprise a fluxgte gradiometer survey, using Bartington Instruments Grad-13 three-axis Gradiometer sensors mounted on a hand-pulled cart. Survey positional referencing will be provided through a Hemisphere S321 GNSS Smart Antenna RTK GPS.

5.2.2 A detailed Method Statement from the survey contractor, Magnitude Surveys, is provided as Appendix A.

5.3 Trial Trenching: Machine Excavation & Investigation of Trial Trenches

5.3.1 Preceding any groundwork, the trial trench areas will be scanned for any uncharted underground services using a CAT. This will be undertaken by a suitable trained member of staff from the archaeological contractor or agent of the Client, depending upon the site schedule. Any potential services identified within the excavation area will be marked on the ground using spray paint to provide a surface visual. All plant movement will be undertaken in such a way as to avoid where possible, or minimise tracking over identified services.

5.3.2 All plant movement will be via access routes agreed with the Client or their appointed site agent/principal contractor.

5.3.3 Following the removal of topsoil the interface at the base of the topsoil will be inspected for lithic scatters or anything else of interest.

5.3.4 Topsoil and overburden will be removed by mechanical excavator using a toothless ditching bucket (c.1.8m wide), under continuous archaeological supervision. The spoil generated during the trial trenching will be mounded away from the edges of each trench. Mechanical excavation will cease at either undisturbed natural deposits or the top of archaeological deposits. The nature of these deposits will be assessed by hand excavation. All potential features (including those that appear to be natural/geological or vegetation related) will be tested to prove they are not of archaeological interest. Once a sufficient number of features have been tested then representations will be made to the planning archaeologist to reduce the number of tested features of dubious origin. Upcast and spoil from mechanical excavation will be scanned by eye and by metal detector to aid the recovery of topsoil artefacts.

5.3.5 Should the excavation of the trenches reach 1.2m in depth (or limit of safe working depth) without natural geology being encountered, a machine dug sondage will be excavated in order to establish the depth of natural geology.

5.3.6 Each trench will be cleaned by hand as necessary to assist the identification and interpretation of exposed archaeological features and the nature of identified features assessed by sample excavation sufficient to determine date, nature, extent and condition and their environmental and scientific potential. All exposed features will be investigated – as a minimum (where possible) a 1m wide section of each linear feature will be excavated by hand and all pits or discrete features will be half sectioned. All features of apparently natural creation and thus of no archaeological interest will be initially tested to prove their origin. Where the excavation of a feature will be detrimental to its future investigation (i.e. relationships between groups of features not fully exposed within the trench) these will be avoided and recommended for investigation in any future archaeological works.

5.3.7 All excavation by machine and hand will be undertaken with a view to avoid damaging archaeological deposits or features which appear worthy of preservation in situ or more detailed investigation than for the purposes of evaluation. Where structures, features or finds appear to merit preservation in situ, they will be adequately protected from deterioration. Should any unexpected discoveries of significant or complex remains be revealed the Planning Archaeologist will be notified at the earliest opportunity.

5.3.8 The trenches will be left open for a minimum of three days to weather out, unless otherwise agreed with the Planning Archaeologist. Once a trench is weathered it will be inspected for any previously unidentified archaeological features which, if present will be, excavated/tested.

5.3.9 Upon completion of the trial trenching, excavated trenches will be backfilled with arisings and loosely compacted. Trenches will not be backfilled without prior agreement with the Planning Archaeologist.

5.3.10 In the event of unexpectedly significant archaeology being revealed, the archaeological contractor will immediately inform CgMs who will notify the Planning Archaeologist.

5.4 Recording

5.4.1 The trenches will be recorded at a suitable appropriate scale (1:100, 1:50 or 1:20) by measured drawing and photography and will be located to the Ordnance Survey National Grid.

5.4.2 All archaeological features and deposits uncovered will be recorded using pro forma sheets conforming to industry best practice. The recording should include a stratigraphic matrix of the relationship between features and deposit.

5.4.3 The excavation areas as well as archaeological features and deposits will be mapped in relation to the OS grid by measured survey equipment (GPS or EDM) with a tolerance of + or – 100mm. All planning and survey of archaeological features will be undertaken by a suitable qualified surveyor supplied by the archaeological contractor. Plans, sections and elevations of archaeological features and deposits will be drawn as necessary at 1:10, 1:20 and 1:50 as appropriate. Each archaeological feature and deposit as well as the excavated slots will have a spot height recorded in relation to Ordnance Datum, correct to two decimal places. All drawings will be made in pencil on permanent drafting film and tied into the site survey.

5.4.4 Photographs will be taken as necessary to produce a photographic record of the site. The record should look to place features within their site context, display feature and deposit associations and relationships, and demonstrate a features specific qualities and depositional sequence where appropriate. Additional photographs should be taken of the site conditions and working practices to display any constraints to achieving the aims and objectives of the project. Photographs

should be taken of the site to demonstrate the site conditions before the start of the archaeological work.

5.4.5 Photographs will be taken using 35mm monochrome prints and supplemented by digital imagery.

5.4.6 Photographs will be taken utilising digital cameras of no less than 10 megapixels and in RAW format. All photography will follow the archaeological contractor's guidance which conforms to industry best practice (ADS 2013). Images will be converted to uncompressed baseline v.6 TIFF for archiving. All images will have accompanying metadata specifying; photo ID, capture device, converting software, colour space, bit depth, resolution, date of capture, photographer, caption, and any alterations made to the image.

