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**CASTLE GREEN HOMES LTD**

# QUARRY FARM, OAKENHOLT, FLINT

# ARCHAEOLOGICAL DESK BASED ASSESSMENT

**NOVEMBER 2023**

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# QUARRY FARM, OAKENHOLT, FLINT

# ARCHAEOLOGICAL DESK BASED ASSESSMENT

**NOVEMBER 2023**

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## EXECUTIVE SUMMARY

*In October 2023, Wardell Armstrong carried out an archaeological desk-based assessment of a Site at Quarry Farm, Oakenholt, Flint. The archaeological assessment was undertaken in respect for proposals for a residential development.*

*The Site has been identified as having a low archaeological potential for prehistoric, early medieval, and medieval remains; and moderate potential for Romano-British, post-medieval, and modern remains. This is based upon archaeological, historical, documentary, and cartographic evidence.*

*The geophysical survey undertaken across the Site in 2014 has confirmed that the archaeological potential of the Site is most likely limited to Field 1 in the north of the Site, with the evidence of a Roman cremation cemetery and a Roman enclosure, as well as a Scheduled Ancient Monument relating to the Croes Atti Roman settlement. It should be noted these have been subject to investigation but may be surrounded by other features of Roman origins. In order to preserve these significant remains in situ, the proposed development layout excludes the area of the aforementioned Roman historic assets; no ground disturbance is anticipated which would impact these Roman remains. Regardless, the close proximity of the Croes Atti Roman settlement increases the likelihood of the presence of ancillary or peripheral remains on the Site, perhaps in the form of agricultural features like those identified in the south during the geophysical survey. These likely agricultural and peripheral features, if present, would are anticipated to be of low importance. Construction activity would impact upon these remains. This would result in a major magnitude of impact which, on an asset of low to medium significance, would equate to an impact of slight to moderate adverse significance.*

*It is anticipated that no further work would be required at the predetermination stage.*

# 1 INTRODUCTION

1.1.1 This report has been prepared by Wardell Armstrong LLP, a Registered Organisation with the Chartered Institute for Archaeologists (CIfA). The report sets out the archaeological and historical background of a Site at Quarry Farm, Oakenholt, Flint (NGR SJ 25852 71623), where proposals entail residential development consisting of affordable housing.

1.1.2 This report provides an assessment of the significance of any known or potential historic assets of an archaeological nature within the boundary of the Site. Potential direct impacts as a result of the proposed development to identified, and potential, historic assets of an archaeological nature are established, and their heritage significance assessed. Appropriate mitigation measures for reducing/offsetting these potential impacts are proposed where relevant. This assessment does not assess any potential indirect impacts to the setting of designated historic assets.

1.1.3 The assessment has been undertaken following the Standards and Guidance of the Chartered Institute for Archaeologists (CIfA 2020) and in accordance with terminology expressed within Chapter 6 of Planning Policy Wales (PPW). This assessment does not assess any potential indirect impacts to the setting of historic assets.

1.1.4 In order to inform this assessment baseline data was obtained from the following:

- The Clwyd-Powys Archaeological Trust (HER), consulted October 2023
- Flintshire Record Office
- In-house datasets of designations (Cadw):
    - Scheduled Monuments
    - Listed Buildings
    - Registered Parks and Gardens
    - Registered Battlefields

1.1.5 In addition, a walkover survey of the Site was undertaken on 24 October 2023.

1.1.6 The objectives of the assessment were to provide for the identification of areas of archaeological potential within the Site; to consider the Site within its wider archaeological context; and to describe the likely extent, nature, condition, importance, and potential state of preservation of the archaeology.

# 2 PLANNING POLICY AND LEGISLATION

## 2.1 Legislation

2.1.1 Designated historic assets protected by statutory legislation comprise Scheduled Monuments, Protected Wrecks, Listed Buildings and Conservation Areas. Nationally significant archaeological sites, monuments and structures are protected under the Ancient Monuments and Archaeological Areas Act (1979), as amended by the Historic Environment (Wales) Act (2016).

## 2.2 National Planning Policy

2.2.1 Chapter 6 of Planning Policy Wales (PPW) (2021) sets out the Welsh Governments objectives to the protection, management and conservation of the historic environment in Wales and requires that:

- Decisions are based upon an understanding of the significance of historic assets;
- Archaeological remains are conserved, both for their own sake and for their role in education, leisure and economy;
- The character of historic buildings is safeguarded and change managed to ensure their special architectural and historic interest is preserved;
- The character or appearance of conservation areas is preserved or enhanced whilst helping them remain vibrant and prosperous;
- The special interest of sites of the register of historic parks and gardens in Wales are preserved; and
- Areas of registered historic Welsh landscapes are conserved.

2.2.2 These objectives are emphasised within Technical Advice Note 24 'The Historic Environment' (2017) which defines a historic asset as 'an identifiable component of the historic environment. It may consist or be a combination of an archaeological site, a historic building or area, historic park and garden or a parcel of historic landscape.' (TAN24 Para 1.7).

2.2.3 Where historic assets are to be affected by a proposed development TAN 24 advises that it is for the applicant to provide the local planning authority with sufficient information to allow the assessment of their proposals in respect of designated assets and their settings.

2.2.4 Statutory designations comprise scheduled monuments, protected wrecks, listed buildings and conservation areas. In addition to the national and local planning policy,

presented below, the Ancient Monuments and Archaeological Areas Act (1979) provides protection for scheduled monuments.

2.2.5 The Historic Environment (Wales) Act 2016 amends sections of both the Ancient Monuments and Archaeological Areas Act 1979 and the Planning (Listed Buildings and Conservation Areas) Act 1990 in relation the Historic Environment of Wales. The Act also contains new stand-alone provisions including the creation of statutory register of historic parks and gardens, a statutory register of historic place names and places a statutory duty of Welsh Minsters to compile and maintain Historic Environment Records (HER).

2.2.6 Non-statutory designations such as registered battlefields, are assessed under national and local planning policy only. This is also the case for the remainder of the archaeological resource. These are non- statutory designations and comprise entries onto a Historic Environment or Sites and Monument Record as well as previously unknown features which may be recorded as part of a desk-based assessment or environmental impact assessment.

## 2.3 Local Policy

2.3.1 The *Flintshire Local Development Plan 2015-2030* was adopted in January 2023. Relevant policy in respect of archaeological remains is found in Policy EN8: Built Historic Environment and Listed Buildings, which is quoted in full below:

*Policy EN8: Built Historic Environment and Listed Buildings*

*The County's buildings and features of special architectural and historic importance, and their settings, will be preserved.*

a. *Development proposals affecting listed buildings will be permitted only where:*
   i. *The alteration and/or extension to a listed building or its curtilage ensures that the special architectural character or historic interest is preserved;*
   ii. *The change of use of a listed building or its curtilage contributes towards the retention of a building or its sustainable re-use without having an adverse effect on its character, special interest or structural integrity;*
   iii. *The total or substantial demolition of a listed building is accompanied by the strongest justification and convincing evidence that the proposal is necessary and unavoidable.*
b. *Development should preserve Scheduled Ancient Monuments and their settings and where appropriate the preservation of other archaeological remains, having regard to the intrinsic importance of the remains and the need for the proposed development.*
c. *Development should protect and conserve historic landscapes, parks, and gardens.*

# 3 BASELINE INFORMATION

## 3.1 Site Description

3.1.1 The Site is located in Flint, Wales, within the wider county of Flintshire. The Site comprises two fields, one to the north and one to the south, which are divided by a trackway running east to west within a stand of trees. The fields are bounded by hedgerows. The northern boundary of the Site is set back along Chester Road, while the western boundary of the Site follows the course of Leadbrook Drive. At the eastern end of the Site, Fields 1 and 2 lie adjacent to residential development, with the south-west and south-east ends of Field 2 lying adjacent to neighbouring fields. Access to the Site is currently afforded along Leadbrook Drive, via a series of gates which enter onto Field 1, Field 2, and the trackway which divides the two fields.

*Plate A: The red-line boundary of the Site.*

## 3.2 Designated Historic Assets

3.2.1 There is one designated historic asset located within the Site boundary, which comprises the Croes Atti Roman Site; a Scheduled Ancient Monument located within the northern portion of Field 1 (Ref. 4386). The monument comprises the buried remains of a Roman road, roadside settlement and associated cremation cemetery (Railton 2014; Moore 2015). During the geophysical survey of the Site (Appendix 3), series of magnetic anomalies ranged along the line of the road indicates an area of intense human activity, likely to represent parallel ditches for building plots containing

possible structures, pits and hearths or furnaces. The subsequent evaluation to the south of this area revealed a well-preserved cremation cemetery of both cists and urns, and a range of post holes, pits and gullies containing Roman pottery dating from the late 1st to early 3rd centuries AD. As noted within its listing, the monument is of national importance as a rare example of a Roman roadside industrial settlement and cemetery with few parallels in Wales. It is likely to retain extensive and well-preserved buried archaeological deposits with high potential to enhance our knowledge of Roman industry, civilian settlement, transport and funerary practices, and of broader patterns of Roman activity along the Dee Estuary.

3.2.2 Within the 1km search area there are also three listed buildings, including the Grade II listed buildings: Oakenholt Hall (Ref. 355), the Grade II listed Oakenholt Farmhouse (Ref. 521), and the Grade II listed Leadbrook Hall (Ref. 16409). There is also an additional Scheduled Ancient Monument, comprising the Pentre Bridge Roman Site (Ref. 2217).

### 3.3 Known Non-Designated Historic Assets

3.3.1 Two non-designated historic assets are located within the Site boundary, including evidence of a Roman enclosure in the north-east corner of the Site (HER 128787), and evidence of a Roman cremation cemetery in the north of the Site (HER 128788). In addition, a depression in the northern field has been identified as a possible marl pit of unknown date.

# 4 METHODOLOGY

***Archaeological Databases***

4.1.1 The standard collation of all known archaeological sites and find spots within a 1km radius of the Site comes from the Clwyd-Powys Archaeological Trust Historic Environment Record (HER). Significant entries within an approximate 1km radius of the Site are plotted on Drawing LD10792-002. Where relevant, these sites and finds have been discussed in Section 5.

4.1.2 Information on designated historic assets has been sourced from Cadw datasets.

***Historical and Cartographic Sources***

4.1.3 The principal sources for this type of evidence were:

- The Clwyd-Powys Archaeological Trust;
- The National Library of Wales;
- The National Library of Scotland.

4.1.4 Relevant documents are listed in the bibliography.

***Secondary Sources***

4.1.5 All sources are listed in the bibliography. The principal sources of secondary material were:

- British History Online (BHO),
- the Archaeology Data Service (ADS),
- the Wardell Armstrong in-house library.

***Geological/Geotechnical Information***

4.1.6 A description of the superficial and solid geology of the local and surrounding area was compiled in order to assess the likely presence and potential condition of any archaeological remains on the Site. This information was drawn from appropriate maps published by the Geological Survey of Great Britain (BGS 2023) and the Soil Survey of England and Wales (SSEW 1983).

4.1.7 Where available, Site Investigation reports will be referenced as appropriate and detailed within the bibliography.

## 4.2 Site Inspection

4.2.1 During the course of the archaeological desk-based assessment, a physical walkover of the Site was undertaken on 24 October 2023. The inspection had the following purposes:

- to examine the areas of archaeological potential identified during the desk-based assessment; in particular, with a view to gauging the likely survival and condition of archaeological remains;
- to identify signs of disturbance or truncation within the Site which could affect archaeological potential;
- to review the presence/absence of earthworks indicative of the presence of archaeological remains i.e. ridge and furrow earthworks;
- to confirm the presence/absence of historic hedgerows; and
- to inform the Impact Assessment element of this document.

# 5 THE EVIDENCE

## 5.1 Topography, Geology, and Soils

5.1.1 The 5ha Site at Quarry Farm is located within the Parish of Northop between the settlements of Pentre and Oakenholt in the County of Flintshire, North Wales (NGR SJ 25852 71623). The land within the boundary of the Site slopes from a high point of 27m AOD in the south of the Site, to a low point of 15m AOD in the north of the Site. The Site is located on a north or north-western facing slope.

5.1.1 As noted above, the Site's northern and southern fields are divided by a trackway within a stand of trees. The fields are bounded by hedgerows. The northern boundary of the Site is set back along Chester Road, while the western boundary of the Site follows the course of Leadbrook Drive. At the eastern end of the Site, Fields 1 and 2 lie adjacent to residential development, with the south-west and south-east ends of Field 2 lying adjacent to neighbouring fields.

5.1.2 The solid geology recorded within the Site generally comprises mudstone, sandstone, and siltstone of the Pennine Lower Coal Measures. This is predominantly overlain by till. There are, however, strips of land within the Site which are underlain by sandstone only, some of which has no overlying till (British Geological Survey 2023).

## 5.2 Archaeological and Historical Background

5.2.1 The Clwyd-Powys Archaeological Trust Historic Environment Record was consulted for entries within the search area (taken as an area of approximately 1km radius from the Site boundary). Besides identifying historic assets that may be directly or indirectly affected by the proposed residential development, this boundary was expected to provide sufficient data to represent the archaeological character of the area. Information on designated historic assets was complemented by Wardell Armstrong's in-house databases. From these consultations it was established that there are three Grade II listed buildings and 183 non-designated historic assets recorded within the 1km search area, as detailed on Drawings LD10792-001 and LD10792-002.

***Previous Archaeological Work***

5.2.2 Excavations were undertaken in the 19$^{th}$ and 20$^{th}$ centuries in the north-western section of the 1km search area, which attested to Roman settlement activity in the area associated with lead working.

5.2.3 The construction of a roundabout on the A548 was subject to an archaeological watching brief in February 2013. The preliminary groundworks for the roundabout uncovered the unexpected presence of a well-persevered Roman road to the south of

the A548, with the Roman road previously being thought to be north of the A548. On reflection of the new evidence, it has been concluded that the Roman road recorded during the construction of the roundabout was most likely a spur from the main Roman Road that connected the forts at Chester and Caernarfon, which was located to the north of the A548 (Walter, M. 2014 *pers comm*., 10th April).

5.2.4 Adjacent to the previously unrecorded Roman road to the south of the A548 were settlement and industrial remains indicative of dense roadside settlement and lead working activity. This extended along the line of the road and *c*.20-30m back from it on both sides. As a consequence of the well-preserved and extensive archaeological remains, the construction of the roundabout was temporarily ceased whilst a rescue excavation was undertaken by Cadw. Fifteen trenches were excavated. These recorded two undated gullies/ditches, one post-medieval ditch, and the stone footings of a curvilinear structure most likely of Roman date between the 1st or early-2nd century and possibly a funerary monument or mausoleum. The latter feature was the only significant feature recorded during the trial-trenching and was located 150m west of the site.

5.2.5 Other fieldwork has been carried out in the area which also attests to Roman activity in the area. This has included the excavation of a small section of Roman road to the north of the A548, 90m north of the site (HER 17811). This was undertaken in 1993 by Wrexham Archaeology Service and is thought to be the main road connecting the forts at Chester and Caernarfon.

5.2.6 Wardell Armstrong carried out an archaeological evaluation of the Site in 2015, at which time the Site formed a larger footprint which included the present two fields, in addition to three fields extending to the south (Moore 2015). The evaluation comprised a total of 14 trenches following a desk-based assessment and geophysical survey in 2014 (Railton 2014). The evaluation identified potential Roman metalworking activity, water management features, a Romano-British cremation cemetery, the remains of a possible structure, an undated hearth, and 19th to 20th-century post holes. Pottery was also recovered which dated to the 1st to early-3rd centuries.

***General Historical Background***

*Prehistoric*

5.2.7 The HER does not record any evidence for prehistoric activity within the boundary of the Site. Within the 1km search area, prehistoric evidence, not described in detail, was found approximately 300m to the north-west of the Site boundary (HER 44890).

Approximately 451m south-east of the Site, various undated features were found which likely originated during the prehistoric period. These remains included a working hollow and a shallow terrace (HER 35018). Finally, a stone hammer with three encircling grooves, likely dating to the prehistoric period, was also found in a garden pond at Oakenholt Hall in 1932, (HER 100129).

*Romano British*

5.2.8 During the Roman period, lead from Halkyn Mountain was processed in the Pentre/Oakenholt area. The initial processing of the ore was most likely to have been undertaken at streams running into the Dee, whilst the final processing was undertaken at industrial settlements (Arnold & Davies 2000).

5.2.9 A known settlement in the vicinity of the Site, referred to as Croes Atti, is thought to have been established by the end of the 1st century with its centre located approximately 409-484m north-west of the Site. Within the Site boundary, evidence for this settlement includes the Croes Atti Roman Site, a Scheduled Ancient Monument located in the northern portion of Field 1 (Ref. 4386).

5.2.10 Additional Roman remains within the Site boundary include evidence of a cremation cemetery (HER 128788) in the north of the Site, and a possible Roman enclosure in the north-east corner of the Site (HER 128787). The cemetery was excavated in 2015 (WA 2015); eight cremations were found, six were un-urned with one found in a vessel of 1st-2nd century date. The other appeared to be in a small stone cist. The enclosure/square barrow was identified in 2014 which measured 10m across with ditches of 1-1.5m in width. Pottery was identified some of which were of cooking jars found within the ditch fills dating the 2nd century. The presence of the enclosure and cemetery suggests occupation activity within the Site, likely dating to the 1st and 2nd centuries.

