Appendix 7.1 CULTURAL HERITAGE – ASSESSMENT METHODOLOGY

7.1A Assessment of value of cultural heritage assets

7.1A.1 For all three cultural heritage sub-topics, an assessment of the value of each asset was undertaken on a six-point scale of Very High, High, Medium, Low, Negligible and Unknown. The assessment of value was based on professional judgement informed by the criteria for the assessment of value provided in the Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 2 'Cultural Heritage' (HA 208/07) set out in Tables 7.1b to 7.1c below.

Table 7.1a: Criteria to assess the value of archaeological remains

Value	Criteria
Very High	World Heritage Sites (including nominated sites). Assets of acknowledged international importance. Assets that can contribute significantly to acknowledged international research objectives.
High	Scheduled Monuments (including proposed sites). Undesignated assets of schedulable quality and importance. Assets that can contribute significantly to acknowledged national research objectives.
Medium	Designated or undesignated assets that contribute to regional research objectives.
Low	Designated and undesignated assets of local importance. Assets compromised by poor preservation and/or poor survival of contextual associations. Assets of limited value, but with potential to contribute to local research objectives
Negligible	Assets with very little or no surviving archaeological interest.
Unknown	The sensitivity of the site has not been ascertained.

Table 7.1b: Criteria to assess the value of historic buildings

Value	Criteria
Very High	Structures inscribed as of universal importance as World Heritage Sites. Other buildings of recognised international importance.
High	Scheduled Monuments with standing remains. Grade I and Grade II* Listed Buildings. Other listed buildings that can be shown to have exceptional qualities in their fabric or historical associations not adequately reflected in the listing grade. Conservation Areas containing very important buildings. Undesignated structures of clear national importance.
Medium	Grade II Listed Buildings. Historic (unlisted) buildings that can be shown to have exceptional qualities in their fabric or historical associations. Conservation Areas containing buildings that contribute significantly to its historic character. Historic Townscape or built-up areas with important historic integrity in their buildings, or built settings (e.g. including street furniture and other structures).
Low	'Locally Listed' buildings. Historic (unlisted) buildings of modest quality in their fabric or historical association. Historic Townscape or built-up areas of limited historic integrity in their buildings or built settings (e.g. including street furniture and other structures).
Negligible	Buildings of no architectural or historical note; buildings of an intrusive character.
Unknown	Buildings with some hidden (i.e. inaccessible) potential for historic significance.

Table 7.1c: Criteria to assess the value of historic landscape types

Value	Criteria
Very High	World Heritage Sites inscribed for their historic landscape qualities. Historic landscapes of international value, whether designated or not. Extremely well preserved historic landscapes with exceptional coherence, time-depth, or other critical factor(s).
High	Designated historic landscapes of outstanding interest. Undesignated landscapes of outstanding interest. Undesignated landscapes of high quality and importance, and of demonstrable national value. Well preserved historic landscapes, exhibiting considerable coherence, time-depth or other critical factor(s).
Medium	Designated special historic landscapes. Undesignated historic landscapes that would justify special historic landscape designation, landscapes of regional value. Averagely well-preserved historic landscapes with reasonable coherence, time-depth or other critical factor(s).
Low	Robust undesignated historic landscapes. Historic landscapes with importance to local interest groups. Historic landscapes whose value is limited by poor preservation and/or poor survival of contextual associations.
Negligible	Landscapes with little or no significant historical interest.

7.1A.2 The setting of cultural heritage assets is defined in the NPPF as "*The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral*" (DCLG 2012, Annex 2). Impacts on the setting of cultural heritage assets were assessed using a three-step process in line with the guidance contained in *Historic Environment Good Practice Advice in Planning, Note 3: The Setting of Heritage Assets* (Second Edition) (Historic England 2017):

- **Step 1:** cultural heritage assets where the setting may be affected by the Proposed Scheme were identified. As noted in Section 7.3 (Assessment Methodology) of the Cultural Heritage chapter, the Zone of Theoretical Visibility defined in the Landscape and Visual Effects chapter (Chapter 8, Section 8.4) was used to identify designated cultural heritage assets located outside of the 200m study area and

where the setting of which may be affected by construction and operation of the Scheme.

- **Step 2:** modern Ordnance Survey mapping, on-line aerial photography and a walkover survey were used to define the setting of cultural heritage assets by establishing if and how their surroundings contribute to the ways in which the cultural heritage asset is understood, appreciated and experienced, and how these attributes contribute to the significance of the cultural heritage asset. Where relevant further information on the setting of assets is presented in Appendix A7.3 (Cultural Heritage Gazetteer).
- **Step 3:** the way in which the Scheme would affect the ability to understand, appreciate, or experience a cultural heritage asset, and how this would affect the significance of the cultural heritage asset was then assessed. This is presented in Section 7.5 (Potential Impacts (without mitigation)) of the Cultural Heritage chapter.

7.1B Assessment of magnitude of impact on cultural heritage assets

7.1B.1 Magnitude of impact is the degree of change that would be experienced by an asset and its setting if the Scheme was completed, as compared with a 'do nothing' situation. Magnitude of impact is assessed without reference to the assessment of value of the receptor, and may include physical impacts upon the asset, or impacts upon its setting or amenity value. The assessments were informed by the guidance provided in *Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets: The Setting of Heritage Assets* (Second Edition) (Historic England, 2017).

7.1B.2 Assessment of magnitude of impact was assessed using professional judgement guided by the methodology and criteria provided by DMRB for archaeological remains, historic buildings and the historic landscape, set out in Tables 7.1d to 7.1f. Unless otherwise stated, all impacts would be adverse.

Table 7.1d: Criteria to assess magnitude of impact on archaeological remains

Magnitude	Criteria
Major	Change to most or all key archaeological materials, such that the resource is totally altered. Comprehensive changes to setting.
Moderate	Changes to many key archaeological materials, such that the resource is clearly modified. Considerable changes to setting that affect the character of the asset.
Minor	Changes to key archaeological materials, such that the asset is slightly altered. Slight changes to setting.
Negligible	Very minor changes to archaeological materials, or setting.
No Change	No Change.

Table 7.1e: Criteria to assess magnitude of impact on historic buildings

Magnitude	Criteria
Major	Change to key historic building elements, such that the resource is totally altered. Comprehensive changes to the setting.
Moderate	Change to many key historic building elements, such that the resource is significantly modified. Changes to the setting of an historic building, such that it is significantly modified.
Minor	Change to key historic building elements, such that the asset is slightly different. Change to the setting of an historic building, such that it is noticeably changed.
Negligible	Slight changes to historic building elements or setting that hardly affect it.
No Change	No change to fabric or setting.

Table 7.1f: Criteria to assess magnitude of impact on historic landscape

Magnitude	Criteria
Major	Change to most or all key historic landscape elements, parcels or components; extreme visual effects; gross change of noise or change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character unit.
Moderate	Changes to many key historic landscape elements, parcels or components, visual change to many key aspects of the historic landscape, noticeable differences in noise or sound quality, considerable changes to use or access; resulting in moderate changes to historic landscape character.
Minor	Changes to few key historic landscape elements, parcels or components, slight visual changes to few key aspects of historic landscape, limited changes to noise levels or sound quality; slight changes to use or access; resulting in limited changes to historic landscape character.
Negligible	Very minor changes to key historic landscape elements, parcels or components, virtually unchanged visual effects, very slight changes in noise levels or sound quality; very slight changes to use or access; resulting in a very small change to historic landscape character.
No Change	No change to elements, parcels or components; no visual or audible changes; no changes arising from amenity or community factors.

7.1C Assessment of the level of significance of the effect on cultural heritage assets

7.1C.1 For all three sub-topics, the significance of the effect is determined as a combination of the value of the asset and the magnitude of impact. This is achieved using professional judgment informed by the matrix illustrated below in Table 7.1g. Five levels of significance of effect are defined which apply equally to Adverse and Beneficial effects.

Table 7.1g: Matrix to assess the significance of effects on cultural heritage assets

Value/ Sensitivity	Magnitude of impact				
	No change	**Negligible**	**Minor**	**Moderate**	**Major**
Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Large or Very Large
High	Neutral	Slight	Moderate or Slight	Moderate or Large	Large or Very Large
Medium	Neutral	Neutral or Slight	Slight	Slight or Moderate	Moderate or Large
Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

Appendix 7.2 CULTURAL HERITAGE – GEOPHYSICAL SURVEY

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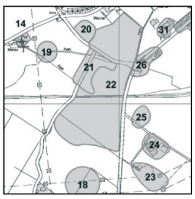
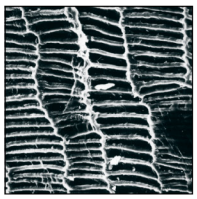
DLJS18










A19 DOWNHILL LANE JUNCTION, SUNDERLAND, TYNE AND WEAR

GEOPHYSICAL SURVEY

commissioned by Jacobs
on behalf of Highways England

March 2018

HEADLAND ARCHAEOLOGY

REGISTERED ORGANISATION CIfA

A19 DOWNHILL LANE JUNCTION, SUNDERLAND, TYNE AND WEAR

GEOPHYSICAL SURVEY

commissioned by Jacobs
on behalf of Highways England

March 2018

This report adheres to the quality standard of ISO 9001:2008

PROJECT INFO:

HA Project Code **DLJS18** / NGR **NZ 3419 5979** / Parish **Sunderland** / Local Authority **Sunderland City Council** / OASIS Ref. **headland5-312477**

PROJECT TEAM:

Project Manager **David Harrison** / Author **Alistair Webb, Ross Bishop** / Fieldwork **Kevin Heaton, Krasimir Dyulgerski, Olivier Vansassenbrouck, Ross Bishop** / Graphics **Beata Wieczorek-Oleksy, Caroline Norrman, David Harrison**

Approved by **David Harrison** [redacted].....

