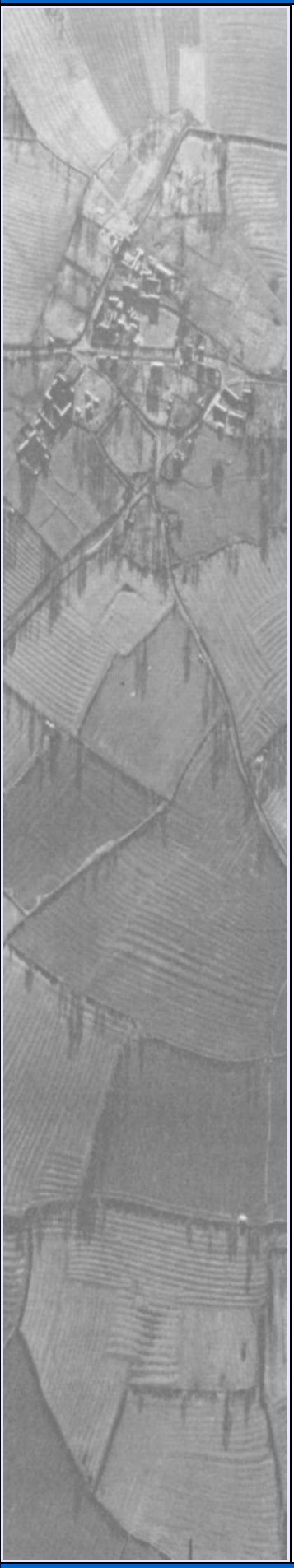

Somerdale – Cadbury Factory Site
Keynsham
Bath & North East Somerset

REPORT ON A MAGNETOMETRY AND EARTH RESISTANCE SURVEY AND LIDAR DATA ANALYSIS

for

Taylor Wimpey UK Ltd

David Sabin and Kerry Donaldson

October 2012

Ref. no. 418

ARCHAEOLOGICAL SURVEYS LTD

Somerdale – Cadbury Factory Site
Keynsham
Bath & North East Somerset

Magnetometry and Earth Resistance Survey
and LiDAR Data Analysis Report

for

Taylor Wimpey UK Ltd

Fieldwork by David Sabin, Kerry Donaldson, Jack Cousins and Richard Grove
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Survey dates – 4th July to 10th August & 18th to 26th September 2012
Ordnance Survey Grid Reference – **ST 65500 69700**

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SUMMARY

A geophysical survey and LiDAR data analysis was undertaken over approximately 60ha within the grounds of the former Cadbury Somerdale Factory at Keynsham, Bath & North East Somerset. Detailed magnetometer survey covered the sports grounds and floodplain of the River Avon to the west and north of the factory buildings. The survey located a large number anomalies that can be identified as ditches, enclosures, pits, buildings and roads or tracks that are associated with a Roman settlement covering at least 8ha. The survey supports the evidence that this was a Roman town which has long been conjectured to be that of *Traiectus*, listed during the 3rd century in the Antonine Itinerary.

The survey located a well defined Roman road that extends through the core of the settlement, as well as other more minor roads and tracks. The remains of at least 15 buildings flank the roads in the central part of the settlement, with some evidence that others may have been robbed or quarried. The data demonstrate that many of the buildings have internal walls forming individual rooms. There is also evidence of high levels of magnetic enhancement indicating possible areas of burning. This may be associated with occupational debris, possibly indicating furnaces and hypocausts, but there may be a possibility of industrial activity. Two small earth resistance surveys were also carried out within areas that were subject to magnetic disturbance close to the core of the settlement. The results confirmed the outline of one building, with several other linear anomalies possibly indicating structural remains within an area subject to modern landscaping and terracing.

At the north western corner of the core of the settlement is a circular structure with a 9.3m external diameter. It is sited within a rectilinear enclosure formed by a boundary ditch with an entrance gap at the south eastern corner. Overlying the southern ditch are the remains of a building, with another building immediately east of the boundary ditch. It is possible that these features relate to a shrine or temple.

The magnetometer survey within the floodplain demonstrated that anomalies are often very weak and this is likely to relate to alluvium and frequently waterlogged conditions. The majority of the magnetic anomalies within this area are associated with land drains, agricultural features or natural features. There is some evidence within the floodplain for a ditch extending from the Roman settlement towards the west and for a small square enclosure.

LiDAR data analysis was also carried out over the area. The majority of the visible features appear to relate to ditches associated with land drainage, and banks associated with agriculture and possibly flood management. Very slight earthworks do correlate with Roman structural remains, identified in the magnetometer data, and suggest that substantial wall remains survive. In addition, a low circular mound was located within the floodplain area and this was confirmed by field observations.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by the Environmental Dimension Partnership (EDP), on behalf of Taylor Wimpey UK Ltd, to undertake a geophysical survey within the grounds of the Cadbury Factory site (Somerdale), Keynsham, Bath & North East Somerset (B&NES). The site has been outlined for a proposed residential, sporting and leisure development. The survey would provide information on the archaeological potential of land which may be disturbed by redevelopment of the former Somerdale site.

1.1.2 The geophysical survey was carried out in accordance with a Written Scheme of Investigation (WSI) produced by Archaeological Surveys (2012) and approved by Richard Sermon, Senior Archaeological Officer for Bath & North East Somerset Council.

1.2 Survey objectives and techniques

1.2.1 The aim of the survey was to use geophysical techniques to locate anomalies that may be archaeological in origin, so that they may be assessed prior to development of the site. The primary objective was to cover all accessible areas by magnetometry with earth resistance survey (resistivity) used in support to target specific parts of the site where additional detail may be required. Resistivity may provide detailed information relating to structural remains and may be useful in areas subject to magnetic disturbance. In support of the geophysics, LiDAR analysis was carried out on data derived from survey work carried out by the Environment Agency. LiDAR can be particularly useful in supporting the interpretation of geophysical data and may indicate the presence of upstanding remains or very slight earthworks of archaeological potential.

1.2.2 Detailed magnetometry was carried out over sports fields and a flood plain area to the west and north of the factory buildings and also within a small “picnic site” to the south east of the main area, close to the River Avon. Some targeted resistivity was also undertaken in areas that were found to be magnetically disturbed. The techniques are considered to be an efficient and effective approach to archaeological prospection.

1.2.3 The survey and report generally follow the recommendations set out by: English Heritage (2008) *Geophysical survey in archaeological field evaluation;* and Institute for Archaeologists (2002) *The use of Geophysical Techniques in Archaeological Evaluations*. The work has been carried out to the Institute for Archaeologists (2011) *Standard and Guidance for Archaeological Geophysical Survey.*

1.3 Site location, description and survey conditions

1.3.1 The site is located within the grounds of the former Cadbury Somerdale Factory to the north of Keynsham, B&NES. It comprises sports pitches and hay meadows to the west and north of the factory buildings. The entire area available for survey was approximately 60ha. It is centred on Ordnance Survey National Grid Reference (OS NGR) ST 65500 69700, see Figures 01 and 02.

1.3.2 The survey is split into Areas 1-14 for the purposes of this report. The work was completed in several phases, starting with the sports pitches and moving into hay meadows within the River Avon flood plain as they became accessible after mowing.

1.3.3 Areas 1, 2, 5, 6, and 13 slope down very gently towards the west and north west and meet a large flat floodplain of the River Avon that encompasses Areas 3, 4, 7, 8, 9, 10, 11 and 12. The floodplain area lies at approximately 9m AODN (Above Ordnance Datum Newlyn), the river lies approximately 2-3m below the floodplain whilst the sloping areas above the floodplain are approximately 9.3 – 12m AODN.

1.3.4 The ground conditions across the site were generally considered to be favourable for the collection of magnetometry and earth resistance data once the hay meadows were cut. Weather conditions during the survey were variable but predominantly wet with periods of heavy rain or heavy showers. As a consequence, disruption to the survey schedule frequently occurred.

1.4 Site history and archaeological potential

1.4.1 The Roman town of *Traiectus* was listed in the Antonine Itinerary in the 3rd century as being sited between *Aquae Sulis* (Bath) and *Abonus* (Sea Mills). However, as these two sites are both to the north of the River Avon historic conjecture on the location of the town presumed it was at Bitton, 3km to the east of Somerdale (Seyer, 1821). In 1922 during construction of the Cadbury Factory, a well appointed Roman building was located, together with Roman coffins and a well (Bullied & Horne, 1926). More recent ground disturbance during levelling of the sports pitches and subsequent investigation, revealed a number of Roman buildings, roads and associated features, supporting evidence that the site contains a Roman town, possibly that of *Traiectus* (Browne, 1991). Other small scale investigations have taken within the site during the 1990s (AAU, 1993 & 1995) with a geophysical survey immediately to the south of the factory building locating a possible rectilinear enclosure (Archaeological Surveys, 2009).

1.4.2 Although some evaluation has taken place, no in depth survey or large scale excavation has been carried out within the site. Due to the known presence of Roman buildings and other remains both within and adjacent to the survey area, it was anticipated that there was a very high potential to locate geophysical anomalies relating to these archaeological features.

1.5 Geology and soils

1.5.1 The underlying solid geology varies with the site. The sports pitches in the centre of the site and to the south (Areas 1, 2, 5, 6, 7 & 8) are mudstone from the Blue Anchor Formation with overlying head deposits. Across the northern, western and north eastern parts of the site (Areas 3, 4 , 9, 10, 11, 12 & 13) Mercia Mudstone is overlain by alluvial deposits. Area 14 to the south east of the site is interbedded limestone and mudstone from the Rugby Limestone Member (BGS, 2012) .

1.5.2 The overlying soil across the floodplain is from the Fladbury 1 association, which is a pelo-alluvial gley soil. It consists of a stoneless, clayey soil variably affected by groundwater. The rest of the site is unmapped due to the urban location (Soil Survey of England and Wales, 1983).

1.5.3 Magnetometry survey carried out across similar soils has produced good results where cut features exist. However, magnetic enhancement can be suppressed within clayey soils associated with Mercia Mudstone and alluvial deposits, and the ability to locate anomalies can be dependent on the depth of any alluvial cover and the magnetic susceptibility of the fills of cut features. Deeply buried (i.e. over 1m) and/or weakly magnetic features may be particularly difficult to locate. Periodically waterlogged alluvial soils are frequently associated with low levels of magnetic susceptibility resulting in very weak magnetic anomalies. These soils can also contain fluvial and other natural features that can often appear pit-like and ditch-like in form.

1.5.4 The nature and age of alluvial deposits across the site is uncertain but it is likely that accumulation has occurred over a very long period of time and to some degree is probably continuing within the current floodplain area. The implications are, therefore, that archaeological features could be both cut into alluvial deposits and be buried beneath alluvium.

2 METHODOLOGY

2.1 Technical synopsis

2.1.1 Magnetometry survey records localised magnetic fields that can be associated with features formed by human activity. Magnetic susceptibility and magnetic thermoremnance are factors associated with the formation of localised fields. Additional details are set out below and within Appendix A.

2.1.2 Iron minerals within the soil may become altered by burning and the break down of biological material; effectively the magnetic susceptibility of the soil is increased, and the iron minerals become magnetic in the presence of the Earth's magnetic field. Accumulations of magnetically enhanced soils within features, such as pits and ditches, may produce magnetic anomalies that can be mapped by magnetic prospection.

2.1.3 Magnetic thermoremnance can occur when ferrous minerals have been heated to high temperatures such as in a kiln, hearth, oven etc. On cooling, a permanent magnetisation may be acquired due to the presence of the Earth's magnetic field. Certain natural processes associated with the formation of some igneous and metamorphic rock may also result in magnetic thermoremnance.

2.1.4 The localised variations in magnetism are measured as sub-units of the Tesla, which is a SI unit of magnetic flux density. These sub-units are nano Teslas (nT), which are equivalent to 10^{-9} Tesla (T).

2.1.5 The electrical resistance or resistivity of the soil depends upon the moisture content and distribution within the soil. Buried features such as walls can affect the moisture distribution and are usually more moisture resistant than other features such as the infill of a ditch. A stone wall will generally give a high resistance response and the moisture retentive content of a ditch can give a low resistance response. Localised variations in resistance are measured in ohms (Ω) which is the SI unit for electrical impedance or resistance.

2.1.6 The Twin Probe configuration used in this survey is favoured for archaeological prospection and can give a response to features up to 1m in depth with a mobile probe separation of 0.5m.

2.2 Equipment configuration, data collection and survey detail

2.2.1 The detailed magnetic survey was carried out using Bartington Grad 601-2 gradiometers. The instruments effectively measure a magnetic gradient between two fluxgate sensors mounted vertically 1m apart. Two sets of sensors are mounted on a single frame 1m apart horizontally.

2.2.2 The instruments are extremely sensitive and are able to measure magnetic variation to 0.01nanoTesla (nT), with an effective resolution of 0.03nT. The data are limited to ±100nT when surveying with the highest sensitivity. All readings are saved to an integral data logger for analysis and presentation.

2.2.3 The instruments are operated according to the manufacturer's instructions with consideration given to the local conditions. An adjustment procedure is required, prior to collection of data, in order to balance the sensors and remove the effects of the Earth's magnetic field; further adjustment is required during the survey due to instrument drift often associated with temperature change.

2.2.4 It can be very difficult to obtain optimum balance for the sensors due to localised magnetic vectors that may be associated with large ferrous objects, geological/pedological features, 'magnetic debris' within the topsoil and natural temperature fluctuations. Imperfect balance results in a heading error often visible as striping within the data; this can be effectively removed by software processing and generally has little effect on the data unless extreme.

2.2.5 The Bartington gradiometers undergo regular servicing and calibration by the

manufacturer. A current assessment of the instruments is shown in Table 1 below.

Sensor type and serial numbers	Bartington Grad - 01 – 1000 Nos. 084, 085, 242 and 396
Date of certified calibration/service	Sensors 084 and 085 - August 2012 (due Aug 2014) Sensors 242 and 396 - October 2011 (due Oct 2013)
Bandwidth	12Hz (100nT range) both sensors
Noise	<100pT peak to peak
Adjustable errors	<2nT

Table 1: Bartington fluxgate gradiometer sensor calibration results

The instruments were considered to be in good working order prior to the survey, with no known faults or defects.

2.2.6 Data were collected at 0.25m centres along traverses 1m apart. Areas 1, 2, 3, 9, 10, 11, 12 and 13 were separated into 40m by 40m grids (1600m²) giving 6400 measurements per grid and Areas 4, 5, 6, 7 and 8 into 30m by 30m grids (900m²) giving 3600 recorded measurements per grid. Area 14, to the south east of the site, was separated into 20m by 20m grids (400m²) giving 1600 measurements per grid. This sampling interval is very effective at locating archaeological features and is the recommended methodology for archaeological prospection (English Heritage, 2008).

2.2.7 The earth resistance survey (resistivity) was carried out using a TR Systems Ltd Resistance Meter TRCIA 1.31 using a mobile Twin Probe array. The standard mobile frame for the TRCIA instrument has a 0.5m electrode separation and readings were recorded at 0.5m intervals along traverses 0.5m apart within 20m grids. The instrument was set to filter stray earth currents which can cause errors within the resistance measurements. Resistivity was targeted along the south eastern sides of Areas 1 and 2 due to the presence of magnetic disturbance caused by steel fencing.

2.2.8 The survey grids were set out to the Ordnance Survey OSGB36 datum using a Penmap RTK GPS. The GPS is used in conjunction with Leica's SmartNet service, where positional corrections are sent via a mobile telephone link. Positional accuracy of around 10 – 20mm is possible using the system. The instrument is regularly checked against the ETRS89 reference framework using Ordnance Survey ground marker C1ST7784 (Horton).

2.3 Data processing and presentation

2.3.1 Magnetometry data downloaded from the Grad 601-2 data logger are analysed and processed in specialist software known as ArcheoSurveyor. The software allows greyscale and trace plots to be produced for presentation and display. Survey grids are assembled to form an overall composite of data (composite file) creating a dataset of the complete survey area. Appendix C

contains specific information concerning the survey and data attributes and is derived directly from ArcheoSurveyor; this should be used in conjunction with information provided by Figure 02.

2.3.2 Only minimal processing is carried out in order to enhance the results of the survey for display. Raw data are always analysed, as processing can modify anomalies. The following schedule sets out the data and image processing used in this survey:

- clipping of the raw data at ±10nT to improve greyscale resolution,
- clipping of processed data at either ±8nT or ±3nT to enhance low magnitude anomalies,
- de-stagger is used to enhance linear anomalies where necessary,
- zero median/mean traverse is applied in order to balance readings along each traverse.

Reference should be made to Appendix B for further information on the specific processes carried out on the data. Appendix C metadata includes details on the processing sequence used for each survey area.

2.3.3 Data logged by the resistance meter are downloaded and processed within ArcheoSurveyor software. The following processing has been carried out on data in this survey:

- processed data have been clipped at 2SD between 7.42Ω and 23.14Ω for Area 1 and 9.14Ω and 16.36Ω for Area 2,
- the greyscale palette has been flipped to show high resistance anomalies as white and low resistance as black in order to easily correlate negative (white) and positive (black) responses within the magnetometer data,
- data have been “despiked” in order to remove spurious high contact responses.

2.3.4 An abstraction and interpretation is offered for all geophysical anomalies located by the survey. A brief summary of each anomaly, with an appropriate reference number, is set out in list form within the results (Section 3) to allow a rapid and objective assessment of features within each survey area. Where further interpretation is possible, or where a number of possible origins should be considered, more subjective discussion is set out in Section 4.

2.3.5 The main form of data display prepared for this report is the greyscale plot. Raw data is only shown for Areas 1 and 2 and processed data have been shown for all areas followed by an abstraction and interpretation plot. Anomalies are abstracted using colour coded points, lines and polygons. All plots are scaled to landscape A3 for paper printing.

2.3.6 Graphic raster images in bitmap format (.BMP) are initially prepared in ArcheoSurveyor. Regardless of survey orientation, data captured along each traverse are displayed and processed by ArcheoSurveyor from left to right. Prior to displaying against base mapping, raster graphics require a rotation to

restore north to the top of the image upon insertion into AutoCAD.

2.3.7 The raster images are combined with base mapping using ProgeCAD Professional 2009 and AutoCAD LT 2007, creating DWG file formats. All images are externally referenced to the CAD drawing in order to maintain good graphical quality. Quality can be compromised by rotation of graphics in order to allow the data to be orientated with respect to grid north; this is considered acceptable as the survey results are effectively georeferenced allowing relocation of features using GPS, resection method etc.

2.3.8 A digital archive is produced with this report, see Appendix D below. The main archive is held at the offices of Archaeological Surveys Ltd.

3 RESULTS

3.1 General assessment of survey results - magnetometry

3.1.1 The detailed magnetic survey was carried out over a total of fourteen survey areas covering approximately 60ha.

3.1.2 Magnetic anomalies located can be generally classified as positive and negative responses of archaeological potential, positive and negative anomalies of an uncertain origin, anomalies associated with land management, areas of magnetic debris and disturbance, strong discrete dipolar anomalies relating to ferrous objects and strong multiple dipolar linear anomalies relating to buried services or pipelines.

3.1.3 Anomalies located within each survey area have been numbered and are described below with subsequent discussion in Section 4.

3.2 Statement of data quality - magnetometry

3.2.1 Data are considered representative of the magnetic anomalies present within the site. Magnetic disturbance was frequently encountered immediately adjacent to modern ferrous objects and services. Such disturbance has the potential to obscure anomalies of low magnitude.

3.3 Data interpretation - magnetometry

3.3.1 The list of sub-headings below attempts to define a number of separate categories that reflect the range and type of features located during the survey. A basic explanation of the characteristics of the magnetic anomalies is set out for each category in order to justify interpretation, a basic key is indicated to allow cross referencing to the abstraction and interpretation plot. CAD layer names are included to aid reference to associated digital files (.dwg/.dxf). Sub-headings are then used to group anomalies with similar characteristics for each survey area.

