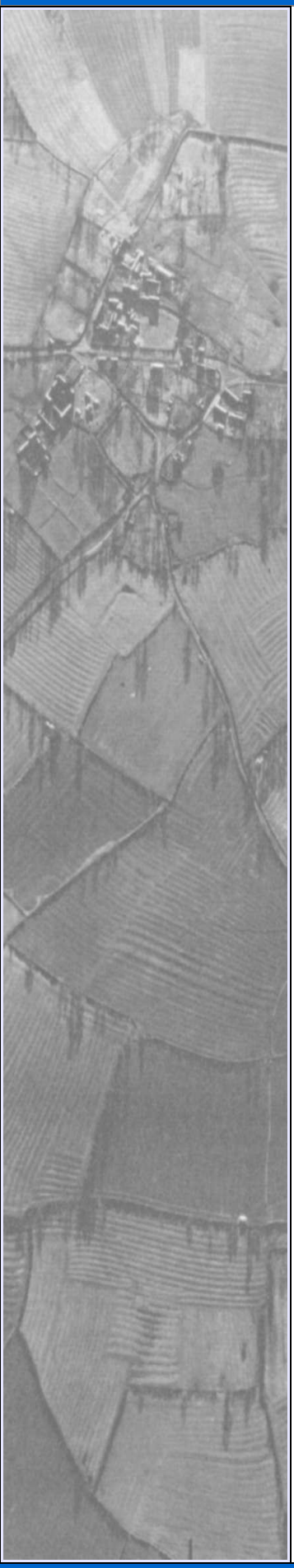

Marlborough College
Marlborough
Wiltshire

A REPORT ON A GROUND PENETRATING RADAR SURVEY

for

Marlborough Mound Trust

David Sabin and Kerry Donaldson

March 2016

Ref. no. 652

ARCHAEOLOGICAL SURVEYS LTD

Marlborough College
Marlborough
Wiltshire

Ground Penetrating Radar Survey

for

Marlborough Mound Trust

Fieldwork and report by
David Sabin BSc (Hons) MIFA and Kerry Donaldson BSc (Hons)

Survey dates - 20th February and 21st & 22nd March 2016
Ordnance Survey Grid Reference - **SU 184 686**

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SUMMARY

A ground penetrating radar survey was carried out at Marlborough College in an area formerly known as The Wilderness by Archaeological Surveys Ltd. The area lies to the south east of Marlborough Mound, a Neolithic monument subsequently utilised as part of medieval Marlborough castle. The results of the survey revealed several features of archaeological potential including substantial wall remains in the vicinity of previous excavations that revealed the castle's outer wall. A long channel or drain was also located and a possible track or bank with a similar orientation; it could not be established as to whether these features relate to the castle or later landscaping and ornamental gardens. Linear and discrete features of uncertain origin were also located at depths of approximately 0.6m. Some of these may be fragmented responses to services although several within Area 6 may relate to former structures and their archaeological potential should be considered.

1 INTRODUCTION

1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by Matthew Blossom on behalf of Michael Macfadyen, Chairman of Marlborough Mound Trust, to undertake a ground penetrating radar (GPR) survey at Marlborough College. The survey is located in an area formerly known as The Wilderness and lies immediately south east of Marlborough Mound. The work forms part of archaeological research into the site of Marlborough Castle and the results may be used to inform a programme of excavation.

1.1.2 The geophysical survey was carried out in accordance with a brief methodology set out in quotation Q1587 which addressed the aims set out during a site meeting involving David Sabin (Archaeological Surveys Ltd), Melanie Pomeroy-Kellinger (Wiltshire County Archaeologist) and Matthew Blossom (Marlborough College). An initial trial survey was carried out in order to assess the suitability of GPR survey over the soils and surfaces encountered at the site.

1.1.3 The Mound at Marlborough College was originally constructed as a Neolithic monument c.2400BC. During the medieval period the Mound and surrounding area was developed as a royal castle, although this appears to have been largely destroyed by later landscaping and development at the site.

1.2 Survey aims and techniques

1.2.1 The aim of the survey is to locate the buried footings of the 12th century castle bailey wall to the south of Leaf Block using GPR survey and to follow them around as far as possible. In addition, the survey will attempt to locate

structural remains associated with the castle below accessible areas within part of the college formerly known as The Wilderness. The results will help to inform decisions on the potential use of excavation to further research the medieval castle and to raise awareness about the site.