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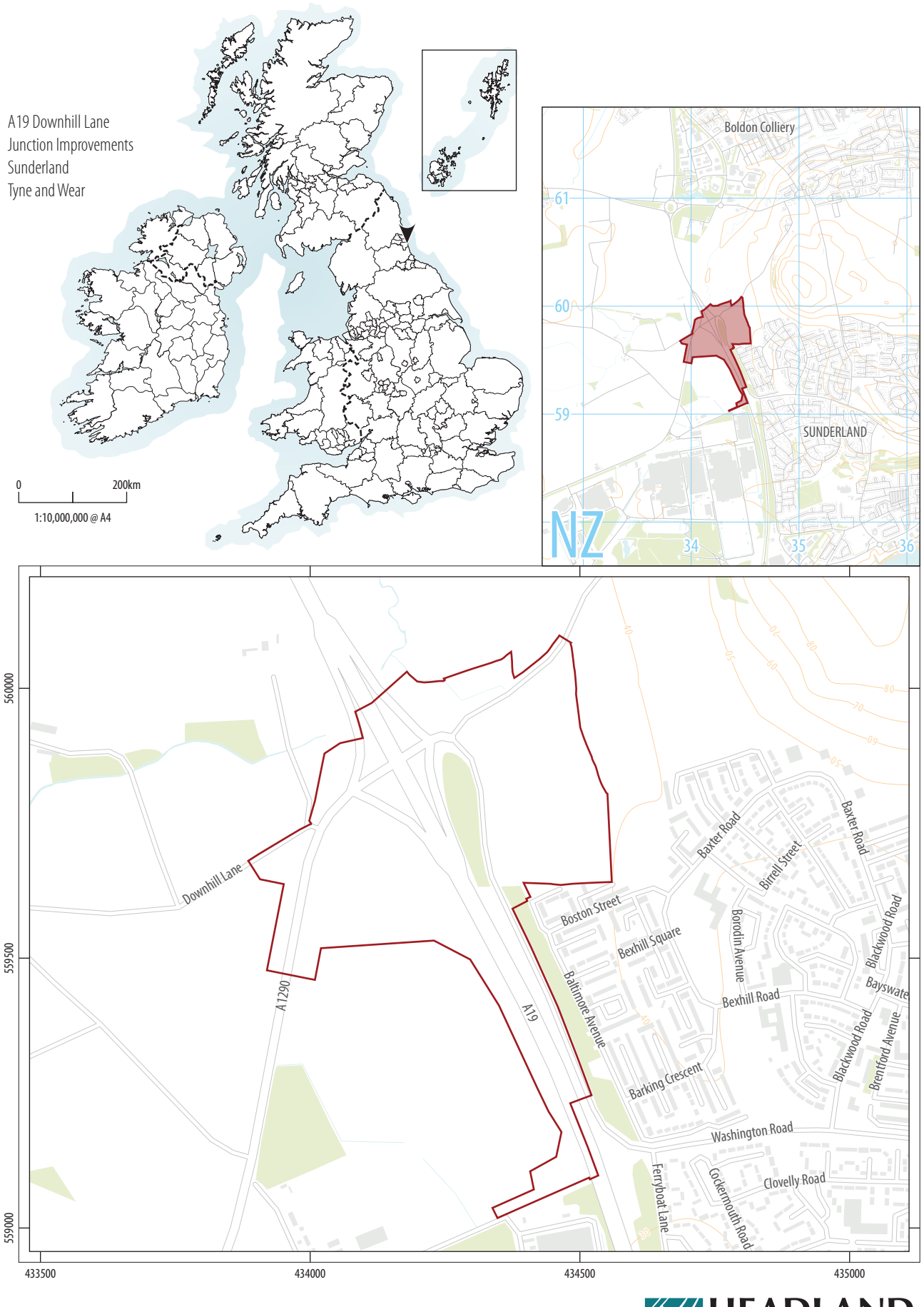
HEADLAND ARCHAEOLOGY

PROJECT SUMMARY

Headland Archaeology (UK) Ltd, undertook a geophysical (magnetometer) survey, covering approximately 15 hectares, in advance of planned improvements to the existing grade separated junction of the A19 trunk road and A1290 Downhill Lane west of Sunderland, Tyne and Wear. The survey has identified anomalies indicative of former agricultural land-use, including ploughing and former field boundaries, recent activity (dumping/infilling) and geological variation. A single linear anomaly of uncertain origin has been identified and for this reason an archaeological interpretation cannot be dismissed. However, the anomaly is on the same alignment as current boundaries and therefore a modern or agricultural origin is preferred. Therefore, on the basis of the geophysical survey, the archaeological potential of the area that will be impacted by the proposed junction improvements is assessed as low.

CONTENTS

LIST OF ILLUSTRATIONS



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ILLUS 1 Site location

A19 DOWNHILL LANE JUNCTION, SUNDERLAND, TYNE AND WEAR

GEOPHYSICAL SURVEY

1 INTRODUCTION

Headland Archaeology (UK) Ltd was commissioned by Jacobs on behalf of Highways England (the Client), to undertake a geophysical (magnetometer) survey around the junction of Downhill Lane (A1290) with the A19 west of Sunderland, where improvements to the junction are being considered. The results of the survey will inform future archaeological strategy.

The work was undertaken in accordance with a Technical Specification for Geophysical Survey (Jacobs, 2017). All work was undertaken in line with current best practice (Chartered Institute for Archaeologists 2014, English Heritage 2008).

The survey was carried out in two phases, between 6th and 7th November 2017, and the second between 19th and 20th February 2018.

1.1 SITE LOCATION, LAND-USE AND TOPOGRAPHY

The proposed development area (PDA) covered parts, or the entirety of, nine fields, that will be impacted by the proposed junction improvement works located between and adjacent to the junction of the A19 and A1290/Downhill Lane in the north and the Nissan car plant in the south.

To differentiate between the two phases of fieldwork separate field numbers (F10 and F11) have been given to the second phase survey even though these areas were located within F4 and F10 respectively from the Phase 1 survey.

At the time of survey Fields 3, 4/11, 6, 7 and 8 were under arable cultivation (see Illus 2), F1, F5 and F6 were under pasture (see Illus 3) and F2, F9/10 and F11 were not in agricultural production and were semi-overgrown with scrub vegetation (see Illus 4).

The site is centred at NGR NZ 34191 59794 (see Illus 5).

The site slopes gently down from Downhill Lane in the north at 40m above Ordnance Datum (AOD), to 33m AOD at the southern end of the PDA, just north of the Nissan factory.

1.2 GEOLOGY AND SOILS

The bedrock geology underlying the PDA is complex with the majority of the area comprising either Pennine Upper or Middle Coal Measures, consisting of mudstone, siltstone and sandstone, interspersed with bands of both Pennine Upper and Middle Coal Measures comprised of sandstone that are aligned north-west/south-east. The solid geology is overlain by clay of the Pelaw clay member across the whole of the PDA (NERC 2018).

The soils split east and west of the A19. The soils to the west are classified in the Soilscape 18 association, characterised as slowly permeable, slightly acid loams and clays. The soils to the east of the A19 are classified in the Soilscape 5 classification, characterised as freely draining lime rich loams (Cranfield University 2018).

2 ARCHAEOLOGICAL BACKGROUND

No information on any known heritage assets within the PDA was available at the time of writing.

ILLUS 2 Field 3, looking east **ILLUS 3** Field 6, looking west **ILLUS 4** Field 9/10, looking north-west

Analysis of the historic Ordnance Survey (OS) mapping shows that three field boundaries have been removed since the publication of the first edition in 1888.

3 AIMS, METHODOLOGY AND PRESENTATION

The general aim of the geophysical survey was to provide sufficient information to establish the presence/absence, character and extent of any archaeological remains within the survey area. This will therefore enable an assessment to be made of the impact of the proposed development on any sub-surface archaeological remains, if present.

The specific archaeological objectives of the geophysical survey were:

- to provide information about the nature and possible interpretation of any magnetic anomalies identified;
- to therefore model the presence/absence and extent of any buried archaeological features; and
- to prepare a report summarising the results of the survey.

3.1 MAGNETOMETER SURVEY

Magnetic survey methods rely on the ability of a variety of instruments to measure very small magnetic fields associated with buried archaeological remains. A feature such as a ditch, pit or kiln

can act like a small magnet, or series of magnets, that produce distortions (anomalies) in the earth's magnetic field. In mapping these slight variations, detailed plans of sites can be obtained as buried features often produce reasonably characteristic anomaly shapes and strengths (Gaffney & Gater 2003). Further information on soil magnetism and the interpretation of magnetic anomalies is provided in Appendix 1.

The survey was undertaken using four Bartington Grad601 sensors mounted at 1m intervals (1m traverse interval) onto a rigid carrying frame. The system was programmed to take readings at a frequency of 10Hz (allowing for a 10-15cm sample interval) on roaming traverses (swaths) 4m apart. These readings were stored on an external weatherproof laptop and later downloaded for processing and interpretation. The system was linked to a Trimble R8s Real Time Kinetic (RTK) differential Global Positioning System (dGPS) outputting in NMEA mode to ensure a high positional accuracy for each data point.

MLGrad601 and MultiGrad601 (Geomar Software Inc.) software was used to collect and export the data. Terrasurveyor V3.0.32.4 (DWConsulting) software was used to process and present the data.

3.2 REPORTING

A general site location plan is shown in Illus 1 at a scale of 1:10,000. Illus 2-4 are site condition photographs. Illus 5 is a 1:4,000 scale survey location plan showing the GPS swaths and photograph locations overlying the 1888-1913 six inch OS map. Illus 6 and 7, also at 1:4,000, show the fully processed overall (greyscale) data and the overall interpretation respectively. Illustration 8, 9 and 10 display the fully processed greyscale data, the minimally processed XY traceplot data and an interpretation of the data respectively from the northern half of the PDA (Sector 1) at a scale of 1:2,500 scale. Illustration 11, 12 and 13 show the data from the southern half of the PDA (Sector 2) at the same scale.