5.2.11 Further evidence of the Croes Atti settlement includes non-designated assets located within the 1km study area such as furnaces (HER 57653; 128755; 128756; 128757; 128769), burials (HER 128750; 128751; 128752; 128780), the remains of a building (HER 128775), pits (HER 128764; 128793), a Roman road (HER 86956), a timber structure (HER 128722), remnants of walls (HER 128770; 12771), and buildings relating to a ship field (HER 128798; and 128798). Occupation continued into the 3rd century. Consequently, the HER is dominated by entries referring to the Roman period. These are predominantly located in the north-western portion of the 1km search area.

5.2.12 A possible Roman enclosure has also been recorded approximately 4m to the west of the Site (HER 152315), though potentially extending within the bounds of the Site. A

cast copper alloy bow brooch was found approximately 10m west of the Site boundary at the southern end of the Site (HER 120328) and the possible line of a Roman road to Varae is located approximately 13m to the east of the Site (HER 104577). A second Scheduled Ancient Monument of Roman date, the Pentre Bridge Roman Site, is located approximately 405m north-west of the Site.

*Early Medieval and Medieval*

5.2.13 King Edward I of England began to build Flint Castle in 1277, and Flint and its castle were later attacked by the forces of Madog ap Llywelyn during the revolt of 1294-5. English forces subsequently burned the town in order to render it useless to the Welsh (Flint Town Council). Flint Castle is featured in Act III, Scene III of the Shakespeare play Richard II due to its historical role in the handover of Richard II to his enemy Henry Bolingbroke in 1399.

5.2.14 During the medieval period, the town of Flint did not have a wall, but rather a defensive earthen and wooden palisaded ditch. The outline of this feature remained visible in the pattern of streets until the mid-1960s, and the medieval boundary can still be traced (*ibid*.).

5.2.15 There is no evidence for early medieval activity within the Site boundary or within the 1km search area. The HER does not record any evidence for medieval activity within the boundary of the Site.

5.2.16 Medieval ridge and furrow evidence is found approximately 64m north-west of the Site boundary (HER 86953). The site of a medieval cross is also located approximately 566m north-west of the Site boundary (HER 100130) and a medieval field system was discovered using aerial photography approximately 967m south-west of the Site (HER 102620). Furthermore, a silver short cross penny of either King Richard I or King John, dating from c. 1190-1205, was found approximately 600m west of the Site (HER 120378), and a broken silver-gilt ring with a slightly raised bezel was found approximately 859m south-west of the Site boundary (HER 119022).

*Post medieval and Modern (c.1540 to 1901)*

5.2.17 There are no post-medieval or modern archaeological remains within the Site boundary; however, 103 post-medieval assets are located within the 1km study area. These include a spoil heap associated with Quarry Farm located approximately 50m to the west of the Site boundary (HER 86948) and a road associated with the farm located approximately 66m west of the Site (HER 89569).

5.2.18 Other post-medieval assets within the study area include industrial remains such as those of Oakenholt Mill approximately 402m east of the Site (HER 104022), Oakenholt Colliery approximately 563m east of the Site (HER 89524), a limekiln field approximately 519m east of the Site (HER 89525), the Coed-onn Limekiln approximately 570m west of the Site (HER 104040), and the Pentre Flour Mill approximately 360m north-west of the Site (HER 104047).

5.2.19 Other post-medieval assets include several relating to the agricultural character of the broader area, including those associated with Little Leadbrook Farm approximately 419m south-west of the Site (HER 87992; 179114; 179115; 179116; 179117; 179118; 179119; 179120) and Leadbrook Farm approximately 340m south-east of the Site (HER 179108; 179111; 177984; 179112; 179109; 36189; 119883; 35019).

## 5.3 Cartographic Sources

5.3.1 The 1839 tithe map of Oakenholt shows the Site as having occupied portions of Plots 16, 18, 27, and 278. All plots are listed as having been owned by Sir William Lewis Salusbury Trelawney. Plot 278 was occupied by George Cooper with the land comprising a croft garden. Plots 16 and 18 are listed as arable land occupied by Thomas Morris. Plot 27 is listed as arable land and woodland which was occupied by Mrs Mary Bithell.

5.3.2 The Ordnance Survey map dating from 1871 to 1882 shows the presence of Quarry Farm, with field boundaries roughly in keeping with those present today. The Site is bounded by a road to the north and east, and adjacent fields to the west and south. A trackway is shown dividing the north and south fields, with a grassy area and pond lying at the west end of the Site. A collection of farm buildings is depicted in the south-west corner of the northern field, comprising an L-shaped range to the south, a rectangular building to the north with an extension to the south-west, and three small outbuildings lying between the two larger buildings. A path is shown running east to west and leading to the farm buildings in the northern field, and a small oval feature which might represent the location of an additional pond.

5.3.3 The historic Oakenholt Hall and Leadbrook Hall are shown lying to the south-east of the Site, and Little Leadbrook Hall to the south. The broader area was agricultural and industrial in character, with a mill and an alkali works to the north-west of the Site, a lime kiln to the south-west, and the Oakenholt flour mill to the east.

5.3.4 The Ordnance Survey map published in 1900 shows the Site in largely the same state; however, two small outbuildings at Quarry Farm had since been demolished. A rectangular farm building had also been constructed to the immediate west of the two

larger farm buildings which are shown on the 1871-1882 Ordnance Survey map. The 1900 edition also denotes the south field of the Site as the 'Old Quarry'.

5.3.5 Ordnance Survey maps published in 1913, 1946, and 1954 show no discernible changes in the Site.

## 5.4 Site Visit

5.4.1 The Site was observed to comprise two fields under pasture (Plate 1-8). The Site visit confirmed the presence of a depression in Field 1 (the northernmost field), measuring approximately 15m wide. This may have been a marl pit, and its period of origin is unknown.

5.4.2 Other remains within the Site which may be of archaeological interest are a trackway or holloway between Fields 1 and 2. This was first shown on the 1871-1880 Ordnance Survey map.

5.4.3 There was no visible evidence of the Croes Atti Roman Site, the Scheduled Ancient Monument recorded in the northern part of Field 1 (Ref. 4386).

# 6 ARCHAEOLOGICAL POTENTIAL

## 6.1 Summary Potential

6.1.1 Based on the evidence presented above the potential of the Site may be judged as follows:

6.1.2 ***Prehistoric – Low***. Prehistoric remains within the 1km search area are limited to three entries on the historic environment record situated at some distance from the proposed development Site. The Site, therefore, has a low archaeological potential for evidence dating from the prehistoric period.

6.1.3 ***Roman – Moderate***. A cemetery and enclosure/square barrow have been identified within the northern extent of the Site, and this area has been designated as a Scheduled Ancient Monument relating to the Croes Atti Roman settlement. Although this area has been subject to previous excavations there is potential for further remains associated with this occupation in the immediate surrounding area. A number of Romano-British historic assets have been recorded within the 1km study area surrounding the Site, including an additional Scheduled Ancient Monument associated with the Pentre Bridge Roman settlement. Roman assets found within the search area largely relate to various Roman settlements in and around Flint. Considering this, the Site has high archaeological potential for evidence associated with these settlements; however, considering that the proposed development layout excludes the northern portion of the Site and the paucity of remains identified in the south during the trial-trench evaluation and geophysical survey, this potential can be downgraded to moderate.

6.1.4 ***Early Medieval – Low***. No early medieval assets are recorded within the Site boundary, nor within the 1km study area. The Site, therefore, has a negligible to low archaeological potential for early medieval remains.

6.1.5 ***Medieval – Low.*** There are no medieval remains within the Site boundary. Medieval remains within the 1km search area are limited to ephemeral ridge and furrow, the site of a medieval cross, a silver penny, and a silver-gilt ring. As these assets are found at a distance from the Site and due to the fact that the Site has undergone recent archaeological evaluation, the Site has a low archaeological potential for further evidence dating from the medieval period.

6.1.6 ***Post-Medieval and later – Moderate***. The Site features two undated potential assets comprising a depression in the north field which may have formed a marl pit, and a trackway which runs between the north and south fields. The 1km study area

surrounding the Site features 103 non-designated historic assets dating to the post-medieval period and four dating to the modern period, with many of these assets relating to agriculture, milling, and other industrial activity. Despite the abundance of assets within the search area, the fact that the Site has undergone recent archaeological evaluation during which no additional assets were found diminishes the odds of finding such assets in the future. The Site, therefore, has a moderate archaeological potential for further evidence dating from these periods.

# 7 IMPACT ASSESSMENT

## 7.1 Proposed Development

7.1.1 It is proposed to develop the Site for residential use, with the construction of affordable housing and the laying out of new roads.

## 7.2 Direct Impacts

7.2.1 Appendix 2 describes the methodology for assessing the magnitude of impact and the overall significance of impact.

7.2.2 The Site has been identified as having a low archaeological potential for prehistoric, early medieval, and medieval remains; and moderate potential for Romano-British, post-medieval, and modern remains. This is based upon archaeological, historical, documentary, and cartographic evidence.

7.2.3 One Scheduled Ancient Monument, which comprises two non-designated historic assets of Roman origins, are located in the north of the Site. These non-designated historic assets include evidence of a cremation cemetery and a possible enclosure, all relating to the Croes Atti Roman settlement. In order to preserve these remains *in situ*, the proposed development layout excludes the area of the aforementioned Roman historic assets; no ground disturbance is anticipated which would impact these Roman remains. As such, the magnitude of impact of the proposed development on these archaeological remains is judged to result in no change to an asset of up to medium to high importance, which would equate to an impact of **neutral** significance. Regardless, the close proximity of the Croes Atti Roman settlement increases the likelihood of the presence of ancillary or peripheral remains on the Site, perhaps in the form of agricultural features like those identified in the south during the geophysical survey. These likely agricultural and peripheral features, if present, would are anticipated to be of low importance. Construction activity would impact upon these remains. This would result in a major magnitude of impact which, on an asset of low to medium significance, would equate to an impact of **slight to moderate adverse** significance.

7.2.4 There is also potential for unknown archaeological remains to be present within the Site. Any remains associated with the known archaeological resource of the wider area would be considered to be of local/regional (low to medium) importance, there being no evidence to indicate that remains of national (high importance) are present. Construction activity would also impact upon any unknown buried remains, if present. This would result in a major magnitude of impact which, on an asset of low to medium significance, would equate to an impact of **slight to moderate adverse** significance.

# 8 MITIGATION

8.1.1 In this instance, the archaeological evaluation is not considered necessary at the pre-determination stage; it being reasonably assumed that if evaluation was a pre-requisite of all applications potentially affecting archaeological remains then this would be expressly stated within the policy. As it is not, the requirement for field evaluation should be applied proportionally, most likely being required on sites where remains of potential high (national) importance could be located which could preclude development; or on sites where archaeological remains are known to survive. On the baseline presented here, there is no evidence to indicate the presence of remains of national importance.

8.1.2 It is anticipated that archaeological fieldwork, if it is required, could be delayed as a condition to consent, and undertaken as mitigation works, as a phased programme if considered necessary, in accordance with a Written Scheme of Investigation prepared in consultation with Flintshire County Council. This would be reasonable and proportionate on reflection of the information presented within the baseline data which indicates that there is no evidence to suggest the presence of remains within the boundary of the Site, which could preclude development.

# 9 COMPLIANCE WITH NATIONAL PLANNING POLICY AND LEGISLATION

## 9.1 Legislation

9.1.1 The proposals would not affect a Scheduled Ancient Monument, or other archaeological remains of national importance. The proposals would not therefore be in contravention of the Welsh Office Circular 60/96 Planning and the Historic Environment: Archaeology (1996).

## 9.2 Planning Policy

9.2.1 In accordance with Chapter 6 of Planning Policy Wales (February 2021) this assessment has described the significance of potential buried remains, which could be affected by the proposals. This report constitutes the appropriate desk-based assessment required and has demonstrated that a field evaluation to determine the application is not necessary in this instance. There is no indication that potential archaeological remains within the Site would preclude development and as such their potential removal could be mitigated by a programme of archaeological fieldwork undertaken as a condition to planning consent if this is deemed necessary by the Planning Archaeologist.

9.2.2 In accordance with Policy EN8 of the Flintshire Local Development Plan 2025-2030, this assessment has provided the sufficient information to assess the potential impacts of development on historic environment assets together with any proposed mitigation measures.

## 10 CONCLUSION

10.1.1 The Site has been identified as having a low archaeological potential for prehistoric, early medieval, and medieval remains; and moderate potential for Romano-British, post-medieval, and modern remains. This is based upon archaeological, historical, documentary, and cartographic evidence.

10.1.2 The geophysical survey undertaken across the Site in 2014 has confirmed that the archaeological potential of the Site is most likely limited to Field 1 in the north of the Site, with the evidence of a Roman cremation cemetery and a Roman enclosure, as well as a Scheduled Ancient Monument relating to the Croes Atti Roman settlement. It should be noted these have been subject to investigation but may be surrounded by other features of Roman origins. In order to preserve these significant remains *in situ*, the proposed development layout excludes the area of the aforementioned Roman historic assets; no ground disturbance is anticipated which would impact these Roman remains. Regardless, the close proximity of the Croes Atti Roman settlement increases the likelihood of the presence of ancillary or peripheral remains on the Site, perhaps in the form of agricultural features like those identified in the south during the geophysical survey. These likely agricultural and peripheral features, if present, would are anticipated to be of low importance. Construction activity would impact upon these remains. This would result in a major magnitude of impact which, on an asset of low to medium significance, would equate to an impact of slight to moderate adverse significance.

10.1.3 It is anticipated that no further work would be required at the predetermination stage.

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*Cartographic Sources*

Tithe Map of 1839

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# APPENDIX 1

## Plates

**Plate 1: Chester Rd and Leadbrook Dr, looking south down Leadbrook Dr**

**Plate 2: Access to the north field off Leadbrook Dr, looking west**

**Plate 3: The Site's north field, looking north**

**Plate 4: The Site's north field, looking south**

**Plate 5: A depression located in the Site's north field**

**Plate 6: A trackway between the north and south fields, looking west**

**Plate 7: The Site's south field, looking south**

**Plate 8: The Site's south field, looking north**

# APPENDIX 2

## DMRB Impact Assessment Methodology

In ascribing levels of **importance** to historic assets, the Design Manual for Roads and Bridges, LA 104 Environmental Assessment and Monitoring (Highways England 2019) has been used, see Table 1 below.

The **magnitude of impact** is measured from the condition that would prevail in a 'do nothing' scenario and it is assessed without regard to the importance of the receptor (Highways England, 2019).

The worst magnitude of impact would be loss of resource and/or quality and integrity of resource and severe damage to key characteristics, features or elements.

In ascribing the magnitude of impact, guidance presented in the Design Manual for Roads and Bridges, LA 104 Environmental Assessment and Monitoring (Highways England 2019) has been used, see Table 2 below.

The **significance of impact** is devised by cross referencing the importance of the receptor with the magnitude of the impact, see Table 3. In some cases, the significance of impact is shown as being one of two alternatives. In these cases, a single description should be decided upon with reasoned judgement for that level of significance chosen.

**Table 1: Establishing the importance of a historic asset**

| Value (sensitivity) | Typical description |
|---|---|
| Very High | Very high importance and rarity, international scale and very limited potential for substitution |
| High | High importance and rarity, national scale, and limited potential for substitution |
| Medium | Medium or high importance and rarity, regional scale, limited potential for substitution. |
| Low | Low or medium importance and rarity, local scale |
| Negligible | Very low importance and rarity, local scale |

Design Manual for Roads and Bridges, LA 104 Environmental Assessment and Monitoring (Highways England 2019)

**Table 2: Establishing the magnitude of impact**

| Magnitude of impact (change) | | Typical description |
|---|---|---|
| Major | Adverse | Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements. |
| | Beneficial | Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality. |
| Moderate | Adverse | Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements. |
| | Beneficial | Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality. |
| Minor | Adverse | Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements. |
| | Beneficial | Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring. |

| Magnitude of impact (change) | | Typical description |
|---|---|---|
| Negligible | Adverse | Very minor loss or detrimental alteration to one or more characteristics, features or elements. |
| | Beneficial | Very minor benefit to or positive addition of one or more characteristics, features or elements. |
| No change | | No loss or alteration of characteristics, features or elements; no observable impact in either direction. |

Design Manual for Roads and Bridges, LA 104 Environmental Assessment and Monitoring (Highways England, 2019)

**Table 3: Establishing the significance of impact**

| | | | | | | |
|---|---|---|---|---|---|---|
| **Value/Importance** | **Very High** | Neutral | Slight | Moderate/large | Large or very large | Very large |
| | **High** | Neutral | Slight | Slight or moderate | Moderate or large | Large or very large |
| | **Medium** | Neutral | Neutral/slight | Slight | Moderate | Moderate or large |
| | **Low** | Neutral | Neutral or slight | Neutral or slight | Slight | Slight or moderate |
| | **Negligible** | Neutral | Neutral | Neutral or slight | Neutral or slight | Slight |
| | | **No change** | **Negligible** | **Minor** | **Moderate** | **Major** |
| | | **Magnitude of impact** | | | | |

Design Manual for Roads and Bridges, LA 104 Environmental Assessment and Monitoring (Highways England, 2019

**Table 4: Significance categories**

| Significance Category | Typical Description |
|---|---|
| **Very large** | Effects at this level are material in the decision-making process. |
| **Large** | Effects at this level are likely to be material in the decision-making process |
| **Moderate** | Effects at this level can be considered to be material decision-making factors |
| **Slight** | Effects at this level are not material in the decision-making process |
| **Neutral** | No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error |

Design Manual for Roads and Bridges, LA 104 Environmental Assessment and Monitoring (Highways England, 2019)

**APPENDIX 3**
**Geophysical Survey Report**

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DESK BASED ASSESSMENTS
ARCHAEOLOGICAL EVALUATION
ARCHAEOLOGICAL EXCAVATION
GEOPHYSICAL SURVEY
TOPOGRAPHIC AND LANDSCAPE SURVEY
HISTORIC BUILDING RECORDING
ENVIRONMENTAL SERVICES

# LAND AT
# QUARRY FARM
# OAKENHOLT
# FLINT

## GEOPHYSICAL SURVEY
## REPORT

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**DATE ISSUED:** June 2014
**JOB NUMBER:** CP10907
**GRID REFERENCE:** SJ 2570 7150

# ROTHSCHILD TRUST (SCHWEIZ) AG

# LAND AT QUARRY FARM,

# OAKENHOLT, FLINT

## GEOPHYSICAL SURVEY REPORT

**PREPARED BY:**

Martin Railton Senior Project Manager

**APPROVED BY:**

Frank Giecco Technical Director

*This report has been prepared by Wardell Armstrong Archaeology with all reasonable skill, care and diligence, within the terms of the Contract with the Client. The report is confidential to the Client and Wardell Armstrong Archaeology accepts no responsibility of whatever nature to third parties to whom this report may be made known.*

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# ILLUSTRATIONS

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# SUMMARY

Wardell Armstrong Archaeology have undertaken a geophysical survey of land at Quarry Farm, Oakenholt, Flint, at the request of Wardell Armstrong LLP to provide information to inform a proposed development at the site. Magnetic survey was undertaken within a five fields of pasture to the south and east of Quarry Farm. The survey area was centred on Ordnance Survey grid reference SJ 257 715, and measured approximately 12.5ha in total.