5.5 **Finds**

5.6 The finds retrieved from the site will be treated in accordance with industry best practice and guidance (English Heritage 2005, 2006b and Watkinson and Neal 1998).

5.7 All artefacts from excavated contexts will be retained by the archaeological contractor, except for unstratified modern material. Artefacts will be bagged and labelled according to the individual deposit from which they were recovered, ready for later cleaning and analysis.

5.8 All finds as a minimum will be cleaned, weighed, counted and identified. Any artefacts requiring immediate stabilisation will be done so in line with First Aid for Finds (Watkinson and Neal 1998). Where warranted, metallic artefacts and residues will be will be submitted for X-radiography and stabilisation, in accordance with industry best practice (English Heritage, 2006b).

5.9 If finds are made of gold, silver or other items of possible treasure these will if possible be archaeologically excavated and removed to a safe place. Such finds will also be reported immediately to the local Coroner (within 14 days, in accordance with the 1997 Treasure Act). Should it not be possible to remove the finds that day suitable security will be arranged.

5.10 **Human Remains**

5.10.1 Any human remains encountered will be cleaned with minimal disturbance, recorded and left in situ and only removed if necessary. Any human remains requiring removal will be done so following receipt of a Ministry of Justice licence.

Investigation and excavation of human remains will be undertaken by, or under supervision of, suitably experienced specialist staff and in accordance with IFA Guidelines ("Excavation and Post-excavation Treatment of Cremated and Inhumed Human Remains" Roberts, C & McKinley, J 1993 – IFA Technical Paper 13; "Guidelines to the standards for recording human remains" ed Brickley, M & McKinley, J 2004 – IFA Paper 7). Assessment of excavated human remains will be undertaken in line with current English Heritage Guidelines ("Human Bones from archaeological sites: Guidelines for the production of assessment documents and analytical reports" Centre for Archaeology Guidelines 2004). The archaeological contractor will comply with all reasonable requests of interested parties as to the method of removal, re-interment or disposal of the remains or associated items. Every effort will be made, at all times, not to cause offence to any interested parties. The Planning Archaeologist will be informed immediately if human remains are discovered.

5.11 Environmental Samples

5.11.1 The environmental sampling strategy will include the routine sampling of deposits for the retrieval and assessment of the preservation conditions and potential for analysis of all biological remains, and will be developed in consultation with an environmental specialist and the Planning Archaeologist. The resulting site-specific environmental sampling strategy will be documented and reviewed as the project progresses. The environmental specialist will conduct or commission, as appropriate, programmes of scientific investigation in conjunction with the fieldwork, the results of which will be presented in the final publication or report. They will also ensure that, where time allows, the strategy evolves on site by seeking to ensure that bulk samples taken in the initial stages of the project are processed quickly and the results fed back to inform the excavation strategy. All environmental work will be undertaken in accordance with current Historic England guidelines (see Environmental Archaeology: A guide to the theory and practice of methods, from sampling and recovery to post-excavation, Centre for Archaeology Guidelines 2011). Sample sizes will normally be 40-60 litres unless the deposit is smaller in volume. Samples will be directed to a representative range of context type from each phase, and examine:

- Survival of material
- Key archaeological contexts
- Potential

5.11.2 A suitable specialist will, if necessary, make a site visit to advise on deposits suitable for environmental sampling and/or geoarchaeological assessment.

5.11.3 Charred plant samples will be wet sieved with flotation using a 0.5mm mesh. All residues will be checked.

5.11.4 Should waterlogged deposits be encountered they will be left in situ until such time as further mitigation works are required. If this is not possible then further consultation with a suitable specialist will determine methods for recovery.

5.12 **Other Samples**

5.12.1 Samples will be taken for scientific dating (principally radiocarbon dating), where dating by artefacts is insecure and where dating is necessary for development of the subsequent mitigation strategy. Where in situ timbers are found to survive in good condition, samples will be taken for dendrochronological determination following procedures presented in the English Heritage document '*Dendrochronology: guidelines on producing and interpreting dendrochronological dates'*.

5.12.2 Where there is evidence for industrial activity, macroscopic technological residues (or a sample of them) should be collected by hand. Separate samples (c.10ml) should be collected for micro-slags (hammer-scale and spherical droplets). Excavation and sampling of such deposits will be in accordance with the Centre for Archaeology Guideline on Archaeometallurgy.

6.0 REPORTING AND ARCHIVING

6.1 General

6.1.1 Both the County Council Archaeologist and the relevant museum curator will be informed in writing of the completion of the fieldwork.

6.1.2 Following the completion of the field work a programme of post-excavation assessment and reporting, in line with English Heritage "MoRPHE" procedures, will be undertaken. Post excavation work will comprise the following:

- checking of drawn and written records during and on completion of fieldwork;
- production of a stratigraphic matrix of the archaeological deposits and features present on the site, if appropriate;
- cataloguing of photographic material;
- cleaning, marking, bagging and labelling of finds according to the individual deposits from which they were recovered. Any finds requiring specialist treatment and conservation will be sent for appropriate treatment. Finds will be identified and dated by appropriate specialists;
- Where artefacts are recovered from archaeological features they shall be quantified by date, class and type.
- The processing and analysis of soil samples.