Report sub-heading CAD layer names and plot colour	Description and origin of anomalies
Anomalies with archaeological potential AS-ABST MAG POS LINEAR ARCHAEOLOGY AS-ABST MAG POS DISCRETE ARCHAEOLOGY AS-ABST MAG TRACK ARCHAEOLOGY AS-ABST MAG DISTURBED ARCHAEOLOGY AS-ABST MAG NEG STRUCTURAL ARCHAEOLOGY	Anomalies have the characteristics (mainly morphological) of a range of archaeological features such as pits, enclosures, structures etc..
Anomalies with an uncertain origin AS-ABST MAG POS LINEAR UNCERTAIN AS-ABST MAG NEG LINEAR UNCERTAIN AS-ABST MAG POS DISCRETE UNCERTAIN AS-ABST MAG POS AREA UNCERTAIN AS-ABST MAG NEG AREA UNCERTAIN	The category applies to a range of anomalies where there is not enough evidence to confidently suggest an origin. Anomalies in this category may well be related to archaeologically significant features, but equally relatively modern features, geological/pedological features and agricultural features should be considered. Positive anomalies are indicative of magnetically enhanced soils that may form the fill of 'cut' features or may be produced by accumulation within layers or 'earthwork' features; soils subject to burning may also produce positive anomalies. Negative anomalies are produced by material of comparatively low magnetic susceptibility such as stone and subsoil.
Anomalies relating to land management AS-ABST MAG BOUNDARY AS-ABST MAG LAND DRAIN	Anomalies are mainly linear and may be indicative of the magnetically enhanced fill of cut features (i.e. ditches). The anomalies may be long and/or form rectilinear elements and they may relate to topographic features or be visible on early mapping. Associated agricultural anomalies (e.g. headlands, plough marks and former ridge and furrow) may support the interpretation. Land drains can appear in a classic herringbone pattern of interconnected multiple dipolar linear anomalies, or as parallel linear anomalies. The multiple dipolar response indicates a ceramic land drain.
Anomalies associated with magnetic debris AS-ABST MAG DEBRIS AS-ABST MAG STRONG DIPOLAR	Magnetic debris often appears as areas containing many small dipolar anomalies that may range from weak to very strong in magnitude. It often occurs where there has been dumping or ground make-up and is related to magnetically thermoremnant materials such as brick or tile or other small fragments of ferrous material. This type of response is occasionally associated with kilns, furnace structures, or hearths and may therefore be archaeologically significant. It is also possible that the response may be caused by natural material such as certain gravels and fragments of igneous or metamorphic rock. Strong discrete dipolar anomalies are responses to ferrous objects within the topsoil.
Anomalies with a modern origin AS-ABST MAG DISTURBANCE AS-ABST MAG SERVICE AS-ABST MAG SPORTS	The magnetic response is often strong and dipolar indicative of ferrous material and may be associated with extant above surface features such as wire fencing, cables, pylons etc.. Often a significant area around such features has a strong magnetic flux which may create magnetic disturbance; such disturbance can effectively obscure low magnitude anomalies if they are present. Fluxgate sensors may respond erratically and with hysteresis adjacent to strong magnetic sources. Buried services may produce characteristic multiple dipolar anomalies dependant upon their construction.
Anomalies with a natural origin AS-ABST MAG NATURAL FEATURES	Naturally formed magnetic anomalies are are caused by localised variability in the magnetic susceptibility of soils, subsoils and other drift or solid geologies. Anomalies may be amorphous, linear or curvilinear and may appear 'fluvial' or discrete; the latter are almost impossible to distinguished from pit-like anomalies with an anthropogenic origin. Fluvial, glacial and periglacial processes may be responsible for their formation within drift material and subsoil. Igneous and metamorphic activity can lead to anomalies within more solid geology.

Table 2: List and description of magnetometry interpretation categories

3.4 List of anomalies – Area 1

Area centred on OS NGR 365480 169550, see Figures 06 – 11.

3.4.1 Area 1 contains positive and negative linear and discrete anomalies that relate to former buildings, tracks/roads, enclosures, pits, ditches and areas of burning. The response to at least nine buildings is recorded within this part of the site. The morphology of the anomalies is entirely consistent with that of a Roman settlement showing a high degree of order and planning.

Anomalies of archaeological potential

(1) – Positive linear anomalies that relate to ditches and boundaries and flanking tracks (4) within the settlement. The magnitude of the responses is generally high, over 10nT, probably indicating that occupational debris has become incorporated within the fill of these cut features.

(2) – Positive rectilinear anomalies that relate to enclosure ditches and subdivisions within a settlement site. The response can be over 20nT which indicates that occupationally enhanced soil and other debris is incorporated within them.

(3) – Discrete positive anomalies that relate to pits and areas of burning. The response to these features is generally over 10nT and up to 70nT. The high magnitude of some of the anomalies may be indicative of industrial activity.

(4) – Negative linear anomalies that relate to trackways or roads within the settlement. There is a general east-southeast to west-northwest and south-southwest to north-northeast orientation. The response to these anomalies is generally -5nT, indicating the presence of material with low magnetic susceptibility, such as stone, used as a surface material.

(5) – Negative linear anomalies that relate to structural remains associated with former buildings and possible boundary walls. The morphology of the buildings would be consistent with those of Roman origin. There are the remains of at least nine buildings within this part of the site and possible location of three others (6). There is also evidence of sub-division relating to individual rooms.

(6) – There are several amorphous zones of variable magnetic response that appear to indicate disturbed archaeological remains. It is possible that these are former Roman buildings that have been disturbed by quarrying and stone robbing.

(7) – A negative curvilinear anomaly at the western edge of the settlement forms a complete circle with a 9.3m external diameter. It appears to have a pit or enhanced area in the centre, and also on the north western and north eastern sides. It is located within a rectilinear enclosure ditch that also contains a building partially covering the southern part of the enclosure ditch. A further building is located adjacent to the eastern edge of the enclosure. Although of archaeological origin, the function of this enclosure and circular feature is not certain. It is possible that it

relates to a stone built circular dwelling or ornamented feature; however, it is possible that it relates some form of ritual site, such as a temple.

(8) – A positive linear anomaly that extends 80m to the north of the main Roman settlement site. It continues to the west as anomaly (24) where it changes direction. The anomaly also appears to extend southwards at its eastern limit. The response to this anomaly is generally between 2nT and 6nT, indicating it is less magnetically enhanced compared to the core part of the settlement to the south. This "habitation effect" is frequently observed and may indicate that the anomaly is a former boundary ditch.

(9) – Positive linear anomalies located in the southwestern part of the survey area close to Areas 2 and 8 (Figs 10 and 11). These anomalies may relate to former ditches and enclosures that extend westwards into Area 8.

(10) – Close to the north eastern corner of Area 1 are several positive linear anomalies relating to former ditches that extend eastwards into Area 13.

Anomalies with an uncertain origin

(11) – Positive linear, discrete and amorphous anomalies are located in the north eastern part of the survey area. Although it is possible for them to be related to cut features, their origin is uncertain.

(12) – A sinuous negative anomaly appears to extend northwards towards anomaly (10) and may relate to material with a low magnetic susceptibility such as stone or subsoil. A negative linear anomaly also crosses it.

(13) – Located in the south western part of Area 1 are several positive linear anomalies (Figs 10 and 11). A broad linear anomaly is located immediately to the northwest of the former, and relatively modern field boundary, and further linear anomalies appear to form a rectilinear enclosure on the north western side of it. It is possible that these anomalies are archaeological in origin.

Anomalies associated with land management

(14) – A discontinuous positive linear anomaly and adjacent patches of magnetic debris relate to a modern land boundary and possible former boundary fences.

Anomalies with a modern origin

(15) – A strong, multiple dipolar, linear anomaly extends northeastwards from the southern edge of the survey area and relates to a modern pipe or service.

3.5 List of anomalies – Area 2

Area centred on OS NGR 365330 169330, see Figures 09 – 11.

3.5.1 Area 2 contains a southern extension of the anomalies seen within Area 1. It appears to contain a central trackway/road orientated north-northeast to south-southwest with at least six buildings and boundary walls located either side. Positive linear, rectilinear and discrete anomalies relate to ditches, enclosures and pits or areas of burning. The survey area includes an area of hard standing, half of which contains very strongly magnetic material which may have obscured anomalies with an archaeological origin.

Anomalies of archaeological potential

(16) – A negative linear anomaly extends across the majority of Area 2 in a south-southwesterly direction. It relates to a Roman road and is associated with some flanking ditches and buildings to both sides. It continues to the north within Area 1.

(17) – Negative linear and rectilinear anomalies that relate to structural remains associated with former Roman buildings. There are at least six buildings within Area 2 and they are located either side of a road (16).

(18) – Negative linear anomalies extend away orthogonally to the Roman road. It is possible that these relate to boundary walls.

(19) – Positive linear and rectilinear anomalies relate to ditches and enclosures associated with the Roman buildings. The responses are similar to those seen within Area 1 to the north, indicating that quantities of burnt and other occupational debris has become incorporated within the fill of the ditches.

(20) – Discrete positive anomalies are a response to pits and/or areas of burning within the settlement. These have a response of over 10nT and up to 60nT within the confines of the buildings, indicating areas of burning, such as possible furnaces, flues or hypocausts.

Anomalies with an uncertain origin

(21) – Two parallel negative linear anomalies extend across the southwestern end of the survey area. They are broadly parallel with the adjacent field boundary and do not appear to extend north westwards into Area 8. It is possible that these are modern in origin.

(22) – A negative linear anomaly appears parallel to anomalies (18); however, it is possible that this “cuts” or extends over anomaly (16) and others with an archaeological origin.

Anomalies with a modern origin

(23) – A strong, multiple dipolar, linear anomaly extends across the survey area and is a response to a buried service or pipe.

3.6 List of anomalies – Area 3

Area centred on OS NGR 365435 169715, see Figures 16 & 17.

3.6.1 Area 3 is located to the north and west of Area 1 and contains a continuation of cut features which appear to define the extent of the Roman settlement. An isolated rectilinear enclosure is located in the western part of the survey area. The area lies within the River Avon floodplain and contains several land drains. There are a number of weak anomalies that may relate to cut features, although their strength and form differ from the majority of archaeological anomalies further south. The responses are generally very weak, which may indicate that they are overlain by alluvial deposits although could also be as a consequence of waterlogged and frequently damp soil.

Anomalies of archaeological potential

(24) – A positive linear anomaly that is an extension of anomaly (8) in Area 1 to the east. This anomaly becomes a complex feature with at least three short parallel sections. The response to this anomaly is very weak, generally less than 1nT. However, it is situated within the floodplain, and could be overlain by alluvial deposits. It also changes direction from almost east-west to almost north-south. It is roughly parallel to the main Roman road in Area 1, mirroring the change in direction. It appears to represent a boundary ditch and may enclose the Roman settlement to the south and east.

(25) – A weakly positive linear anomaly appears to extend northwestwards from anomaly (24) for 100m, where it then extends to the west-southwest for 140m; it then appears to have been disturbed by land drains and other linear features. The feature may relate to an outer boundary to the Roman settlement; however, whilst the western section is parallel with that of anomaly (24), the northern and eastern sections differ from others associated with the Roman settlement. The eastern section is roughly parallel with a former strip field boundary recorded in 1842 and an association cannot be ruled out.

(26) – A positive rectilinear anomaly forming two sides of a square enclosure. The third side can be seen as anomaly (59) within Area 9 immediately south west. The anomaly is very weak (<0.5nT), either indicating that it has low levels of magnetically enhanced material within the fill of the ditches, or that it is overlain with alluvial deposits. There are ditch-like and pit-like anomalies within the confines of the enclosure but it is unclear as to whether they are associated. Although the south eastern side of the enclosure is not discernible, it appears from its southern side in Area 9 to have a return. Its dimensions are, therefore, possibly 45m by 45m.

Although it appears to relate to an enclosure, it is not possible to determine if it is associated with the Roman settlement, or if it pre or post dates it.

Anomalies with an uncertain origin

(27) – A positive linear anomaly extends, with a north-northwest to south-southeast orientation, across much of the western part of the survey area. It corresponds to a ditch (L7) seen within the LiDAR data and extends northwards towards other linear anomalies. It is likely to relate to a drainage ditch.

(28) – Two parallel linear anomalies with a northwest to southeast orientation through the western part of the survey area. They appear to relate to ditches seen within the LiDAR data, and head northwards into Area 10.

(29) – A weakly positive linear anomaly extends across the western part of Area 3 with a west-northwest to east-southeast orientation. Although fragmented, it is possible that it does extend into Area 9 to the west (60). It has a similar orientation to, and may be an extension of, a Roman road or track in Area 1.

(30) – Weak, broad linear anomalies with a north-northeast to south-southwest orientation. Similar anomalies with the same orientation can be seen in Area 9 to the west. This type of response can indicate former ridge and furrow although the river floodplain area appears generally unsuitable for arable cultivation due to flooding.

(31) – A positive linear anomaly extends parallel with, and adjacent to, the modern field boundary that exists within the centre of Area 3 . Although it is possible that it relates to a ditch-like feature, a modern origin would have to be considered.

(32) – The western half of Area 3 contains many weakly positive linear anomalies. Although it is possible that they relate to cut features, many of them extend northwards into Area 10, and it is possible that they relate to land drains.

(33) – Discrete, positive anomalies that may indicate pit-like features.

(34) – A positive linear anomaly located in the eastern part of Area 3. It is possible that this feature is associated with a former agricultural boundary or strip field recorded in 1842.

(35) – Broad, linear, positive anomalies that extend across the south eastern section of the survey area. They are parallel with the southern land boundary, and may indicate former agricultural practices, although this is not certain.

(36) – Two positive linear anomalies are parallel with a land drain that extends diagonally across the central part of the survey area and may be associated with it. They correspond to a ditch (L8) seen within the LiDAR data which, together with anomalies (27) and (28), converge within Area 10 as anomaly (71) and are likely to relate to drainage ditches with an unknown date.

(37) – The eastern half of Area 3 contains several weak and fragmented linear anomalies. Many of them extend northwards and eastwards into Areas 11 and 12, and although it is possible that they relate to cut features, they may relate to land drainage.

(38) – A very weak possible rectilinear anomaly is located in the central part of the survey area. It appears to be truncated by modern features and it is possible that it is also truncated by anomaly (24).

Anomalies associated with land management

(39) – Two sets of negative linear anomalies can be seen within the survey area. One set is orientated parallel with the northern field boundary, and another reflects a more classic herringbone pattern in the central part of the survey area. They both appear to relate to land drainage measures.

(40) – A weakly positive linear anomaly with associated magnetic debris is associated with the former land boundary.

(41) – A linear zone of magnetic debris is associated with the line of a removed field boundary.

Anomalies associated with magnetic debris

(42) – An area of magnetic debris located adjacent to the central field boundary is associated with a modern earth platform within the central part of a golf course. Groundsmen indicated that the earth mound may contain Roman material displaced from ground levelling some 200m to the south east.

Anomalies with a modern origin

(43) – A square area of weak magnetic enhancement is associated with the location of a cricket square.

3.7 List of anomalies – Area 4

Area centred on OS NGR 365915 170000, see Figures 18 & 19.

3.7.1 Area 4 contained several weakly positive anomalies, some of which correspond to LiDAR features. Others may relate to natural features. Magnetic disturbance is evident from a buried service and modern material in the southern part of the survey area.

Anomalies with an uncertain origin

(44) – Weakly positive anomalies may be associated with banks visible within the site and in LiDAR data (L14). The banks may be associated with former agricultural

activity or protection against flooding and are recorded on the 1842 Tithe map.

(45) – Weakly positive anomalies, with some adjacent negative anomalies may relate to natural features.

Anomalies associated with land management

(46) – A negative linear anomaly extends across the northern part of the survey area and relates to a drainage ditch.

3.8 List of anomalies – Areas 5 and 6

Area 5 centred on OS NGR 365305 169210, see Figures 20 & 21.
Area 6 centred on OS NGR 365295 169175, see Figures 20 & 21.

3.8.1 Areas 5 and 6 are located immediately south of Area 2 and, therefore, within the Roman settlement. However, highly magnetic debris, possibly associated with ground make up, may have obscured weaker underlying features.

3.9 List of anomalies – Area 7

Area centred on OS NGR 365210 169280, see Figures 20 & 21.

3.9.1 Area 7 contains a continuation of ditches and pits of archaeological potential seen within areas to the north and northeast. The southeastern part of the area appears to have been subject to ground make up and contains a very highly magnetic response likely to completely obscure archaeological features extending south from the Roman settlement immediately to the north.

Anomalies of archaeological potential

(47) – A positive rectilinear anomaly extends southwestwards from Area 8. It forms an enclosure containing ditches and pits (48). The long axis is parallel with the Roman road located approximately 55m to the east. The response is generally up to 7nT, indicating a moderate enhancement.

(48) – Positive linear and discrete anomalies associated with anomaly (47). These relate to pits and other cut features containing magnetically enhanced material.

(49) – Two sides of a positive rectilinear anomaly are located to the north west of anomaly (47). The response is weak, generally between 0.5nT and 2nT, indicating that it is further away from the core of the Roman settlement. The northern return of the feature is not visible within Area 7 or Area 9 to the north indicating that it is

possibly very weak or has been truncated.

Anomalies associated with magnetic debris

(50) – The southern half of the survey area contains widespread magnetic debris. The strength of this material indicates a high ferrous content and is likely to be associated with ground make up. It is likely that it has obscured or buried archaeological features.

Anomalies with a modern origin

(51) – A strongly magnetic linear anomaly is a response to a buried service.

3.10 List of anomalies – Area 8

Area centred on OS NGR 365245 169385, see Figures 22 & 23.

3.10.1 Area 8 contains ditches and enclosures that continue from adjacent areas to the north, south and east. The enclosures appear to contain possible structural remains and pits and areas of burning.

Anomalies of archaeological potential

(52) – Positive linear anomalies orientated south-southwest to north-northeast are a continuation of anomaly (47) that forms an enclosure within Area 7 to the south. It contains several pits and has a complex of ditches and pits on its eastern side.

(53) – A positive linear anomaly that may form a rectilinear enclosure containing ditches and pits (54) and possible structural remains (55). There is some continuation of the features to the north as anomaly (9) in Area 1.

(54) – Positive linear and discrete anomalies that relate to ditches and pits and/or areas of burning.

(55) – Negative linear and rectilinear anomalies that my indicate wall foundations.

Anomalies associated with magnetic debris

(56) – Patches of magnetic debris that may be modern in origin.

3.11 List of anomalies – Area 9

Area centred on OS NGR 365035 169495, see Figures 24 & 25.

3.11.1 Area 9 contains weakly positive linear anomalies that extend westwards across the survey area towards a linear depression or drain. It is not clear if the anomalies extend from the Roman settlement itself in Area 8, or if they are a continuation of anomaly (25) in Area 3 that may represent an outer ditch surrounding the settlement. It is possible that it forms a drainage ditch or ditches from the settlement. The western half of a square enclosure, seen as anomaly (26) in Area 3 to the east, is present as a very weak feature. The survey area also contains several weak anomalies of uncertain origin, and anomalies associated with fluvial features. A low bank within the survey area was used as a small firing range in WWII and this appears to be surrounded by magnetic debris likely to be associated with other removed features or dumped material from this period.

Anomalies of archaeological potential

(57) – A positive linear anomaly extends across the southern half of the survey area from close to the southeastern corner in a west-northwesterly direction. At its eastern end, it appears as two parallel positive linear anomalies and at its western end, it splits into a fork. The anomaly is very weak, generally less than 1nT, indicating that although some magnetically enhanced material may be incorporated within the feature, it's distance from the main core of the settlement, coupled with it's location within the floodplain may have resulted in low levels of magnetic enhancement. A pipe or service has cut through this anomaly and it is unclear as to whether it continues eastwards towards anomalies (53) and (54) in Area 8, or if it changes direction as anomaly (58).