Technical information on the equipment used, data processing and magnetic survey methodology is given in Appendix 1. Appendix 2 details the survey location information and Appendix 3 describes the composition and location of the site archive. Data processing details are presented in Appendix 4. A copy of the OASIS entry (Online Access to the Index of Archaeological Investigations) is reproduced in Appendix 5.

The survey methodology, report and any recommendations comply with guidelines outlined by Historic England (English Heritage 2008) and by the Chartered Institute for Archaeologists (CIfA 2014). All illustrations from Ordnance Survey mapping are reproduced with the permission of the controller of Her Majesty's Stationery Office (© Crown copyright).

The illustrations in this report have been produced following analysis of the data in 'raw' and processed formats and over a range of different display levels. All illustrations are presented to most suitably display and interpret the data from this site based on the experience and knowledge of management and reporting staff.

4 RESULTS AND DISCUSSION

The ground conditions across the PDA were generally good and accordingly the data quality is good throughout.

A variable magnetic background has been identified across most of the PDA, with one notable exception (see below). Against this background, numerous anomalies have been identified. All are discussed below and cross-referenced to specific anomalies on the interpretative drawings, where appropriate.

4.1 FERROUS ANOMALIES

Ferrous anomalies, characterised as individual 'spikes', are typically caused by ferrous (magnetic) material, either on the ground surface or in the plough-soil. Little importance is normally given to such anomalies, unless there is any supporting evidence for an archaeological interpretation, as modern ferrous debris is common on most sites, often being present as a consequence of manuring or tipping/infilling. There is no obvious clustering to these ferrous anomalies which might indicate an archaeological origin. Far more probable is that the 'spike' responses are likely caused by the random distribution of ferrous debris in the upper soil horizons.

The whole of F5 and most of F6 is dominated by high magnitude magnetic disturbance. This is almost certainly modern in origin, probably resulting from dumping/infilling of magnetically enhanced material, possibly from when the original road junction was constructed. Any low magnitude anomalies of archaeological potential, if present, may be masked in the affected areas, although there is no reason to suspect that this is the case.

Magnetic disturbance around the field edges is due to ferrous material within or close to the adjacent field boundaries, and is of no archaeological interest.

4.2 AGRICULTURAL ANOMALIES

Parallel linear trends in the data have been identified across most of the PDA, with the exception of F5, F6, and F2. They are of higher magnitude in F3 and F7 (where the magnetic background is elevated) and lower magnitude in F1, F4, F8, F9, and F10, where the magnetic background is less variable. The anomalies are either parallel with, or at right angles to, current field boundaries. These anomalies are all attributed to modern agricultural activity; ploughing.

Two former field boundaries (FB1 and FB2) manifest as linear magnetic anomalies. Both (FB1 in F7 and FB2 in F4) are recorded on the 1888-1913 6 inch OS mapping and neither is considered to be of archaeological significance.

FB2 locates a boundary separating an area of marsh from a cultivated area, as indicated on the first edition mapping. A third former boundary, also separating cultivated farmland from marsh (as shown on the first edition), does not manifest as a magnetic anomaly but can be clearly inferred in the magnetic data being defined by the boundary between an area of much more variable magnetic background (the land that has been cultivated over a longer period of time) and a much less variable background, which correlates with

the former marshland which has only been brought into agricultural production relatively recently.

4.3 GEOLOGICAL ANOMALIES

Numerous low magnitude discrete anomalies are identified and evenly distributed throughout the PDA. These are likely to be caused by localised variations in the depth and composition of the soils and the Pelaw clays from which they derive.

4.4 POSSIBLE ARCHAEOLOGICAL ANOMALIES

A single linear anomaly (D1) has been identified to the west of F4 aligned west to east. It is low in magnitude, but stronger than the surrounding agricultural trends, and is oblique to all other anomalies contained within F4. In the absence of any clear explanation, an archaeological interpretation should be considered, however it is far more likely to be modern/agricultural in origin.

5 CONCLUSION

The survey has successfully evaluated the PDA identifying anomalies caused by post-medieval agricultural activity (ploughing) and the removal and infilling of former field boundaries. Previous ground conditions have also had an effect on the magnetic background across the PDA with former areas of marshland much less 'noisy' than areas which have been cultivated over a longer period of time. The extent of areas affected by dumping or infilling of modern, magnetically enhanced, material have also been defined.

Only a single linear anomaly in the west of F4, has been ascribed a possible archaeological origin as it cannot definitely be interpreted as agricultural or modern in origin, although a modern/agricultural cause is thought most likely. On the basis of the geophysical survey, the PDA is assessed as having a low archaeological potential.

6 REFERENCES

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SECTOR 1
SEE ILLUS 8-10

SECTOR 2
SEE ILLUS 11-13

F1
F2
F3
F4
F5
F6
F7
F8
F9
F10
F11

2
3
4

A19
A1290
DOWNHILL LANE
Make-me-rich
Ford
F.B.
S.P.
Downhill Level Crossing
Hylton Lane Level Crossing
Hylton Depot
B.M. 132·6
B.M. 121·9
Stone
Lane
130
136
123

560200
560000
559800
559600
559400
559200

433800
434000
434200
434400
434600

proposed development area
location and direction of ILLUS 2-4
GPS swaths

0 100m
1:4,000 @ A3

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Sunderland
Tyne and Wear

CLIENT Jacobs

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Illus 5 Survey location showing GPS swaths overlying the 1888-1913 six inch OS map

SECTOR 1
SEE ILLUS 8-10

SECTOR 2
SEE ILLUS 11-13

A19

A1290

DOWNHILL LANE

F1
F2
F3
F4
F5
F6
F7
F8
F9
F10
F11

560200
560000
559800
559600
559400
559200

433800
434000
434200
434400
434600

proposed development area

nT
-2.0
3.0

0
100m
1:4,000 @ A3

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Illus 6 Survey location showing GPS swaths overlying the 1888-1913 six inch OS map

SECTOR 1
SEE ILLUS 8-10

SECTOR 2
SEE ILLUS 11-13

A19
A19
A19
A1290
DOWNHILL LANE
DOWNHILL LANE

F1
F2
F3
F4
F5
F6
F7
F8
F9
F10
F11
FB1
FB2
FM
D1

560200
560000
559800
559600
559400
559200

433800
434000
434200
434400
434600

TYPE OF ANOMALY	INTERPRETATION
dipolar isolated	ferrous material
magnetic disturbance	ferrous material
linear trend	agricultural
linear	former field boundary
linear	former field boundary

TYPE OF ANOMALY	INTERPRETATION
magnetic enhancement	geology
low variation	area of former marsh
magnetic enhancement	archaeology?

ABBREVIATIONS

FB	former boundary
D	ditch
FM	former marsh

0 100m
1:4,000 @ A3

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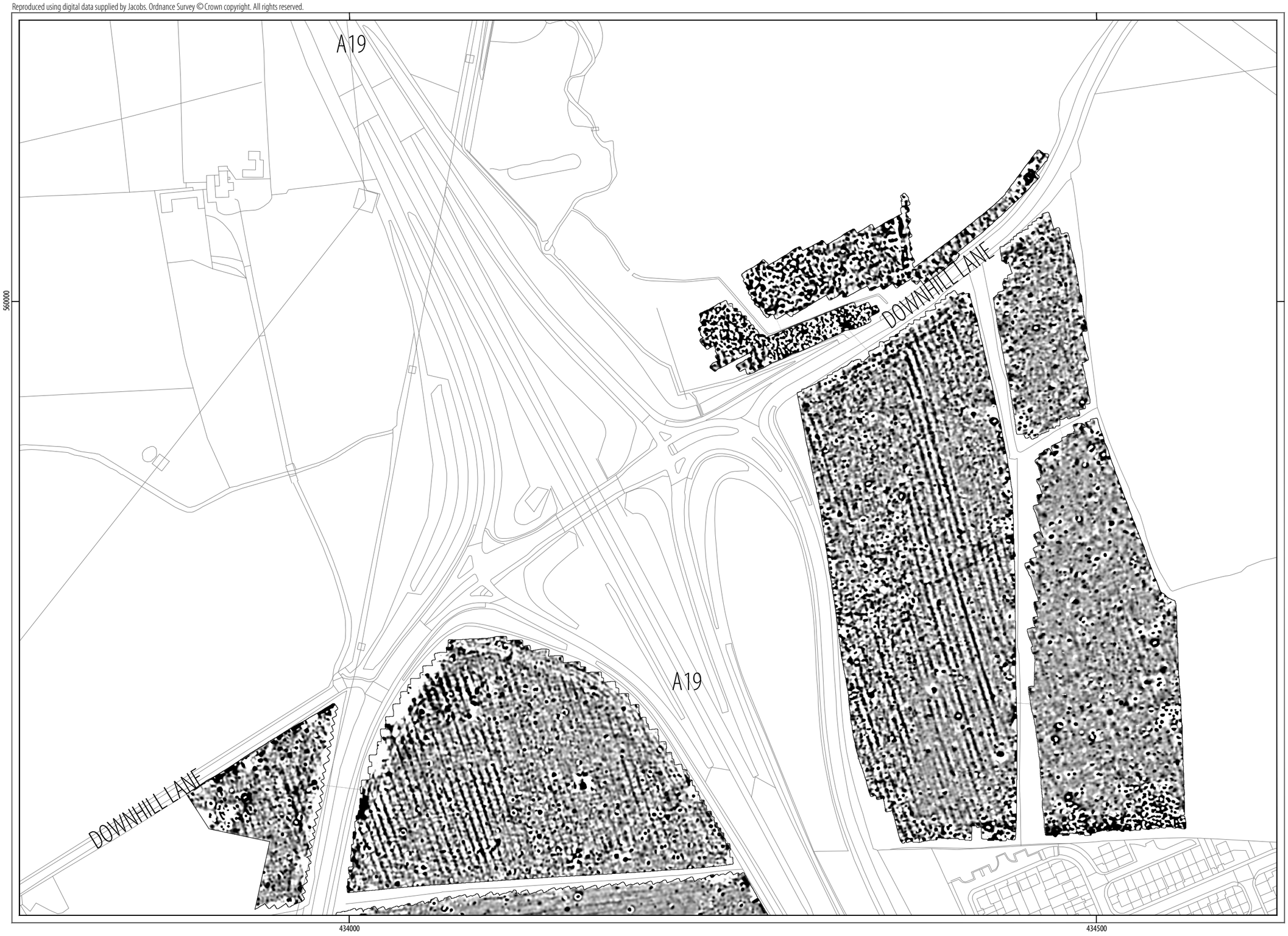
Illus 7 Overall interpretation of magnetometer data