6.1.3 Unless otherwise agreed with the Derbyshire County Council Archaeologist, a report detailing the findings of the archaeological works will be prepared within six weeks of the completion of site works (dependant on receiving specialist reports) and will consist of:

- a title page detailing site address, site code and accession number, NGR, author/originating body, client's name and address;
- a copy of the OASIS form;
- an archive statement giving summary of contents, location, accession number and proposed date for final deposition (unless it is agreed that no archive deposition is necessary);
- full contents listing;
- a non-technical summary of the findings of the investigation;
- an introductory statement;
- the aims and purposes of the archaeological work;
- a description of the topography and geology of the area;
- a description of the methodologies used during the investigation;

- an objective summary statement of the findings;
- a site location plan and plans of each of the areas investigated showing the archaeological features exposed (to include AOD levels and to be tied into Ordnance Survey data);
- all plans will be drawn at appropriate and accurate scales with north arrows and show the location of excavated sections and section drawings;
- sections of the excavated archaeological features (to include AOD levels, cardinal points and be located on the site plans which will be tied into Ordnance Survey data);
- a phased stratigraphic discussion of the archaeological features;
- an interpretation of the archaeological features exposed and their local and regional context, including a statement of significance;
- specialist reports on the artefactual / ecofactual remains from the site;
- photographs to include general site images (including blank trenches) and key archaeological features, reproduced at 5" by 4";
- a full context list [appendix];
- full quantification of artefacts and ecofacts [appendix];
- a publication statement including a proposed timetable, location and scale of publication;

6.2 Specialist Reports

6.2.1 Specialist reports will include recommendations for retention/discard of material. It is noted that should significant material be recovered it should be retained and assessed alongside any further material recovered from any subsequent phase of works.

6.3 Dissemination

6.3.1 Copies of the archaeological fieldwork report will be sent to the client for approval, and then the Derbyshire County Council Archaeologist and the LPA. The digital submission to the Historic Environment Record will include the full site report (in PDF/A-1a format). Digital photographs will be converted to uncompressed baseline v.6 TIFF for archiving. The OASIS online report form for the fieldwork will be updated and completed. A digital copy of the report will be uploaded to the OASIS site.

6.3.2 The report will look to assess the results of the archaeological fieldwork including where necessary the results of any specialist and scientific assessment/analysis and place the results within their local, regional and national context. The report should look to identify any potential research priorities where applicable.

6.4 Archive

6.4.1 An integrated project archive (including both artefacts/ecofacts and project documentation) will be prepared upon completion of the project. The integrated archive will be deposited with Buxton Museum and Art Gallery.

6.4.2 All works will be archived under the accession number obtained at Project Initiation stage, and the archaeological contractor will complete the required archive deposition forms.

6.4.3 The archive of finds and records generated during the project will be kept secure at all stages of the project. All records and materials produced will be archived in accordance with industry best practice (Brown 2011, English Heritage 2006, CIfA 2014g, Procedures for the Deposition of Archaeological Archives from Derbyshire at Buxton Museum and Art Gallery April 2016 and SMA 1993).

6.4.4 In the event that artefacts are retrieved from the site, the transfer of the ownership of the finds will be made to the Buxton Museum and Art Gallery, assuming the land owner gives their approval.

6.4.5 An online OASIS form at http://www.oasis.ac.uk/ will also be completed as part of the project. This will be on the understanding that this information will be made available through the above website, unless otherwise agreed.

7.0 TIMETABLE, PERSONNEL AND MONITORING

7.1 Timetable

7.1.1 It is intended that the geophysical survey and trial trenching programme will be undertaken in the Autumn of 2017.

7.1.2 Advance notice of the confirmed start date and programme for each phase of work will be provided to the Derbyshire County Council Archaeologist.

7.2 Personnel

7.2.1 The geophysical survey will be undertaken by an experienced archaeological geophysics team from Magnitude Surveys.

7.2.2 The trial trenching works will be undertaken on behalf of the developer by professional archaeological contractor (to be appointed). CgMs will oversee implementation of the project on behalf of the developer. CgMs is a Registered Organisation with the Chartered Institute for Archaeologists.

7.2.3 Myk Flitcroft BA MSC MCI*f*A of CgMs will be in overall charge of the archaeological project. Work on site will be led by a Project Officer / Project Supervisor from the appointed archaeological contractor, assisted by a team of assistants drawn from their permanent and temporary staff. Actual staff resources will be managed to ensure successful implementation of the programme of works. CVs of key personnel and specialists will be provided to the Planning Archaeologist on request.

7.3 Monitoring

7.3.1 The aims of monitoring are to ensure that the archaeological works are undertaken within the limits set by this specification, and to the satisfaction of the Local Planning Authority.

7.3.2 Myk Flitcroft MCI*f*A, Director for CgMs will monitor implementation of the programme of works on behalf of the developers.

7.3.3 Derbyshire County Council's Archaeologist will be given notice of when work is due to commence and will be free to visit the site by prior arrangement with CgMs. The County Council Archaeologist will monitor implementation of the programme of works on behalf of the Local Planning Authority and evaluate the work being undertaken on site against the methodology detailed in this specification.