(58) – A positive linear anomaly that appears to be a continuation of anomaly (25) in Area 3 to the north. It is possible that it also continues as anomaly (57); however, a pipeline and associated magnetic disturbance have obscured this part of the site.

(59) – A positive linear anomaly is associated with anomaly (26) in Area 3 and forms two sides of a square or rectilinear enclosure with dimensions of 45m. With a response of less than 0.5nT, this is a very weak feature possibly indicating that it lies at some depth below the alluvial deposits, or that it has been cut into and then backfilled with alluvial soils, which remain very weak.

Anomalies with an uncertain origin

(60) – A weakly positive anomaly that may be an extension of anomaly (29) in Area 3 although a natural origin is also possible.

(61) – The survey area contains many weakly positive linear, discrete and amorphous anomalies. Although these may be ditch-like and pit-like it is possible that they are natural in origin.

(62) – A series of parallel positive anomalies orientated almost north to south. Similar anomalies are visible to the east in Area 3 (30), and although it is possible that they relate to former ridge and furrow, they are very widely spaced.

(63) – A weakly positive rectilinear anomaly is located in the south eastern part of the survey area. While this may indicate some form of enclosure, it is not possible to determine if is archaeological in origin.

(64) – A weakly positive, broadly linear anomaly is located close to the south western corner of the survey area. Although its origin is uncertain, there is some possibility that it is associated with anomalies in Area 7 to the east.

(65) – An "L" shaped positive linear and adjacent negative linear anomaly can be seen "cutting" anomaly (57). Another negative linear anomaly extends northwestwards from them. It is possible that these features have disturbed (57) and may be associated with the former WWII range.

(66) – A negative linear anomaly appears to extend between the wartime range and an inspection cover. It is possible that it relates to a service or drain.

(67) – Discrete positive anomalies with responses of up to 8nT may indicate pit-like features containing magnetically enhanced material.

Anomalies with a natural origin

(68) – Sinuous, amorphous and discrete weakly positive anomalies located within the northern half of the survey area relate to fluvial features.

Anomalies associated with magnetic debris

(69) – A zone of magnetic debris with some ferrous content is located in the southern part of the survey area. It corresponds with a wartime firing range that exists as an extant bank in the field.

(70) – Magnetic debris along the southern edge of the survey area is likely to be modern in origin.

3.12 List of anomalies – Area 10

Area centred on OS NGR 365113 169733, see Figures 26 & 27.

3.12.1 Area 10 lies within the floodplain and the anomalies located are generally very low in magnitude as a consequence. It contains several linear anomalies, some of which extend northwards from Area 3, and it is possible that they relate to land drainage.

Anomalies with an uncertain origin

(71) – Positive and negative linear anomalies appear to extend northwards from Area 3 and some join to form a single feature. They also correspond to ditches (L7)

and (L8) identified within the LiDAR data and it is possible that they relate to land drainage.

(72) – A group of discrete positive anomalies are located close to the river bank and may relate to natural features.

3.13 List of anomalies – Area 11

Area centred on OS NGR 365308 169865, see Figures 26 & 27.

3.13.1 Area 11 lies within the floodplain and magnetic anomalies were very low in magnitude as a consequence . The area contains several linear anomalies, some of which extend northwards from Area 3, and it is possible that they relate to land drainage. A broad, positive and negative anomaly corresponds to a boundary feature seen within the LiDAR. The northern part of the survey area, adjacent to the River Avon, contains zones of variable response likely to relate to former fluvial features.

Anomalies with an uncertain origin

(73) – Several weakly positive anomalies extend northwards and northwestwards from Area 3. It is possible that these anomalies relate to land drainage.

Anomalies associated with land management

(74) – Close to the south eastern corner of the survey area is a positive and negative broadly linear anomaly. A similar feature (82) can be seen within Area 12 to the east. It corresponds to a former land boundary feature identified within the LiDAR data.

Anomalies with a natural origin

(75) – Zones of variable response are located within the northern part of the survey area and relate to former fluvial features.

3.14 List of anomalies – Area 12

Area centred on OS NGR 365650 169920, see Figures 28 & 29.

3.14.1 Area 12 lies to the east of Area 11 and west of Area 4, separated by the former railway embankment. It contains several positive and negative broadly linear anomalies, with rectilinear elements, many of which correspond to linear boundary features and agricultural features identified within the LiDAR data and recorded on the Keynsham Tithe Map of 1842. Others may have a similar origin, but cannot be as confidently interpreted.

Anomalies with an uncertain origin

(76) – Located in the southern part of Area 12 are two weakly positive linear anomalies. It is possible that they relate to former boundaries or agricultural plots.

(77) – A weakly positive linear anomaly extends northeastwards from the southern field boundary. It is possible that this relates to a cut feature, a ditch with archaeological potential can be seen with a similar orientation in Area 13 to the south.

(78) – The south western part of the survey area contains several clusters of discrete positive responses. These groups of anomalies have a response of generally less than 2nT which may indicate groups of pits containing weakly magnetically enhanced material.

(79) – Weak, broadly linear and rectilinear anomalies may indicate former land boundaries or relate to former agricultural practices. These do not correspond to features seen within the LiDAR data or recorded on the 1842 map and are therefore uncertain in origin.

(80) – A broad negative response may relate to agricultural activity.

(81) – Weakly positive anomalies are generally parallel with anomalies associated with former agricultural practices (83) and may be associated.

Anomalies associated with land management

(82) – Extending across the centre of the survey area are positive and negative linear and rectilinear anomalies. The relate to former land boundary features identified within the LiDAR data (L16) and are associated with possible ridge and furrow, strip fields or flood banks (83).

Anomalies with an agricultural origin

(83) – Broad, parallel positive and negative anomalies appear to relate to former ridge and furrow, strip fields or possible flood banks.

(84) – Parallel linear anomalies oriented almost north to south can be seen in the northern part of the survey area. It is possible that they relate to relatively recent agricultural activity as they appear to partially extend over a former land boundary feature (82).

Anomalies with a natural origin

(85) – Anomalies with a variable response are located at the northern part of the survey area and may relate to former fluvial features.

3.15 List of anomalies – Area 13

Area centred on OS NGR 365705 169695, see Figures 30 & 31.

3.15.1 Area 13 occupies a small parcel of land immediately east of Area 1 and south of Area 12. In the western part of the survey area are several positive linear anomalies that appear to relate to ditches with archaeological potential, some of which can be seen extending from Area 1 to the west.

Anomalies of archaeological potential

(86) – Positive linear and rectilinear anomalies, primarily located within the western half of the survey area, can be seen to be a continuation of ditches associated with the possible outer boundaries of the Roman town extending from Area 1 immediately to the west. These anomalies have a response of between 5nT and 8nT indicating that occupational debris is likely to be incorporated within them.

Anomalies with an uncertain origin

(87) – Two positive linear anomalies are located close to anomalies (86) and may also relate to cut features. They have a response of 2nT and may be an extension of anomaly (90).

(88) – A positive linear anomaly extends northward towards the northern field boundary. It is possible that this is associated with anomalies (86) and an archaeological origin should therefore be considered.

(89) – A positive linear anomaly extends across the centre of the survey area with a north west to south east orientation, and is in the vicinity of a bank (L10) identified within the LiDAR data. It is likely that this relates to a former land boundary.

(90) – A positive anomaly extends along the survey area from the eastern field boundary, towards the west. It is possible that it extends westwards as anomalies (87).

(91) – The survey area contains a number of weakly positive linear anomalies and while it is possible that they may relate to cut features, their archaeological potential is uncertain.

3.16 List of anomalies – Area 14

Area centred on OS NGR 365790 169080, see Figures 32 & 33.

3.16.1 Area 14 is situated at the south eastern edge of the site within an area of grass referred to as “the picnic area” adjacent to the River Avon. It contains widespread magnetic debris with a high ferrous content and indicates that the

area is likely to have been made up or consolidated with modern material from elsewhere.

3.17 General assessment of survey results – resistivity

3.17.1 The earth resistance survey was carried out over a total of two survey areas covering approximately 0.5ha.

3.17.2 Resistive anomalies located can be generally classified as high resistance anomalies associated with structural remains and high and low resistance anomalies of uncertain origin. Anomalies have been numbered and will be outlined below with subsequent discussion in Section 4.

3.18 Statement of data quality – resistivity

3.18.1 Data are considered representative of the resistive anomalies present within the site. Heavy rainfall during the collection of survey data within Area 2 may account for some weak striping within the southern half of the survey.

3.19 Data interpretation - resistivity

3.19.1 The listing of sub-headings below attempts to define a number of separate categories that reflect the range and type of features located during the earth resistance survey. A basic explanation of the characteristics of the anomalies is set out for each category in order to justify interpretation, a basic key is indicated to allow cross reference to the abstraction and interpretation plot. Sub-headings are then used to group anomalies with similar characteristics for each survey area.

Report sub-heading CAD layer names and plot colour	**Description and origin of anomalies**
Anomalies with archaeological potential AS-ABST RES HIGH LINEAR ARCHAEOLOGY	Anomalies have the characteristics (mainly morphological) of a range of archaeological features such as enclosures, structures, ring ditches, etc.. High resistance may indicate structural material (e.g. stone); low resistance may relate to the moisture retentive fill of cut features.
Anomalies with an uncertain origin AS-ABST RES HIGH LINEAR UNCERTAIN AS-ABST RES LOW LINEAR UNCERTAIN AS-ABST RES HIGH AREA UNCERTAIN AS-ABST RES LOW AREA UNCERTAIN	The category applies to a range of anomalies where there is not enough evidence to confidently suggest an origin. Anomalies in this category may well be related to archaeologically significant features, but equally relatively modern features, geological/pedological features and agricultural features should be considered. High resistance anomalies are indicative of comparatively low moisture and may indicate stone, compacted soil, changes in drainage, etc. Low resistance anomalies are indicative of comparatively high moisture and may relate to the fill of cut features, organic material within the soil, damp areas etc..
Anomalies with a modern origin AS-ABST RES SERVICE	A high or low resistance linear anomaly that can be interpreted as a service due to corresponding magnetometer data, and/or can be seen leading between inspection covers.

Table 3: List and description of resistivity interpretation categories

3.20 List of anomalies – resistivity Area 1

Area centred on OS NGR 365520 169470, see Figures 12 & 13.

3.20.1 The earth resistance survey carried was carried out along part of the south eastern edge of Area 1 that was obscured by magnetic disturbance within the magnetometer data. It contains at least one building with four rooms that corresponds to an anomaly seen within the magnetometer data. There are also other possible structural remains. The area contains several high resistance linear anomalies that cannot be easily categorised, but that may also have archaeological potential. The survey area contains numerous discrete low resistance responses (9-13Ω) and discrete high resistance responses (14-20Ω), that may indicate pit-like anomalies or areas of ground disturbance. As these are so widespread across the entire survey area, they have not been abstracted.

Anomalies of archaeological potential

(1) – High resistance linear anomalies (up to 29Ω) are a response to structural remains probably associated with a Roman building with at least four rooms. The size of the building measures approximately 7.5m by 10.2m.

(2) – High resistance linear anomalies appear to relate to structural remains, forming an incomplete or disturbed rectilinear feature.

Anomalies with an uncertain origin

(3) – High resistance linear anomalies with rectilinear and curvilinear elements may relate to structural remains, although this is not certain.

(4) – A high resistance curvilinear anomaly is located close to anomalies (1) and (2) and extends between them. It is not clear if it is associated with these anomalies, or is related to a service or drain that avoids them.

(5) – Two parallel high resistance linear anomalies extend east-west across the southern part of the survey area. Although the northernmost anomaly does not extend fully across the area, it is also parallel to a magnetically positive linear anomaly. It is possible that these anomalies relate to services/drains, although this is not certain.

3.21 List of anomalies – resistivity Area 2

Area centred on OS NGR 365372 169329, see Figures 12 & 13.

3.21.1 Earth resistance survey was carried out along the eastern edge of Area 2

that was also affected by magnetic disturbance. The results reveal only a slight difference between high (14-15Ω), and low resistance (10-11Ω). One small area of high resistance corresponds with the southeast foundations of a building revealed by magnetometry, while others of high and low resistance are uncertain in origin. There are also several low resistance linear anomalies of uncertain origin.

Anomalies of archaeological potential

(6) – A small area of high resistance corresponds to a magnetically negative linear anomaly associated with the south eastern wall of a Roman building.

Anomalies with an uncertain origin

(7) – An amorphous area of high resistance (up to 16Ω).

(8) – An area of low resistance (10Ω) is located a the southern edge of the survey area.

(9) – Low resistance linear anomalies, some of which may be archaeological in origin, although drainage/services are also possible.

(10) – A linear anomaly extends along the eastern side of the survey area. It is partly of low resistance, and then of high resistance. It is possible that it relates to a service/drain but this is not certain.

Anomalies with a modern origin

(11) – A low resistance linear anomaly relates to a service or pipeline that crosses the site.

3.22 Summary of LiDAR analysis

3.22.1 The LiDAR data contain evidence of many surface features across the site. Few of these appear archaeological in origin although many features could not be confidently interpreted and are of uncertain origin. Subtle undulations appear to correlate with evidence of Roman buildings as discovered by the magnetometer survey. This would tend to indicate that they are shallow and that preservation may be very good. Other notable features of uncertain origin include a low circular mound in the western part of the floodplain and several long banks in the north eastern part of the site. The analysis has proved useful in support of the interpretation of magnetometer anomalies and suggests that all ditch-like features associated with the Roman settlement site are fully infilled.

3.23 General assessment of LiDAR data

3.23.1 The LiDAR data were assessed and analysed over an area of approximately 60ha. This included the playing fields surveyed by magnetometry and the flood plain adjacent to the river. Analysis was also undertaken of the sports field area immediately south of the main factory buildings. When interpolated and subject to relief shading, the data provided a clear and useful indication of surface features.

3.23.2 The abstracted features included slightly variable and undulating ground of archaeological potential, banks, ditches and marks of uncertain origin, agricultural features and other surface marks of modern origin. These have been numbered and are described below with subsequent discussion in Section 4.

3.24 LiDAR data interpretation

3.24.1 The listing of sub-headings below attempts to define a number of separate categories that reflect the range and type of features located during the LiDAR data analysis. A basic explanation of the characteristics of the anomalies is set out for each category in order to justify interpretation, a basic key is indicated to allow cross reference to the abstraction and interpretation plot. Sub-headings are then used to group features with similar characteristics.

Report sub-heading CAD layer names and plot colour	**Description and origin of anomalies**
Features with archaeological potential AS-ABST LIDAR UNDULATING ARCHAEOLOGY	Surface undulations formed by very shallow banks and ditches. Generally poorly defined and amorphous. Features often correlate with known archaeology.
Features with an uncertain origin AS-ABST LIDAR BANK UNCERTAIN AS-ABST LIDAR DITCH UNCERTAIN AS-ABST LIDAR MARK UNCERTAIN AS-ABST LIDAR DISCRETE UNCERTAIN	The category applies to a range of anomalies where there is not enough evidence to confidently suggest an origin. Anomalies in this category may well be related to archaeologically significant features, but equally relatively modern features, geological/pedological features and agricultural features should be considered. The term 'mark' is used to describe a feature visible in the data that cannot be clearly attributed to a bank or ditch-like earthwork.
Features relating to land management AS-ABST LIDAR BOUNDARY AS-ABST LIDAR WATER COURSE	Features that are mainly linear and indicative of banks and ditches. The features may be long and/or form rectilinear elements and they may be visible on early mapping. Associated agricultural features (e.g. headlands, plough marks and former ridge and furrow) may support the interpretation although the features may not be exclusively related to agricultural activity.
Features with an agricultural origin AS-ABST LIDAR AGRICULTURAL AS-ABST LIDAR AGRICULTURAL RIDGE AS-ABST LIDAR AGRICULTURAL FURROW	The features are often linear and form a series of parallel responses or are parallel to extant land boundaries.
Features with a modern origin AS-ABST LIDAR SERVICE AS-ABST MAG SCAR	Features of modern origin such as service trenches and erosion scars.

Table 4: List and description of LiDAR interpretation categories

3.25 List of anomalies – LiDAR data

See Figures 37 and 38.

Features of archaeological potential

(L1) – Slightly undulating ground correlates with an area of former Roman buildings located by magnetometry to the west of the Somerdale Factory. Although the LiDAR data also contain evidence of a cricket pitch, very low undulating earthworks are only visible in the zone where several stone buildings of Roman origin have been located.

(L2) – Similar to L1 but located approximately 85m to the south beyond a car park. Broadly undulating ground that correlates with Roman buildings located by magnetometry.

Features with an uncertain origin

(L3) – A broad bank to the west of a car park. The feature may relate to a former land boundary visible as anomaly L15 to the north and still extant to the south. It could be associated with a river terrace or flood protection.

(L4) – Very low broad banks of uncertain origin in the western part of the site. Some may relate to former agricultural activity or water management.

(L5) – A discrete low mound in the western part of the site. There are no geophysical anomalies directly related to the feature although it is notable that it occurs at north western edge of a small enclosure revealed by magnetometry. The feature lies within the flat floodplain and is an isolated mound crossed by an extant field boundary.

(L6) – Weak linear marks to the north of L5 are of uncertain origin.

(L7) – Linear depressions that correlate with magnetic anomalies. The features are generally long and are likely to be associated with modern land drainage.

(L8) – Linear depressions and marks probably indicative of former drainage ditches and/or the course of drainage pipes.

(L9) – A linear bank within the southern part of the site. The feature correlates with the north western limit of an area of magnetic debris and is likely to define the extent of modern ground make-up.

(L10) – Possible field boundary in the eastern part of the site.

(L11) – Ditch-like features that may relate to an earlier layout of field boundaries in the eastern part of the site.

(L12) – A broad linear depression in the north eastern part of the site that may be natural in origin.

(L13) – A broad bank that may be associated with ridge and furrow immediately to the east.

(L14) – Several broad curving banks in the eastern part of the site are of uncertain origin and function although may relate to former agricultural features or flood management.

Features relating to land management

(L15) – Linear bank and ditch that correlates with a removed field boundary.

(L16) – The northern part of the floodplain contains a series of low linear banks that would appear to relate to former land boundaries.

(L17) – Parallel ditches in the southern part of the site associated with water management and drainage.

(L18) – Linear bank and ditch that correlates with a removed field boundary.

Features with an agricultural origin

(L19) – A series of large ridges and furrows in the north eastern part of the site. The features are likely to have some agricultural function.

(L20) – Parallel linear features probably indicative of ridge and furrow cultivation.

Features with a modern origin

(L21) – Line of a service also visible as a magnetic anomaly.

(L22) – Erosion scars formed by animals crossing through gateways.

Features relating to ground disturbance/quarrying

(L23) – Two broad, shallow, linear depressions are evident within the area to the south of the factory buildings. These are likely to relate to former quarrying or ground disturbance, possibly during construction of the road or factory.

4 DISCUSSION

4.1.1 The potential for the survival of Roman remains within the Hams has previously been identified as high. The discovery of a high status Roman building, together with coffins and a well during the construction of the factory in 1922, revealed the first major evidence for a possible Roman settlement (Bulleid & Horne, 1926). In 1991 the sports pitches to the west of the factory were levelled, uncovering and destroying several Roman buildings. Subsequent recording by the local amateur group has recovered a large and varied finds assemblage, indicating occupation of the site throughout the Roman period with evidence for industrial activity, including bronze and iron working. On the basis of this evidence, it has been suggested that the site may be the Romano-British town of *Traiectus,* listed within the Antonine Itinerary during the 3rd century (Browne, 1991, p.6). Archaeological evaluations and aerial photograph analysis support this theory, recording metalled roads and occupational debris with evidence for at least 20 buildings provisionally identified within the Hams (AEUS, 1999, p.12).