The objective of the geophysical surveys was to determine the presence/absence, nature and extent of potential archaeological features within the study area, and the presence/absence of any known modern features within the survey area, which may affect the results. Modern service pipes were detected crossing the north part of the site. A possible plaeochannel was also detected on the south side of the survey area.

It is believed that a Roman road crossed the north side of the site, and was most likely a spur from the main Roman road, which connected the forts at Chester and Caernarfon. The geophysical survey detected a series of anomalies in this area, which appear to indicate the presence of property boundaries, structures and possible industrial activity extending up to c.20m either side of the road. Two possible small square enclosures were also detected to the south of the road.

A series of former field boundary ditches, some of which are depicted on the 1839 Tithe Map for Northop, and the 1871-1880 Ordnance Survey map, were also detected. Possible land drains and/or plough furrows were also detected by the survey.

# 1 INTRODUCTION

## 1.1 CIRCUMSTANCES OF THE PROJECT (FIGURE 1)

1.1.1 Between 19th and 23rd April 2014 Wardell Armstrong Archaeology undertook a geophysical survey of land at Quarry Farm, near Oakenholt, Flint. The survey was commissioned by Wardell Armstrong LLP, on behalf of their client Rothschild Trust (Schweiz) Ag, to provide information to support a proposed residential development at the site. The archaeological work was undertaken in accordance with a Wardell Armstrong Archaeology project design, which was submitted to Mark Walters, Development Control Archaeologist, Clwyd-Powys Archaeological Trust, for approval prior to the start of the survey. This is in line with government advice as set out in Section 12 of the National Planning Policy Framework (NPPF 2012).

1.1.2 The survey area lies within several fields to the northwest of Oakenholt, south of the A548 and the River Dee, immediately east and south of Quarry Farm, in Flintshire (Figure 1). The site is centred on Ordnance Survey grid reference SJ 2570 7150, and measures approximately 12.5ha in total.

1.1.3 It is recognised that the proposed development at Quarry Farm has the potential to physically impact buried archaeological remains, including possible archaeological features associated with the projected course of a Roman road, which runs through the northern part of the site (Wardell Armstrong 2014).

1.1.4 The objective of the geophysical survey therefore was to determine the presence/absence, nature and extent of potential archaeological features within the survey area, and the presence/absence of any known modern features within the survey area, which may affect the results. This report outlines the results of the geophysical survey undertaken, and includes an interpretation of the geophysical survey results.

# 2 METHODOLOGY

## 2.1 PROJECT DESIGN

2.1.1 A project design was submitted by Wardell Armstrong Archaeology in response to a request Wardell Armstrong LLP, for a geophysical survey of the study area (Railton 2014). Following this, Wardell Armstrong Archaeology was commissioned by the client to undertake the work. The project design was adhered to in full, and the work was consistent with English Heritage guidelines (English Heritage 2008), and in accordance with the standard and guidance of the Institute for Archaeologists (IfA 2011).

## 2.2 GEOPHYSICAL SURVEYS

2.2.1 ***Technique Selection:*** geomagnetic survey was selected as the most appropriate technique, given the non-igneous environment, and the expected presence of cut archaeological features at depths of no more than 1.5m. This technique involves the use of hand-held gradiometers, which measure variations in the vertical component of the earth's magnetic field. These variations can be due to the presence of sub-surface archaeological features. Data were recorded by the instruments and downloaded into a laptop computer for initial data processing in the field using specialist software.

2.2.2 ***Field Methods:*** the geophysical study area measured *c.*12.5ha in total, and covered the five separate fields of pasture (Areas 1-5). A 30m grid was established across each area, and tied-in to known Ordnance Survey points using a Trimble R8 GPS system.

2.2.3 Geomagnetic measurements were determined using a Bartington Grad601-2 dual gradiometer system, with twin sensors set 1m apart. It was expected that significant archaeological features at a depth of up to 1.5m would be detected using this arrangement. The survey was undertaken using a zig-zag traverse scheme, with data being logged in 30m grid units. A sample interval of 0.25m was used, with a traverse interval of 1m, providing 3600 sample measurements per grid unit, with measurements being recorded at the centre of each grid cell. The data were downloaded on site into a laptop computer for processing and storage.

2.2.4 ***Data Processing:*** geophysical survey data were processed using Terra Surveyor software, which was used to produce 'grey-scale' images of the raw data. Positive magnetic anomalies are displayed as dark grey, and negative magnetic anomalies are displayed as light grey. A palette bar shows the relationship between the grey shades and geomagnetic values in nT.

2.2.5 Raw data were processed in order to further define and highlight the archaeological features detected. The following basic data processing functions were used:

*Destripe:* to reduce the effect of striping in the gradiometer data, sometimes caused by misalignment of the twin sensors (zero mean traverse was performed on all survey grids).

*Despike:* to locate and suppress random iron spikes in the gradiometer data (despike was performed on all survey grids using a window of 5x5 and threshold of 2.0).

*Destagger:* to reduce location inaccuracies in the gradiometer data, sometimes caused by operator error (destagger applied in both the x and y directions by -2 readings).

*Clip:* to clip data to specified maximum and minimum values, in order to limit large noise spikes in the geophysical data (clipped from -3nT to 3nT).

2.2.6 ***Interpretation:*** five types of geophysical anomaly were detected in the gradiometer data:

*positive magnetic:* regions of anomalously high or positive magnetic data, which may be associated with the presence of high magnetic susceptibility soil-filled features, such as pits or ditches.

*negative magnetic:* regions of anomalously low or negative magnetic data, which may be associated with features of low magnetic susceptibility, such as stone-built features, geological features, land-drains or sub-surface voids.

*dipolar magnetic:* regions of paired positive and negative magnetic anomalies, which typically reflect ferrous or fired materials, including fired/ferrous debris in the topsoil, or fired structures, such as kilns or hearths.

*bipolar magnetic:* typically linear anomalies comprising alternating positive and negative magnetic responses, representing buried metallic structures or service pipes.

*magnetic disturbance:* areas of high amplitude magnetic disturbance or interference, which may be associated with the presence of modern structures, such as services, fences or buildings.

2.2.7 ***Presentation:*** the grey-scale images were combined with site survey data and Ordnance Survey data to produce the geophysical survey figures. Colour-coded geophysical interpretation diagrams are provided, showing the locations and extent of positive, negative, dipolar and bipolar geomagnetic anomalies and areas of magnetic disturbance.

2.2.8 Archaeological interpretation diagrams are also provided, which are based on the interpretation of the geophysical survey results in light of the archaeological and historical context of the site.

2.2.9 Plots of the raw unprocessed data are included in Appendix 1, which are clipped for display purposes only from -10nT to 10nT.

## 2.3 ARCHIVE

2.3.1 The data archive for the geophysical survey has been created in accordance with the recommendations of the Archaeology Data Service (ADS 2013). This archive is currently held at the company offices at Carlisle, Cumbria. The archive comprises a compressed (zipped) file folder, containing the geophysics data, documentation (metadata), and other project material (report and field notes).

2.3.2 One copy of the final report will be deposited with the County Historic Environment Record, where viewing will be available on request.

# 3 BACKGROUND

## 3.1 LOCATION AND GEOLOGICAL CONTEXT

3.1.1 The proposed development area at Quarry Farm is located within the Parish of Northop, between the settlements of Pentre and Oakenholt, in the County of Flintshire, North Wales (centred on NGR SJ 257 715). The land within the site boundary slopes from high point of 35m AOD in the south of the site, to a low point of 15m AOD in the north of the site; being located on a north or northwest facing slope. This area is bound by Chester Road (A548) to the north and Leadbrook Drive to the east with Quarry Farm to the west (Figure 1).

3.1.2 The underlying geology at the site comprises mudstone, sandstone and siltstone, known as the Pennine Lower Coal Measures Formation. Tidal flat deposits lies to the north of the site close to the River Dee, in an environment previously dominated by swamps, estuaries and deltas (BGS 2001).

3.1.3 The overlying soils are known as Clifton soils, which are deep permeable course loamy soils affected by groundwater. These are associated with seasonally waterlogged fine and coarse loamy soils (SSEW 1980).

## 3.2 ARCHAEOLOGICAL BACKGROUND

3.2.1 An archaeological desk-based assessment of the site is being produced by Wardell Armstrong LLP, a summary of which is provided below (Wardell Armstrong LLP 2014). This is based mostly on secondary sources and is intended only as a brief introduction to the historic and archaeology of the site. References to the Historic Environment Record (HER) are included, where known.

3.2.3 ***Prehistoric:*** No known prehistoric sites are recorded within the proposed development area. However, possible prehistoric features, comprising a hollow and a terrace are recorded 440m to the southeast of the site boundary (HER 35017/8). A Bronze Age find is also recorded 730m to the west of the site (HER 100134). A further 'prehistoric' find (HER 44890) is recorded 300m northwest of the site, attesting to early activity in the area (Wardell Armstrong LLP 2014, 8).

3.2.4 ***Romano-British:*** During the Roman period, it is believed that lead from Halkyn Mountain was processed in the Pentre/Oakenholt area. The initial processing of the ore was most likely to have been undertaken at streams running into the Dee, whilst it is believed that the final processing was undertaken at industrial settlements (Arnold & Davies 2000).

3.2.5 A known settlement is thought to have been established by the end of the first century at Pentre, approximately 0.5km northwest of the site (HER 19946) with occupation continuing into the third century. Numerous Roman finds have been recovered to the northwest of the site, including coins, burials and buildings, including furnaces and a villa (Wardell Armstrong LLP 2014).

3.2.6 Within the site boundary, HER entries are restricted to the findspot of a Roman brooch (HER 120328). However, recent fieldwork has indicated that a Roman road, with intensive roadside activity related to lead working, may be present within the northern part of the proposed development area (see Section 3.3).

3.2.7 ***Medieval:*** No known medieval activity is recorded within the Historic Environment Record within the proposed development area. However, a medieval settlement is known to have existed at Oakenholt, located 490m east of the site (HER 19946). The site of a medieval cross is also located 540m northeast of the site boundary (HER 100130).

3.2.8 ***Post medieval and Modern:*** The earliest cartographic evidence studied as part of the assessment was the 1839 Tithe Map for Northop. Field names on this map included Quarry Field and Quarry Croft, which, along with Quarry Farm immediately west of the site, indicates the presence of quarrying activity within and near the boundary of the site. Indeed, two possible quarries are depicted within the southwest side of the proposed development area.

3.2.9 By the time of the production of the 1871-1880 Ordnance Survey map, several field boundaries appear to have gone out of use. Similarly, by the time of the production of the 1897-1898 Ordnance Survey map, several of the tithe map boundaries previously dividing the site had been removed to make fewer larger fields (Wardell Armstrong LLP 2014). .

### 3.3 PREVIOUS ARCHAEOLOGICAL WORK

3.3.1 Recent archaeological work has recorded the presence of a previously-unknown Roman road, which is believed to follow an alignment through the northern part of the proposed development area.

3.3.2 The excavation of a small section of Roman road to the north of the A548, (90m north of the current site) was undertaken in 1993 by Wrexham Archaeology Service. This is thought to be part of the main road connecting the forts at Chester and Caernarfon (HER 17811).

3.3.3 In February 2013 an archaeological watching brief was undertaken during the construction of a roundabout on the A548. Preliminary groundworks for the roundabout revealed the unexpected presence of another well persevered Roman road, running to the south of the A548 (the Roman road was previously thought only to be north of the A548). On reflection of the new evidence, it was concluded that the Roman road recorded during the construction of the roundabout was most likely a spur from the main Roman Road, which connected the forts at Chester and Caernarfon, and was located to the north of the A548 (Mark Walters *pers. comm*. 10th April 2014).

3.3.4 Settlement and industrial activity, indicative of dense roadside settlement and lead-working, were recorded adjacent Roman road south of the A548. This extended along the line of the road and continued for a distance of up to c.20-30m on both sides. As a consequence, a rescue excavation was undertaken by Cadw. The results of this excavation are not yet readily available.

3.3.5 An archaeological evaluation was also undertaken in advance of a residential development located 150m to the west of the current site. Fifteen trenches were excavated in total, which recorded two undated ditches, one post-medieval ditch, and the stone footings of a curvilinear structure, believed to be Roman in date. This is believed to be part of a first or early second century funerary monument/mausoleum (Wardell Armstrong LLP 2014, 6).

# 4 THE GEOPHYSICAL SURVEYS

## 4.1 INTRODUCTION (FIGURE 2)

4.1.1 The geophysical surveys were undertaken between 19th and 23rd April 2014. Geomagnetic survey was undertaken over the whole of the study area (Areas 1-5), excluding some small areas of vegetation (Figure 2). The survey areas were bounded by field boundaries consisting of mature hedges, some of which included post & wire fences. These fences produced strong magnetic disturbance around the periphery of some of the survey areas.

4.1.2 Small discrete dipolar magnetic anomalies were detected across the whole of the study area. These are almost certainly caused by fired/ferrous litter in the topsoil, which is typical for modern agricultural land. These anomalies are indicated on the geophysical interpretation drawings, but not referred to again in the subsequent interpretations.

## 4.2 AREA 1 (FIGURES 3-5)

4.2.1 Area 1 was located within a sub-rectangular field on the north side of the proposed development area, south of the A548. This area was bounded by a play park to the north, Leadbrook Drive to the east, and a track to the south. Strong magnetic disturbance was detected on the east and west sides of Area 1 due to the presence of post & wire fences.

4.2.2 Two strong linear bipolar magnetic anomalies were detected crossing the south side of Area 1. These exhibited magnetic field strengths in excess of -3000nT to 300nT, and are almost certainly due to the presence of modern service pipes. A linear positive magnetic anomaly was detected immediately to the north of these anomalies, which is interpreted as a possible water pipe or drain.

4.2.3 A series of linear positive magnetic anomalies were detected over the northern part of Area 1, aligned approximately northeast to southwest, with magnetic field strengths of between c.0.8nT to c.2.5nT. It is possible that these anomalies soil-filled ditches or boundary features. It is possible these features represent the flanking ditches of a Roman road, which is believed to cross the site in this location. Further linear positive magnetic anomalies were detected running perpendicular to these, aligned approximately north to south, which may represent further soil-filled boundary ditches flanking both sides of the road.

4.2.4 A series of discrete positive magnetic anomalies were detected either side of the possible Roman road, with magnetic field strengths of between c.2.5nT to c.7.5nT, which may represent the remains of soil-filled pits, or the foundations of buildings or other structures.

4.2.5 Further positive magnetic anomalies were detected to the south of these features, which appear to define at least two possible small sub-rectangular enclosures or structures. These measured *c*.8m across, being open to the north.

4.2.6 A series of other weak linear positive magnetic anomalies were detected crossing Area 1, aligned approximately northwest to southeast, the nature of which is uncertain. These may represent soil-filled gullies. However, it is also possible that these represent plough furrows or other agricultural features.

4.2.7 Two further weak linear positive magnetic anomalies were detected crossing the south side of Area 1, which appear indistinct, and may be geological.

### 4.3 AREA 2 (FIGURES 6-8)

4.3.1 Area 2 was located within a separate field to the south of Area 1, separated by a trackway and an area of vegetation. Several telegraph posts were present in Area 2, which produced strong dipolar magnetic anomalies in the gradiometer data. A survey station was also present, which also produced a strong dipolar anomaly.