7.3.4 The County Council Archaeologist will also be responsible for considering any changes to the specification of works; any such alterations will be agreed in writing with the relevant parties prior to commencement of onsite works, or at the earliest available opportunity.

8.0 INSURANCE AND HEALTH AND SAFETY

8.1 Insurance

8.1.1 The archaeological contractor will hold Public Liability Insurance to the minimum value of £5m and Professional Indemnity Insurance to the minimum of £5m and Profession.

8.2 Health and Safety

8.2.1 All works will be in compliance with the Health and Safety at Work Act (1974) and all applicable regulations and Codes of Practice and the Construction Design Management Regulations 2007. All archaeological staff will undertake their operations in accordance with safe working practices.

8.2.2 A site specific risk assessment and safety plan will be prepared before the start of the project and will be updated through the project as required.

8.2.3 A continuous process of dynamic risk assessment will be undertaken and if significant hazards are identified a specific risk assessment will be undertaken and recorded. Control measures will be implemented as required in response to specific hazards.

8.2.4 If significant new hazards are identified a specific risk assessment will be undertaken and recorded. Control measures will be implemented as required in response to specific hazards.

8.2.5 Safe working will take priority over the desire to record archaeological features or remains, and where it is considered that recording is dangerous, any such features or remains will be recorded by photography, at a safe distance.

9.0 SOURCES

9.1 Bibliographic

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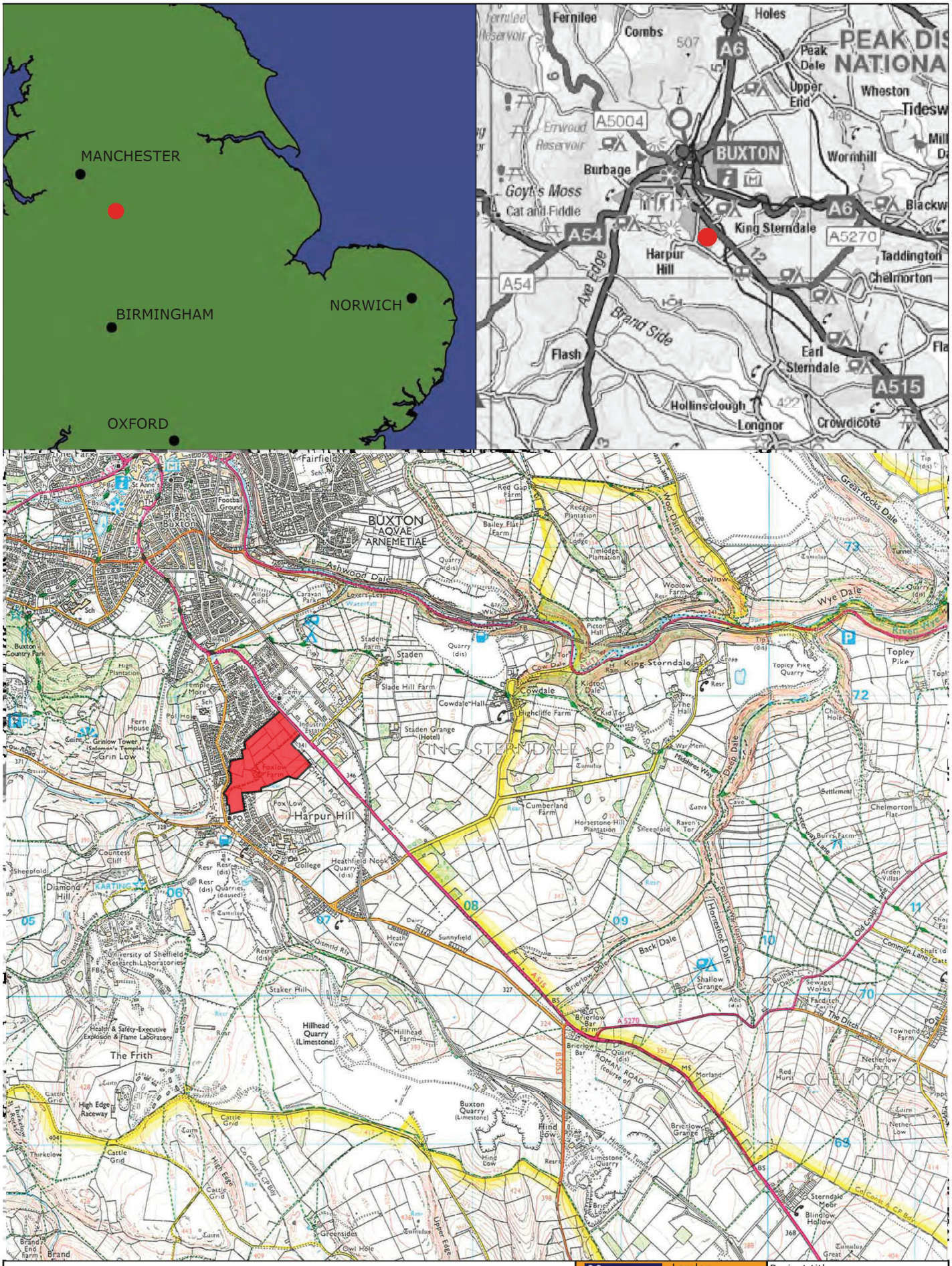