4.1.2 A previous geophysical survey carried out in the Recreation Ground immediately to the south of the factory building, located the eastern and southern sides of an undated rectilinear enclosure (Archaeological Surveys, 2009). This enclosure lies 185m east of Area 2 and a projection of the linear elements forming the enclosure towards the west and to the north, possibly demonstrates a correlation with ditches identified during the present survey. This may suggest that the previously located enclosure is also Roman in date and is a boundary feature associated with the settlement. During the 2009 survey several other geophysical anomalies were located, although the majority of them could not be confidently interpreted on morphological grounds. Several pit-like anomalies were recorded, as well as evidence for quarrying or ground disturbance. Located in the central southern part of the site, some 90m south east of the enclosure, are a group of negative linear anomalies measuring 30m by 20m and although these may also indicate quarrying, there is some potential for this to relate to a former structure. Without further intrusive investigation, the origin of this feature remains uncertain.

4.1.3 The 2012 geophysical survey has for the first time established the nature and extent of the archaeological activity on the Somerdale site as postulated by previous desk-based analysis and fieldwork. It has revealed the extent of the Roman town and a number of possible external boundary ditches. The core of the settlement covers approximately 8ha, with surrounding boundary ditches enclosing some 18ha. The main focus of the settlement includes the remains of several roads or tracks, enclosures, ditches and at least 15 buildings, which flank the roads.

4.1.4 There is some conjecture regarding the course of the Roman road within the

site (Browne, 1991; AEUS, 1999). It was purported to cross Area 1 from the east and then turn 90° leading to the south-southwe st into Area 2, continuing further south. The geophysical survey has revealed that while the southerly orientation is correct, it is actually sited 20m further west. The easterly axis has also some positional error and is orientated slightly differently. The actual position of the main Roman road is approximately 20m to the south, and extends in an east-southeasterly direction, rather than more easterly as previously conjectured. The projected line of this axis would then cross the River Avon some 100m further south of the presumed crossing point. However, there are several other possible trackways, which if projected would cross the river at a more northerly point.

4.1.5 The majority of the archaeological features associated with the Roman town are located within Area 1 and continue into Area 2 to the south. Both areas are currently used as sports pitches. The features are also likely to extend, or would have extended, beneath the metalled car park between the two survey areas, and also within Areas 5, 6 and 7 to the south of Area 2. It is also possible that the town would have extended eastwards beneath the residential area and car parks associated with the Fry's Pavilion.

4.1.6 The buildings located in Area 1 include evidence for disturbance, either through robbing of building materials or through more recent activity. There appears to be a cluster of at least three buildings on the northern edge of the town that have been affected in this way. The remains of at least nine other buildings can be seen in this part of the site, flanking the roads/trackways. Many of them appear to be incomplete, but several show internal divisions. High levels of magnetic enhancement within and surrounding many of the buildings may relate to hearths or hypocausts, but could also indicate industrial activity.

4.1.7 On the north western corner of the town within Area 1, is a rectilinear enclosure defined by ditches some 22m by 32m that have an entrance in the southeast corner. It contains a central circular negative response, which relates to structural remains with an external diameter of 9.3m. It appears to contain some internal and external features in the form of structural remains and cut features. To the south, overlying the southern boundary ditch, is a rectangular building with dimensions 13.7m by 10.2m. Abutting the eastern boundary ditch is a square building measuring 7.8m across that appears to contain an internal square structure of 2.7m across and a small room on the northern edge. It is possible that the enclosure and structures relate to a temple complex, with central circular structure, and associated rectangular and square structures to the south and east. Evidence for Roman circular temples includes those at Hayling Island (King & Soffe, 1999) and at Nettleton Scrubb (Wedlake, 1982). The Hayling Island temple was originally constructed over a circular Iron Age shrine and is on a much larger scale. It has a more regular square outer enclosure 40m across containing a central circular *cella* some 13m in diameter. There is also a porch on the eastern side of the *cella* and an entrance building on the eastern side. The most direct parallels with this temple are in France. Closer to the site is the Temple of

Apollo at Nettleton Scrubb on the Fosse Way in Wiltshire, some 18km to the northeast. Here a circular temple was constructed sometime between 69 and 210 AD, which was superseded by an octagonal temple after 230 AD. The earlier circular temple at Nettleton had a diameter of 10.1m, slightly larger than the circular structure located at Keynsham, which has an external diameter of 9.3m. Although on a smaller scale, it is possible that this building relates to a shrine or temple.

4.1.8 The northern and eastern parts of the site lie within the floodplain of the River Avon. Here, alluvial deposits are likely to be associated with low or very low magnetic susceptibility within the topsoil and any former cut features. In addition, features may appear very weak if they are buried beneath alluvium as effectively the sensors are more distant from the magnetic anomaly. Within Areas 9, 10 and 11, are several linear anomalies which correspond to ditches identified within the LiDAR data, and they may relate to land drainage systems. Within Area 12 in the northern part of the site, several magnetic anomalies correspond with boundary and agricultural features identified within the LiDAR data. These are mapped as boundaries between narrow fields and recorded on the 1842 Keynsham Tithe Map.

4.1.9 Both LiDAR and magnetic data provide weak evidence of ridge and furrow cultivation within the northern and western parts of the floodplain. A very low bank in the western part of the site, magnetometry Area 9 and LiDAR anomaly L4, may define the southern extent of a series of ridge and furrow like magnetic anomalies (62). If this type of arable cultivation was carried out within the floodplain, it may provide useful information in understanding how the floodplain landscape has changed through time. It is currently unclear as to whether there is a significant alluvial deposit of post Roman origin within the floodplain.

4.1.10 The potential for development through the Roman period and the possibility of pre Roman activity is also considered. The structures referred to in 4.1.7. above possibly reveal a number of changes suggesting an extensive period of activity. A clearly defined negative rectilinear anomaly, consistent with a Roman building, appears to be located over the top of a strong ditch-like response indicative of part of a small enclosure. This would suggest some redevelopment and perhaps a reconstruction of an earlier site in stone. Analysis of the alignment of structural remains and ditch-like features within Area 2 similarly reveals inconsistencies that are best answered by considering the potential for redevelopment over a long period. A series of rectilinear enclosures and ditches to the west of the Roman settlement may also hint at earlier phases or different types of activity within the floodplain area.

5 CONCLUSION

5.1.1 A detailed magnetometry survey was undertaken within the sports pitches and floodplain of the Hams at the former Cadbury Somerdale Factory in Keynsham. The survey located numerous ditches, enclosures, buildings, pits, roads or tracks and areas of burning that relate to the remains of a Roman town, possibly that of *Traiectus,* listed within the Antonine Itinerary during the 3rd century. The survey has revealed that the core of the settlement covers at least 8ha.

5.1.2 The remains of at least 15 Roman buildings have been located with possible evidence for at least a further three buildings that have been disturbed by quarrying. The layout of the town is centred on a road or trackway, extending from the east in a west-northwesterly direction, then abruptly turning to the south-southwest. Other trackways have also been located to the north of the main route. The buildings lie either side of the main road and are identified as negative linear and rectilinear anomalies indicative of stone walls or foundations. These are associated with positive linear and discrete anomalies which indicate magnetically enhanced material within ditches and pits. The strength of the responses is consistent with evidence for occupation and also possible industrial activity. There is some evidence for a circular structure surrounded by a rectilinear enclosure and associated with buildings to the south and east. It is suggested that this may represent a shrine or temple. The original Roman building discovered in 1922 was located approximately 200m east of the main body of archaeological features and this could now be considered as being associated with the Roman settlement, relating to a possible town house, rather than an isolated villa.

5.1.3 The earth resistance survey was carried out over small strips within Areas 1 and 2 where magnetic disturbance obscured weaker responses. The resistivity confirmed the location of a Roman building and suggested that there may be some survival of archaeology in an area subject to modern landscaping and terracing.

5.1.4 LiDAR analysis was also undertaken across the whole site; however, the majority of topographical features relate to land drainage or former agriculture activity and field boundaries. Irregular undulations were apparent in the data and appear to correlate with the location of Roman buildings revealed by magnetometry. A circular earthwork feature of unknown origin was located within the floodplain area and confirmed by field observations.

5.1.5 The magnetometer survey has provided an excellent assessment of the archaeological potential of the site and will hopefully assist in further interpretation of the Roman settlement. Resistivity provided useful supporting evidence with LiDAR data assisting in the interpretation of anomalies. The survey results have demonstrated the utility of the approach to archaeological prospection at the site.

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Appendix A – basic principles of magnetic survey

Iron minerals are always present to some degree within the topsoil and enhancement associated with human activity is related to increases in the level of magnetic susceptibility and thermoremnant material.

Magnetic susceptibility is an induced magnetism within a material when it is in the presence of a magnetic field. This can be thought of as effectively permanent due to the presence of the Earth's magnetic field.

Thermoremnant magnetism occurs when ferrous material is heated beyond a specific temperature known as the Curie Point. Demagnetisation occurs at this temperature with re-magnetisation by the Earth's magnetic field upon cooling.

Enhancement of magnetic susceptibility can occur in areas subject to burning and complex fermentation processes on biological material; these are frequently associated with human settlement. Thermoremnant features include ovens, hearths, and kilns. In addition thermoremnant material such as tile and brick may also be associated with human activity and settlement.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil can create an area of enhancement compared with surrounding soils and subsoils into which the feature is cut. Mapping enhanced areas will produce linear and discrete anomalies allowing an assessment and characterisation of hidden subsurface features.

It should be noted that areas of negative enhancement can be produced from material having lower magnetic properties compared to the topsoil. This is common for many sedimentary bedrocks and subsoils which were often used in the construction of banks and walls etc. Mapping these 'negative' anomalies may also reveal archaeological features.

Magnetic survey or magnetometry can be carried out using a fluxgate gradiometer and may be referred to as gradiometry. The gradiometer is a passive instrument consisting of two fluxgate sensors mounted vertically 1m apart. The instrument is carried about 30cm above the ground surface and the upper sensor measures the Earth's magnetic field as does the lower sensor but this is influenced to a greater degree by any localised buried field. The difference between the two sensors will relate to the strength the magnetic field created by the buried feature. If no enhanced feature is present the field measured by both sensors will be similar and the difference close to zero.

There are a number of factors that may affect the magnetic survey and these include soil type, local geology and previous human activity. Situations arise where magnetic disturbance associated with modern services, metal fencing, dumped waste material etc., obscures low magnitude fields associated with archaeological features.

Appendix B – data processing notes

Clipping

Minimum and maximum values are set and replace data outside of the range with those values. Extreme values are removed improving colour or greyscale contrast associated with data values that may be archaeologically significant. It has been found that clipping data to ranges between ±5nT and ±1nT often improves the appearance of features associated with archaeology. Different ranges are applied to data in order to determine the most suitable for anomaly abstraction and display.

Zero Median/Mean Traverse (magnetometry only)

The median (or mean) of each traverse is calculated ignoring data outside a threshold value, the median (or mean) is then subtracted from the traverse. The process is used to equalise slight differences between the set-up and stability of gradiometer sensors and can remove striping. The process can remove archaeological features that run along a traverse so data analysis is also carried out prior its application.

De-stagger (magnetometry only)

Compensates for small positional errors within data collection by shifting the position of the readings along each traverse by a specified amount. Data lost at the end of each traverse are extrapolated from adjacent value in the same row.

Deslope (magnetometry only)

Corrects for striping and distortion caused by metal objects/services etc.. The process calculates a curve based on a polynomial best fit mathematical function for each traverse. This curve is then subtracted from the actual data.

Edge Match

Calculates the mean of the 2 lines (rows or columns) of data either side of the edge to match. It then subtracts the difference between the means from all datapoints in the selected area.

FFT (Fast Fourier Transform) spectral filtering

A mathematical process used to determine the frequency components of a traverse. Repetitive features, such as plough marks, produce characteristic spectral zones that can be suppressed allowing greyscale images to appear clearer.

High Pass Filter

Removes low frequency anomalies within the data that are not considered to be archaeologically significant and may be natural in origin. A window passes over the data, the mean of all the data within the window is subtracted from the centre value. The size of the window is adjusted as is the weighting which may be uniform or Gaussian.

Appendix C – survey and data information

Area 1 raw data

COMPOSITE
Filename: J418-mag-Area1-raw.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 05/07/2012
Assembled by: on 05/07/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 640 x 480
Survey Size (meters): 160.00m x 480.00 m
Grid Size: 40.00 m x 40.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 10.00
Min: -10.00
Std Dev: 4.73
Mean: -1.09
Median: -1.24
Composite Area: 7.68 ha
Surveyed Area: 4.98 ha

PROGRAM
Name: ArcheoSurveyor
Version: 2.5.16.0

Processes: 2
1 Base Layer
2 Clip from -10.00 to 10.00 nT

Source Grids: 40
1 Col:0 Row:3 grids\23.xgd
2 Col:0 Row:4 grids\24.xgd
3 Col:0 Row:5 grids\25.xgd
4 Col:0 Row:6 grids\20.xgd
5 Col:0 Row:7 grids\21.xgd
6 Col:0 Row:8 grids\22.xgd
7 Col:0 Row:9 grids\01.xgd
8 Col:1 Row:3 grids\26.xgd
9 Col:1 Row:4 grids\27.xgd
10 Col:1 Row:5 grids\28.xgd
11 Col:1 Row:6 grids\17.xgd
12 Col:1 Row:7 grids\18.xgd
13 Col:1 Row:8 grids\19.xgd
14 Col:1 Row:9 grids\02.xgd
15 Col:1 Row:10 grids\03.xgd
16 Col:1 Row:11 grids\04.xgd
17 Col:2 Row:0 grids\38.xgd
18 Col:2 Row:1 grids\39.xgd
19 Col:2 Row:2 grids\40.xgd
20 Col:2 Row:3 grids\29.xgd
21 Col:2 Row:4 grids\30.xgd
22 Col:2 Row:5 grids\31.xgd
23 Col:2 Row:6 grids\14.xgd
24 Col:2 Row:7 grids\15.xgd
25 Col:2 Row:8 grids\16.xgd
26 Col:2 Row:9 grids\05.xgd
27 Col:2 Row:10 grids\06.xgd
28 Col:2 Row:11 grids\07.xgd
29 Col:3 Row:0 grids\35.xgd
30 Col:3 Row:1 grids\36.xgd
31 Col:3 Row:2 grids\37.xgd
32 Col:3 Row:3 grids\32.xgd
33 Col:3 Row:4 grids\33.xgd
34 Col:3 Row:5 grids\34.xgd
35 Col:3 Row:6 grids\11.xgd
36 Col:3 Row:7 grids\12.xgd
37 Col:3 Row:8 grids\13.xgd
38 Col:3 Row:9 grids\08.xgd
39 Col:3 Row:10 grids\09.xgd
40 Col:3 Row:11 grids\10.xgd

Area 1 processed data

COMPOSITE
Filename: J418-mag-Area1-proc.xcp

Stats
Max: 8.00
Min: -8.00
Std Dev: 4.01
Mean: 0.02
Median: 0.00
Composite Area: 7.68 ha
Surveyed Area: 4.98 ha

Processes: 5
1 Base Layer
2 DeStripe Median Traverse: Grids: All
3 De Stagger: Grids: 03.xgd Mode: Both By: 1 intervals
4 De Stagger: Grids: 02.xgd Mode: Both By: 1 intervals
5 Clip from -8.00 to 8.00 nT

Area 2 raw data

COMPOSITE
Filename: J418-mag-Area2-raw.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 05/07/2012
Assembled by: on 05/07/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 640 x 280
Survey Size (meters): 160.00m x 280.00 m
Grid Size: 40.00 m x 40.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 10.00
Min: -10.00
Std Dev: 6.55
Mean: 0.71
Median: 0.52
Composite Area: 4.48 ha
Surveyed Area: 2.21 ha

Processes: 2
1 Base Layer
2 Clip from -10.00 to 10.00 nT

Source Grids: 22
1 Col:0 Row:0 grids\15.xgd
2 Col:0 Row:1 grids\16.xgd
3 Col:0 Row:5 grids\17.xgd
4 Col:0 Row:6 grids\18.xgd
5 Col:1 Row:0 grids\13.xgd
6 Col:1 Row:1 grids\14.xgd
7 Col:1 Row:2 grids\01.xgd
8 Col:1 Row:3 grids\02.xgd
9 Col:1 Row:4 grids\03.xgd
10 Col:1 Row:5 grids\19.xgd
11 Col:1 Row:6 grids\20.xgd
12 Col:2 Row:0 grids\11.xgd
13 Col:2 Row:1 grids\12.xgd
14 Col:2 Row:2 grids\04.xgd
15 Col:2 Row:3 grids\05.xgd
16 Col:2 Row:4 grids\06.xgd
17 Col:2 Row:5 grids\21.xgd
18 Col:2 Row:6 grids\22.xgd
19 Col:3 Row:1 grids\10.xgd
20 Col:3 Row:2 grids\07.xgd
21 Col:3 Row:3 grids\08.xgd
22 Col:3 Row:4 grids\09.xgd

Area 2 processed data

COMPOSITE
Filename: J418-mag-Area2-proc.xcp

Stats
Max: 8.00
Min: -8.00
Std Dev: 5.55
Mean: 0.58
Median: 0.52
Composite Area: 4.48 ha
Surveyed Area: 2.21 ha

Processes: 6
1 Base Layer
2 De Stagger: Grids: 03.xgd Mode: Both By: 1 intervals
3 De Stagger: Grids: 05.xgd 06.xgd Mode: Both By: 1 intervals
4 De Stagger: Grids: 12.xgd Mode: Both By: 1 intervals
5 De Stagger: Grids: 04.xgd Mode: Both By: 1 intervals
6 Clip from -8.00 to 8.00 nT

Area 3 processed data

COMPOSITE
Filename: J418-mag-Area3-proc.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 16/07/2012
Assembled by: on 16/07/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 960 x 480
Survey Size (meters): 240.00m x 480.00 m
Grid Size: 40.00 m x 40.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 3.00
Min: -3.00
Std Dev: 1.10
Mean: -0.06
Median: 0.00
Composite Area: 11.52 ha
Surveyed Area: 8.55 ha

Processes: 4
1 Base Layer
2 DeStripe Median Traverse: Grids: All
3 De Stagger: Grids: All Mode: Outbound By: 1 intervals
4 Clip from -3.00 to 3.00 nT