nT
-2.0 3.0

0 50m
1:2,500 @ A3

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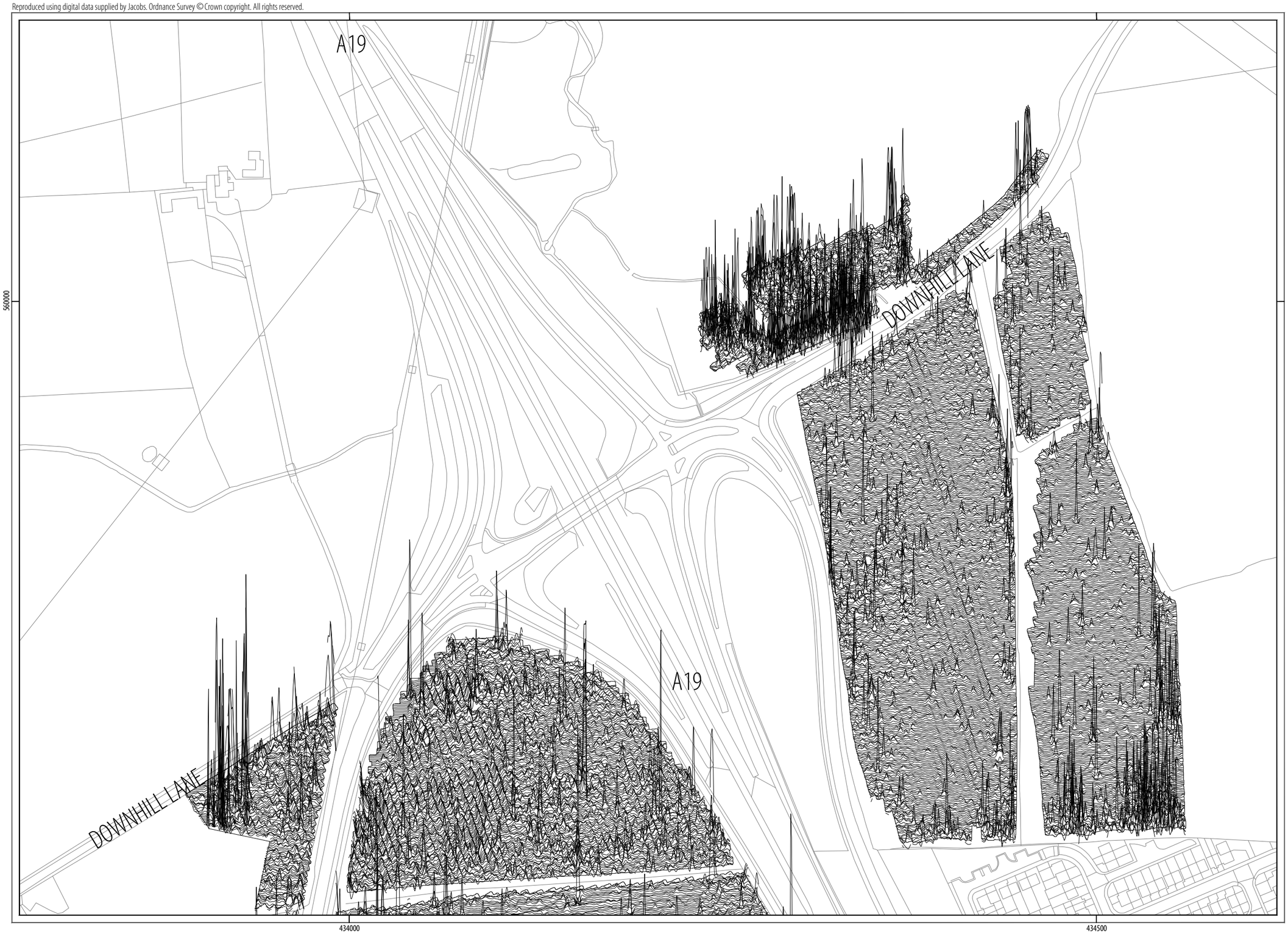
ILLUS 8 Processed greyscale magnetometer data: Sector 1



25.0nT/cm

0 50m

1:2,500 @ A3

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ILLUS 9 XY trace plot of minimally processed magnetometer data: Sector 1

TYPE OF ANOMALY / INTERPRETATION

TYPE OF ANOMALY	INTERPRETATION
dipolar isolated	ferrous material
magnetic disturbance	ferrous material
linear trend	agricultural
linear	former field boundary
linear	former field boundary
magnetic enhancement	geology
low variation	former marsh

ABBREVIATIONS

FB former boundary
FM former marsh

0 50m
1:2,500 @ A3

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ILLUS 10 Interpretation of magnetometer data: Sector 1

559500

A1290

A19

434000

434500

-1.0 nT 2.0

0 50m

1:2,500 @ A3

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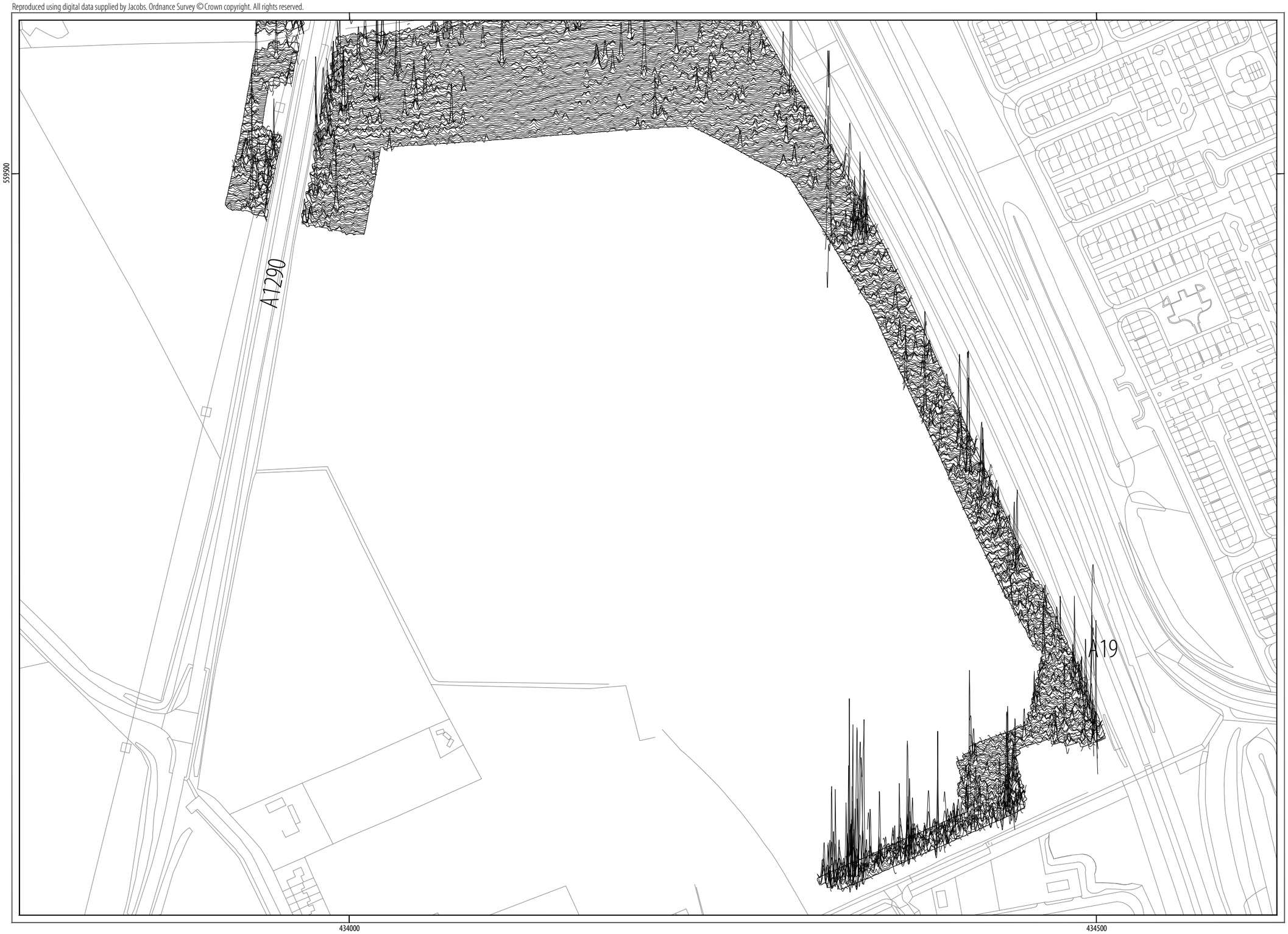
ILLUS 11 Processed greyscale magnetometer data: Sector 2



25.0nT/cm

0 50m

1:2,500 @ A3

PROJECT DLJS/01
A19 Downhill Lane Junction
Sunderland
Tyne and Wear

CLIENT Jacobs

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ILLUS 12 XY trace plot of minimally processed magnetometer data: Sector 2

TYPE OF ANOMALY	INTERPRETATION
dipolar isolated	ferrous material
magnetic disturbance	ferrous material
linear trend	agricultural
linear	former field boundary
linear	former field boundary
magnetic enhancement	geology
low variation	former marsh
magnetic enhancement	archaeology?