CgMs CONSULTING

London
Cheltenham
Kettering
Newark
Birmingham
www.cgms.co.uk

Planning & Development
Archaeology & Historic Buildings

Project title:
Foxlow Farm, Buxton

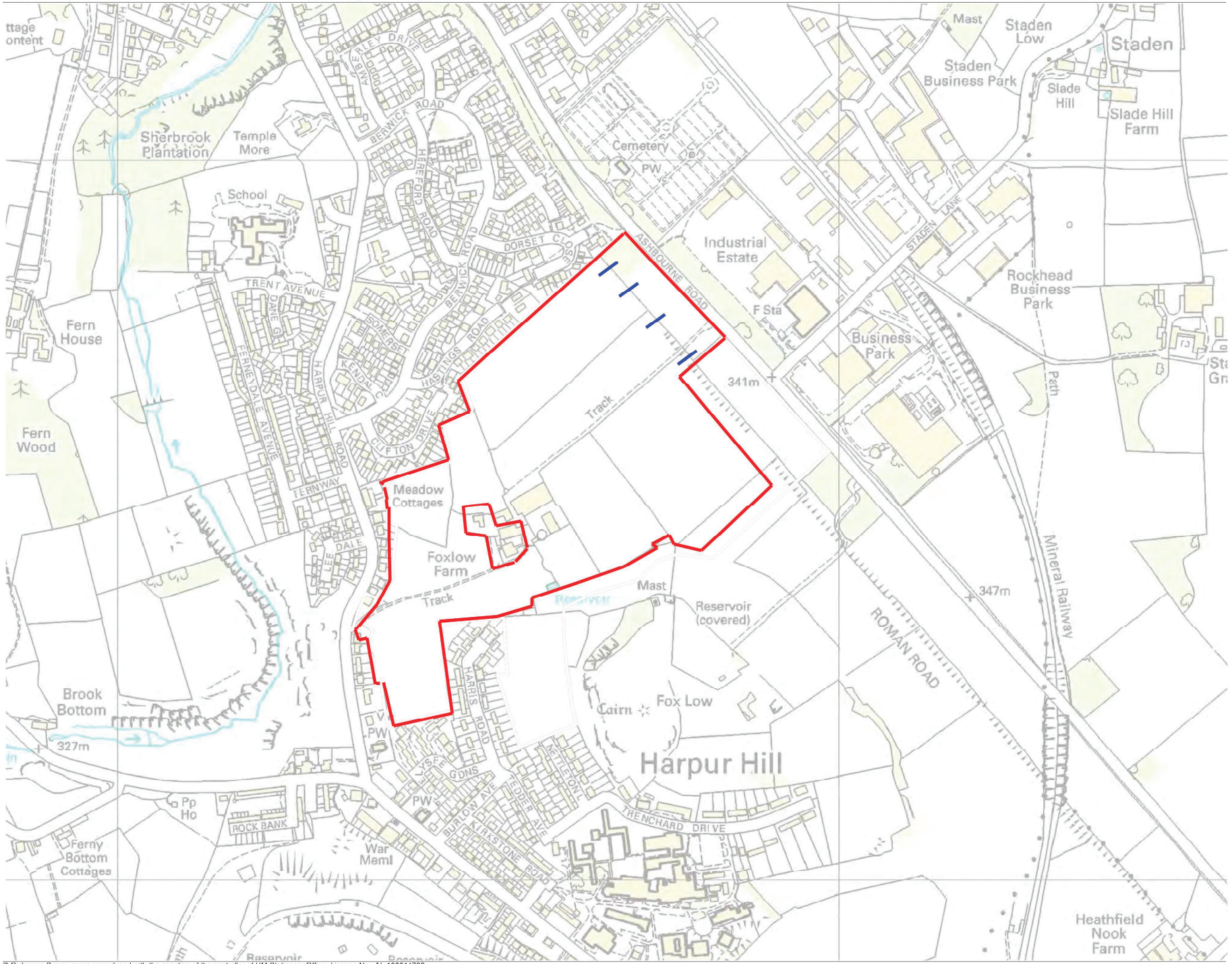
Not to Scale:
Illustrative Only

Date printed:
28.08.17

Drawn by: MF

Checked by: MF

Figure 1: Site Location



Additional information:

Key

Site Boundary

30m Trial Trench

Project title:

Foxlow Farm, Buxton

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Planning & Development
Archaeology & Historic Buildings

Scale at A3: 1:5,000

0 200 m

Date printed: 31.08.17

Drawn by: MF

Checked by:

Figure 2: Site Details

APPENDIX A

magnitude surveys

Method Statement

For a Geophysical Survey

of

Foxlow Farm, Buxton

For

CgMs

Magnitude Surveys Ref: MSSK179

August 2017

Unit 17, Commerce Court

Challenge Way

Bradford

BD4 8NW

01274 926020

info@magnitudesurveys.co.uk

Contents

1. Introduction

1.1. This document details a Methods Statement (MS) for a geophysical survey by Magnitude Surveys Ltd (MS) for CgMs.The survey comprises a c. 13ha area of land at Foxlow Farm, Buxton (NGR. SK065715).

1.2. The geophysical survey will comprise a hand pulled fluxgate gradiometer survey. Magnetic survey is the standard primary geophysical method for archaeological applications in the UK for its ability to detect a range of different features. The technique is particularly suited for detecting fired or magnetically enhanced features, such as ditches, pits, kilns, sunken earth houses, and industrial activity.(David et al., 2008).