Source Grids: 63
1 Col:0 Row:0 grids\01.xgd
2 Col:0 Row:1 grids\02.xgd
3 Col:0 Row:2 grids\03.xgd
4 Col:0 Row:3 grids\34.xgd
5 Col:0 Row:4 grids\35+36.xgd
6 Col:0 Row:4 grids\35+36.xgd
7 Col:0 Row:5 grids\37+38.xgd
8 Col:0 Row:6 grids\40+39.xgd
9 Col:0 Row:7 grids\41.xgd
10 Col:0 Row:8 grids\42.xgd
11 Col:0 Row:9 grids\63.xgd
12 Col:0 Row:10 grids\64.xgd
13 Col:0 Row:11 grids\65.xgd
14 Col:1 Row:0 grids\04.xgd
15 Col:1 Row:1 grids\05.xgd
16 Col:1 Row:2 grids\06.xgd
17 Col:1 Row:3 grids\31.xgd
18 Col:1 Row:4 grids\32.xgd
19 Col:1 Row:5 grids\33.xgd
20 Col:1 Row:6 grids\43.xgd
21 Col:1 Row:7 grids\44.xgd
22 Col:1 Row:8 grids\45.xgd
23 Col:1 Row:9 grids\60.xgd
24 Col:1 Row:10 grids\61.xgd
25 Col:1 Row:11 grids\62.xgd
26 Col:2 Row:0 grids\07.xgd
27 Col:2 Row:1 grids\08.xgd
28 Col:2 Row:2 grids\09.xgd
29 Col:2 Row:3 grids\28.xgd
30 Col:2 Row:4 grids\29.xgd
31 Col:2 Row:5 grids\30.xgd
32 Col:2 Row:6 grids\46.xgd
33 Col:2 Row:7 grids\47.xgd
34 Col:2 Row:8 grids\48.xgd
35 Col:2 Row:9 grids\57.xgd
36 Col:2 Row:10 grids\58.xgd
37 Col:2 Row:11 grids\59.xgd
38 Col:3 Row:0 grids\10.xgd
39 Col:3 Row:1 grids\11.xgd
40 Col:3 Row:2 grids\12.xgd
41 Col:3 Row:3 grids\25.xgd
42 Col:3 Row:4 grids\26.xgd
43 Col:3 Row:5 grids\27.xgd
44 Col:3 Row:6 grids\49.xgd
45 Col:3 Row:7 grids\50.xgd
46 Col:3 Row:8 grids\51.xgd
47 Col:3 Row:9 grids\55.xgd
48 Col:3 Row:10 grids\56.xgd
49 Col:4 Row:0 grids\13.xgd
50 Col:4 Row:1 grids\14.xgd
51 Col:4 Row:2 grids\15.xgd
52 Col:4 Row:3 grids\22.xgd
53 Col:4 Row:4 grids\23.xgd
54 Col:4 Row:5 grids\24.xgd
55 Col:4 Row:6 grids\52.xgd
56 Col:4 Row:7 grids\53.xgd
57 Col:4 Row:8 grids\54.xgd
58 Col:5 Row:0 grids\16.xgd
59 Col:5 Row:1 grids\17.xgd
60 Col:5 Row:2 grids\18.xgd
61 Col:5 Row:3 grids\19.xgd
62 Col:5 Row:4 grids\20.xgd
63 Col:5 Row:5 grids\21.xgd

Area 4 processed data

COMPOSITE
Filename: J418-mag-Area4-proc.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 02/10/2012
Assembled by: on 02/10/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 480 x 540
Survey Size (meters): 120.00m x 540.00 m
Grid Size: 30.00 m x 30.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 3.00
Min: -3.00
Std Dev: 0.99
Mean: -0.07
Median: 0.00
Composite Area: 6.48 ha
Surveyed Area: 2.68 ha

Processes: 19
1 Base Layer
2 Clip from -30.00 to 30.00 nT
3 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 120, Left 240, Bottom 149, Right 359)
4 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 150, Left 240, Bottom 179, Right 359)
5 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 180, Left 240, Bottom 209, Right 359)
6 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 210, Left 240, Bottom 239, Right 359)
7 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 240, Left 240, Bottom 269, Right 359)
8 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 270, Left 240, Bottom 299, Right 359)
9 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 300, Left 240, Bottom 329, Right 359)
10 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 100, Left 124, Bottom 134, Right 178)
11 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 110, Left 176, Bottom 140, Right 242)
12 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 108, Left 110, Bottom 134, Right 148)
13 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 90, Left 0, Bottom 119, Right 119)
14 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 326, Left 0, Bottom 338, Right 2)
15 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 258, Left 4, Bottom 416, Right 52)
16 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 258, Left 0, Bottom 332, Right 6)
17 De Stagger: Grids: 38.xgd 39.xgd Mode: Both By: 1 intervals
18 DeStripe Median Traverse: Grids: All
19 Clip from -3.00 to 3.00 nT

Source Grids: 54
1 Col:0 Row:0 grids\37.xgd
2 Col:0 Row:1 grids\38.xgd
3 Col:0 Row:2 grids\39.xgd
4 Col:0 Row:3 grids\13.xgd
5 Col:0 Row:4 grids\14.xgd
6 Col:0 Row:5 grids\15.xgd
7 Col:0 Row:6 grids\16.xgd
8 Col:0 Row:7 grids\17.xgd
9 Col:0 Row:8 grids\18.xgd
10 Col:0 Row:9 grids\19.xgd
11 Col:0 Row:10 grids\20.xgd
12 Col:0 Row:11 grids\52.xgd
13 Col:0 Row:12 grids\53.xgd
14 Col:0 Row:13 grids\54.xgd
15 Col:0 Row:15 grids\49.xgd
16 Col:0 Row:16 grids\50.xgd
17 Col:0 Row:17 grids\51.xgd
18 Col:1 Row:0 grids\34.xgd
19 Col:1 Row:1 grids\35.xgd
20 Col:1 Row:2 grids\36.xgd
21 Col:1 Row:3 grids\09.xgd
22 Col:1 Row:4 grids\10.xgd
23 Col:1 Row:5 grids\11.xgd
24 Col:1 Row:6 grids\12.xgd
25 Col:1 Row:7 grids\21.xgd
26 Col:1 Row:8 grids\22.xgd
27 Col:1 Row:9 grids\23.xgd
28 Col:1 Row:10 grids\24.xgd
29 Col:1 Row:11 grids\40.xgd
30 Col:1 Row:12 grids\41.xgd
31 Col:1 Row:13 grids\42.xgd
32 Col:1 Row:14 grids\43.xgd
33 Col:1 Row:15 grids\44.xgd
34 Col:1 Row:16 grids\45.xgd
35 Col:1 Row:17 grids\46.xgd
36 Col:2 Row:1 grids\32.xgd
37 Col:2 Row:2 grids\33.xgd
38 Col:2 Row:3 grids\05.xgd
39 Col:2 Row:4 grids\06.xgd
40 Col:2 Row:5 grids\07.xgd
41 Col:2 Row:6 grids\08.xgd
42 Col:2 Row:7 grids\25.xgd
43 Col:2 Row:8 grids\26.xgd
44 Col:2 Row:9 grids\27.xgd
45 Col:2 Row:10 grids\28.xgd
46 Col:2 Row:15 grids\47.xgd
47 Col:2 Row:16 grids\48.xgd
48 Col:3 Row:3 grids\01.xgd
49 Col:3 Row:4 grids\02.xgd
50 Col:3 Row:5 grids\03.xgd
51 Col:3 Row:6 grids\04.xgd
52 Col:3 Row:7 grids\29.xgd
53 Col:3 Row:8 grids\30.xgd
54 Col:3 Row:9 grids\31.xgd

Area 5 processed data

COMPOSITE
Filename: J418-mag-Area5-proc.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 06/08/2012
Assembled by: on 06/08/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 240 x 60
Survey Size (meters): 60.00m x 60.00 m
Grid Size: 30.00 m x 30.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 10.00
Min: -10.00
Std Dev: 7.66
Mean: -0.03
Median: 0.00

Composite Area: 0.36 ha
Surveyed Area: 0.13 ha

Processes: 4
1 Base Layer
2 Clip from -30.00 to 30.00 nT
3 DeStripe Median Traverse: Grids: All
4 Clip from -10.00 to 10.00 nT

Source Grids: 4
1 Col:0 Row:0 grids\01.xgd
2 Col:0 Row:1 grids\02.xgd
3 Col:1 Row:0 grids\03.xgd
4 Col:1 Row:1 grids\04.xgd

Area 6 processed data

COMPOSITE
Filename: J418-mag-Area6-proc.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 06/08/2012
Assembled by: on 06/08/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 240 x 30
Survey Size (meters): 60.00m x 30.00 m
Grid Size: 30.00 m x 30.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 10.00
Min: -10.00
Std Dev: 7.78
Mean: -4.95
Median: -10.00
Composite Area: 0.18 ha
Surveyed Area: 0.04 ha

Processes: 3
1 Base Layer
2 Clip from -30.00 to 30.00 nT
3 Clip from -10.00 to 10.00 nT

Source Grids: 2
1 Col:0 Row:0 grids\01.xgd
2 Col:1 Row:0 grids\02.xgd

Area 7 processed data

COMPOSITE
Filename: J418-mag-Area7-proc.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 06/08/2012
Assembled by: on 06/08/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 960 x 120
Survey Size (meters): 240.00m x 120.00 m
Grid Size: 30.00 m x 30.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 3.00
Min: -3.00
Std Dev: 2.01
Mean: -0.47
Median: -0.12
Composite Area: 2.88 ha
Surveyed Area: 1.51 ha

Processes: 10
1 Base Layer
2 De Stagger: Grids: 11.xgd Mode: Both By: 1 intervals
3 De Stagger: Grids: 10.xgd Mode: Both By: 1 intervals
4 De Stagger: Grids: 09.xgd Mode: Both By: 1 intervals
5 Clip from -30.00 to 30.00 nT
6 DeStripe Mean Traverse: Grids: All Threshold: 0.5 SDs
7 Clip from -3.00 to 3.00 nT
8 Edge Match (Area: Top 60, Left 720, Bottom 89, Right 839) to Left edge
9 Edge Match (Area: Top 90, Left 720, Bottom 119, Right 839) to Top edge
10 Clip from -3.00 to 3.00 nT

Source Grids: 25
1 Col:0 Row:0 grids\01.xgd
2 Col:0 Row:1 grids\02.xgd
3 Col:1 Row:0 grids\03.xgd
4 Col:1 Row:1 grids\04.xgd
5 Col:1 Row:2 grids\05.xgd
6 Col:2 Row:0 grids\06.xgd
7 Col:2 Row:1 grids\07.xgd
8 Col:2 Row:2 grids\08.xgd
9 Col:3 Row:0 grids\09.xgd
10 Col:3 Row:1 grids\10.xgd
11 Col:3 Row:2 grids\11.xgd
12 Col:4 Row:0 grids\12.xgd
13 Col:4 Row:1 grids\13.xgd
14 Col:4 Row:2 grids\14.xgd
15 Col:4 Row:3 grids\15.xgd
16 Col:5 Row:0 grids\16.xgd
17 Col:5 Row:1 grids\17.xgd
18 Col:5 Row:2 grids\18.xgd
19 Col:5 Row:3 grids\19.xgd
20 Col:6 Row:0 grids\20.xgd
21 Col:6 Row:1 grids\21.xgd
22 Col:6 Row:2 grids\22.xgd
23 Col:6 Row:3 grids\23.xgd
24 Col:7 Row:2 grids\24.xgd
25 Col:7 Row:3 grids\25.xgd

Area 8 processed data

COMPOSITE
Filename: J418-mag-Area8-proc.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 06/08/2012
Assembled by: on 06/08/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 600 x 120
Survey Size (meters): 150.00m x 120.00 m
Grid Size: 30.00 m x 30.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 3.00
Min: -3.00
Std Dev: 1.91
Mean: -0.20
Median: -0.14
Composite Area: 1.80 ha
Surveyed Area: 0.87 ha

Processes: 7
1 Base Layer
2 Clip from -30.00 to 30.00 nT
3 DeStripe Mean Traverse: Grids: All Threshold: 0.5 SDs
4 DeStripe Median Traverse: Grids: 04.xgd 05.xgd 06.xgd 08.xgd 09.xgd 10.xgd 12.xgd 13.xgd 14.xgd
5 Clip from -3.00 to 3.00 nT
6 De Stagger: Grids: 16.xgd Mode: Both By: 1 intervals
7 De Stagger: Grids: 15.xgd Mode: Both By: 1 intervals

Source Grids: 17
1 Col:0 Row:0 grids\01.xgd
2 Col:0 Row:1 grids\02.xgd
3 Col:1 Row:0 grids\03.xgd
4 Col:1 Row:1 grids\04.xgd
5 Col:1 Row:2 grids\05.xgd
6 Col:1 Row:3 grids\06.xgd
7 Col:2 Row:0 grids\07.xgd
8 Col:2 Row:1 grids\08.xgd
9 Col:2 Row:2 grids\09.xgd
10 Col:2 Row:3 grids\10.xgd
11 Col:3 Row:0 grids\11.xgd
12 Col:3 Row:1 grids\12.xgd
13 Col:3 Row:2 grids\13.xgd
14 Col:3 Row:3 grids\14.xgd
15 Col:4 Row:1 grids\15.xgd
16 Col:4 Row:2 grids\16.xgd
17 Col:4 Row:3 grids\17.xgd

Area 9 processed data

COMPOSITE
Filename: J418-mag-Area9-proc.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 08/08/2012
Assembled by: on 08/08/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 1760 x 240
Survey Size (meters): 440.00m x 240.00 m
Grid Size: 40.00 m x 40.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 3.00
Min: -3.00
Std Dev: 1.26
Mean: -0.34
Median: -0.04
Composite Area: 10.56 ha
Surveyed Area: 8.39 ha

Processes: 65
1 Base Layer
2 Clip from -30.00 to 30.00 nT
3 DeStripe Median Sensors: 04.xgd
4 DeStripe Median Sensors: 07.xgd
5 DeStripe Median Traverse: Grids: 61.xgd 62.xgd 58.xgd 59.xgd 55.xgd 56.xgd
6 DeStripe Median Traverse: Grids: 53.xgd 10.xgd 50.xgd 13.xgd 47.xgd 16.xgd 44.xgd 19.xgd 41.xgd 22.xgd 36.xgd 25.xgd
7 DeStripe Median Traverse: Grids: 01.xgd
8 Edge Match (Area: Top 120, Left 0, Bottom 159, Right 159) to Right edge
9 DeStripe Median Traverse: Grids: 60.xgd
10 DeStripe Median Traverse: Grids: 57.xgd
11 DeStripe Median Traverse: Grids: 54.xgd
12 DeStripe Median Traverse: Grids: 51.xgd
13 DeStripe Median Traverse: Grids: 52.xgd
14 DeStripe Median Traverse: Grids: 48.xgd 49.xgd 45.xgd 46.xgd 42.xgd 43.xgd 39.xgd 40.xgd 37.xgd 38.xgd
15 DeStripe Mean Traverse: Grids: 05.xgd Threshold: 0.5 SDs
16 DeStripe Mean Traverse: Grids: 08.xgd Threshold: 0.5 SDs
17 DeStripe Mean Traverse: Grids: 05.xgd Threshold: 0.5 SDs
18 DeStripe Mean Traverse: Grids: 11.xgd Threshold: 0.5 SDs
19 DeStripe Mean Traverse: Grids: 14.xgd Threshold: 0.5 SDs
20 DeStripe Mean Traverse: Grids: 17.xgd Threshold: 0.5 SDs
21 DeStripe Mean Traverse: Grids: 20.xgd Threshold: 0.5 SDs
22 DeStripe Mean Traverse: Grids: 23.xgd Threshold: 0.5 SDs
23 DeStripe Mean Traverse: Grids: 26.xgd Threshold: 0.5 SDs
24 DeStripe Median Traverse: Grids: 06.xgd
25 DeStripe Mean Traverse: Grids: 09.xgd Threshold: 0.5 SDs
26 DeStripe Mean Traverse: Grids: 12.xgd Threshold: 0.5 SDs
27 DeStripe Mean Traverse: Grids: 15.xgd Threshold: 0.5 SDs
28 DeStripe Mean Traverse: Grids: 18.xgd Threshold: 0.5 SDs
29 DeStripe Mean Traverse: Grids: 21.xgd Threshold: 0.5 SDs
30 DeStripe Mean Traverse: Grids: 24.xgd Threshold: 0.5 SDs
31 DeStripe Mean Traverse: Grids: 27.xgd Threshold: 0.5 SDs
32 DeStripe Mean Traverse: Grids: 27.xgd Threshold: 0.5 SDs
33 Edge Match (Area: Top 200, Left 1280, Bottom 239, Right 1439) to Left edge
34 DeStripe Mean Traverse: Grids: 35.xgd 28.xgd 29.xgd 30.xgd 34.xgd 31.xgd 32.xgd 33.xgd Threshold: 1 SDs
35 DeStripe Mean Traverse: Grids: 35.xgd Threshold: 0.5 SDs
36 DeStripe Mean Traverse: Grids: 28.xgd Threshold: 0.5 SDs
37 DeStripe Mean Traverse: Grids: 29.xgd Threshold: 0.5 SDs
38 DeStripe Mean Traverse: Grids: 29.xgd Threshold: 0.5 SDs
39 DeStripe Mean Traverse: Grids: 03.xgd Threshold: 0.5 SDs
40 DeStripe Mean Traverse: Grids: 02.xgd Threshold: 0.5 SDs
41 DeStripe Mean Traverse: Grids: 02.xgd Threshold: 0.5 SDs
42 DeStripe Mean Traverse: Grids: 03.xgd Threshold: 0.5 SDs
43 Edge Match (Area: Top 80, Left 1440, Bottom 119, Right 1599) to Left edge
44 Edge Match (Area: Top 120, Left 1440, Bottom 159, Right 1599) to Left edge
45 Edge Match (Area: Top 160, Left 1440, Bottom 199, Right 1599) to Left edge
46 DeStripe Mean Traverse: Grids: 30.xgd Threshold: 0.5 SDs
47 DeStripe Mean Traverse: Grids: 30.xgd Threshold: 0.5 SDs
48 Edge Match (Area: Top 120, Left 1600, Bottom 159, Right 1759) to Bottom edge
49 Edge Match (Area: Top 200, Left 1600, Bottom 239, Right 1759) to Top edge
50 DeStripe Mean Traverse: Grids: 07.xgd Threshold: 0.5 SDs
51 DeStripe Mean Traverse: Grids: 07.xgd Threshold: 0.5 SDs
52 Clip from -3.00 to 3.00 nT
53 De Stagger: Grids: 55.xgd Mode: Both By: 1 intervals
54 De Stagger: Grids: 54.xgd Mode: Both By: 1 intervals
55 De Stagger: Grids: 46.xgd Mode: Both By: 1 intervals
56 DeStripe Median Traverse: Grids: 07.xgd
57 DeStripe Median Traverse: Grids: 07.xgd
58 DeStripe Median Traverse: Grids: 56.xgd
59 Edge Match (Area: Top 120, Left 320, Bottom 159, Right 479) to Right edge
60 Add/Subtract -0.5 (Area: Top 119, Left 432, Bottom 121, Right 479)
61 Add/Subtract -0.5 (Area: Top 127, Left 431, Bottom 129, Right 462)
62 Add/Subtract -0.3 (Area: Top 130, Left 470, Bottom 131, Right 479)
63 Add/Subtract -0.2 (Area: Top 128, Left 475, Bottom 129, Right 480)
64 Add/Subtract 0.2 (Area: Top 118, Left 434, Bottom 119, Right 476)
65 Clip from -3.00 to 3.00 nT

Source Grids: 62
1 Col:0 Row:0 grids\60.xgd
2 Col:0 Row:1 grids\61.xgd
3 Col:0 Row:2 grids\62.xgd
4 Col:0 Row:3 grids\01.xgd
5 Col:0 Row:4 grids\02.xgd
6 Col:0 Row:5 grids\03.xgd
7 Col:1 Row:0 grids\57.xgd
8 Col:1 Row:1 grids\58.xgd
9 Col:1 Row:2 grids\59.xgd
10 Col:1 Row:3 grids\04.xgd
11 Col:1 Row:4 grids\05.xgd
12 Col:1 Row:5 grids\06.xgd
13 Col:2 Row:0 grids\54.xgd
14 Col:2 Row:1 grids\55.xgd
15 Col:2 Row:2 grids\56.xgd
16 Col:2 Row:3 grids\07.xgd
17 Col:2 Row:4 grids\08.xgd
18 Col:2 Row:5 grids\09.xgd
19 Col:3 Row:0 grids\51.xgd
20 Col:3 Row:1 grids\52.xgd
21 Col:3 Row:2 grids\53.xgd
22 Col:3 Row:3 grids\10.xgd
23 Col:3 Row:4 grids\11.xgd
24 Col:3 Row:5 grids\12.xgd
25 Col:4 Row:0 grids\48.xgd
26 Col:4 Row:1 grids\49.xgd
27 Col:4 Row:2 grids\50.xgd
28 Col:4 Row:3 grids\13.xgd
29 Col:4 Row:4 grids\14.xgd
30 Col:4 Row:5 grids\15.xgd
31 Col:5 Row:0 grids\45.xgd
32 Col:5 Row:1 grids\46.xgd
33 Col:5 Row:2 grids\47.xgd
34 Col:5 Row:3 grids\16.xgd
35 Col:5 Row:4 grids\17.xgd
36 Col:5 Row:5 grids\18.xgd
37 Col:6 Row:0 grids\42.xgd
38 Col:6 Row:1 grids\43.xgd
39 Col:6 Row:2 grids\44.xgd
40 Col:6 Row:3 grids\19.xgd
41 Col:6 Row:4 grids\20.xgd
42 Col:6 Row:5 grids\21.xgd
43 Col:7 Row:0 grids\39.xgd
44 Col:7 Row:1 grids\40.xgd
45 Col:7 Row:2 grids\41.xgd
46 Col:7 Row:3 grids\22.xgd
47 Col:7 Row:4 grids\23.xgd
48 Col:7 Row:5 grids\24.xgd
49 Col:8 Row:0 grids\37.xgd
50 Col:8 Row:1 grids\38.xgd
51 Col:8 Row:2 grids\36.xgd
52 Col:8 Row:3 grids\25.xgd
53 Col:8 Row:4 grids\26.xgd
54 Col:8 Row:5 grids\27.xgd
55 Col:9 Row:2 grids\35.xgd
56 Col:9 Row:3 grids\28.xgd
57 Col:9 Row:4 grids\29.xgd
58 Col:9 Row:5 grids\30.xgd
59 Col:10 Row:2 grids\34.xgd
60 Col:10 Row:3 grids\31.xgd
61 Col:10 Row:4 grids\32.xgd
62 Col:10 Row:5 grids\33.xgd