ABBREVIATIONS

FB former boundary
D ditch
FM former marsh

0 50m
1:2,500 @ A3

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ILLUS 13 Interpretation of magnetometer data: Sector 2

7 APPENDICES

APPENDIX 1 MAGNETOMETER SURVEY

Magnetic susceptibility and soil magnetism

Iron makes up about 6% of the earth's crust and is mostly present in soils and rocks as minerals such as maghaemite and haematite. These minerals have a weak, measurable magnetic property termed magnetic susceptibility. Human activities can redistribute these minerals and change (enhance) others into more magnetic forms so that by measuring the magnetic susceptibility of the topsoil, areas where human occupation or settlement has occurred can be identified by virtue of the attendant increase (enhancement) in magnetic susceptibility. If the enhanced material subsequently comes to fill features, such as ditches or pits, localised isolated and linear magnetic anomalies can result whose presence can be detected by a magnetometer (fluxgate gradiometer).

In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits, and the magnetic susceptibility of topsoils, subsoils and rocks into which these features have been cut, which causes the most recognisable responses. This is primarily because there is a tendency for magnetic ferrous compounds to become concentrated in the topsoil, thereby making it more magnetic than the subsoil or the bedrock. Linear features cut into the subsoil or geology, such as ditches, that have been silted up or have been backfilled with topsoil will therefore usually produce a positive magnetic response relative to the background soil levels. Discrete feature, such as pits, can also be detected.

The magnetic susceptibility of a soil can also be enhanced by the application of heat. This effect can lead to the detection of features such as hearths, kilns or areas of burning.

Types of magnetic anomaly

In the majority of instances anomalies are termed 'positive'. This means that they have a positive magnetic value relative to the magnetic background on any given site. However some features can manifest themselves as 'negative' anomalies that, conversely, means that the response is negative relative to the mean magnetic background.

Where it is not possible to give a probable cause of an observed anomaly a '?' is appended.

It should be noted that anomalies interpreted as modern in origin might be caused by features that are present in the topsoil or upper layers of the subsoil. Removal of soil to an archaeological or natural layer can therefore remove the feature causing the anomaly.

The types of response mentioned above can be divided into five main categories that are used in the graphical interpretation of the magnetic data:

Isolated dipolar anomalies (iron spikes) These responses are typically caused by ferrous material either on the surface or in the topsoil. They cause a rapid variation in the magnetic response giving a characteristic 'spiky' trace. Although ferrous archaeological artefacts could produce this type of response, unless there is supporting evidence for an archaeological interpretation, little emphasis is normally given to such anomalies, as modern ferrous objects are common on rural sites, often being present as a consequence of manuring.

Areas of magnetic disturbance These responses can have several causes often being associated with burnt material, such as slag waste or brick rubble or other strongly magnetised/fired material. Ferrous structures such as pylons, mesh or barbed wire fencing and buried pipes can also cause the same disturbed response. A modern origin is usually assumed unless there is other supporting information.

Linear trend This is usually a weak or broad linear anomaly of unknown cause or date. These anomalies are often caused by agricultural activity, either ploughing or land drains being a common cause.

Areas of magnetic enhancement/positive isolated anomalies Areas of enhanced response are characterised by a general increase in the magnetic background over a localised area whilst discrete anomalies are manifest by an increased response (sometimes only visible on an XY trace plot) on two or three successive traverses. In neither instance is there the intense dipolar response characteristic exhibited by an area of magnetic disturbance or of an 'iron spike' anomaly (see above). These anomalies can be caused by infilled discrete archaeological features such as pits or post-holes or by kilns. They can also be caused by pedological variations or by natural infilled features on certain geologies. Ferrous material in the subsoil can also give a similar response. It can often therefore be very difficult to establish an anthropogenic origin without intrusive investigation or other supporting information.

Linear and curvilinear anomalies Such anomalies have a variety of origins. They may be caused by agricultural practice (recent ploughing trends, earlier ridge and furrow regimes or land drains), natural geomorphological features such as palaeochannels or by infilled archaeological ditches.

APPENDIX 2 SURVEY LOCATION INFORMATION

An initial survey base station was established using a Trimble VRS differential Global Positioning System (dGPS). The magnetometer data was georeferenced using a Trimble RTK differential Global Positioning System (Trimble R8s model).

Temporary sight markers were laid out using a Trimble VRS differential Global Positioning System (Trimble R8s model) to guide the operator and ensure full coverage. The accuracy of this dGPS equipment is better than 0.01m.

The survey data were then super-imposed onto a base map provided by the client to produce the displayed block locations. However, it should be noted that Ordnance Survey positional accuracy for digital map data has an error of 0.5m for urban and floodplain areas, 1.0m for rural areas and 2.5m for mountain and moorland areas. This potential error must be considered if coordinates are measured off hard copies of the mapping rather than using the digital coordinates.

Headland Archaeology cannot accept responsibility for errors of fact or opinion resulting from data supplied by a third party.

APPENDIX 3 GEOPHYSICAL SURVEY ARCHIVE

The geophysical archive comprises an archive disk containing the raw data in XYZ format, a raster image of each greyscale plot with associate world file, and a PDF of the report.

The project will be archived in-house in accordance with recent good practice guidelines (http://guides.archaeologydataservice.ac.uk/g2gp/Geophysics_3). The data will be stored in an indexed archive and migrated to new formats when necessary.

APPENDIX 4 DATA PROCESSING

The gradiometer data has been presented in this report in processed greyscale and minimally processed XY trace plot format.

Data collected using RTK GPS-based methods cannot be produced without minimal processing of the data. The minimally processed data has been interpolated to project the data onto a regular grid and de-striped to correct for slight variations in instrument calibration drift and any other artificial data.

A high pass filter has been applied to the greyscale plots to remove low frequency anomalies (relating to survey tracks and modern agricultural features) in order to maximise the clarity and interpretability of the archaeological anomalies.

The data has also been clipped to remove extreme values and to improve data contrast.

APPENDIX 5 OASIS DATA COLLECTION FORM: ENGLAND

OASIS ID: headland5-312477

Project details	
Project name	A19 Downhill Lane Junction, Sunderland
Short description of the project	Headland Archaeology (UK) Ltd, undertook a geophysical (magnetometer) survey, covering approximately 15 hectares, in advance of planned improvements to the existing grade separated junction of the A19 trunk road and A1290 Downhill Lane west of Sunderland, Tyne and Wear. The survey has identified anomalies indicative of former agricultural land-use, including ploughing and former field boundaries, recent activity (dumping/ infilling) and geological variation. A single linear anomaly of uncertain origin has been identified and for this reason an archaeological interpretation cannot be dismissed. However, the anomaly is on the same alignment as current boundaries and therefore a modern or agricultural origin is preferred. Therefore, on the basis of the geophysical survey, the archaeological potential of the area that will be impacted by the proposed junction improvements is assessed as low.
Project dates	Start: 06-11-2017 End: 20-02-2018
Previous/future work	Not known / Not known
Any associated project reference codes	DLJS17 - Sitecode
Type of project	Field evaluation
Site status	None
Current Land use	Cultivated Land 4 - Character Undetermined
Monument type	N/A None
Monument type	N/A None
Significant Finds	N/A None
Significant Finds	N/A None
Methods & techniques	"Geophysical Survey"
Development type	Road scheme (new and widening)
Prompt	General structure plan/local plan/minerals plan guidance
Position in the planning process	Not known / Not recorded
Solid geology (other)	Middle and Upper Coal Measures
Drift geology (other)	Pelaw clay member
Techniques	Magnetometry
Project location	
Country	England
Site location	TYNE AND WEAR SUNDERLAND SUNDERLAND A19 Downhill Lane Junction
Study area	15 Hectares
Site coordinates	NZ 34191 59794 54.931571471086 -1.466356308758 54 55 53 N 001 27 58 W Polygon
Project creators	
Name of Organisation	Headland Archaeology
Project brief originator	Jacobs
Project design originator	Headland Archaeology
Project director/manager	Harrison, S
Project supervisor	Bishop, R
Type of sponsor/funding body	Highways Agency
Project archives	
Physical Archive Exists?	No

Digital Archive recipient	In house
Digital Contents	"other"
Digital Media available	"Geophysics"
Paper Archive Exists?	No
Project bibliography 1	
Publication type	Grey literature (unpublished document/manuscript)
Title	A19 Downhill Lane Junction, Sunderland: Geophysical Survey
Author(s)/Editor(s)	Bishop, R. and Webb, A.
Other bibliographic details	DLJS17
Date	2018
Issuer or publisher	Headland Archaeology
Place of issue or publication	Edinburgh
Description	A4 glue bound report and PDF/A
Entered by	Sam Harrison (sam.harrison@headlandarchaeology.com)
Entered on	23 March 2018

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Appendix 7.3 CULTURAL HERITAGE – GAZETTEER

Asset Number	16	Site Name	Scot's House Gatehouse, Walls and Gate Piers
Legal Status	Grade II Listed Building	NGR	NZ3266761065
Value	Medium	Condition	Good
Site Type	Gate House	Period	Post-Medieval
NHL ref	1355069	HER ref	N/A

Description

Gatehouse, walls, gates and gate piers. Circa 1890 for H L Pattinson, chemical manufacturer. Brick with stone dressings; flat-tiled roof. 2 storeys, 3 bays. Central carriage entrance of stone; 3-centred arch with keystone and scroll over, resting on Tuscan pilasters. Plain pilasters above the springing extend to first floor band and carry urn-shaped finials. Small 2-light mullioned windows either side of entrance; at first floor a central 4-light window flanked by 3-light windows, all of stone. Stone-coped Flemish shaped gables, at ends and above arch front and rear, have ball finials. Small gable-end windows; Pattinson arms in stone in the front gable. 2 tall brick chimneys. 2 serpentine walls end in 2 square corniced piers with lions holding shields on top. Continuous cornices and coping. Wrought iron gates. [1] [2]