4.3.2 A 10m-long linear positive magnetic anomaly was detected on the northern edge of Area 2, aligned approximately north to south. This exhibited magnetic field strengths of between c.2nT and c.12nT, and may represent a soil-filled ditch. Similar features were detected elsewhere at the site (see Section 4.4 & 4.5 below), which indicate this anomaly may represent part of a former field boundary.

4.3.3 A series of parallel very weak linear positive magnetic anomalies were detected on the south side of Area 2, aligned east to west. These were spaced on average 7m apart and are likely to represent agricultural features, such as plough furrows or land drains.

4.3.4 A series of other weak linear positive magnetic anomalies were detected crossing Area 2, aligned approximately northwest to southeast, and north to south, the nature of which is uncertain. These may represent plough furrows or other agricultural features.

### 4.4 AREA 3 (FIGURES 9-11)

4.4.1 Area 3 was located within a separate field to the south of Quarry Farm, to the southwest of Area 2. This was separated from Area 2 by a stream. Strong magnetic disturbance was detected on the west side of Area 3 due to the presence of post & wire fences.

4.4.2 A linear positive magnetic anomaly was detected crossing the east and south sides of Area 3, aligned north to south and northeast to southwest. This exhibited magnetic field strengths of between c.2nT and c.12nT, and is believed to represent the soil-filled ditch of a former field boundary.

### 4.5 AREA 4 (FIGURES 12-14)

4.5.1 Area 4 was located to the west of Area 3, south of Quarry Farm. A waterlogged area/marsh was present at the centre of Area 3, which could not be surveyed.

4.5.2 Several linear positive magnetic anomalies were detected crossing the north side of Area 4, aligned north to south and approximately northeast to southwest. These exhibited magnetic field strengths of between c.2.5nT and c.6.5nT, and are believed to represent the soil-filled ditches of former field boundaries. Field boundaries are depicted in this location on the 1839 Tithe Map for Northop.

4.5.3 A further linear positive magnetic anomaly was detected on the east side of Area 3, aligned east to west, the nature of which is uncertain. This feature corresponded to the location of a former quarry depicted on the 1839 Tithe Map. It may therefore represent a later boundary feature or drainage ditch.

4.5.4 A weak linear positive magnetic anomalies were detected crossing the north side of Area 4, aligned east to west, which appeared indistinct, and may be geological.

### 4.6 AREA 5 (FIGURES 15-17)

4.6.1 Area 5 was located within a field on the southwest side of the proposed development area, south of Area 4. A stream bound the west side of this area. Strong magnetic disturbance was detected on the southeast side of Area 5 due to the presence of post & wire fences.

4.6.2 Several curvilinear and indistinct positive magnetic anomalies were detected crossing on the southwest side of Area 5, aligned approximately north to south. These exhibited magnetic field strengths of between c.2.5nT and c.12.5nT, and may represent soil-filled features. The presence of the nearby stream, and the irregular nature of these anomalies, strongly suggests the presence of a palaeochannel (former stream channel).

4.6.3 A series of parallel very weak linear positive magnetic anomalies were detected on the south side of Area 5, aligned northwest to southeast. These were spaced on average 7m apart and are likely to represent agricultural features, such as plough furrows or land drains.

4.6.4 A further series of weak linear positive magnetic anomalies were detected on the north side of Area 5, aligned north to south. These were spaced on average 15m apart and are also interpreted as possible land drains.

### 4.7 DISCUSSION

4.7.1 An area of potential archaeological activity has been detected on the north side of the proposed development area, which is believed to relate to a Roman road. This appears to cross the north side Area 1, with a northwest to southeast alignment. Anomalies detected on either side of this alignment are indicative of road side property boundaries, structures, and possible industrial activity, which extend up to *c*.20m from the road. Two possible small square enclosures have also been detected to the south of the road.

4.7.2 Elsewhere at the site the geophysical surveys have detected a series of former field boundary ditches, some of which are depicted on the 1839 Tithe Map for Northop, and the 1871-1880 Ordnance Survey map, but have since been removed. Possible land drains and/or plough furrows have also been detected, some of which could potentially represent ridge and furrow cultivation of possible medieval or post-medieval date.

4.7.3 A former quarry and possible palaeochannel have also been detected on the south side of the site in Area 5. A number of modern service pipes have also been detected crossing Area 1, which may be associated with Quarry Farm.

4.7.4 If required it is possible that further information could be gained regarding the nature, scale and layout of the archaeological features in Area 1, using a closer traverse interval (e.g. 0.5m) or an alternative technique (e.g. resistance survey).

# 5 CONCLUSIONS

## 5.1 CONCLUSIONS

5.1.1 Geomagnetic survey covering *c*.12.5ha of land has been conducted within several fields of pasture at Quarry Farm, Oakenholt, Flint, covering the proposed location of a new residential development.

5.1.2 The surveys detected a number of modern features, including service pipes, and modern ferrous structures (e.g. telegraph poles and fences). A possible plaeochannel was also detected on the south side of the site.

5.1.3 The most notable features detected were a series of positive magnetic anomalies, present over the northern part of the survey area, which are believed to be associated with the alignment of a Roman road. These anomalies appear to indicate the presence of property boundaries, structures and possible industrial activity extending up to *c*.20m either side of the road. Two possible small square enclosures have also been detected to the south.

5.1.4 A series of former field boundary ditches, some of which are depicted on the 1839 Tithe Map for Northop, and the 1871-1880 Ordnance Survey map, were also detected. Possible land drains and/or plough furrows were also detected.

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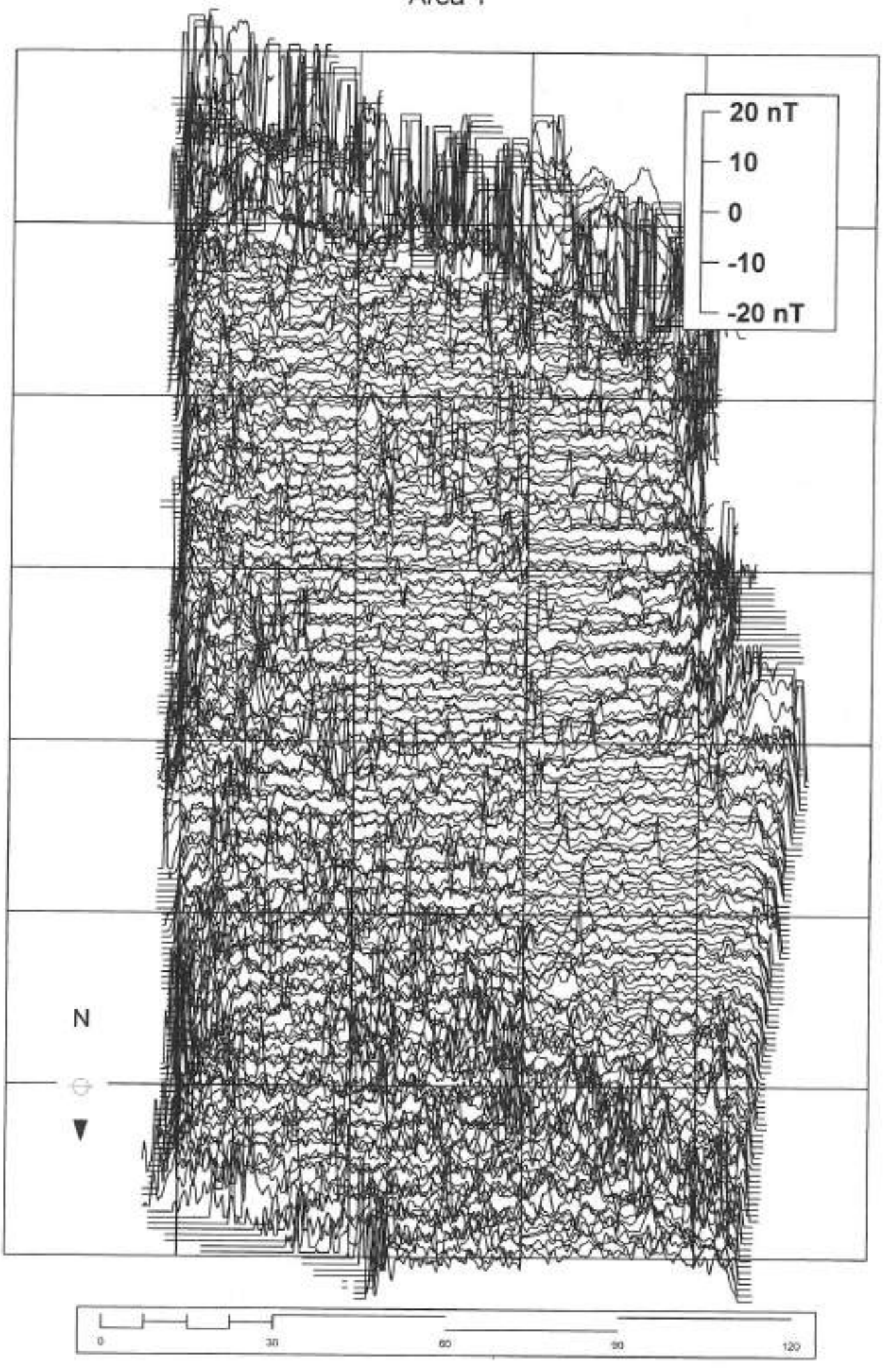
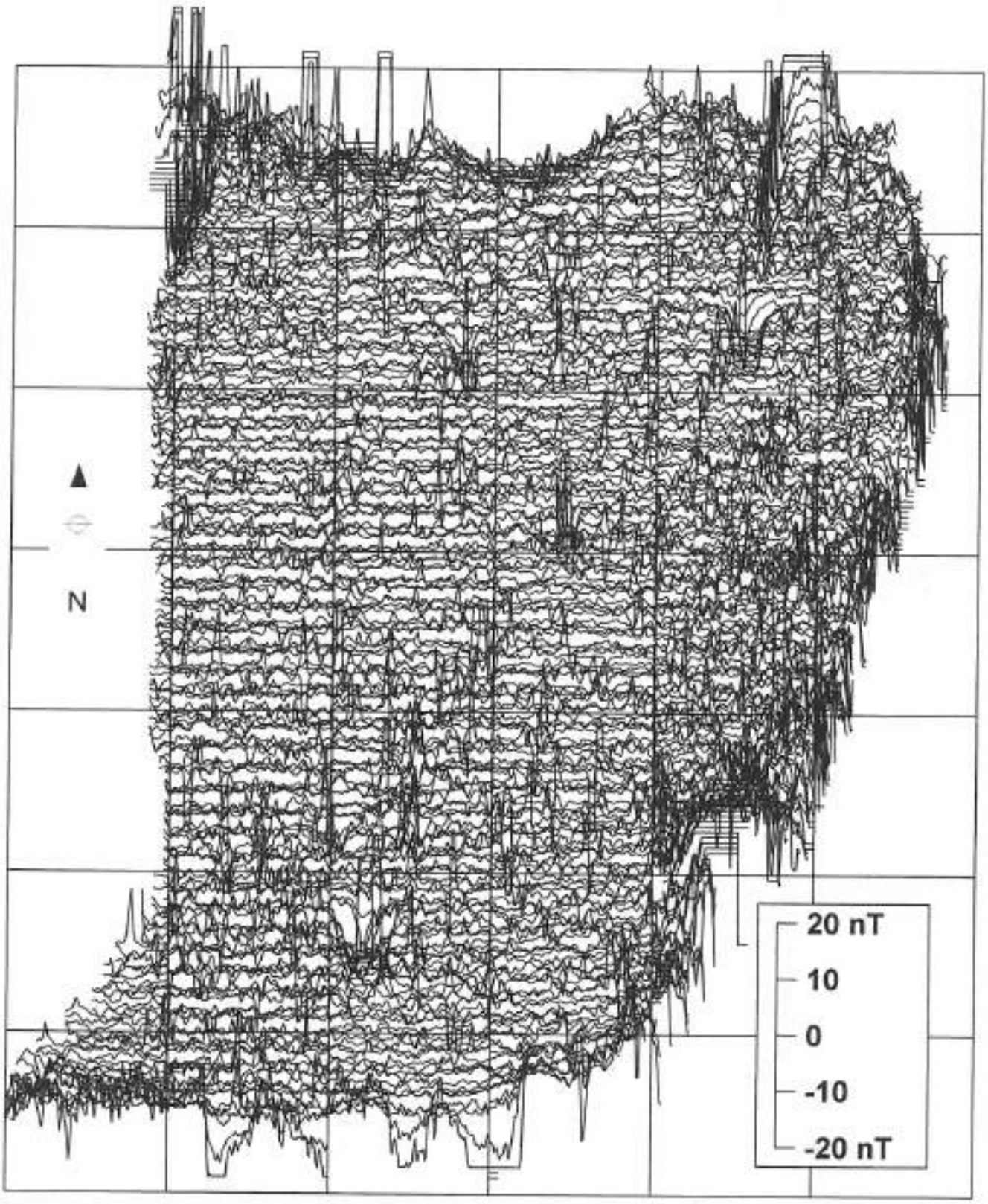
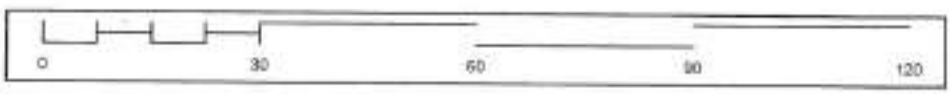
# APPENDIX 1: TRACE PLOTS