Area 10 processed data

COMPOSITE
Filename: J418-mag-Area10-proc.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 18/09/2012
Assembled by: on 18/09/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 800 x 280
Survey Size (meters): 200.00m x 280.00 m
Grid Size: 40.00 m x 40.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 3.00
Min: -3.00
Std Dev: 1.43
Mean: -0.54
Median: -0.10
Composite Area: 5.60 ha
Surveyed Area: 3.01 ha

Processes: 19
1 Base Layer
2 Clip from -30.00 to 30.00 nT
3 DeStripe Median Traverse: Grids: 02.xgd 27.xgd 28.xgd 29.xgd 30.xgd 05.xgd 23.xgd 24.xgd 25.xgd 26.xgd
4 DeStripe Median Sensors: 01.xgd 04.xgd
5 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 55, Left 0, Bottom 73, Right 56)
6 DeStripe Median Sensors: 01.xgd
7 DeStripe Mean Traverse: Grids: 01.xgd Threshold: 0.5 SDs
8 DeStripe Mean Traverse: Grids: 07.xgd 08.xgd 19.xgd 20.xgd 21.xgd 22.xgd Threshold: 1 SDs
9 DeStripe Mean Traverse: Grids: 07.xgd 08.xgd 19.xgd 20.xgd 21.xgd 22.xgd Threshold: 0.5 SDs
10 Edge Match (Area: Top 40, Left 320, Bottom 79, Right 479) to Left edge
11 Edge Match (Area: Top 80, Left 320, Bottom 119, Right 479) to Left edge
12 Edge Match (Area: Top 120, Left 320, Bottom 159, Right 479) to Left edge
13 Edge Match (Area: Top 160, Left 320, Bottom 199, Right 479) to Left edge
14 Edge Match (Area: Top 200, Left 320, Bottom 239, Right 479) to Left edge
15 DeStripe Mean Traverse: Grids: 09.xgd 10.xgd 11.xgd 15.xgd 16.xgd 17.xgd 18.xgd 12.xgd 13.xgd 14.xgd Threshold: 1 SDs
16 DeStripe Mean Traverse: Grids: 09.xgd 10.xgd 11.xgd 15.xgd 16.xgd 17.xgd 18.xgd 12.xgd 13.xgd 14.xgd Threshold: 1 SDs
17 Clip from -3.00 to 3.00 nT
18 De Stagger: Grids: All Mode: Both By: 1 intervals
19 Clip from -3.00 to 3.00 nT

Source Grids: 30
1 Col:0 Row:1 grids\01.xgd
2 Col:0 Row:2 grids\02.xgd
3 Col:0 Row:3 grids\27.xgd
4 Col:0 Row:4 grids\28.xgd
5 Col:0 Row:5 grids\29.xgd
6 Col:0 Row:6 grids\30.xgd
7 Col:1 Row:0 grids\03.xgd
8 Col:1 Row:1 grids\04.xgd
9 Col:1 Row:2 grids\05.xgd
10 Col:1 Row:3 grids\23.xgd
11 Col:1 Row:4 grids\24.xgd
12 Col:1 Row:5 grids\25.xgd
13 Col:1 Row:6 grids\26.xgd
14 Col:2 Row:0 grids\06.xgd
15 Col:2 Row:1 grids\07.xgd
16 Col:2 Row:2 grids\08.xgd
17 Col:2 Row:3 grids\19.xgd
18 Col:2 Row:4 grids\20.xgd
19 Col:2 Row:5 grids\21.xgd
20 Col:2 Row:6 grids\22.xgd
21 Col:3 Row:0 grids\09.xgd
22 Col:3 Row:1 grids\10.xgd
23 Col:3 Row:2 grids\11.xgd
24 Col:3 Row:3 grids\15.xgd
25 Col:3 Row:4 grids\16.xgd
26 Col:3 Row:5 grids\17.xgd
27 Col:3 Row:6 grids\18.xgd
28 Col:4 Row:0 grids\12.xgd
29 Col:4 Row:5 grids\13.xgd
30 Col:4 Row:6 grids\14.xgd

Area 11 processed data

COMPOSITE
Filename: J418-mag-Area11-proc.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 25/09/2012
Assembled by: on 25/09/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions

Composite Size (readings): 960 x 280
Survey Size (meters): 240.00m x 280.00 m
Grid Size: 40.00 m x 40.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 3.00
Min: -3.00
Std Dev: 0.62
Mean: -0.04
Median: 0.00
Composite Area: 6.72 ha
Surveyed Area: 3.91 ha

Processes: 9
1 Base Layer
2 Clip from -30.00 to 30.00 nT
3 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 77, Left 144, Bottom 99, Right 172)
4 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 95, Left 108, Bottom 119, Right 166)
5 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 114, Left 98, Bottom 138, Right 154)
6 DeStripe Median Traverse: Grids: All
7 Clip from -3.00 to 3.00 nT
8 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 119, Left 110, Bottom 168, Right 156)
9 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 116, Left 130, Bottom 168, Right 160)

Source Grids: 39
1 Col:0 Row:2 05.xgd
2 Col:0 Row:3 06.xgd
3 Col:0 Row:4 grids\22.xgd
4 Col:0 Row:5 grids\23.xgd
5 Col:0 Row:6 grids\24.xgd
6 Col:1 Row:1 07.xgd
7 Col:1 Row:2 08.xgd
8 Col:1 Row:3 09.xgd
9 Col:1 Row:4 grids\25.xgd
10 Col:1 Row:5 grids\26.xgd
11 Col:1 Row:6 grids\27.xgd
12 Col:2 Row:0 01.xgd
13 Col:2 Row:1 10.xgd
14 Col:2 Row:2 11.xgd
15 Col:2 Row:3 12.xgd
16 Col:2 Row:4 grids\28.xgd
17 Col:2 Row:5 grids\29.xgd
18 Col:2 Row:6 grids\30.xgd
19 Col:3 Row:0 02.xgd
20 Col:3 Row:1 13.xgd
21 Col:3 Row:2 14.xgd
22 Col:3 Row:3 15.xgd
23 Col:3 Row:4 grids\31.xgd
24 Col:3 Row:5 grids\32.xgd
25 Col:3 Row:6 grids\33.xgd
26 Col:4 Row:0 03.xgd
27 Col:4 Row:1 16.xgd
28 Col:4 Row:2 17.xgd
29 Col:4 Row:3 18.xgd
30 Col:4 Row:4 grids\34.xgd
31 Col:4 Row:5 grids\35.xgd
32 Col:4 Row:6 grids\36.xgd
33 Col:5 Row:0 04.xgd
34 Col:5 Row:1 19.xgd
35 Col:5 Row:2 20.xgd
36 Col:5 Row:3 grids\21.xgd
37 Col:5 Row:4 grids\37.xgd
38 Col:5 Row:5 grids\38.xgd
39 Col:5 Row:6 grids\39.xgd

Area 12 processed data

COMPOSITE
Filename: J418-mag-Area12-proc.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 01/10/2012
Assembled by: on 02/10/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 2080 x 400
Survey Size (meters): 520.00m x 400.00 m
Grid Size: 40.00 m x 40.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 3.00
Min: -3.00
Std Dev: 0.85
Mean: -0.05
Median: 0.00
Composite Area: 20.80 ha
Surveyed Area: 10.62 ha

Processes: 5
1 Base Layer
2 Clip from -30.00 to 30.00 nT
3 DeStripe Median Traverse: Grids: 24.xgd 29.xgd 30.xgd 31.xgd 84.xgd 85.xgd 86.xgd 87.xgd 22.xgd 23.xgd 32.xgd 33.xgd 34.xgd 88.xgd 89.xgd 90.xgd 91.xgd 20.xgd 21.xgd 35.xgd 36.xgd 37.xgd 77.xgd 78.xgd 79.xgd 80+96.xgd 18.xgd 19.xgd 38.xgd 39.xgd 40.xgd 74.xgd 75.xgd 76.xgd 95.xgd 16.xgd 17.xgd 41.xgd 42.xgd 43.xgd 71.xgd 72.xgd 73.xgd 94.xgd 13.xgd 14.xgd 15.xgd 44.xgd 45.xgd 46.xgd 68.xgd 69.xgd 70.xgd 93.xgd 10.xgd 11.xgd 12.xgd 47.xgd 48.xgd 49.xgd 64.xgd 65+66.xgd 67.xgd 92.xgd 07.xgd 08.xgd 09.xgd 50.xgd 51.xgd 52.xgd 62.xgd 63.xgd 05.xgd 06.xgd 53.xgd 54+55.xgd 56.xgd 03.xgd 04.xgd 57.xgd 58.xgd 59.xgd 01.xgd 02.xgd 60.xgd 61.xgd
4 DeStripe Mean Traverse: Grids: 25.xgd 26.xgd 27.xgd 28.xgd 81.xgd 82.xgd 83.xgd Threshold: 0.5 SDs
5 Clip from -3.00 to 3.00 nT

Source Grids: 93
1 Col:0 Row:4 grids\25.xgd
2 Col:1 Row:3 grids\26.xgd
3 Col:1 Row:4 grids\27.xgd
4 Col:1 Row:5 grids\28.xgd
5 Col:1 Row:6 grids\81.xgd
6 Col:1 Row:7 grids\82.xgd
7 Col:1 Row:8 grids\83.xgd
8 Col:2 Row:2 grids\24.xgd
9 Col:2 Row:3 grids\29.xgd
10 Col:2 Row:4 grids\30.xgd
11 Col:2 Row:5 grids\31.xgd
12 Col:2 Row:6 grids\84.xgd
13 Col:2 Row:7 grids\85.xgd
14 Col:2 Row:8 grids\86.xgd
15 Col:2 Row:9 grids\87.xgd
16 Col:3 Row:1 grids\22.xgd
17 Col:3 Row:2 grids\23.xgd
18 Col:3 Row:3 grids\32.xgd
19 Col:3 Row:4 grids\33.xgd
20 Col:3 Row:5 grids\34.xgd
21 Col:3 Row:6 grids\88.xgd
22 Col:3 Row:7 grids\89.xgd
23 Col:3 Row:8 grids\90.xgd
24 Col:3 Row:9 grids\91.xgd
25 Col:4 Row:1 grids\20.xgd
26 Col:4 Row:2 grids\21.xgd
27 Col:4 Row:3 grids\35.xgd
28 Col:4 Row:4 grids\36.xgd
29 Col:4 Row:5 grids\37.xgd
30 Col:4 Row:6 grids\77.xgd
31 Col:4 Row:7 grids\78.xgd
32 Col:4 Row:8 grids\79.xgd
33 Col:4 Row:9 grids\80+96.xgd
34 Col:5 Row:1 grids\18.xgd
35 Col:5 Row:2 grids\19.xgd
36 Col:5 Row:3 grids\38.xgd
37 Col:5 Row:4 grids\39.xgd
38 Col:5 Row:5 grids\40.xgd
39 Col:5 Row:6 grids\74.xgd
40 Col:5 Row:7 grids\75.xgd
41 Col:5 Row:8 grids\76.xgd
42 Col:5 Row:9 grids\95.xgd
43 Col:6 Row:1 grids\16.xgd
44 Col:6 Row:2 grids\17.xgd
45 Col:6 Row:3 grids\41.xgd
46 Col:6 Row:4 grids\42.xgd
47 Col:6 Row:5 grids\43.xgd
48 Col:6 Row:6 grids\71.xgd
49 Col:6 Row:7 grids\72.xgd
50 Col:6 Row:8 grids\73.xgd
51 Col:6 Row:9 grids\94.xgd
52 Col:7 Row:0 grids\13.xgd
53 Col:7 Row:1 grids\14.xgd
54 Col:7 Row:2 grids\15.xgd
55 Col:7 Row:3 grids\44.xgd
56 Col:7 Row:4 grids\45.xgd
57 Col:7 Row:5 grids\46.xgd
58 Col:7 Row:6 grids\68.xgd
59 Col:7 Row:7 grids\69.xgd
60 Col:7 Row:8 grids\70.xgd
61 Col:7 Row:9 grids\93.xgd
62 Col:8 Row:0 grids\10.xgd
63 Col:8 Row:1 grids\11.xgd
64 Col:8 Row:2 grids\12.xgd
65 Col:8 Row:3 grids\47.xgd
66 Col:8 Row:4 grids\48.xgd
67 Col:8 Row:5 grids\49.xgd
68 Col:8 Row:6 grids\64.xgd
69 Col:8 Row:7 grids\65+66.xgd
70 Col:8 Row:8 grids\67.xgd
71 Col:8 Row:9 grids\92.xgd
72 Col:9 Row:0 grids\07.xgd
73 Col:9 Row:1 grids\08.xgd
74 Col:9 Row:2 grids\09.xgd
75 Col:9 Row:3 grids\50.xgd
76 Col:9 Row:4 grids\51.xgd
77 Col:9 Row:5 grids\52.xgd
78 Col:9 Row:7 grids\62.xgd
79 Col:9 Row:8 grids\63.xgd
80 Col:10 Row:1 grids\05.xgd
81 Col:10 Row:2 grids\06.xgd
82 Col:10 Row:3 grids\53.xgd
83 Col:10 Row:4 grids\54+55.xgd
84 Col:10 Row:5 grids\56.xgd
85 Col:11 Row:1 grids\03.xgd
86 Col:11 Row:2 grids\04.xgd
87 Col:11 Row:3 grids\57.xgd
88 Col:11 Row:4 grids\58.xgd
89 Col:11 Row:5 grids\59.xgd
90 Col:12 Row:1 grids\01.xgd
91 Col:12 Row:2 grids\02.xgd
92 Col:12 Row:3 grids\60.xgd
93 Col:12 Row:4 grids\61.xgd

Area 13 processed data

COMPOSITE
Filename: J418-mag-Area13-proc.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 01/10/2012
Assembled by: on 02/10/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 640 x 200
Survey Size (meters): 160.00m x 200.00 m
Grid Size: 40.00 m x 40.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 3.00
Min: -3.00
Std Dev: 1.40
Mean: -0.01
Median: 0.05
Composite Area: 3.20 ha
Surveyed Area: 0.99 ha

Processes: 12
1 Base Layer
2 Clip from -30.00 to 30.00 nT
3 De Stagger: Grids: 10.xgd 11.xgd 07.xgd 08.xgd Mode: Both By: 1 intervals
4 De Stagger: Grids: All Mode: Both By: 1 intervals
5 Search & Replace From: -100 To: 100 With: Dummy (Area: Top 40, Left 154, Bottom 97, Right 166)
6 DeStripe Median Traverse: Grids: 10.xgd 11.xgd 07.xgd 08.xgd 06.xgd
7 DeStripe Mean Traverse: Grids: 09.xgd Threshold: 1 SDs
8 DeStripe Mean Traverse: Grids: 12.xgd Threshold: 1 SDs
9 DeStripe Median Traverse: Grids: 03.xgd 04.xgd 05.xgd
10 DeStripe Median Traverse: Grids: 04.xgd
11 DeStripe Mean Traverse: Grids: 01.xgd 02.xgd Threshold: 1 SDs
12 Clip from -3.00 to 3.00 nT

Source Grids: 12
1 Col:0 Row:2 grids\12.xgd
2 Col:0 Row:3 grids\01.xgd
3 Col:0 Row:4 grids\02.xgd
4 Col:1 Row:0 grids\09.xgd
5 Col:1 Row:1 grids\10.xgd
6 Col:1 Row:2 grids\11.xgd
7 Col:1 Row:3 grids\03.xgd
8 Col:1 Row:4 grids\04.xgd
9 Col:2 Row:1 grids\07.xgd
10 Col:2 Row:2 grids\08.xgd
11 Col:2 Row:3 grids\05.xgd
12 Col:3 Row:2 grids\06.xgd

Area 14 processed data

COMPOSITE
Filename: J418-mag-Area14-proc.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 14/08/2012
Assembled by: on 14/08/2012
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32702.00

Dimensions
Composite Size (readings): 160 x 160
Survey Size (meters): 40.00m x 160.00 m
Grid Size: 20.00 m x 20.00 m
X Interval: 0.25 m
Y Interval: 1.00 m

Stats
Max: 3.00
Min: -3.00
Std Dev: 2.63
Mean: 0.00
Median: 0.00
Composite Area: 0.64 ha
Surveyed Area: 0.30 ha

Processes: 3
1 Base Layer
2 DeStripe Median Traverse: Grids: All
3 Clip from -3.00 to 3.00 nT

Source Grids: 16
1 Col:0 Row:0 grids\09.xgd
2 Col:0 Row:1 grids\10.xgd
3 Col:0 Row:2 grids\11.xgd
4 Col:0 Row:3 grids\12.xgd
5 Col:0 Row:4 grids\13.xgd
6 Col:0 Row:5 grids\14.xgd
7 Col:0 Row:6 grids\15.xgd
8 Col:0 Row:7 grids\16.xgd
9 Col:1 Row:0 grids\01.xgd
10 Col:1 Row:1 grids\02.xgd
11 Col:1 Row:2 grids\03.xgd
12 Col:1 Row:3 grids\04.xgd
13 Col:1 Row:4 grids\05.xgd
14 Col:1 Row:5 grids\06.xgd
15 Col:1 Row:6 grids\07.xgd
16 Col:1 Row:7 grids\08.xgd

Appendix D – digital archive

Archaeological Surveys Ltd hold the primary digital archive at their office in Wiltshire (see inside cover for address). Data are backed-up onto an on-site data storage drive and at the earliest opportunity data are copied to CD ROM for storage on-site and off-site.