Sources

[1] National Heritage List
[2] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	20	Site Name	Scot's House Stables
Legal Status	Grade II Listed Building	NGR	NZ3265860982
Value	Medium	Condition	Good
Site Type	Stables	Period	Post-Medieval
NHL ref	1025230	HER ref	N/A

Description

Stables, cartshed, hay barn and tack room. Early-mid C19. Coursed squared stone with ashlar dressings, including plinth, raised quoins and moulded cornice; Welsh slate roof with stone coping and mace finial; one corniced stone ridge chimney. 2 storeys, 9-bay range to north and a high wall linking it to the one-storey, 5-bay south stable range : keyed architraves to the doors except the carriage door in the projecting pedimented centre piece to the north range: this and the window openings have alternating block surrounds. Loading door above carriage entrance has rusticated round architrave and moulded impost blocks and rests on first floor band. There is a corresponding door and arch in the projecting pedimented centre piece to the north front. Dilapidated at time of survey. Open wood shelter shed in yard not included. [1]

Sources

[1] National Heritage List
[2] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	21	Site Name	Scot's House
Legal Status	Grade II* Listed Building	NGR	NZ3271960973
Value	High	Condition	Good
Site Type	Residential	Period	Post-Medieval
NHL ref	1185728	HER ref	961

Description

House. Early C18. Ashlar with Welsh slate roof. Simple block plan with rear wing. 2 storeys, 5 windows. Plinth; 4 square stone steps lead to central door with pedimented Tuscan doorcase; bands at first floor and cills levels; stone cornice and blocking course; open pediment over 3 central bays. Hipped roof. Interior shows open well staircase with 2 turned balusters to a tread, ramped hand-rail with spiral curtail, complete balustrade also on wall side and along landing. One ground floor room has painted and grained trompe l'oeil panelling and an original carved chimney piece. Adam-style ceilings to staircase and one principal room. Door and window woodwork complete. [1]

Documentary records indicate the existence of a medieval predecessor to Scot's House, although there are no known physical traces of this. The present house is of 18th century date, with 19th century gardens that have largely been turned over to agriculture, the outline of which can still be seen in the modern landscape.

When the current Scot's House was built in the 18th century, it was positioned within a landscape of rolling arable farmland close to one of the principal roads linking Gateshead to the west with Sunderland and the coast (the Wearmouth Bridge and Tyne Bridge Turnpike road, now the A184). The village of West Boldon would have been just discernible almost 2.5 km to the east where the spire of St Nicholas' Church would have been visible from the first storey windows. As they appear on a first edition Ordnance Survey 1:10,560 map of 1865 (Durham Sheet VII), Scot's House, Stables (Asset 20), and Gatehouse (Asset 16) were closely surrounded to the west and north by dense tree planting. This was presumably maintained to provide screening from traffic on the turnpike road, and from agricultural activity at the adjacent farm. The principal (southern) elevation of Scot's House would have enjoyed views across a roughly rectangular garden, with farmland filtered through plantation clumps and boundary wood blocks beyond (Ordnance Survey 1885, Durham Sheet VII). Views in all directions at ground floor level would have been obscured by the same boundary planting, and the terrain.

The Wearmouth Bridge to Tyne Bridge turnpike road was established by Act of Parliament in 1796, and it is assumed that ease of access to this route was one of the attractions for the builders of Scot's House. This proximity is maintained by the continued use of the route, now the A184 dual carriageway, and this relationship contributes to our understanding of the house and its setting, and by extension its significance.

Despite its proximity to the A184, the immediate setting of Scot's House retains an enclosed semi-rural feel due to the mature planting to the west and north of the house itself, and around the Stables (Asset 20) and Farm. Although the Gatehouse (Asset 16) faces the A184, dense planting behind it screens the house and other buildings from view. Views east towards the existing A19 and West Boldon are also screened by mature trees and hedgerow planting within the garden and beyond, as well as the undulating topography and distant woodland. Although the landscape planting and other features of the 19th century garden have been lost and the land returned to agriculture, its mature hedges and modern plantation woodblocks still screen distant views south particularly from ground level.

The setting of Scot's House is defined by its immediate surroundings: dense tree planting surrounding the house and neighbouring buildings (Assets 16 and 20), and the mature and new boundary planting at the periphery of the garden to the south; the whole being surrounded by arable farmland and connected to the former turnpike road via the Gatehouse (Asset 16). [2]
Sources
[1] English Heritage Listed Buildings Description [2] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	**28**	**Site Name**	**Downhill Farmhouse**
Legal Status	Grade II Listed Building	**NGR**	NZ3488760707
Value	Medium	**Condition**	Good
Site Type	Farmhouse	**Period**	Post-medieval
NHL ref	1025248	**HER ref**	1601
Description			
House and hind's cottage, now one dwelling. Rendered, with Welsh slate roof. 2 storeys; 4 bays. House at east: central door in architrave, 3 sash windows. Cottage at west, of one bay, has sash windows, the ground floor one wider. Roof has flat stone coping, end brick chimneys and chimney between house and cottage. [1] Although situated in an elevated position north of the proposed scheme, Downhill Farmhouse is completely screened from views towards it by other buildings to its south and south-west. Its setting is defined by its relationship with and proximity to the associated barn and limekiln. [2]			
Sources			
[1] National Heritage List [2] Rob McNaught (Jacobs) Walkover Survey, December 2014			

Asset Number	**30**	**Site Name**	**Pair of Lodge Cottages at Entrance to Downhill House**
Legal Status	Grade II Listed Building	**NGR**	NZ3473960436
Value	Medium	**Condition**	Good
Site Type	Cottages	**Period**	Post-medieval
NHL ref	1185283	**HER ref**	8050
Description			
Pair of lodges. C18. Eastern cottage: rendered stone; pantiled roof. 2 storeys, the 2nd very low; central door in stone architrave with sash window at left and blank wall at right; 2 small windows above; gable facing road has large Gothick window, band which continues along front eaves, and crenelated parapet; roof hipped at other end; rear chimney. Western cottage: rendered stone; gable has empty Gothick window, band, and crenelated parapet; no roof; derelict at time of survey. [1] Because of their original function as lodges guarding the entrance to Downhill House, their principal elevation faces north-west towards Boldon, and away from the proposed scheme. Although there are windows at ground floor level in the south-west and south-east elevations, the building's alignment means that only very oblique views are available towards the proposed development which are further screened by other buildings and mature vegetation. [2]			
Sources			
[1] National Heritage List [2] Rob McNaught (Jacobs) Walkover Survey, December 2014			

Asset Number	**31**	**Site Name**	**Barn and Gin-Gang to South of Downhill Farmhouse**
Legal Status	Grade II Listed Building	**NGR**	NZ3476860425
Value	Medium	**Condition**	Good
Site Type	Barn	**Period**	Post-medieval
NHL ref	1355078	**HER ref**	8370
Description			
Barn and gin-gang. Late C18/early C19. Three builds. Roughly squared coursed limestone and sandstone rubble; pantile and Welsh slate roofs with stone gable coping. 2 low storeys. Older part with first floor loading bay. Later part has gin at right angles with internal beams and horse wheel complete, a rare survival. [1] The setting of this asset is defined by its relationship to Downhill Lane Farmhouse, and the other contemporary buildings around it. It has no visibility towards the proposed scheme. [2]			
Sources			
[1] National Heritage List [2] Rob McNaught (Jacobs) Walkover Survey, December 2014			

Asset Number	33	Site Name	Limekiln to South East of Downhill Farmhouse
Legal Status	Grade II Listed Building	NGR	NZ3480960409
Value	Medium	Condition	Good
Site Type	Limekiln	Period	Post-medieval
NHL ref	1025249	HER ref	2306

Description

Limekiln. Late C18/early C19. Roughly squared limestone rubble with brick dressings. 3 entrances, in 3 flat sides, have elliptical brick arches. Built against a steep hillside to use the stone from Downhill Quarry. [1]

The limekiln is a functional structure and its setting is defined by its relationship with the other buildings making up Downhill Lane Farm and the fields it served. [2]

Sources

[1] National Heritage List

[2] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	35	Site Name	Downhill House
Legal Status	Grade II Listed Building	NGR	NZ3473960378
Value	Medium	Condition	Good
Site Type	House	Period	Post-medieval
NHL ref	1355079	HER ref	8164

Description

House. C18. Rendered brick with stone quoins; Welsh slate roof. Simple block plan. 2 storeys; 5 windows, having lost glazing bars, with architraves: central 6-panelled door in architrave with brackets and pediment; band at first floor cill level. Mansard roof has stone coping on moulded kneelers; 4 end brick chimneys. Interior has later staircase balustrade, doors and chimney pieces; window shutters remain. Historical note: this was an early Aged Miners' Home bought by the Boldon miners soon after the Association was founded in 1894, but has since returned to private occupation. [1]

Downhill House occupies a hillside location, and its principal elevation faces south-west and appears to have been deliberately arranged to take in extensive views in this direction over rolling countryside towards Newcastle upon Tyne. First floor windows in the southern gable take in views towards the proposed development, which are filtered by mature trees and other vegetation. [2]

Sources

[1] National Heritage List

[2] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	43	Site Name	Make-Me-Rich Farm
Legal Status	None	NGR	NZ3392060100
Value	Low	Condition	Moderate
Site Type	Farmstead	Period	Post-medieval
NHL ref	N/A	HER ref	N/A

Description

A single T-shaped building, orientated N-S is shown on the 1st Edition OS map. [1]

The main farmhouse has been extended to the east and west and heightened, with a dormer attic added to the northern range. [2]