Area 1

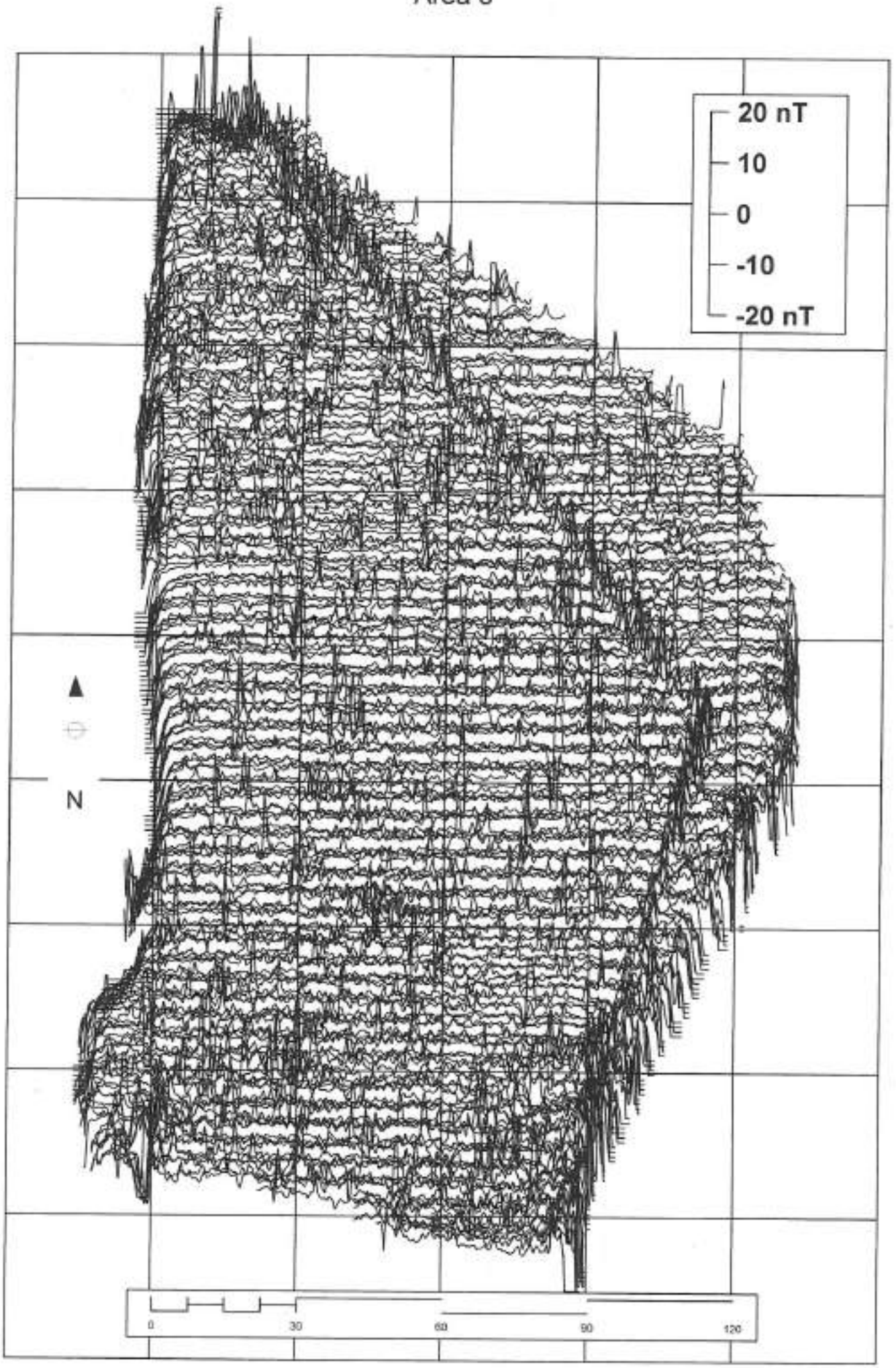


Area 2

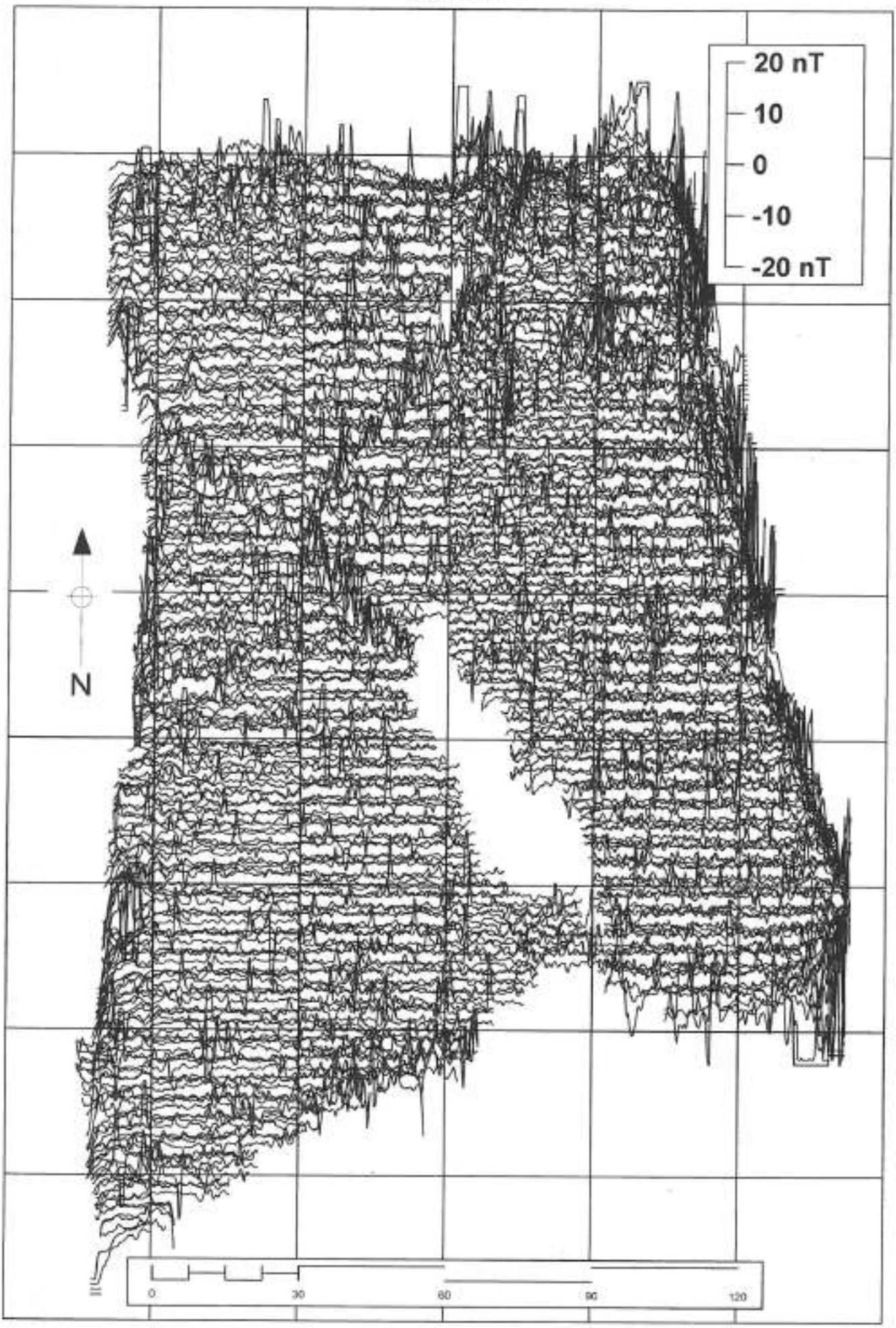


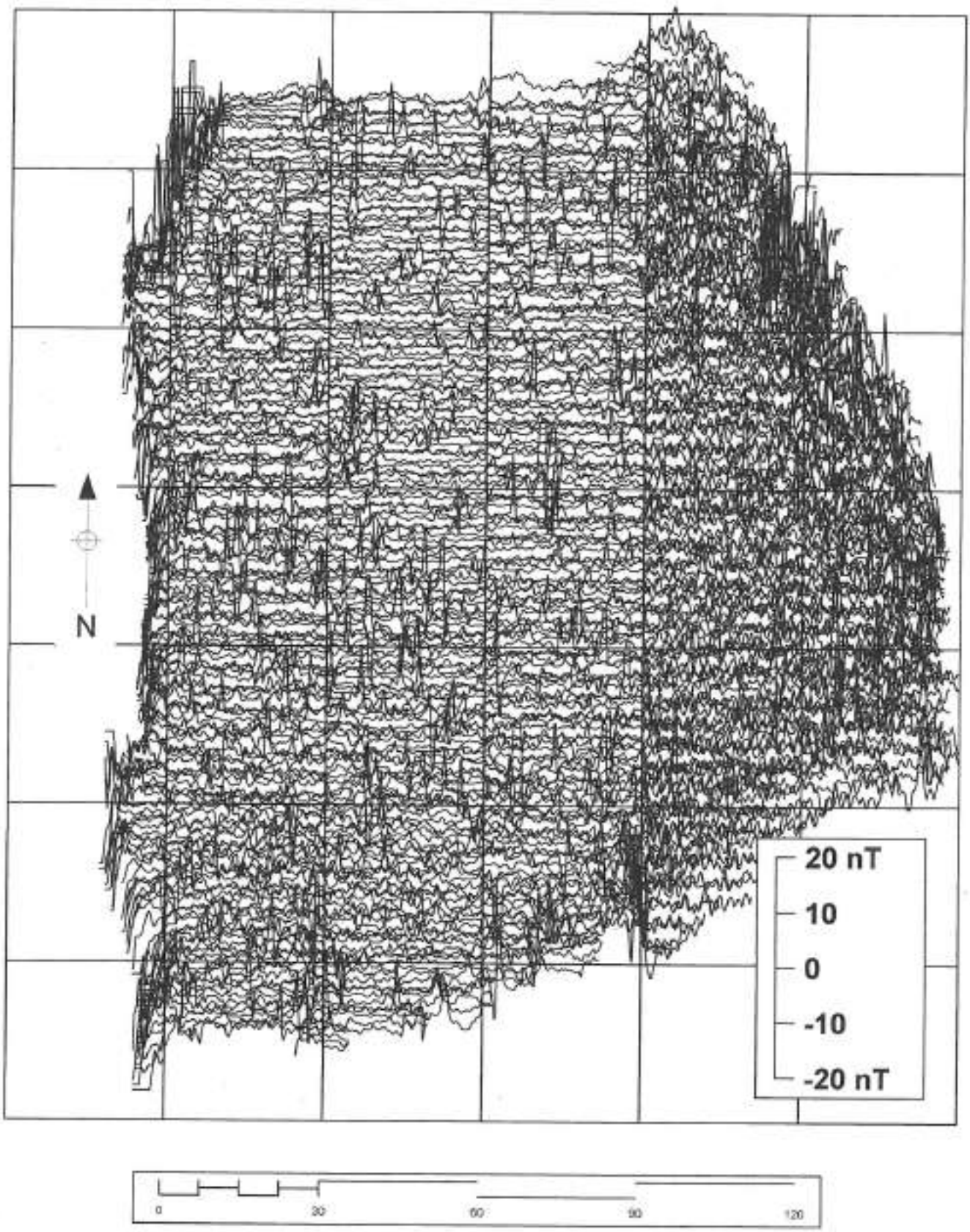
Area 3



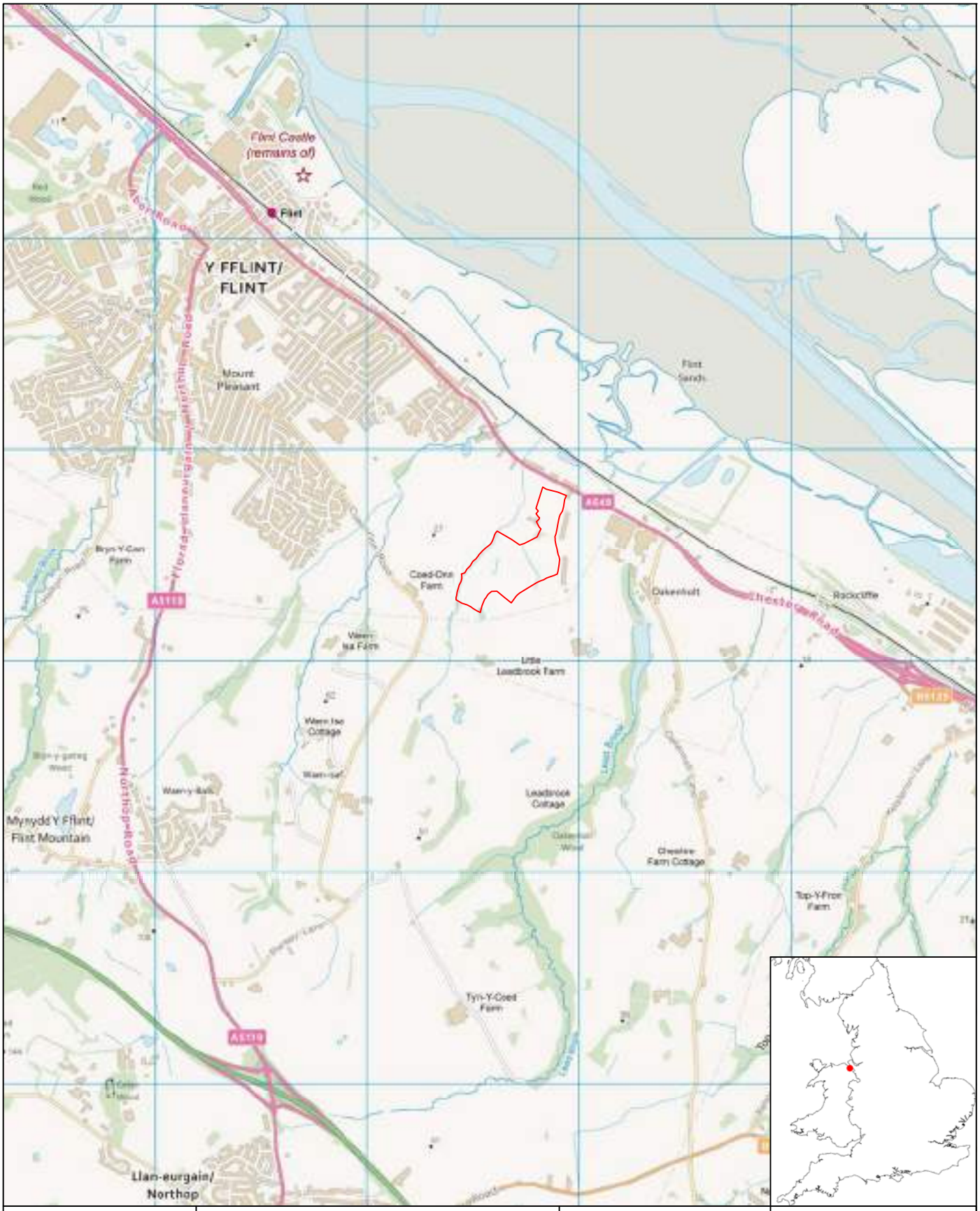
Area 4



Area 5



# APPENDIX 2: FIGURES

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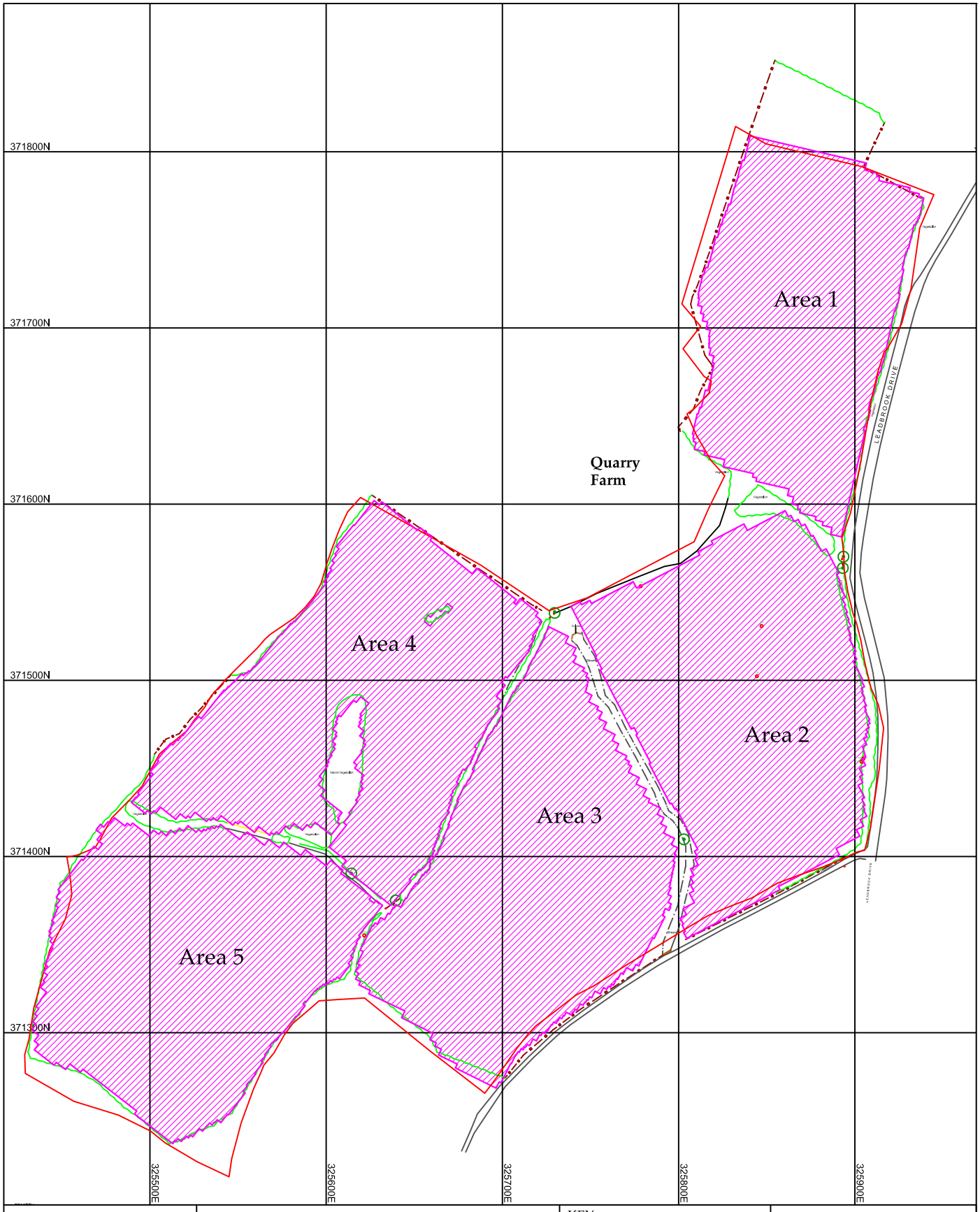
| wardell armstrong archaeology<br><br>Wardell Armstrong Archaeology 2014 | PROJECT: Quarry Farm, Oakenholt, Flint<br>SCALE: 1:25,000 at A4<br>REPORT No: CP10907<br>CLIENT: Rothschild Trust (Schweiz) AG<br>DRAWN BY: AB<br>DATE: June 2014<br>FIGURE: 1 | KEY:<br>Site location | Reproduced by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office. © Crown copyright. All rights reserved. Licence number 100019512 |

Figure 1: Site location.