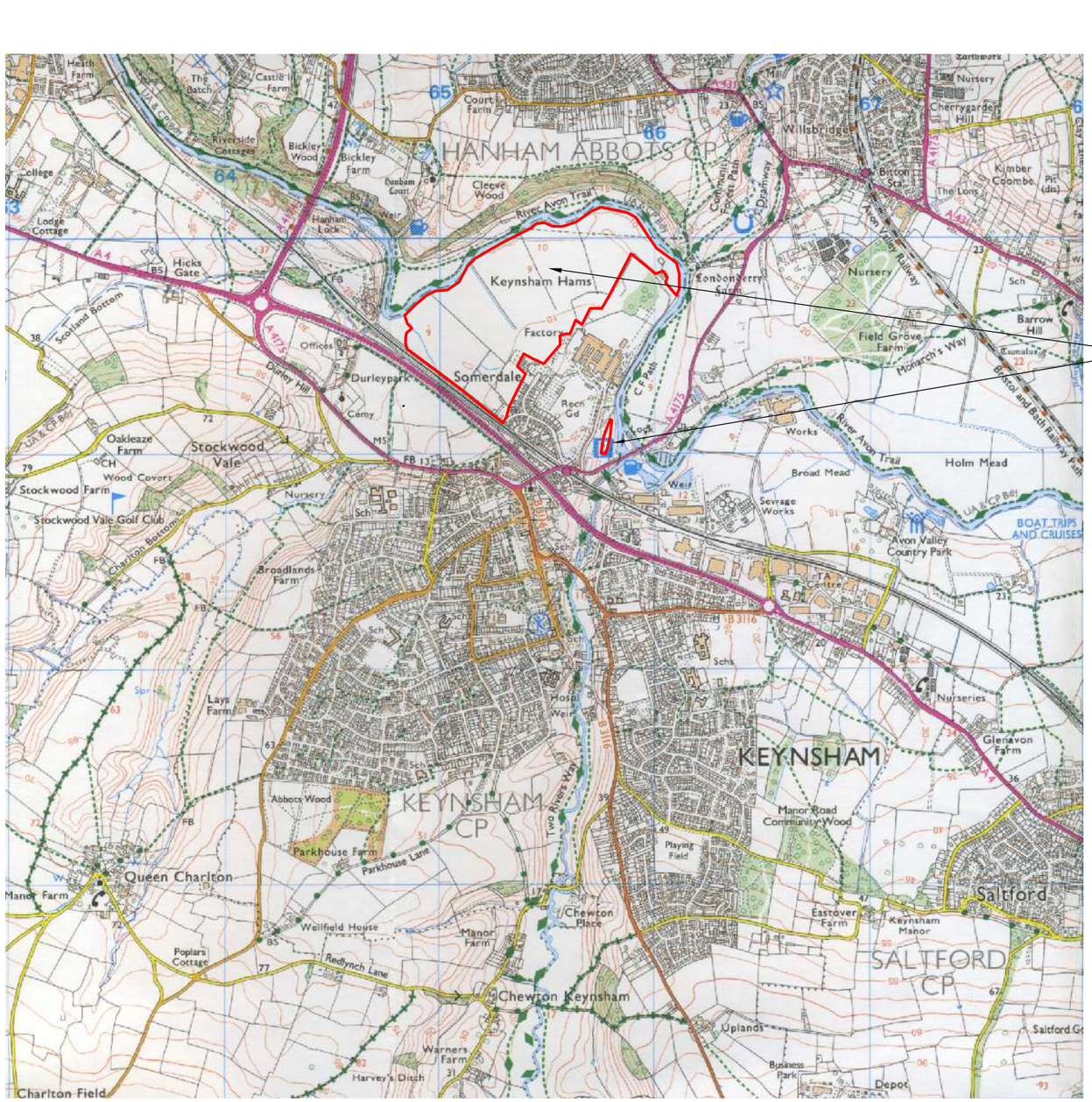
Surveys are reported on in hardcopy (recycled paper) using A4 for text and A3 for plots (all plots are scaled for A3).

This report has been prepared using the following software on a Windows XP platform:

- ArcheoSurveyor version 2.5.16.0 (geophysical data analysis),
- ProgeCAD Professional 2009 (report graphics),
- AutoCAD LT 2007 (report figures),
- OpenOffice.org 3.0.1 Writer (document text),
- PDF Creator version 0.9 (PDF archive).

Digital data produced by the survey and report include the following files:

- ArcheoSurveyor grid and composite files for all geophysical data,
- CSV files for raw and processed composites,
- geophysical composite file graphics as Bitmap images,
- AutoCAD DWG files in 2000 and 2007 versions,
- report text as OpenOffice.org ODT file,
- report text as Word 2000 doc file,
- report text as rich text format (RTF),
- report text as PDF,
- PDFs of all figures.



Survey location

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Map of survey area

● Survey location

Site centred on OS NGR
ST 65500 69700

SCALE 1:25 000

0m 500m 1000m

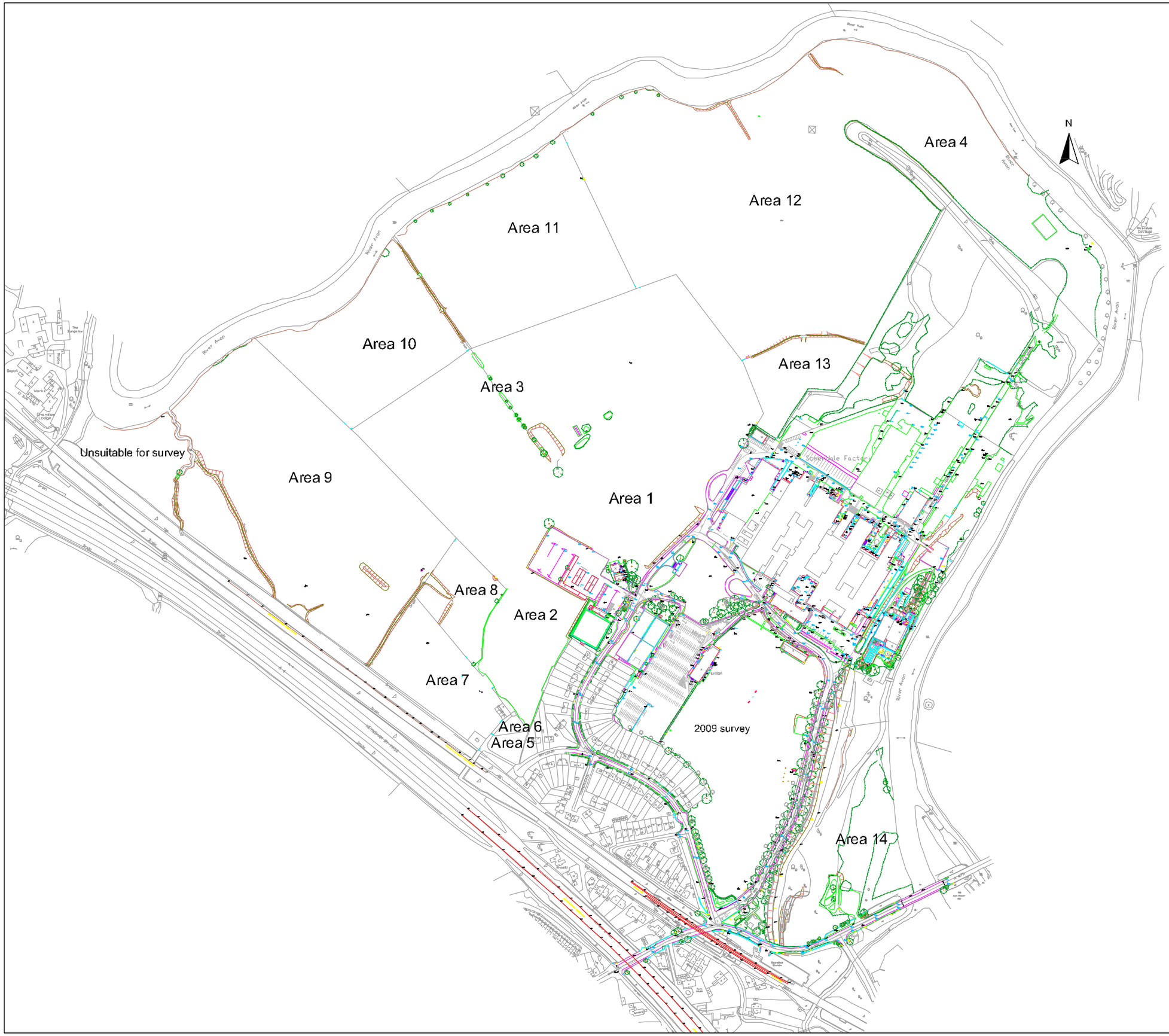
SCALE TRUE AT A3

FIG 01

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Location plan of survey areas



SCALE 1:5000

0m 50 100 150 200 250m

SCALE TRUE AT A3

FIG 02

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Referencing information - southwest

Grid coordinates based on Ordnance Survey OSGB36 datum

Grids set out using RTK GPS with Leica SmartNet correction data RTCMv2 format OSTN02 transformation

01 40m grid reference and filename

01 30m grid reference and filename

Survey start and traverse direction

Areas 1 & 3			Area 9		
A	365226.51	169517.34	I	364885.88	169636.09
B	365525.72	169782.81	J	365142.26	169383.37

Area 2			Area 10		
C	365294.40	169257.30	K	365008.41	169710.16
D	365406.55	169469.48	L	365174.30	169821.87

Areas 5, 6 & 7			Area 11		
E	365154.53	169300.13	M	365179.08	169866.31
F	365298.65	169192.29	N	365395.65	169969.74

Area 8		
G	365215.97	169344.60
H	365284.95	169402.40

SCALE 1:3000

0m 30 60 90 120 150m

SCALE TRUE AT A3

FIG 03

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Referencing information - northeast

Grid coordinates based on Ordnance Survey OSGB36 datum

Grids set out using RTK GPS with Leica SmartNet correction data RTCMv2 format OSTN02 transformation

01 40m grid reference and filename

01 30m grid reference and filename

Survey start and traverse direction

Area 4

O 365759.70 170130.42

P 366098.73 169790.63

Area 12

Q 365490.68 169847.88

R 365745.52 170102.15

Area 13

S 365677.09 169621.96

T 365741.13 169723.44

SCALE 1:3000

0m 30 60 90 120 150m

SCALE TRUE AT A3

FIG 04

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Referencing information - Area 14 and resistivity grids

Grid coordinates based on Ordnance Survey OSGB36 datum

Grids set out using RTK GPS with Leica SmartNet correction data RTCMv2 format OSTN02 transformation

01 20m magnetometry grid reference and filename

01 20m resistivity grid reference and filename

Survey start and traverse direction

Area 1 resistivity

U	365477.24	169445.69
V	365567.00	169525.33

Area 2 resistivity

W	365335.19	169280.98
X	365391.27	169387.09

Area 14 magnetometry

Y	365767.02	169001.30
Z	365806.78	169135.54

SCALE 1:3000

0m 30 60 90 120 150m

FIG 05

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Greyscale plot of raw magnetometer data - Area 1

Area 1

SCALE 1:1000

HC 05

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Greyscale plot of processed magnetometer data - Area 1

-5nT

-5nT

-5nT

-5nT

Area 1

SCALE 1:1000

0m 10 20 30 40 50m

HC 07

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Abstraction and interpretation of magnetometer anomalies - Area 1

- Positive linear anomaly - cut feature of archaeological potential
- Positive linear anomaly - possible ditch-like feature
- Negative linear anomaly - road/track of archaeological potential
- Negative linear anomaly - structural remains/walls of archaeological potential
- Negative linear anomaly - possible land drain
- Positive linear anomaly - former/current field boundary
- Negative linear anomaly - material of low magnetic susceptibility
- Discrete positive response - cut feature/ area of burning/ soil accumulation of archaeological potential
- Discrete positive response - possible pit-like feature
- Variable magnetic anomaly - disturbed structural archaeology
- Positive anomaly - magnetically enhanced material
- Negative anomaly - material of low magnetic susceptibility
- Variable magnetic response - of natural origin
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Magnetic disturbance from ferrous material
- Strong multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object

SCALE 1:1000

0m 10 20 30 40 50m

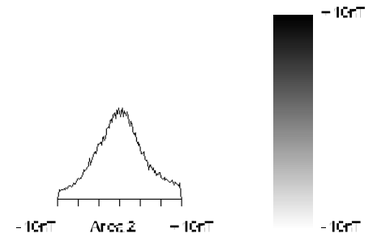
SCALE TRUE AT A3

FIG 08

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Greyscale plot of raw magnetometer data - Area 2



SCALE 1:1000

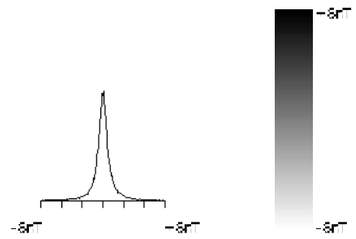
0m 10 20 30 40 50m

HC 09

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Greyscale plot of processed magnetometer data - Area 2



Area 8

Area 2

Pavilion

drain

drain

7

47

69

35

49

SCALE 1:1000

0m 10 20 30 40 50m

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Abstraction and interpretation of magnetometer anomalies - Area 2

- Positive linear anomaly - cut feature of archaeological potential
- Positive linear anomaly - possible ditch-like feature
- Negative linear anomaly - road/track of archaeological potential
- Negative linear anomaly - structural remains/walls of archaeological potential
- Negative linear anomaly - possible land drain
- Positive linear anomaly - former/current field boundary
- Negative linear anomaly - material of low magnetic susceptibility
- Discrete positive response - cut feature/ area of burning/ soil accumulation of archaeological potential
- Discrete positive response - possible pit-like feature
- Variable magnetic anomaly - disturbed structural archaeology
- Positive anomaly - magnetically enhanced material
- Negative anomaly - material of low magnetic susceptibility
- Variable magnetic response - of natural origin
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Magnetic disturbance from ferrous material
- Strong multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object

SCALE 1:1000

0m 10 20 30 40 50m

FIG 11

Area 1

Area 2

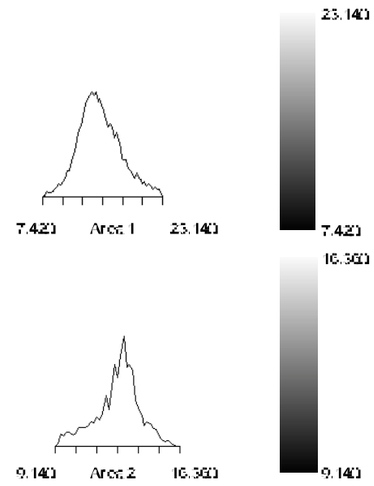
Pavilion

Pavilion

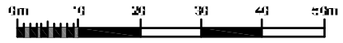
Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Greyscale plot of processed resistance data



SCALE 1:1000



HC 12

Area 1

Area 2

1
2
3
4
5
6
7
8
9
10
11

N

Pavilion

Pavilion

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Abstraction and interpretation of resistance anomalies

- High resistance linear anomaly - structural remains of archaeological origin
- High resistance linear anomaly - uncertain origin
- Low resistance linear anomaly -service
- Low resistance linear anomaly - of uncertain origin
- Area of high resistance - associated with structural remains
- Area of high resistance - uncertain origin
- Area of low resistance - uncertain origin

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TR_BAR

FIG 13

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Greyscale plot of processed magnetometer data - Areas 1 & 2 and 2009 survey

Area 13

Somerdale Factory

Area 1

Area 8

Area 2

Area 7

Area 6

2009 survey

Area 5

Area 14

SCALE 1:2500

0m 50 100m

FIG 14

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Abstraction and interpretation of magnetometer anomalies - Areas 1 & 2 and 2009 survey

- Positive linear anomaly - cut feature of archaeological potential
- Positive linear anomaly - possible ditch-like feature
- Negative linear anomaly - road/track of archaeological potential
- Negative linear anomaly - structural remains/walls of archaeological potential
- Negative linear anomaly - possible land drain
- Positive linear anomaly - former/current field boundary
- Negative linear anomaly - material of low magnetic susceptibility
- Linear anomaly - ridge and furrow
- Discrete positive response - cut feature/ area of burning/ soil accumulation of archaeological potential
- Discrete positive response - possible pit-like feature
- Variable magnetic anomaly - disturbed structural archaeology
- Positive anomaly - magnetically enhanced material
- Negative anomaly - material of low magnetic susceptibility
- Variable magnetic response - due to ground disturbance/quarrying
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Magnetic disturbance from ferrous material
- Strong multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object

SCALE 1:2500

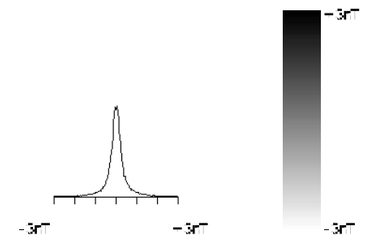
0m 50 100m

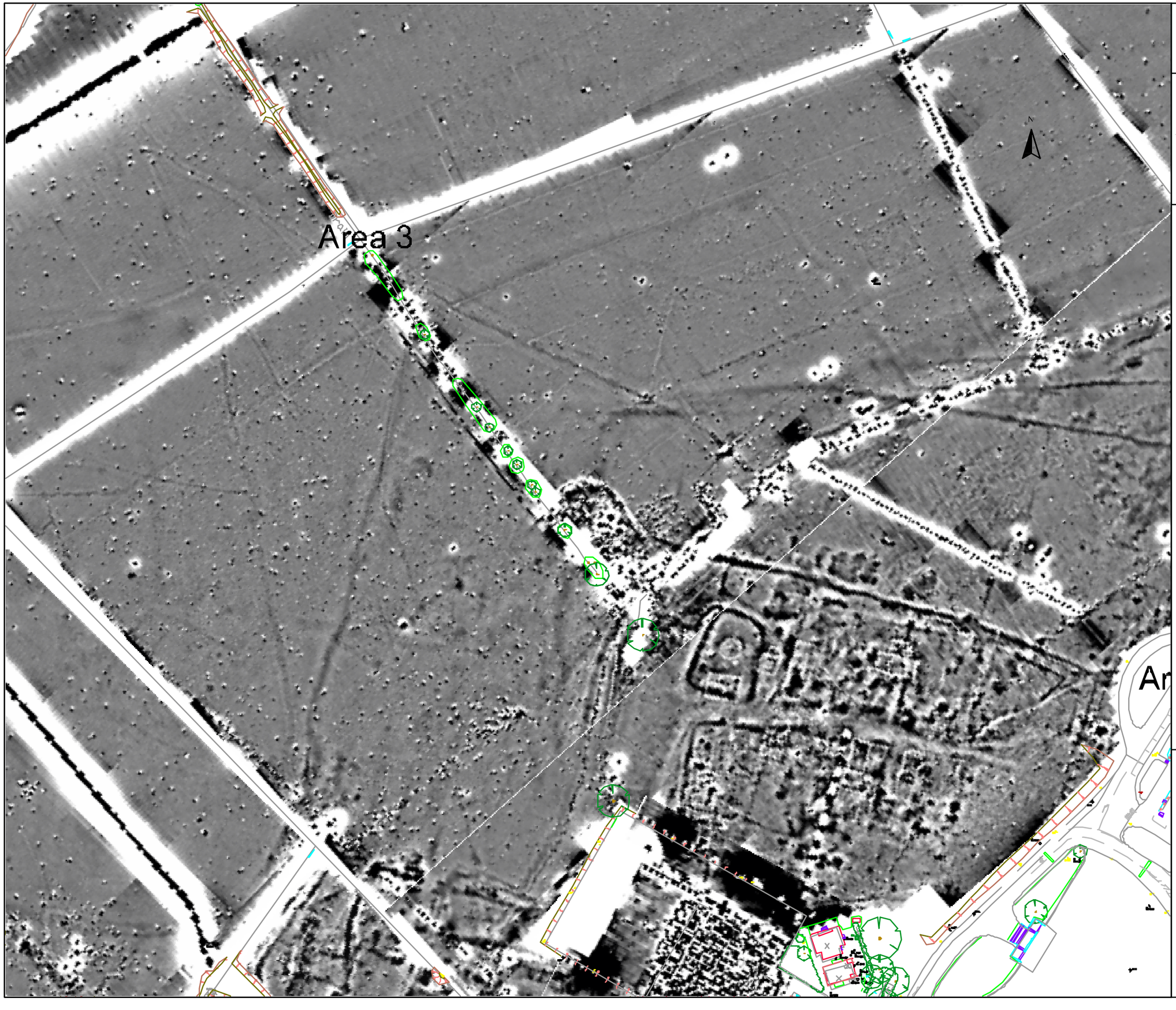
FIG 15

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Greyscale plot of processed magnetometer data - Area 3





SCALE 1:1500

HC 16

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Abstraction and interpretation of magnetometer anomalies - Area 3