2. Quality Assurance

2.1. The survey will be conducted in line with the current best practice guidelines produced by Historic England (David et al., 2008), the Chartered Institute of Field Archaeologists (CIfA, 2014) and the European Archaeological Council (Schmidt et al., 2015).

2.2. Project management, survey work, data processing and report production will be carried out by qualified and professional geophysicists.

2.3. Magnitude Surveys is a corporate member of ISAP (International Society of Archaeological Prospection).

2.4. Director Graeme Attwood is a Member of the Chartered Institute for Archaeologists (CIfA), the chartered UK body for archaeologists, as well as a member of GeoSIG, the CIfA Geophysics Special Interest Group. Director Finnegan Pope-Carter is a Fellow of the London Geological Society, the chartered UK body for geophysicists and geologists, as well as a member of GeoSIG, the CIfA Geophysics Special Interest Group. Director Chrys Harris has a PhD in archaeological geophysics from the University of Bradford.

2.5. All MS managers have postgraduate qualifications in archaeological geophysics. All MS field staff have relevant archaeology or geophysics degrees and supervisors have at least three years' field experience.

3. Risk Assessment

3.1. MS' standard fieldwork risk assessment and site specific risk assessment have been appended to the end of this document. Before geophysical survey is commenced, a brief walkover will be undertaken to identify any additional hazards of an unusual or site-specific nature. If any additional hazards are identified, the site-specific risk assessment will be updated to include these hazards and all surveyors will be informed of the risk. If appropriate mitigation factors cannot be put in place, then the field or part thereof will not be surveyed.

3.2. Field staff will attend a site induction if required. Necessary PPE will be supplied and worn. Wet and cold/hot weather protection is also supplied.

3.3. All surveyors have been issued company mobile phones. Survey teams are expected to make regular contact with the office to keep all parties updated with survey progress. Any change in conditions that may affect the health and safety of the survey team must be reported immediately.

3.4. The survey van contains suitable welfare facilities. Antiseptic hand gel is provided, as is bottled drinking water. A first aid kit is stored in the cab of the van, with a second kit near personnel within the survey area.

4. Methodology

4.1. Data Collection

4.1.1. Geophysical survey will comprise the magnetic method as described in the following table.

4.1.2. Table of survey strategies:

Method	Instrument	Traverse Interval	Sample Interval
Magnetic	Bartington Instruments Grad-13 Digital Three-Axis Gradiometer	1 m	200 Hz reprojected to 0.125 m

4.1.1. Magnetic data will be collected using MS' bespoke, hand-pulled cart system. MS' cart system will be comprised of Bartington Instruments Grad 13 Digital Three-Axis Gradiometers. Positional referencing will be through a Hemisphere S321 GNSS Smart Antenna RTK GPS outputting in NMEA mode to ensure high positional accuracy of collected measurements. The Hemisphere S321 GNSS Smart Antenna is accurate to 0.008 m + 1 ppm in the horizontal and 0.015 m + 1 ppm in the vertical.

4.1.2. Magnetic and GPS data will be stored on an SD card within MS' bespoke datalogger. The datalogger is continuously synced, via an in-field Wi-Fi unit, to servers within MS' offices. This allows data collection, processing and visualisation to be monitored in real-time as fieldwork is ongoing.

4.1.3. A series of temporary sight markers will be established in each survey area to guide the surveyor and ensure full coverage with the cart. The temporary sight markers are lightweight luminous plastic pegs and/or bamboo canes. These markers are only inserted into the top two centimetres of soil and will not come into contact with any underground services. Data will be collected by traversing the survey area along the longest possible lines, to ensure data are efficiently collected and processed. All grid and sight markers will be removed at the completion of survey.

4.2. Data Processing

4.2.1. Magnetic data will be processed in bespoke in-house software produced by MS. Processing steps conform to Historic England's standards for "raw or minimally processed data" (see sect 4.2 in David et al., 2008: 11).

Sensor Calibration – The sensors will be calibrated using a bespoke in-house algorithm, which conforms to Olsen et al. (2003).

Zero Median Traverse – The median of each sensor traverse will be calculated within a specified range and subtracted from the collected data. This removes striping effects caused by small variations in sensor electronics.

Projection to a Regular Grid – Data collected using RTK GPS positioning requires a uniform grid projection to visualise data. Data will be rotated to best fit an orthogonal grid projection and are resampled onto the grid using an inverse distance-weighting algorithm.

Interpolation to Square Pixels – Data will be interpolated using a bicubic algorithm to increase the pixel density between sensor traverses. This produces images with square pixels for ease of visualisation.

4.3. Data Visualisation and Interpretation

4.3.1. Multiple greyscales images will be used for data interpretation; these will be at different plotting ranges and show different components of the vector magnetic field. Greyscale images will be interpreted alongside the XY trace plots. XY trace plots visualise the magnitude and form of the geophysical response, aiding in anomaly interpretation.

4.3.2. Geophysical results will be interpreted using greyscale images and XY traces in a layered environment, overlaid against open street mapping, satellite imagery, historic mapping and LiDAR data. Google Earth will be consulted as well, to compare the results with recent land usages.