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| CLIENT: | Rothschild Trust (Schweiz) AG |
| DRAWN BY: | MDR |
| DATE: | June 2014 |
| FIGURE: | 2 |

KEY:

Outline of proposed development

Geophysical survey area

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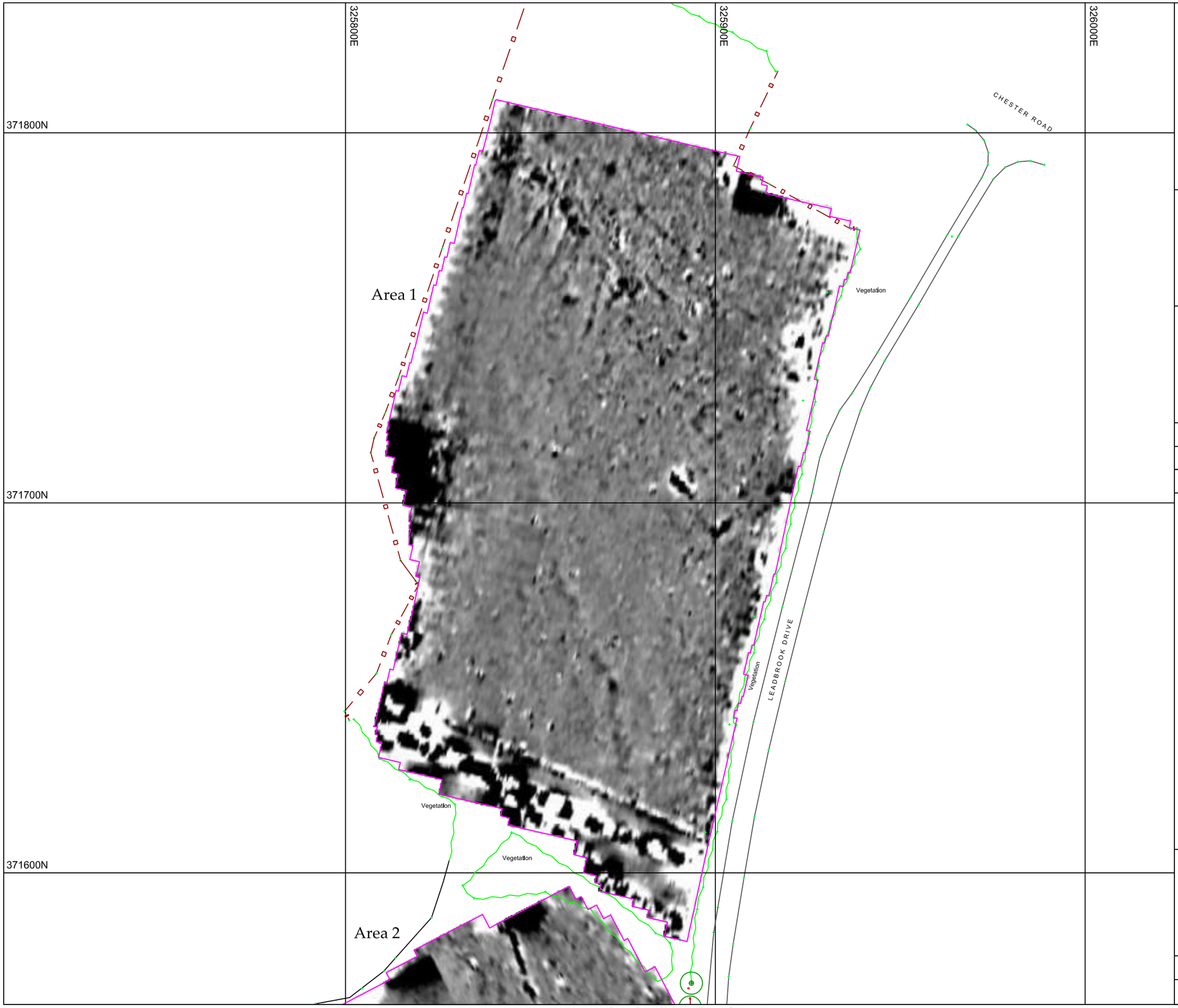
Figure 2: Location of the geophysical survey areas (Areas 1-5).

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SCALE: 1:1,000 at A3

DRAWN BY: MDR

DATE: June 2014

KEY:

Outline of geophysical survey area

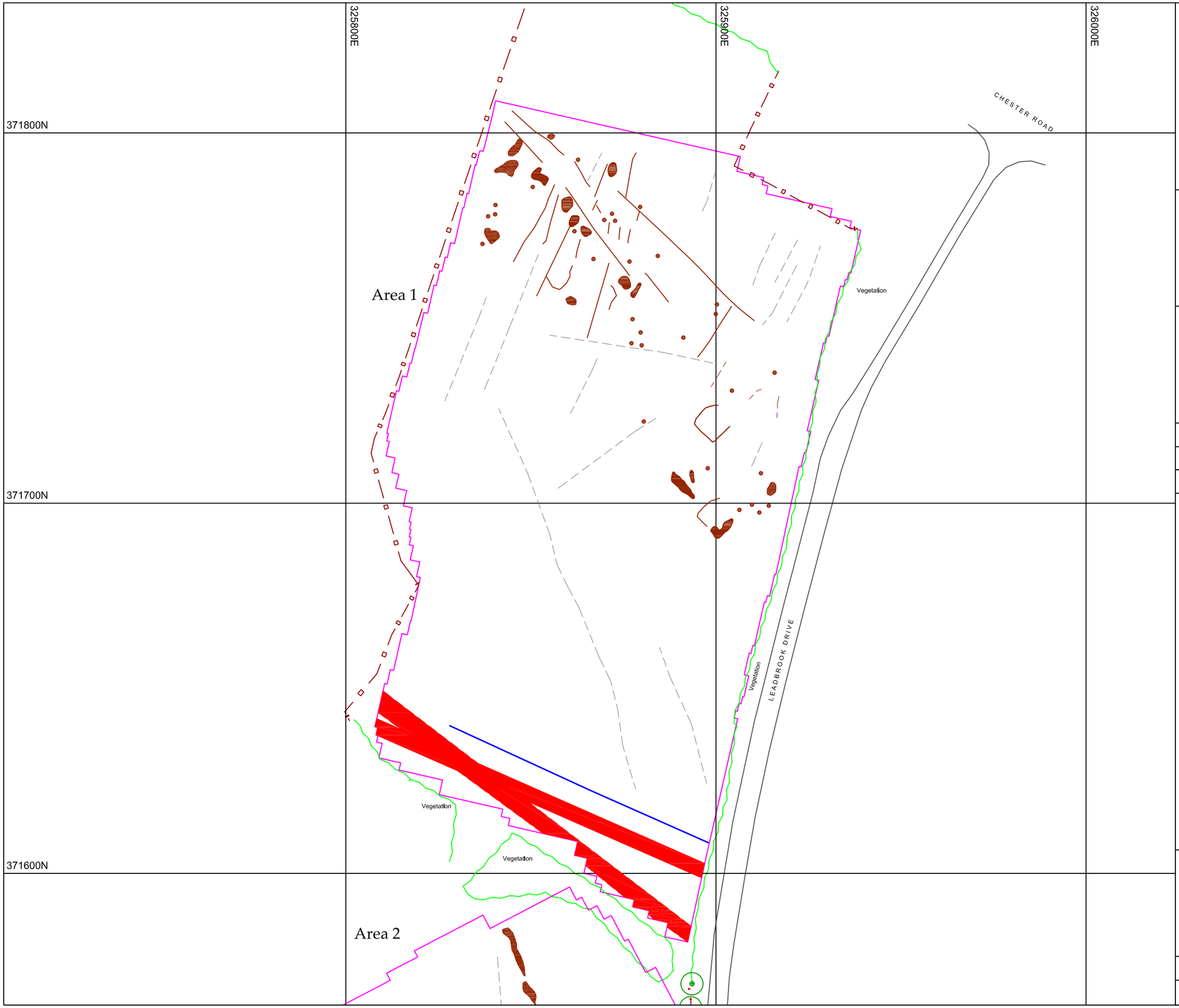
3 nT
2.4
1.8
1.2
0.6
0
-0.6
-1.2
-1.8
-2.4
-3 nT

REPORT No: CP10907

FIGURE: 3

Figure 3: Geophysical survey of Area 1.


Figure 4: Geophysical interpretation of Area 1.

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SCALE: 1:1,000 at A3

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DATE: June 2014

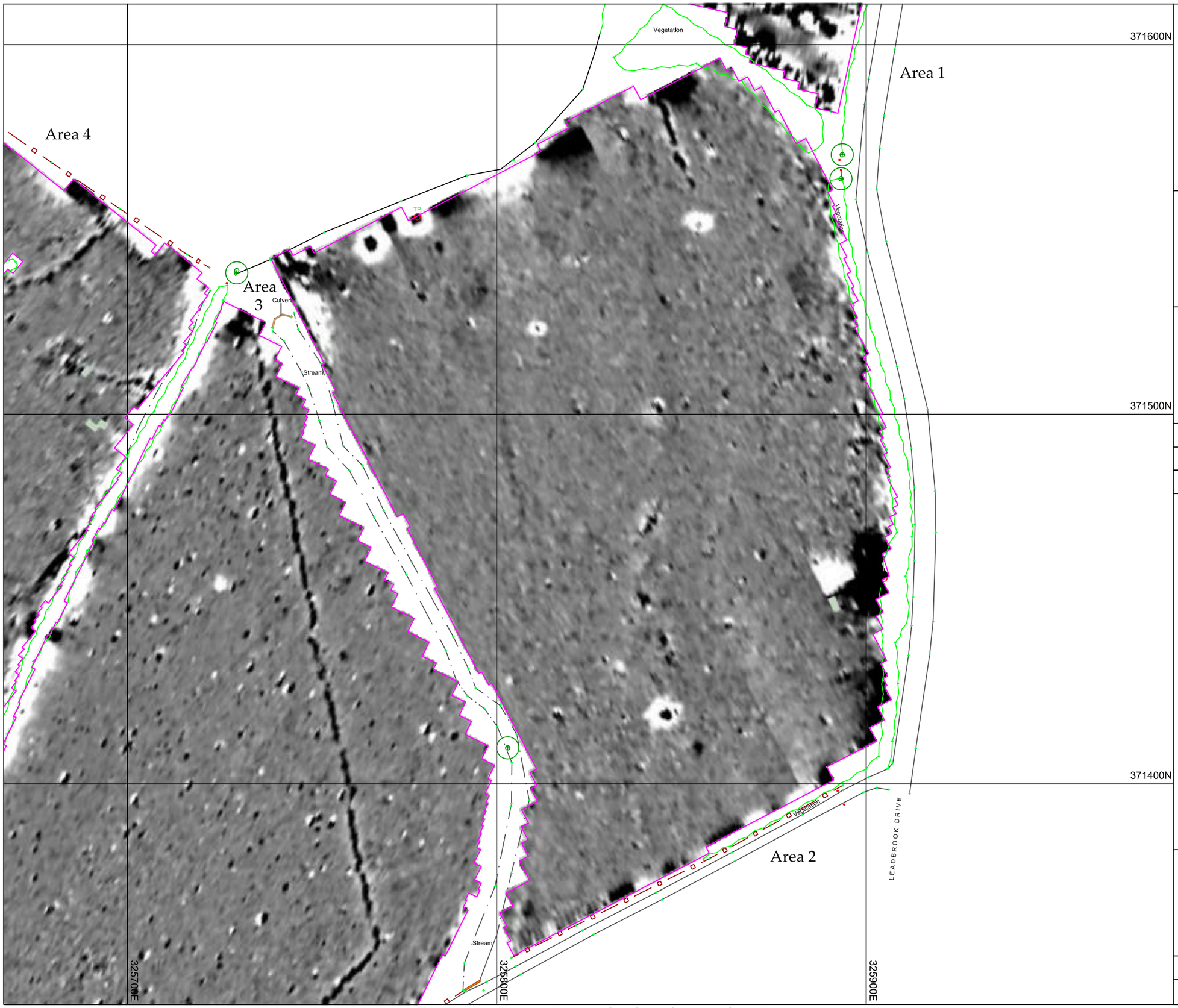
KEY:

- Outline of geophysical survey area
- Possible soil-filled features
- Uncertain linear features
- Possible drain/water pipe
- Service pipes

REPORT No: CP10907

FIGURE: 5

Figure 5: Archaeological interpretation of Area 1.

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SCALE: 1:1,000 at A3

DRAWN BY: MDR

DATE: June 2014

KEY:

Outline of geophysical survey area

3 nT
2.4
1.8
1.2
0.6
0
-0.6
-1.2
-1.8
-2.4
-3 nT

REPORT No: CP10907

FIGURE: 6

Figure 6: Geophysical survey of Area 2.

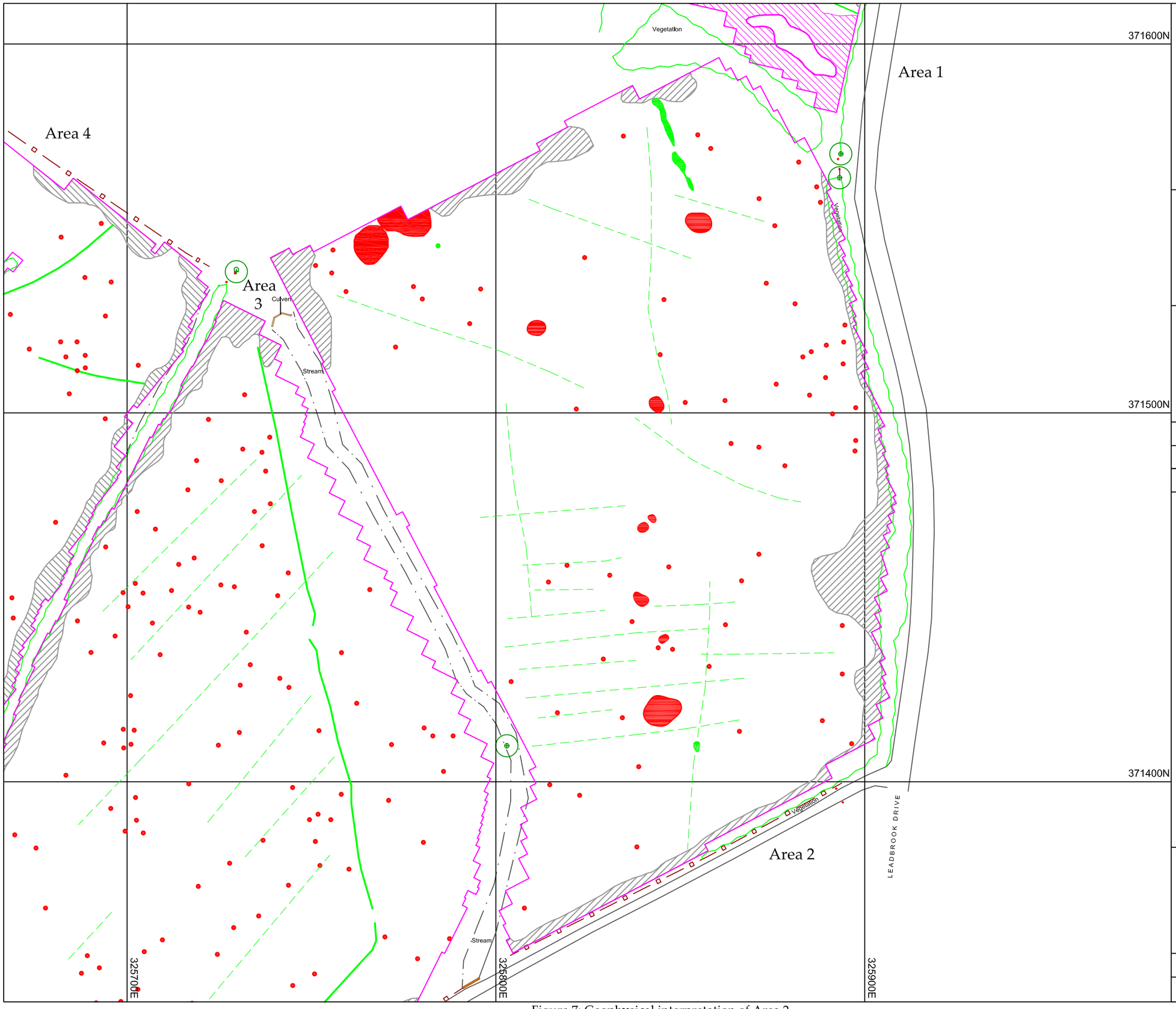


Figure 7: Geophysical interpretation of Area 2.