Make-Me-Rich Farm is now a residential property. The setting of the farmhouse is dominated by the A19 trunk road, and in particular the northbound on sliproad of Downhill Lane junction which is approximnately 60m away at its closest point. Traffic noise is a constant presence. Make-Me-Rich Farm is severed from the fields to the east by the modern A19 trunk road, although it is still possible to appreciate its relationship with the fields to the west. [3]

Sources

[1] Ordnance Survey 1st Edition 6 inch County Series Durham VII 1862

[2] Paul Bennett (Jacobs) Site Visit, July 2006

[3] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	44	Site Name	Stone (Site of)
Legal Status	None	NGR	NZ3449060080
Value	Negligible	Condition	Destroyed
Site Type	Stone	Period	Post-medieval
NHL ref	N/A	HER ref	N/A

Description

The stone is labelled on the 1898 OS map. And is not shown after the edition published in 1938. [1] [2] [3]

No stone was observed here during the site visit. [4]

This asset has been removed, and its setting does not contribute to its significance. [5]

Sources

[1] Ordnance Survey 6 inch County Series Durham VII 1898

[2] Ordnance Survey 6 inch County Series Durham VII 1938

[3] Ordnance Survey 6 inch County Series Durham VII 1952

[4] Paul Bennett (Jacobs) Site Visit, July 2006

[5] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	46	Site Name	Engine House (Site of)
Legal Status	None	NGR	NZ3405059960
Value	Negligible	Condition	Destroyed
Site Type	Railway	Period	Post-medieval
NHL ref	N/A	HER ref	2,302

Description

Engine House on the North Eastern Railway, Pontop and South Shields Branch. [1] This may have been associated with the nearby Dam (Asset 47). It is not shown on the 2nd edition Ordnance Survey plan, so was out of use by 1895. [2] [3]

No visible trace was observed during the walkover survey. [4] [5]

This asset is defined by its proximity to and functional relationship with the Stanhope and Tyne Railway (Asset 58). Because this can only be appreciated when viewing historic maps, its modern surroundings do not contribute to its significance. [5]

Sources

[1] Tyne and Wear Historic Environment Record
[2] Ordnance Survey 1st Edition 6 inch County Series Durham VII 1862
[3] Ordnance Survey 2nd Edition 6 inch County Series Durham VII 1898
[4] Paul Bennett (Jacobs) Site Visit, July 2006
[5] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	47	Site Name	West Boldon Dam (Site of)
Legal Status	None	NGR	NZ3406059910
Value	Negligible	Condition	Destroyed
Site Type	Structure	Period	Post-medieval
NHL ref	N/A	HER ref	2,301

Description

A dam on the River Don. This may have been associated with the nearby Engine House (HER ref. 2302). It is not shown on the 2nd edition Ordnance Survey map so was presumably out of use by 1895. [1]

No visible trace was observed during the walkover survey. [2]

This asset is defined by its proximity to and functional relationship with the Stanhope and Tyne Railway (Asset 58). Because this can only be appreciated when viewing historic maps, its modern surroundings do not contribute to its significance. [3]

Sources

[1] Tyne and Wear Historic Environment Record
[2] Paul Bennett (Jacobs) Site Visit, July 2006
[3] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	49	Site Name	Downhill Level Crossing (Site of)
Legal Status	None	NGR	NZ3401059750
Value	Negligible	Condition	Destroyed
Site Type	Railway	Period	Post-medieval
NHL ref	N/A	HER ref	N/A

Description

Shown on the 1st Edition OS map as a crossing, the level crossing is not labeled untill the 1986 map. [1] [2] [3]

The level crossing has been removed by construction of the A19. [4]

This asset is defined by its proximity to and functional relationship with the Stanhope and Tyne Railway (Asset 58). Because this can only be appreciated when viewing historic maps, its modern surroundings do not contribute to its significance. [5]

Sources

[1] Tyne and Wear Historic Environment Record
[2] Ordnance Survey 1st Edition 6 inch County Series Durham VII 1862
[3] Ordnance Survey 6 inch County Series Durham VII 1898
[4] Paul Bennett (Jacobs) Walkover Survey, September 2006
[5] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	51	Site Name	Hylton Grove Bridge Tyne and Wear County Council Bridge 453
Legal Status	Grade II Listed Building	NGR	NZ3337159579
Value	Medium	Condition	Good
Site Type	Bridge	Period	Post-medieval
NHL ref	1185305	HER ref	N/A

Description

Bridge. Late C18/early C19. Sandstone ashlar, one arch, chamfered on north side. Band below parapet, which has flat coping. Crosses the river Don. Also listed under South Tyneside as item 5/14. [1]

The setting of this asset is defined by its relationship with the road and the River Don. [2]

Sources

[1] National Heritage List
[2] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	58	Site Name	Stanhope and Tyne Railway (Site of)
Legal Status	None	NGR	NZ1904952466
Value	Negligible	Condition	Poor
Site Type	Railway	Period	Post-medieval
NHL ref	1376130	HER ref	2,290

Description

The Stanhope and Tyne Railway was authorised by Deed of Settlement in 1834 and built under the wayleave system. It ran from South Shields to Stanhope via Washington, Fatfield, Leadgate, Cold Rowley, Waskerley and Parkhead. More than half of the line was worked by inclined planes. At its opening in 1834, 10.5 miles were worked by horses, 11 miles by 9 stationary steam engines, 9.5 miles by locomotives, and there were 3 self-acting inclines. The Western part of the line between Leadgate and Stanhope was purchased by the Wear Valley Railway and formed part of the Wear and Derwent Valley Railway from 1841, and closed in 1964. The eastern portion from Leadgate to South Shields became known as the Pontop and South Shields Railway, and remains open. [1]

The North Eastern Railway, Pontop and South Shields Railway had an Engine House (HER ref. 2302) near Hylton Grove and Boldon Station (HER ref. 2311). Its northern terminus was at the Stanhope and Tyne Drops (HER ref. 2336), although it may have had a short branch to Fairle's Dock (HER ref. 2337). Near this point was a Wagon Making Works (HER ref. 2453). Originally the Stanhope and Tyne Railway, the line was built by an Act of Parliament and opened in 1834 as the first public railway on Tyneside. It carried minerals from County Durham to the Tyne and passengers from South Shields to the Durham Turnpike. In 1842 the northern section was taken over by the Pontop and South Shields Railway. The central section is now dismantled from Whitburn Junction (HER ref. 1691) to where a link has been put in fairly recently between it and Westoe Railway. [2]

The line of the railway within the study area is now a private road north of Downhill Lane junction, and the route of the modern A1290. [2] [3]

The former function of the Stanhope and Tyne Railway can only be appreciated when viewing historic maps, its modern surroundings do not contribute to its significance.

Sources

[1] National Monuments Record
[2] Paul Bennett (Jacobs) Site Visit, July 2006
[3] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	70	Site Name	Ridge and Furrow 8
Legal Status	None	NGR	NZ3420259897
Value	Negligible	Condition	Poor
Site Type	Geophysical Anomaly	Period	Medieval; Post-medieval
NHL ref	None	HER ref	11731; 2007/27

Description

Levelled ridge and furrow ploughing identified by geophysical survey. [1]

No surface trace of this asset was observed during the walkover survey. [2]

The value of this asset is derived from its archaeological remains and geographical extent, and consequently its setting does not contribute to its significance. [2]

Sources

[1] Tyne and Wear Historic Environment Record
[2] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	72	Site Name	Narrow Ridge and Furrow
Legal Status	None	NGR	NZ3254862421
Value	Negligible	Condition	Poor
Site Type	Crop Mark; Ridge and Furrow	Period	Post-medieval
NHL ref	1403245	HER ref	N/A

Description

Several blocks of post medieval narrow ridge and furrow were seen on air photographs in the parish of Jarrow. Most of the ridge and furrow has been built over but there is some still extant south of Jarrow. [1]

No surface traces were visible during the walkover survey. [2]

The value of this asset is derived from its archaeological remains and geographical extent, and consequently its setting does not contribute to its significance. [2]

Sources

[1] Historic England Archive
[2] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	73	Site Name	Ridge and Furrow 9
Legal Status	None	NGR	NZ3462060230
Value	Negligible	Condition	Poor
Site Type	Crop Mark; Ridge and Furrow	Period	Post-medieval
NHL ref	N/A	HER ref	11731

Description

Levelled ridge and furrow ploughing identified on aerial photographs. [1]

No surface traces were visible during the walkover survey. [2]

The value of this asset is derived from its archaeological remains and geographical extent, and consequently its setting does not contribute to its significance. [2]

Sources

[1] Tyne and Wear Historic Environment Record

[2] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	74	Site Name	Sunderland Aerodrome / RAF Usworth (Site of)
Legal Status	None	NGR	NZ3410058420
Value	Negligible	Condition	Poor
Site Type	Possible archaeological remains	Period	Modern
NHL ref	N/A	HER ref	1824

Description

Started life in October 1916 as a Flight Station for "B" Flight of 36 Squadron and was known as Hylton. By 1917, when it was used by "A" Flight, it was just beginning to be called Usworth. Site now largely under Nissan. Usworth was a training station for most of its wartime career. In 1934, 607 Squadron of the Auxiliary Air Force was based at Usworth. The trainee pilots were mostly local miners and shipworkers. The squadron was transferred to Fighter Command in September 1937. There were two squadrons based here in World War II, one of which was the 607 squadron (City of Durham) whose squadron leader was called Blackadder. In 1940 the site was a fighter command. It was singled out for a major Luftwaffe attack during the Battle of Britain, but due to successful action of the 13 Group and the Anti-Aircraft guns Usworth was left untouched. During the Battle of Britain, Usworth Sector came under the direction of No. 13 Group. Hurricane Squadron No. 43, based at Tangmere in the south, were sent to Usworth in September 1940. Later the No. 55 Operational Training Unit was based there. 607 Squadron continued to operate from Usworth throughout the War. They were disbanded on 19 August 1945. In July 1963 it became Sunderland Aerodrome - a successful light aviation centre. The site is now home to the North East Aircraft Museum.