5. Reporting

5.1. A detailed report of the survey will be produced after data collection is completed. The final report will include as standard:

- Abstract
- Introduction – Details site location and client details.
- Quality Assurance – Details the expertise of Magnitude Surveys and Magnitude Surveys employees undertaking the work.
- Objectives—Details survey objectives.
- Geographic Background – Details the soils and geology of the survey area, as well as providing a general summary of site conditions at time of survey.
- Archaeological Background – Details a brief summary of the archaeological and historical background of the site and its immediate environs. While this will not be an exhaustive assessment of the known sites, it will draw on elements relevant to the results obtained during survey.
- Methodology—Details survey strategy employed, instruments used, data collection strategy, data processing and visualisation methods.
- Survey Considerations – Details specific points of note for each survey area, including topography, upstanding obstructions or neighbouring objects.
- Results—Details the results and interpretation of the geophysical survey, both in a general context and discusses specific anomalies of archaeological interest. Geophysical reports will be discussed in consideration with satellite imagery, historic mapping and LiDAR data—if freely available—as supporting interpretative evidence.
- Conclusions
- Archiving
- Copyright
- References
- Figures—The site location and individual survey areas will be presented. Greyscale images and corresponding interpretations will be displayed at appropriate scales. Interpretations will also be displayed over satellite imagery, historic mapping and LiDAR—if freely available—to provide further context to the interpretations. All figures will include a detailed scale bar, north arrow and key.

6. Archiving

6.1. MS maintains an in-house digital archive, which is based on Schmidt and Ernenwein (2013). This archive stores the collected measurements, minimally processed data, georeferenced and un-georeferenced images, XY traces and a copy of the final report. A copy of this archive will be included in a disk with the final printed report.

6.2. MS contributes all reports to the ADS Grey Literature Library subject to any time embargo dictated by the client.

6.3. Whenever possible, MS has a policy of making data available to view in easy to use forms on its website. This can benefit the client by making all of their reports available in a single repository, while also being a useful resource for research. Should a client wish to impose a time embargo on the availability of data, this can be achieved in discussion with MS.

6.4. An OASIS form will be filled in on completion of the survey.

7. Copyright

7.1. Copyright and the intellectual property pertaining to all reports, figures, and datasets produced by Magnitude Services Ltd. is retained by MS. The client is given full licence to use such material for their own purposes. Permission must be sought by any third party wishing to use or reproduce any IP owned by MS.

8. References

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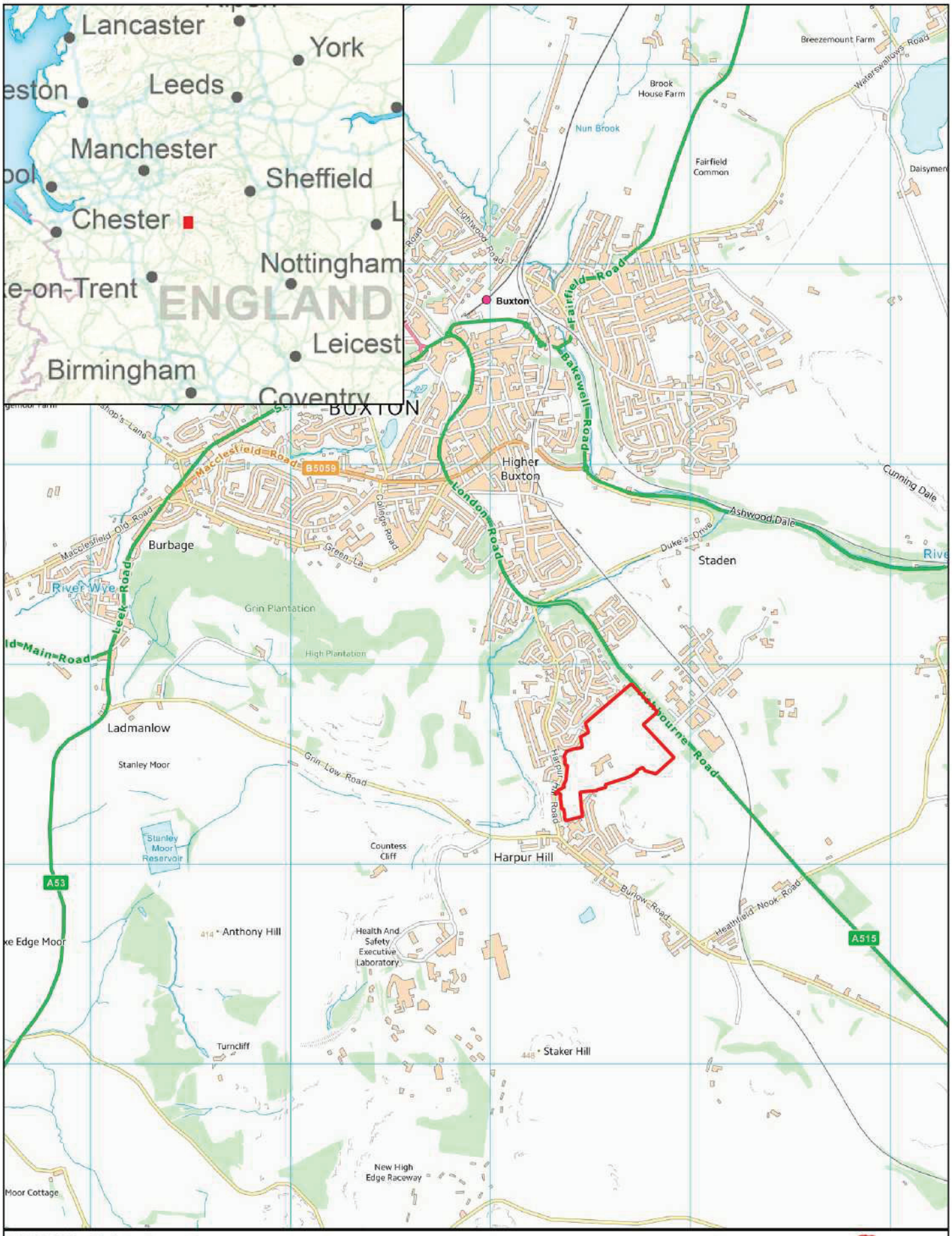