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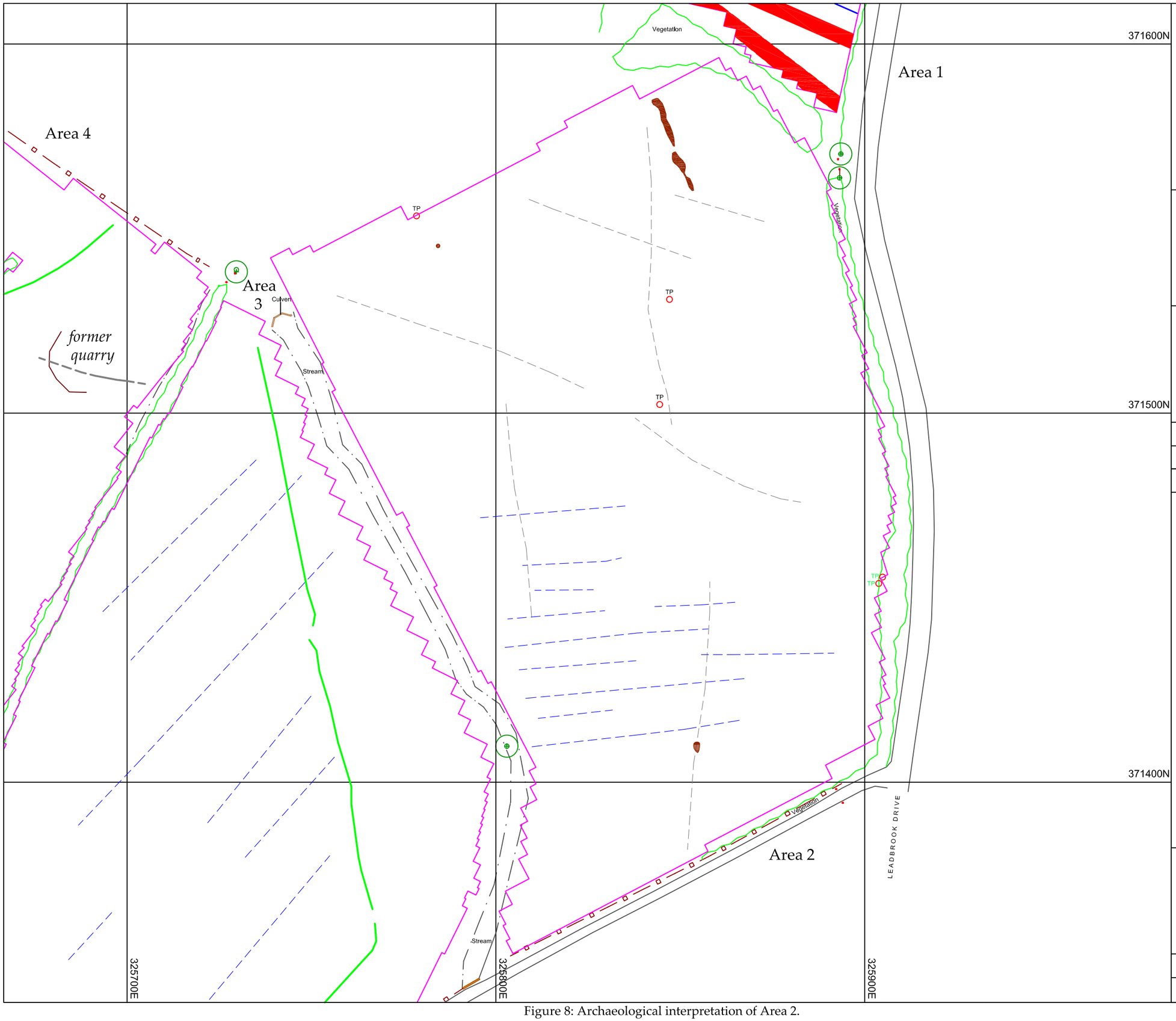
DATE: June 2014

KEY:

- Outline of geophysical survey area
- Positive magnetic anomalies
- Dipolar magnetic anomalies
- Bipolar magnetic anomalies
- Magnetic disturbance

REPORT No: CP10907

FIGURE: 7

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SCALE: 1:1,000 at A3

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DATE: June 2014

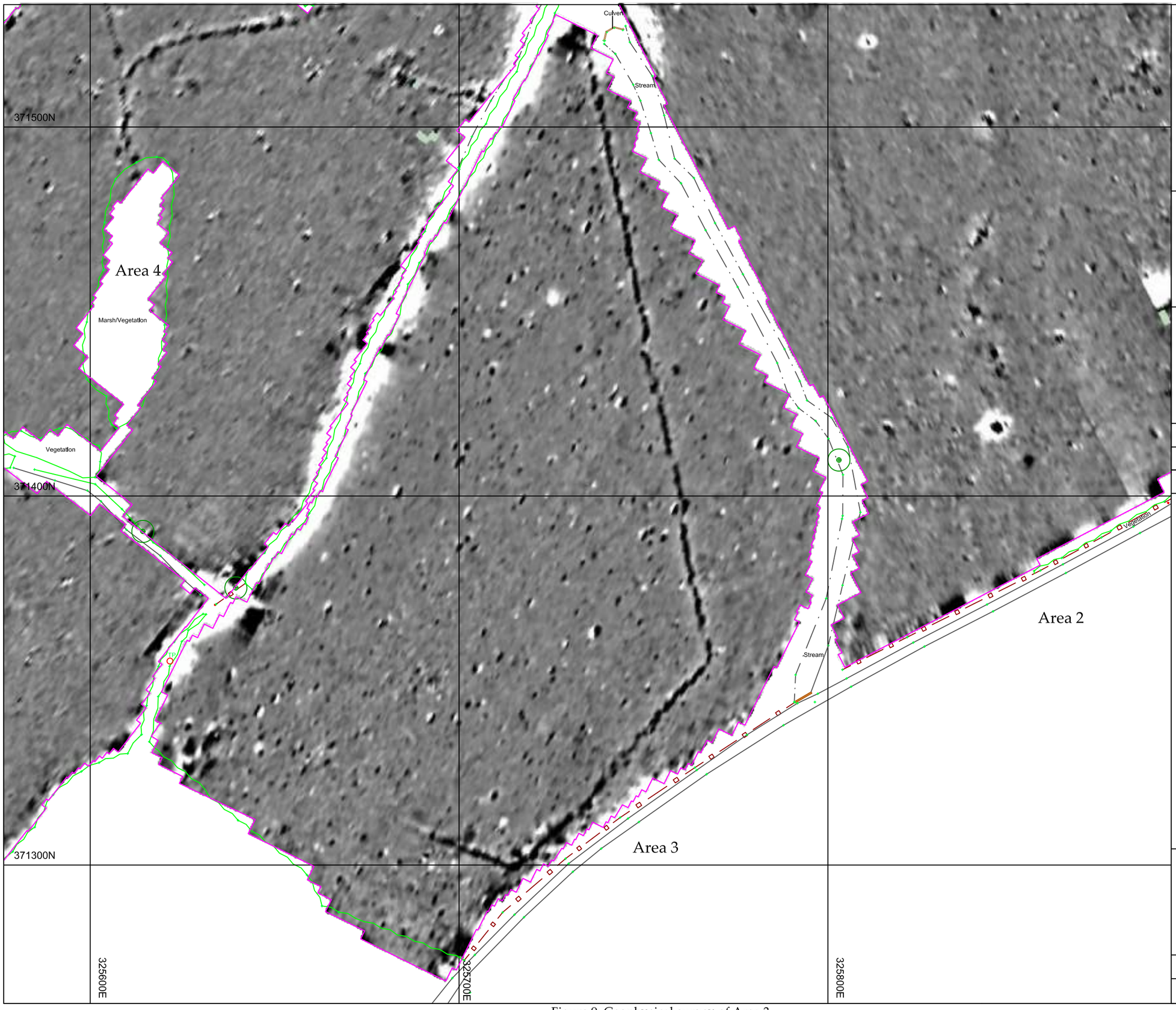
KEY:

- Outline of geophysical survey area
- Possible soil-filled features
- Former field boundary
- Uncertain linear features
- Possible land drain
- Service pipes

REPORT No: CP10907

FIGURE: 8

Figure 8: Archaeological interpretation of Area 2.

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SCALE: 1:1,000 at A3

DRAWN BY: MDR

DATE: June 2014

KEY:

Outline of geophysical survey area

3 nT
2.4
1.8
1.2
0.6
0
-0.6
-1.2
-1.8
-2.4
-3 nT

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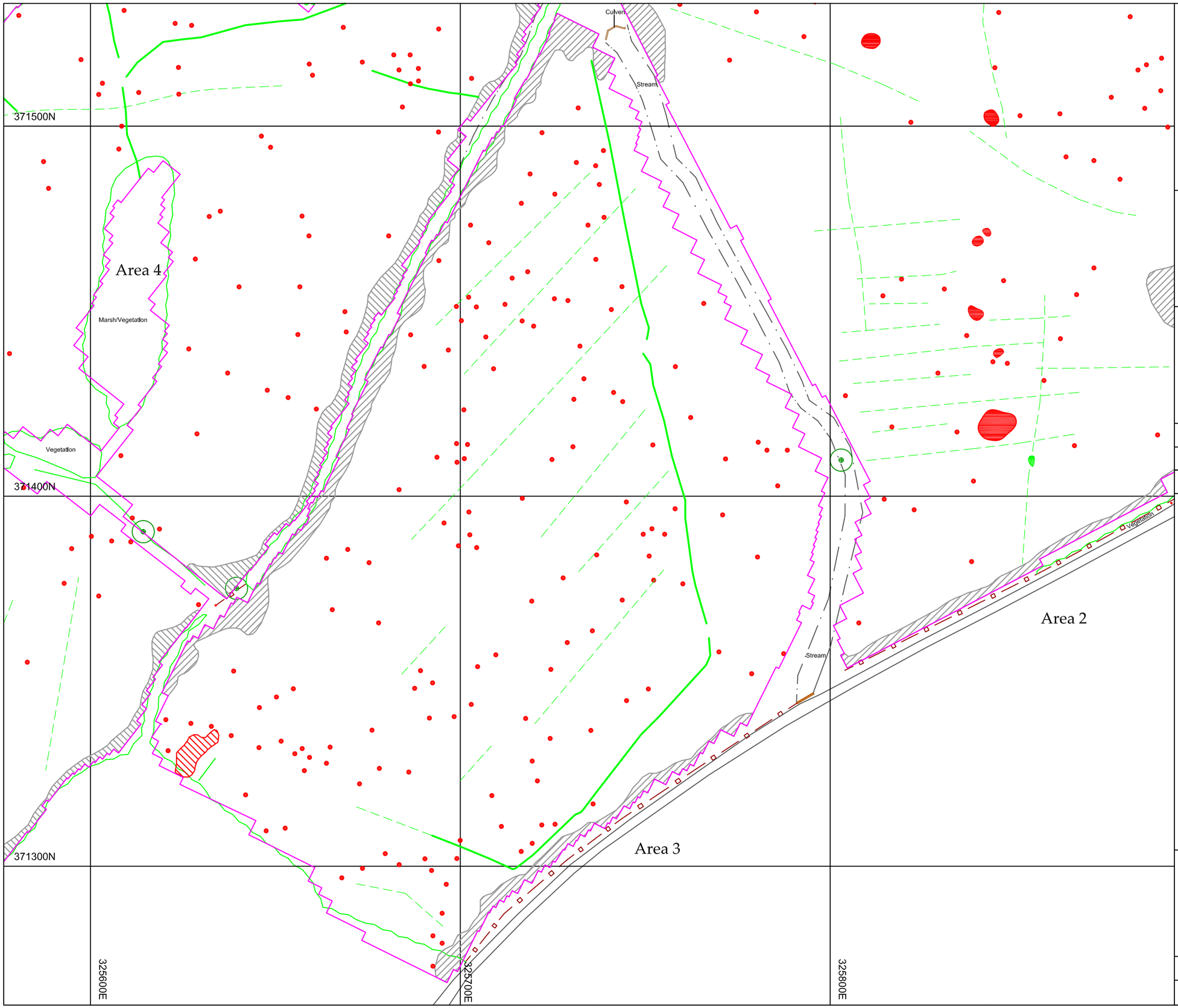
FIGURE: 9

Figure 9: Geophysical survey of Area 3.

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KEY:

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- Positive magnetic anomalies
- Dipolar magnetic anomalies
- Magnetic disturbance

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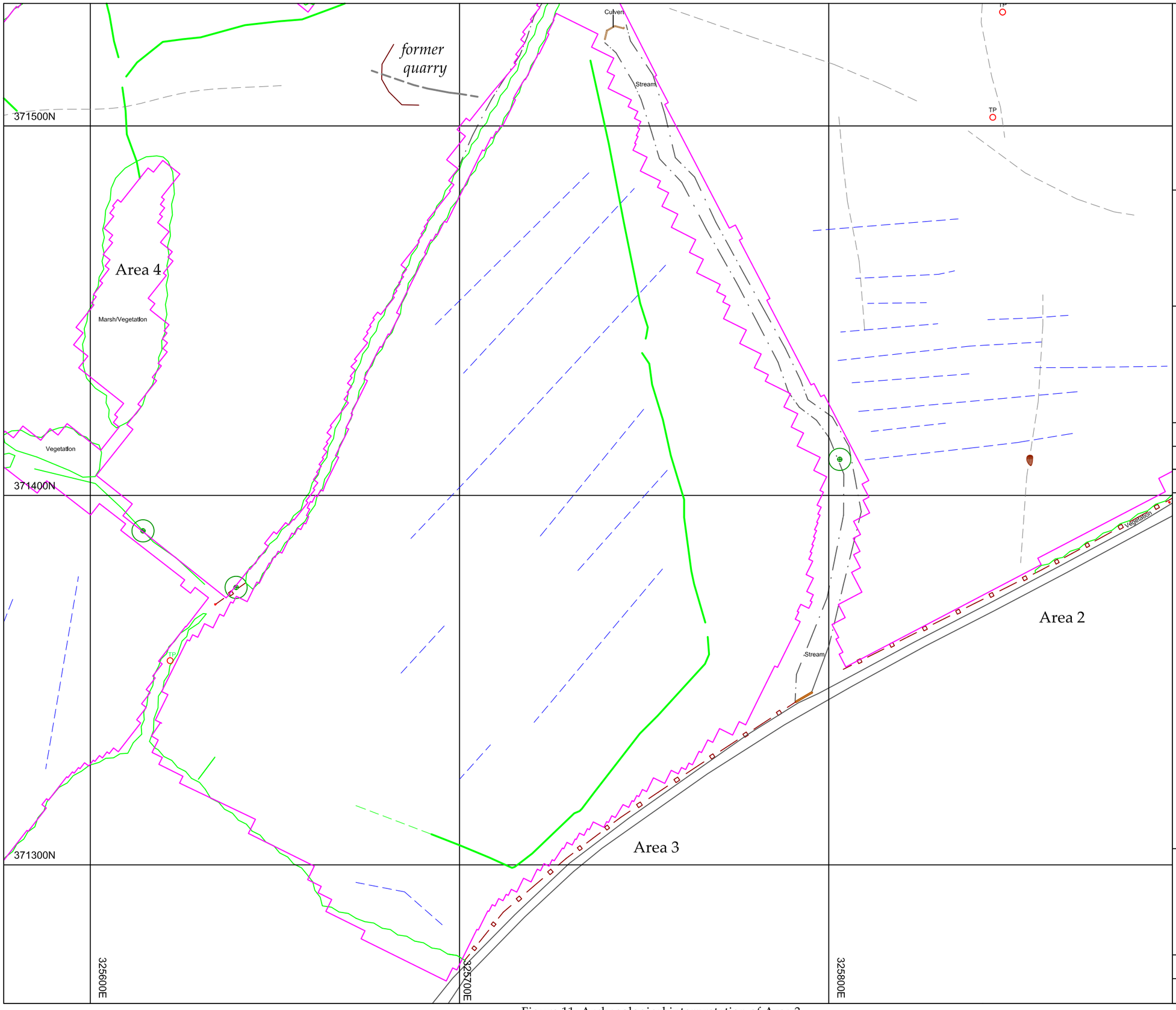
FIGURE: 10

Figure 10: Geophysical interpretation of Area 3.

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DATE: June 2014

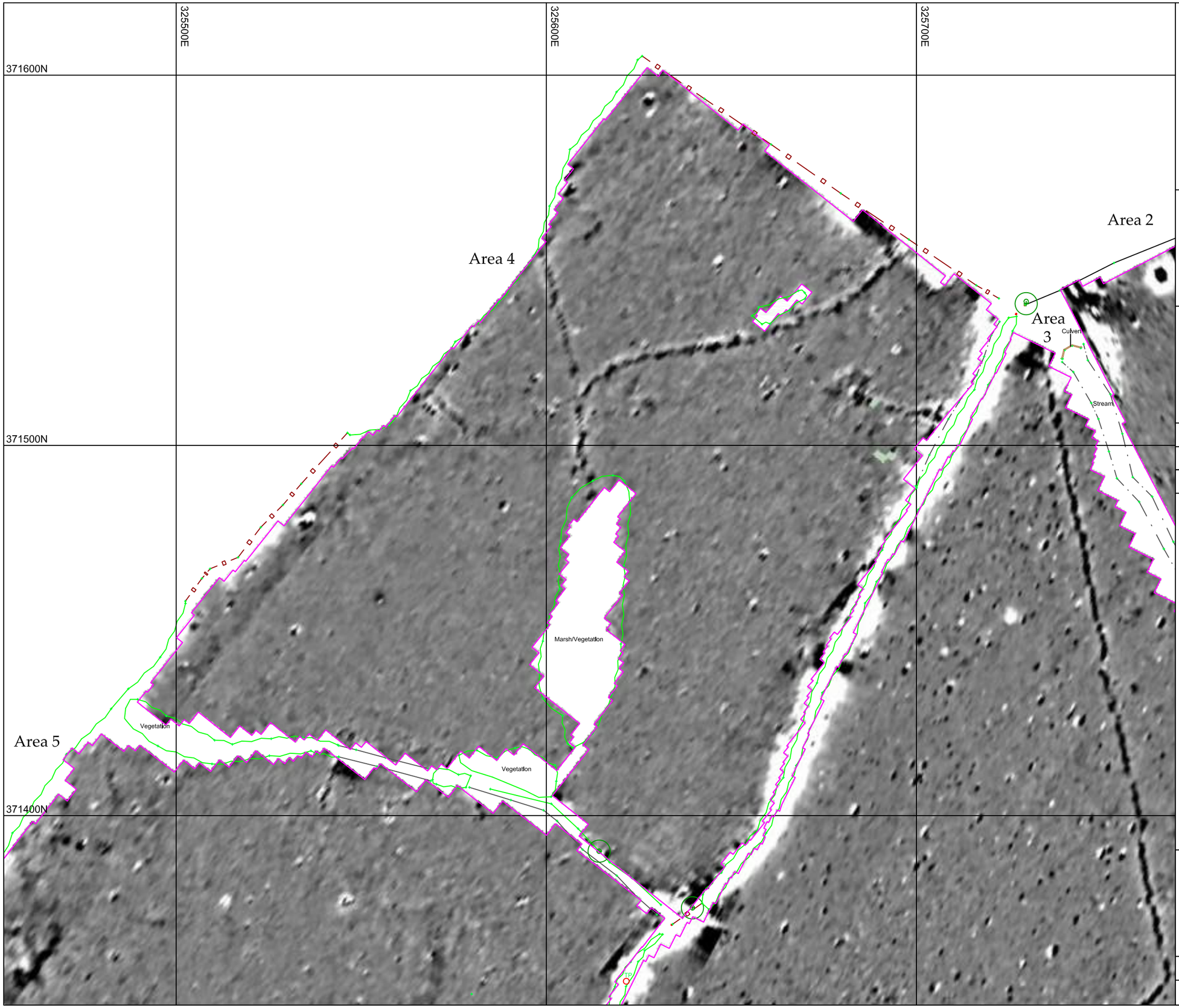
KEY:

- Outline of geophysical survey area
- Possible soil-filled features
- Former field boundary
- Uncertain linear features
- Possible land drain

REPORT No: CP10907

FIGURE: 11

Figure 11: Archaeological interpretation of Area 3.