- Positive linear anomaly - cut feature of archaeological potential
- Positive linear anomaly - possible ditch-like feature
- Positive linear anomaly - possible land drain
- Positive linear anomaly -field boundary
- Negative linear anomaly - material of low magnetic susceptibility
- Discrete positive response - cut feature/ area of burning/ soil accumulation of archaeological potential
- Discrete positive response - possible pit-like feature
- Positive anomaly - magnetically enhanced material
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Positive anomaly - associated with cricket square
- Strong multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object

SCALE 1:1500

0m 10 20 30 40 50m

SCALE TRIBAR

FIG 17

Area 4

River Avon

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Greyscale plot of processed magnetometer data - Area 4

+3nT

-3nT

-3nT

-3nT

SCALE 1:1500

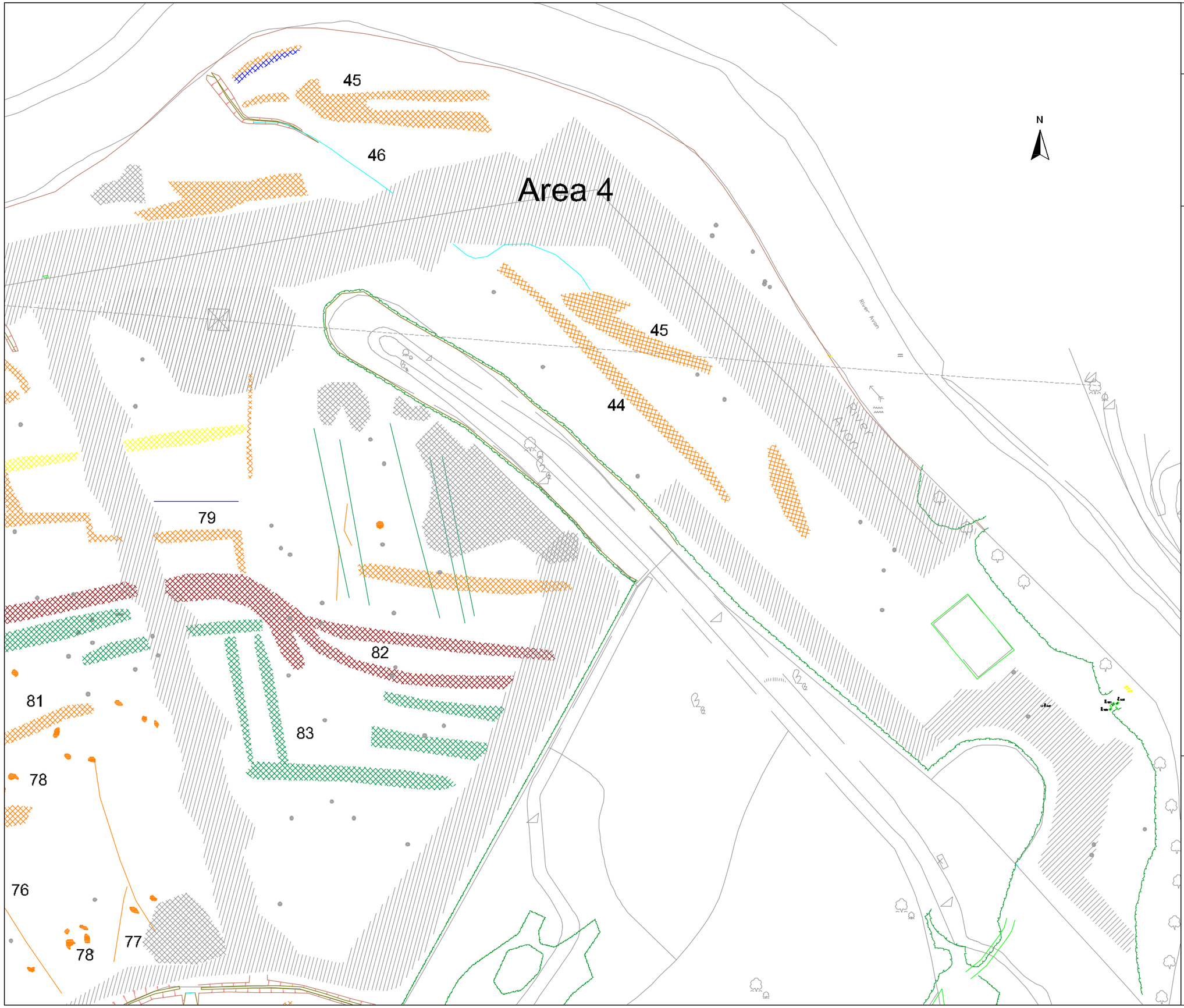
0m 10 20 30 40 50m

HC 18

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Abstraction and interpretation of magnetometer anomalies - Area 4



- Positive linear anomaly - possible land drain
- Positive anomaly - magnetically enhanced material
- Negative anomaly - material with low magnetic susceptibility
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Magnetic disturbance from ferrous material
- Strong multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object

SCALE 1:1500

0m 10 20 30 40 50m

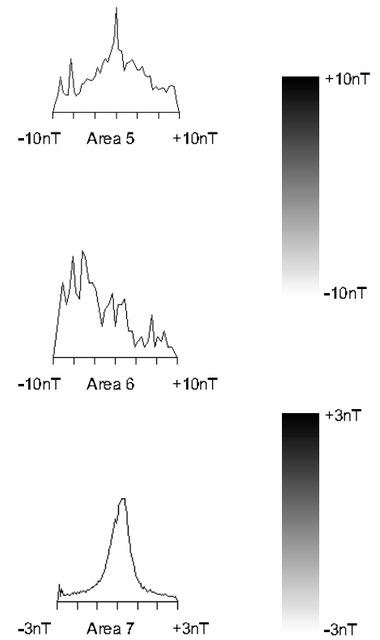
SCALE TRUE DATAS

FIG 19

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Greyscale plot of processed magnetometer data - Areas 5, 6 & 7



SCALE 1:1000

0m 10 20 30 40 50m

FIG 20

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Abstraction and interpretation of magnetometer anomalies - Areas 5, 6 & 7

- Positive linear anomaly - cut feature of archaeological potential
- Discrete positive response - cut feature/ area of burning/ soil accumulation of archaeological potential
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Magnetic disturbance from ferrous material
- Strong multiple dipolar linear anomaly - pipeline / cable / service

Area 8
Area 7
Area 6
Area 5

69 53 55 56 16 63 66 19 17 52 70 64 49 51 18 20 48 22 47 50 21

Drain
KEYNSHAM BY-PASS
DRYLEAZE

SCALE 1:1000

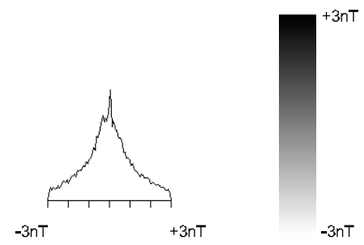
0m 10 20 30 40 50m

FIG 21

Archaeological Surveys Ltd

Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Greyscale plot of processed magnetometer data - Area 8



Area 8

Area 7

Drain

Drain

N

SCALE 1:1000

0m 10 20 30 40 50m

SCALE TRI_BAR3

FIG 22

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Abstraction and interpretation of magnetometer anomalies - Area 8

- Positive linear anomaly - cut feature of archaeological potential
- Negative linear anomaly - structural remains/walls of archaeological potential
- Discrete positive response - cut feature/ area of burning/ soil accumulation of archaeological potential
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Magnetic disturbance from ferrous material
- Strong multiple dipolar linear anomaly - pipeline / cable / service

SCALE 1:1000

0m 10 20 30 40 50m

FIG 23

Area 8

Area 7

Drain

Drain

Drain

67 65 69 66 63 64 70 58 54 53 55 56 52 49 51 48 47 50 9 13 16 17 20 22 21

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Greyscale plot of processed magnetometer data - Area 9

+3nT

-3nT +3nT

-3nT

Area 9

Rough ground - unsuitable for survey

Area 8

N

Drain

Drain

Drain

Drain

SCALE 1:1500

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 24

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Abstraction and interpretation of magnetometer anomalies - Area 9

Area 9

Rough ground - unsuitable for survey

Area 8

N

Drain

Positive linear anomaly - cut feature of archaeological potential

Positive linear anomaly - possible ditch-like feature

Positive linear anomaly - possible land drain

Negative linear anomaly - material of low magnetic susceptibility

Discrete positive response - possible pit-like feature

Positive anomaly - magnetically enhanced material

Variable magnetic response - of natural origin

Magnetic debris - spread of magnetically thermoremnant/ferrous material

Magnetic disturbance from ferrous material

Strong multiple dipolar linear anomaly - pipeline / cable / service

SCALE 1:1500

0m 10 20 30 40 50m

SCALE TRIBAR

FIG 25

Area 11

Area 10

Area 3

River Avon

N

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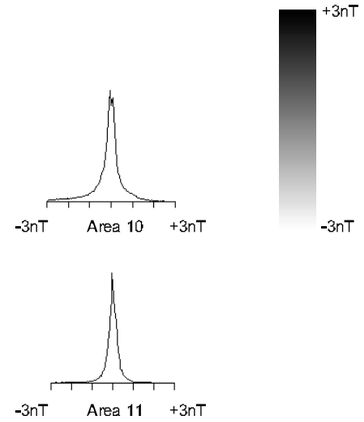
Greyscale plot of processed magnetometer data - Areas 10 & 11



SCALE 1:1500

0m 10 20 30 40 50m

SCALE TRUE AT A3

FIG 26

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Abstraction and interpretation of magnetometer anomalies - Areas 10 & 11

Area 11

Area 10

Area 3

River Avon

N

71 72 73 74 75

32 36 37 39 25 24 27 31 42 38 40 28 33

- Positive linear anomaly - possible ditch-like feature
- Positive linear anomaly - possible land drain
- Positive and negative anomaly - possible former field boundary
- Variable magnetic response - of natural origin
- Magnetic disturbance from ferrous material
- Strong multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object

SCALE 1:1500

0m 10 20 30 40 50m

SCALE TR_BATAS

FIG 27

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Greyscale plot of processed magnetometer data - Area 12

+3nT
-3nT
+3nT
-3nT

SCALE 1:1500

0m 10 20 30 40 50m

FIG 28

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Abstraction and interpretation of magnetometer anomalies - Area 12

- Positive linear anomaly - possible ditch-like feature
- Linear anomaly - of agricultural origin
- Positive linear anomaly - possible land drain
- Linear anomaly - possible ridge and furrow
- Broad anomaly - possible ridge and furrow
- Positive/negative anomaly - possible former field boundary
- Negative anomaly - material of low magnetic susceptibility
- Positive anomaly - magnetically enhanced material
- Discrete positive response - possible pit-like feature
- Variable magnetic response - of natural origin
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Magnetic disturbance from ferrous material
- Strong multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object

SCALE 1:1500

0m 10 20 30 40 50m

SCALE TR_BATAS

FIG 29

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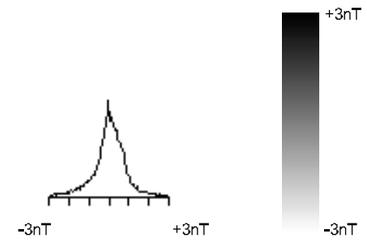
Greyscale plot of processed magnetometer data - Area 13



N

Area 13

Somerdale Factor

SCALE 1:1000

0m 10 20 30 40 50m

FIG 30

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Somerdale - Cadbury Factory
Keynsham, B&NES

Abstraction and interpretation of magnetometer anomalies - Area 13

- Positive linear anomaly - cut feature of archaeological potential
- Positive linear anomaly - possible ditch-like feature
- Positive anomaly - magnetically enhanced material
- Discrete positive response - possible pit-like feature
- Magnetic disturbance from ferrous material
- Strong multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object

SCALE 1:1000

0m 10 20 30 40 50m

FIG 31

Area 13

Somerdale Factor

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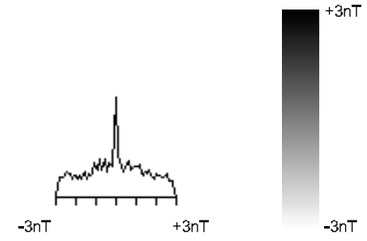
Greyscale plot of processed magnetometer data - Area 14



Area 14

N

SCALE 1:1000

0m 10 20 30 40 50m

FIG 32

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Abstraction and interpretation of magnetometer anomalies - Area 14

Magnetic debris - spread of magnetically thermoremnant/ferrous material

Area 14

N

SCALE 1:1000

0m 10 20 30 40 50m

FIG 33

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Greyscale plot of processed magnetometer data

(Note - see individual area plots for greyscale values)

SCALE 1:5000

0m 50 100 150 200 250m

FIG 34

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Geophysical Survey
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Abstraction and interpretation of magnetometer anomalies

- Positive linear anomaly - cut feature of archaeological potential
- Positive linear anomaly - possible ditch-like feature
- Negative linear anomaly - road/track of archaeological potential
- Negative linear anomaly - structural remains/walls of archaeological potential
- Negative linear anomaly - possible land drain
- Positive linear anomaly - former/current field boundary
- Negative linear anomaly - material of low magnetic susceptibility
- Discrete positive response - cut feature/ area of burning/ soil accumulation of archaeological potential
- Discrete positive response - possible pit-like feature
- Variable magnetic anomaly - disturbed structural archaeology
- Positive anomaly - magnetically enhanced material
- Negative anomaly - material of low magnetic susceptibility
- Positive/negative anomaly - possible field boundary
- Positive/negative anomaly - possible ridge and furrow
- Variable magnetic response - of natural origin
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- Magnetic disturbance from ferrous material
- Strong multiple dipolar linear anomaly - pipeline / cable / service
- Strong dipolar anomaly - ferrous object

SCALE 1:5000

0m 50 100 150 200 250m

FIG 35

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Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Abstraction and interpretation of magnetometer anomalies of archaeological potential

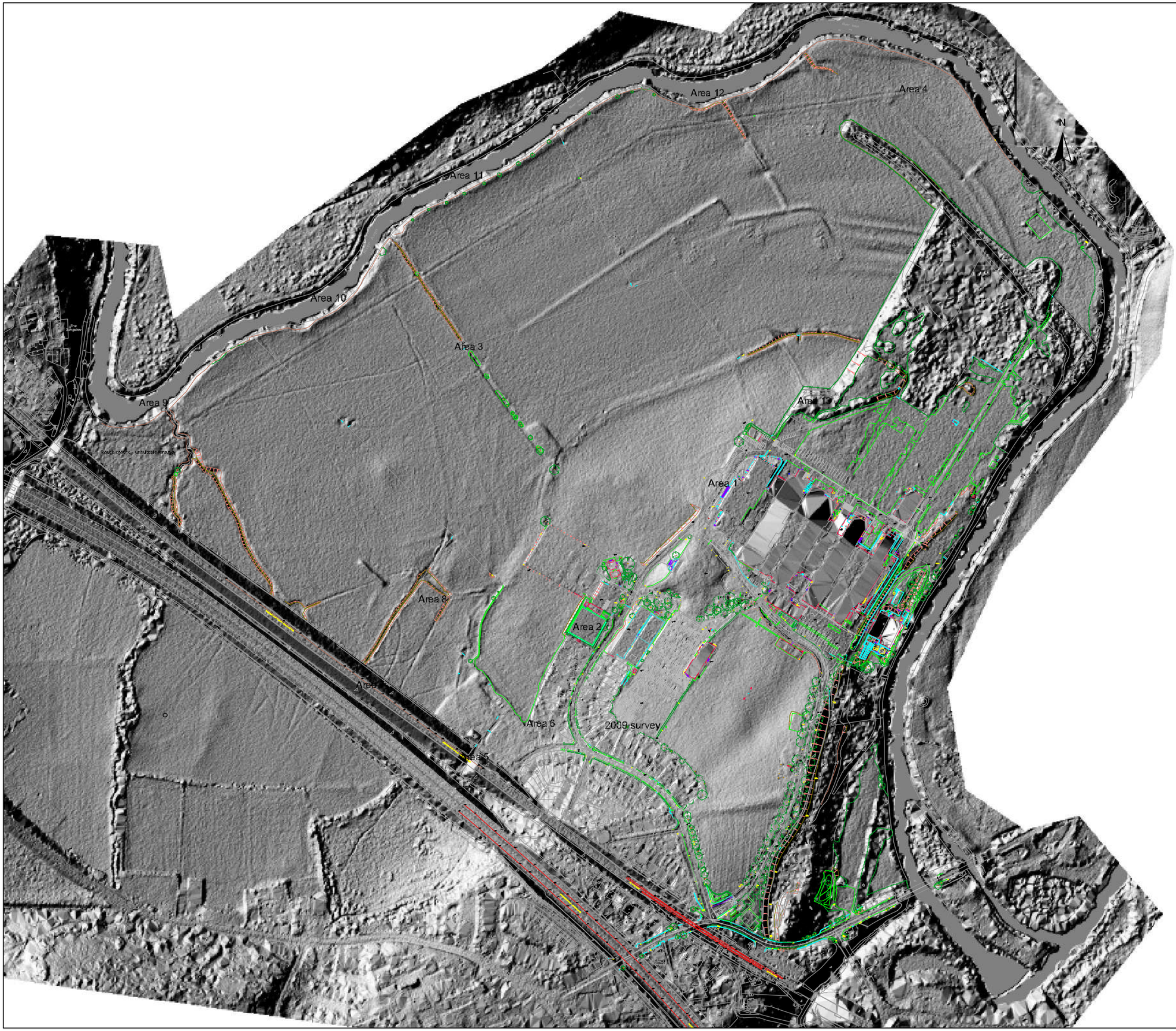
- Positive linear anomaly - cut feature of archaeological potential
- Negative linear anomaly - structural remains/walls of archaeological potential
- Negative linear anomaly - road/track of archaeological potential
- Discrete positive response - cut feature/ area of burning/ soil accumulation of archaeological potential
- Variable magnetic anomaly - disturbed structural archaeology

SCALE 1:2500

0m 50 100m

SCALE TR_BAR

FIG 36



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Somerdale - Cadbury Factory
Keynsham, B&NES

LiDAR data

SCALE 1:5000

0m 50 100 150 200 250m

SCALE TRI_BAR

FIG 37

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Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Abstraction and interpretation of LiDAR data

- Boundary feature
- Watercourse
- Ridge
- Linear bank of uncertain origin
- Linear ditch of uncertain origin
- Earthwork mound of uncertain origin
- Area of undulating archaeology
- Ground disturbance/quarrying
- Furrow
- Erosion scar

SCALE 1:5000

0m 50 100 150 200 250m

FIG 38

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Geophysical Survey
Somerdale - Cadbury Factory
Keynsham, B&NES

Abstraction and interpretation of geophysical and LiDAR data

- Cut feature of archaeological potential
- Possible ditch-like feature
- Road/track of archaeological potential
- Structural remains/walls of archaeological potential
- Former/current field boundary
- Land drain
- Material of low magnetic susceptibility
- Discrete feature of archaeological potential
- Possible pit-like feature
- Disturbed structural archaeology
- Magnetically enhanced material
- Material of low magnetic susceptibility
- Anomalies of natural origin
- Magnetic debris - spread of magnetically thermoremnant/ferrous material
- High resistance linear anomaly - of uncertain origin
- High resistance linear anomaly - structural remains of archaeological origin
- Low resistance linear anomaly - of uncertain origin
- Low resistance linear anomaly -service
- Area of high resistance associated with structural remains
- Area of high resistance - of uncertain origin
- Area of low resistance - of uncertain origin
- Boundary feature
- Watercourse
- Linear bank of uncertain origin
- Linear ditch of uncertain origin
- Ridge
- Earthwork mound of uncertain origin
- Area of undulating archaeology
- Furrow
- Ground disturbance/quarrying

SCALE 1:5000

0m 50 100 150 200 250m

SCALE TR_BATAS

FIG 39