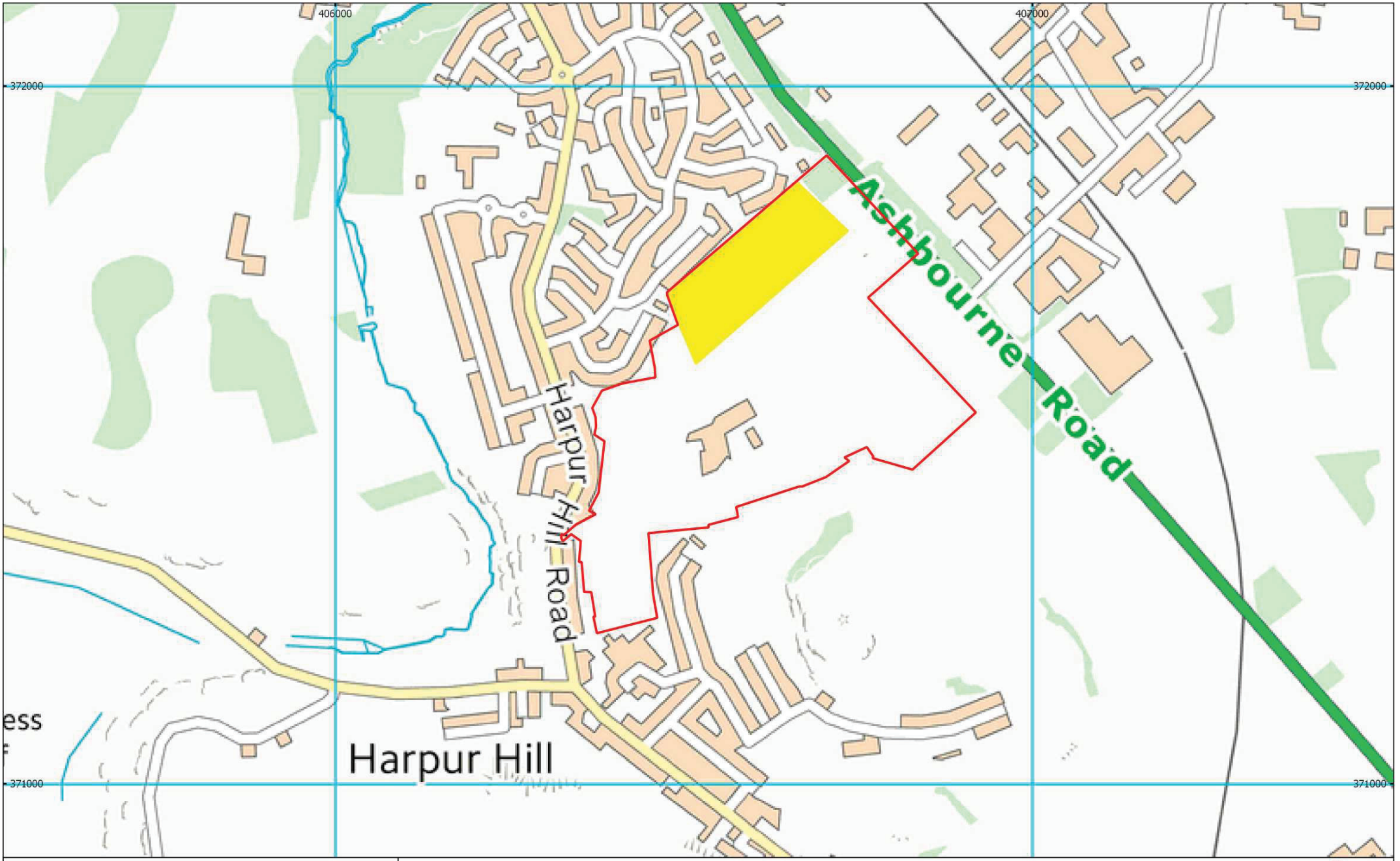
MSSK179 - Foxlow Farm, Buxton
Figure 1 - Site Location
1 : 25,000 @ A4

Survey Area

N

0 0.5 1 km

magnitude surveys



MSSK179 - Foxlow Farm, Buxton
Figure 2 - Location of Survey Areas
1:2000 @ A3

Legend

- Survey Area
- Already Surveyed (Sample)

N

0 50 100 150 m

magnitude surveys