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SCALE: 1:1,000 at A3

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DATE: June 2014

KEY:

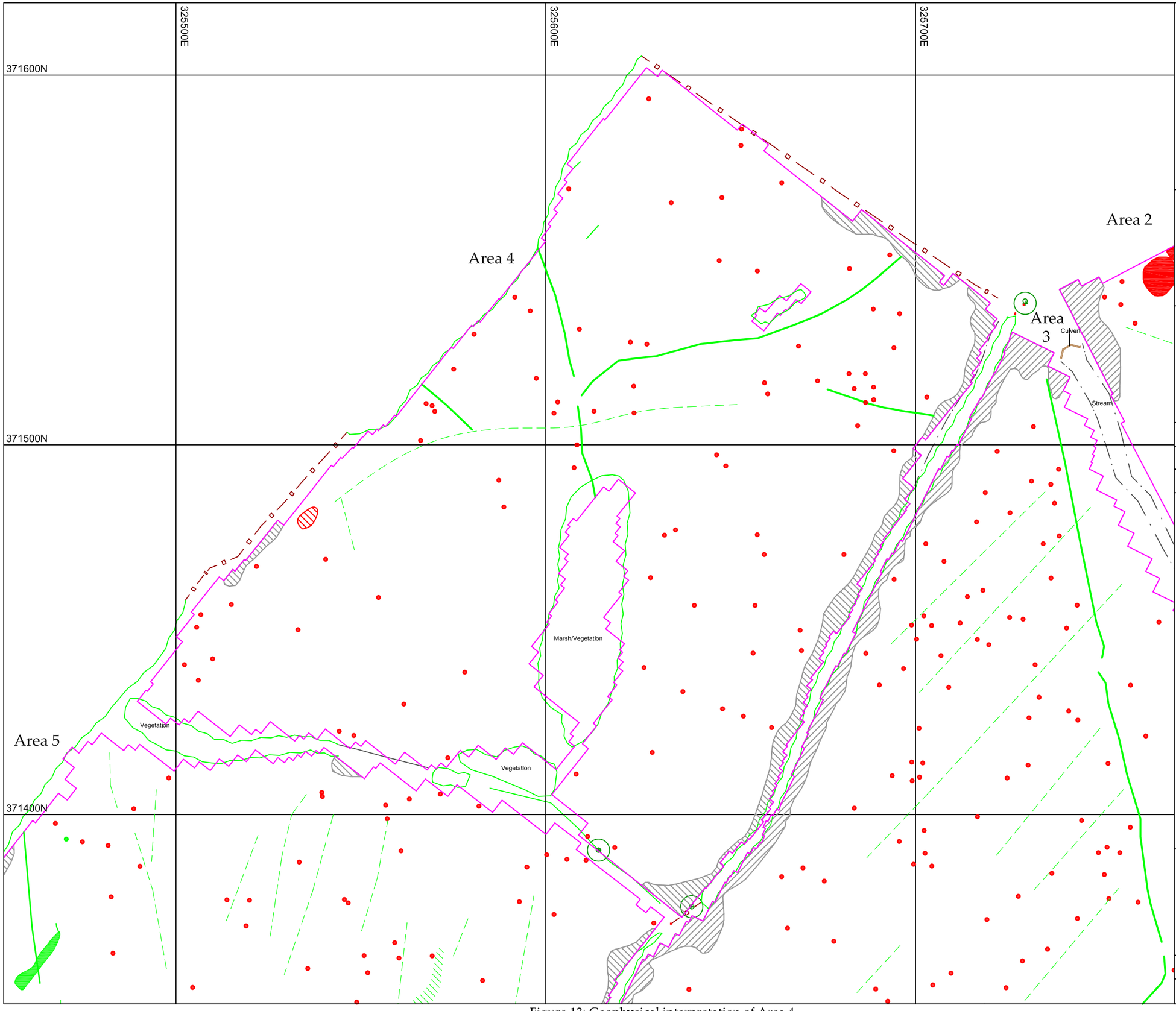
Outline of geophysical survey area

3 nT
2.4
1.8
1.2
0.6
0
-0.6
-1.2
-1.8
-2.4
-3 nT

REPORT No: CP10907

FIGURE: 12

Figure 12: Geophysical survey of Area 4.

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DATE: June 2014

KEY:

- Outline of geophysical survey area
- Positive magnetic anomalies
- Dipolar magnetic anomalies
- Magnetic disturbance

REPORT No: CP10907

FIGURE: 13

Figure 13: Geophysical interpretation of Area 4.

325500E

325600E

325700E

371600N

371500N

371400N

Area 4

Area 2

Area 3

Area 5

former quarry

Culvert

Stream

Marsh/Vegetation

Vegetation

Vegetation

TP

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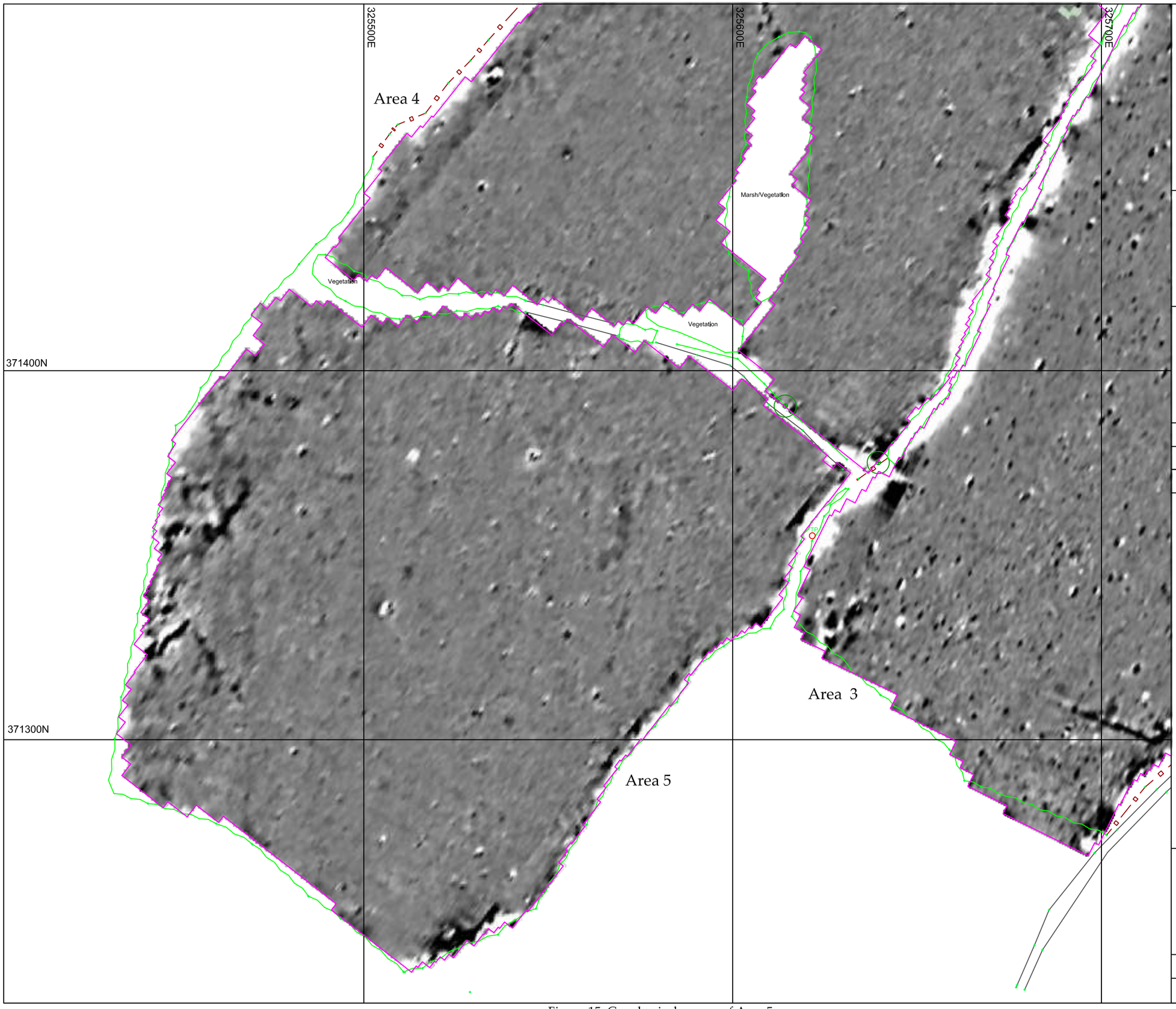
KEY:

- Outline of geophysical survey area
- Possible soil-filled features
- Former field boundary
- Uncertain linear features
- Possible land drain

REPORT No: CP10907

FIGURE: 14

Figure 14: Archaeological interpretation of Area 4.

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DATE: June 2014

KEY:

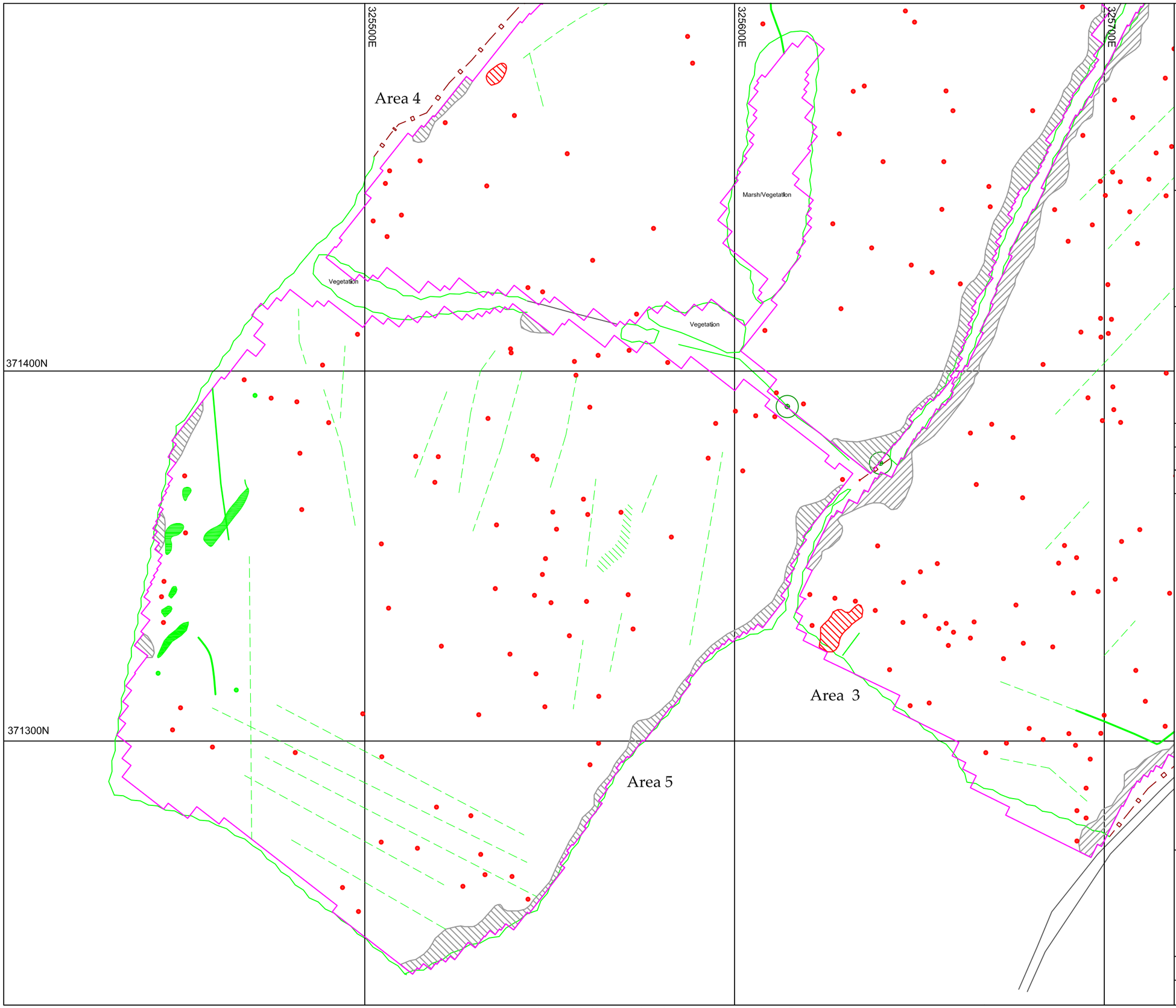
Outline of geophysical survey area

3 nT
2.4
1.8
1.2
0.6
0
-0.6
-1.2
-1.8
-2.4
-3 nT

REPORT No: CP10907

FIGURE: 15

Figure 15: Geophysical survey of Area 5.

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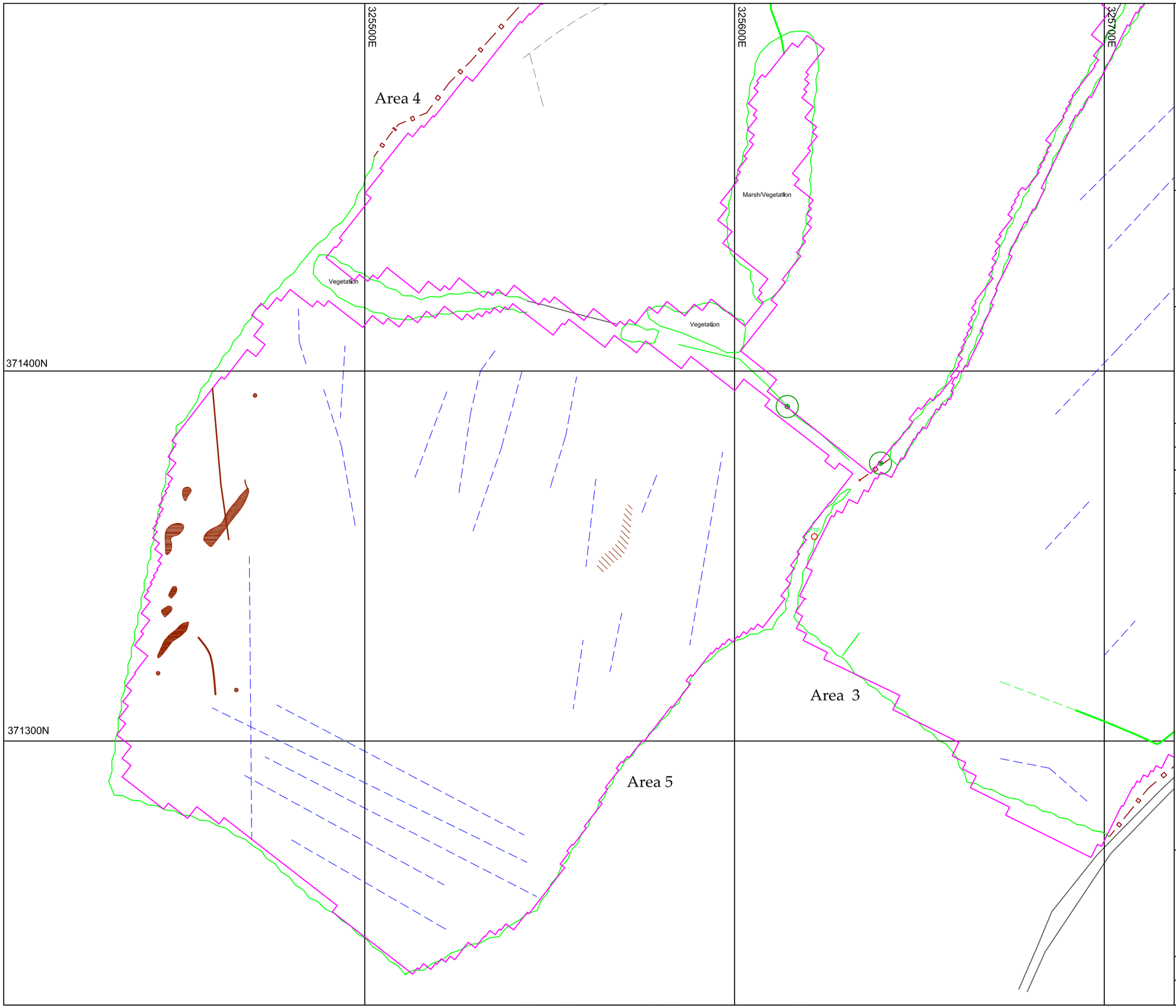
KEY:

- Outline of geophysical survey area
- Positive magnetic anomalies
- Dipolar magnetic anomalies
- Magnetic disturbance

REPORT No: CP10907

FIGURE: 16

Figure 16: Geophysical interpretation of Area 5.

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DATE: June 2014

KEY:

- Outline of geophysical survey area
- Possible soil-filled features
- Former field boundary
- Uncertain linear features
- Possible land drain

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FIGURE: 17

Figure 17: Archaeological interpretation of Area 5.

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