The majority of this site now is now in use as a car factory and has been the UK manufacturing base for Nissan cars since the mid-1980s. [1]

Almost no trace of the former RAF Usworth was observed during the walkover survey, and other than parts of its perimeter little can be identified in maps and aerial photographs. As a result, its setting is not considered to contribute it significance. [2]

Sources

[1] Tyne and Wear Historic Environment Record

[2] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	75	Site Name	RAF Usworth, Searchlight Battery TT237 (Site of)
Legal Status	None	NGR	NZ3460059200
Value	Negligible	Condition	Poor
Site Type	Substation	Period	Modern
NHL ref	N/A	HER ref	5534

Description

Searchlight Battery - During WW2 many of the Tyneside searchlights were manned by the 225th Anti-Aircraft Artillery (Searchlight Battalion) USA. Their headquarters was at Debdon Gardens in Newcastle (HER 5559). Many of the searchlight sites were used as low security POW camps after the American troops left, accommodating the prisoners who were working on local farms. Until radar was invented, searchlights were the only means by which aimed anti-aircraft fire and fighter interception were possible at night. The searchlights forced the enemy aircraft to fly higher, thus reducing their bombing accuracy. They also guided disabled allied aircraft back to base. During WW1 searchlights were emplaced to defend London and other vulnerable points. In 1916 a searchlight belt was established 25 miles inland from Sussex to Northumberland. In WW2 almost the whole country was covered in a grid of searchlights. A searchlight site would comprise of a circular earthwork around 9.14m in diameter for a 90cm light, a predictor emplacement, at least one light anti-aircraft machine gun pit and a number of huts for the detachment and generator. These sites only generally survive as crop marks, unless the huts or foundations survive [1]

Site located in area of modern housing development which is likely to have removed any physical remains. [2]

This asset is not perceptible on the surface and its setting is defined more in terms of its relationship with the former RAF Usworth than any physical remains. Consequently, its setting is not considered to contribute to its significance. [2]

Sources

[1] Tyne and Wear HER

[2] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	80	Site Name	Doorway to South of Rectory Green, Newcastle Road
Legal Status	Grade II Listed Building	NGR	NZ3488860988
Value	Medium	Condition	Good
Site Type	Doorway	Period	Post-medieval
NHL ref	1185725	HER ref	8061

Description

Doorway in wall of grounds of demolished rectory. C18. Sandstone. Moulded architrave, pulvinated frieze, moulded pediment with stone coping. [1]

The setting of this asset is dominated by its proximity to the A184 Boldon Bridge road, and much of its context has been lost since the demolition of the former rectory, and its replacement by mid-20th century semi-detached houses. The presence of houses and mature vegetation on the south side of the road completely screen the doorway from the proposed development. [2]

Sources

[1] National Heritage List

[2] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	81	Site Name	West Boldon Conservation Area
Legal Status	Conservation Area	NGR	NZ3493061085
Value	Medium	Condition	Good
Site Type	Settlement	Period	Post-medieval
NHL ref	N/A	HER ref	11864

Description

Designated in 1975. The Conservation Area is based on West Boldon medieval village (HER 954) and comprises of an isolated, introspective cluster of historic and modern houses in a traditional village setting, shrouded in mature trees. The village is dominated by St. Nicholas Church (HER 956). During the last half of the C19 with the opening of Downhill Quarry and Boldon Colliery, the medieval rural origins of West Boldon began to change. Buildings were built on the green and terraces of cottages for miners built along Newcastle Road. Many early houses on Gateshead Terrace, Redcar Terrace and Rectory Bank were cleared and the sites grassed over in C20.

After WW2 there was a comprehensive redevelopment plan to demolish almost everything in the village, except the church and public houses, to construct a brand new village centre. The only part of this scheme which was built was St. Nicholas View. Individual gap sites were infilled with Ashby Villas and Glebe Farm Cottages, Wayside Cottage, Hill View and The Bungalow. These dwellings have weakened the appearance of the neighbouring Ascot Court, West Boldon Hall and Mansion House. Few development opportunities are now available. There is green Belt to the south, and a grassy hillside to the north which needs protecting.

Early buildings in West Boldon are built of local Magnesian limestone rubble (Mansion House, Hill Top House, Hall Green Farm, 1-5 The Folly). This stone is used extensively for boundary walls. Mid to late C19 buildings are in warm red brick. Early roofs are in hand-made clay pantiles (Hall Green Farm and 1-5 The Folly). West Boldon Hall, 19-25 Rectory Bank and the Red Lion use Welsh slate. In the last 40 years, materials such as grey brick, smooth bright red brick, orange brick and concrete tiles and diluted character. Rendering and painting of the Wheatsheaf Public House has also altered character. [1]

West Boldon Conservation Area, designated in 1975, is based on a village with medieval origins – an isolated, introspective, cluster of historic and modern houses in a traditional village setting, shrouded in mature trees, and sited on a prominent hill between the Tyne and the Wear.

The village has been moulded over many centuries and bears good evidence of its development in the buildings, streets, boundaries, spaces and trees. A variety of building styles combine to create a real sense of harmony which is most attractive, dominated by St Nicholas Church and set in open countryside with striking long distance views.

This quiet, predominantly residential area is a valuable historic environment within South Tyneside borough, and represents a townscape of considerable interest worthy of preservation and enhancement. [2]

A combination of extensive and restricted views contributes to the distinctive character and setting of the Conservation area, and therefore to its significance.

Despite its hilltop location, views from the Conservation Area towards the proposed development site are limited by topography, and vegetation. Views towards West Boldon from the summit of Downhill Lane are considered important in the Conservation Area Appraisal, but would be unaffected by the proposed scheme. [3]

Sources
[1] Tyne and Wear Historic Environment Record [2] South Tyneside Council, 2006, West Boldon Conservation Area Character Appraisal [3] Rob McNaught (Jacobs) Walkover Survey, December 2014

Asset Number	HLT1	Site Name	20th Century Enclosure
Legal Status	None	NGR	N/A
Value	Negligible	Condition	Good
Site Type	Historic Landscape Type	Period	Modern; 20th century
NHL ref	None	HER ref	None
Description			
HLT1 is characterised by the agglomeration of smaller fields into larger units to accommodate modern agricultural practice. This results in poor legibility of earlier phases of land division and use. [1] [2] [3]			
Sources			
[1] Collins, S., 2014, Tyne and Wear Historic Landscape Characterisation Final Report [2] Paul Bennett (Jacobs) Site Visit, July 2006 [3] Rob McNaught (Jacobs) Walkover Survey, December 2014			

Asset Number	HLT3	Site Name	Settlement
Legal Status	None	NGR	N/A
Value	Low	Condition	Good
Site Type	Historic Landscape Type	Period	Post-medieval; Modern
NHL ref	None	HER ref	None
Description			
HLT3 is represented by 20th century housing on the edges of Boldon Colliery and Fellgate in the north-east and north-west of the study area, respectively. This has erased evidence of earlier land division, resulting in poor time depth. [1] [2] [3] [4]			
Sources			
[1] Tyne and Wear Historic Environment Record [2] Paul Bennett (Jacobs) Site Visit, July 2006 [3] Collins, S., 2014, Tyne and Wear Historic Landscape Characterisation Final Report [4] Rob McNaught (Jacobs) Walkover Survey, December 2014			

Asset Number	HLT5	Site Name	Modern Communications
Legal Status	None	NGR	N/A
Value	Negligible	Condition	Good
Site Type	Historic Landscape Type	Period	Modern; 20th century
NHL ref	None	HER ref	None
Description			
HLT5 represents the prominent 20th century A19, and the associated Testos and Downhill Lane junctions. [1] [2] [3]			
Sources			
[1] Tyne and Wear Historic Environment Record [2] Paul Bennett (Jacobs) Site Visit, July 2006 [3] Rob McNaught (Jacobs) Walkover Survey, December 2014			

Asset Number	HLT9	Site Name	20th Century Plantation
Legal Status	None	NGR	N/A
Value	Negligible	Condition	Good
Site Type	Historic Landscape Type	Period	Modern
NHL ref	None	HER ref	None
Description			
Small areas of modern woodland established for screening of modern housing and factory developments, as well as the modern A19 trunk road. [1] [2]			
Sources			
[1] Ordnance Survey, 1862, 6” map, Sheet Durham VII [2] Rob McNaught (Jacobs) Walkover Survey, December 2014			

Asset Number	HLT11	Site Name	Recreation
Legal Status	None	NGR	N/A
Value	Low	Condition	Good
Site Type	Historic Landscape Type	Period	Modern
NHL ref	None	HER ref	None
Description			
Recreation types form a large proportion of the historic and modern landscape within Tyne and Wear. As with public service types some of the broad types within the recreation class can also be found within the public space attribute attached to the settlement class type. [1] Within the study area this type is represented by open space associated with the North East Aircraft Museum. [2]			
Sources			
[1] Collins, S., 2014, Tyne and Wear Historic Landscape Characterisation Final Report [2] Rob McNaught (Jacobs) Walkover Survey, December 2014			

Asset Number	HLT12	Site Name	Industrial
Legal Status	None	NGR	N/A
Value	Negligible	Condition	Good
Site Type	Historic Landscape Type	Period	Modern
NHL ref	None	HER ref	None
Description			
Within the study area, the industrial type is represented by a small portion of the large Nissan car factory, which occupies the site of the former RAF Usworth (see Asset 74). The plant was opened in 1985, and is characterised by large industrial buildings, surrounded by car parking and storage, with a long oval test track at the south of the site. [1]			
Sources			
[1] Rob McNaught (Jacobs) Walkover Survey, December 2014			