1.2.2 GPR survey is likely to be the only technique capable of providing useful information on the archaeological potential of the site at a resolution suitable for targeted excavation works. Previous geophysical surveys within the site have used magnetometry and earth resistance measurement (see 1.4.4) but both techniques have responded strongly to modern features and have provided inconclusive results. GPR survey is capable of resolving archaeological features under a wide range of hard and soft surfaces, can provide characteristic responses to modern features, such as services, and can provide information on the depth and thickness of features. The technique is most suited to the location of structural remains which would be expected within the site of a former castle.

1.2.3 The methodology is considered an efficient and effective approach to archaeological prospection. The survey and report generally follow the recommendations set out by: English Heritage, 2008, *Geophysical survey in archaeological field evaluation;* 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 at Marlborough College, Wiltshire. Ordnance Survey National Grid Reference (OS NGR) SU 1841 6860, see Figures 01 and 02.

1.3.2 The geophysical survey covers approximately 1614m^2 within eleven survey areas labelled Areas 1 - 11 for the purposes of this report. Ground cover is variable and consists of areas of grass, tarmac, beds and paths. Survey areas may contain several different surfaces and other features such as kerbs and underground services.

Plate 1: Area 6 looking north towards the Mound

1.3.3 The ground conditions across the site were generally considered to be favourable for the collection of GPR data. Weather conditions during the survey were fine.

1.4 Site history and archaeological potential

1.4.1 Background information is derived from the Wiltshire and Swindon Historic Environment Record and Wiltshire Council is acknowledged as the copyright holder of the summaries set out in 1.4.2 & 1.4.3.

1.4.2 Recent work on Marlborough Mound involving coring has revealed that the main body of the structure is contemporaneous with Silbury Hill, dating to the second half of the 3rd millennium BC. Within the medieval period the mound was utilised as part of a Norman motte and bailey castle. It is a Scheduled Monument (WI 321).

1.4.3 Excavations by the Marlborough College Natural History Society in the early 20th century revealed 12th - 13th century pottery, animal bone, plaster, roofing tiles and flint foundations. In 1936 further excavations revealed rubble foundations and a curtain wall and in 1955-56 Norman pottery was located.

1.4.4 Though many of these digs uncovered remains, no coherent physical evidence of the layout of the castle bailey and its buildings persists. Previous geophysical surveys, including magnetometry and earth resistance measurement, have been carried out within the site (GeoQuest Associates, 2001, Archeoscan, 2015a & 2015b), with a number of linear features located. Ground penetrating radar (GPR)

is, therefore, to be utilised as part of the archaeological prospection prior to any intrusive investigation.

1.5 Geology and soils

1.5.1 The underlying geology is the Holywell Nodular Chalk Formation and New Pit Chalk Formation (undifferentiated) with overlying superficial River Terrace Deposits consisting of sand and gravel (BGS, 2016).

1.5.2 The overlying soil across the site is unmapped and is likely to have been altered by previous land use and make-up from landscaping.

1.5.3 The geology and soil is considered suitable for GPR survey with anomalies resolved to a depth of 1.5m in similar conditions. Hard surfaces and sub-base material may produce variable responses that are very different to the natural ground immediately adjacent.

2 METHODOLOGY

2.1 Technical synopsis

2.1.1 Ground penetrating radar systems transmit an electromagnetic wave into the ground and record the time delay and amplitude of reflections from buried features. Reflections occur from changes in conductivity or dielectric permittivity.

2.1.2 Electromagnetic waves are increasingly attenuated as frequency increases and, therefore, lower frequencies provide greater penetration into the subsurface. However, the longer wavelengths associated with lower frequencies reduce the resolution of buried features. Typical frequencies chosen for archaeological prospection are around 500 and 200 MHz.

2.2 Equipment configuration and data collection

2.2.1 Ground penetrating radar data were acquired using an Utsi Electronics Groundvue 3A system running with a 400MHz shielded antenna. The system utilises a wheeled encoder system on a small cart. A dielectric constant of 10 was used in the field to set up the instrument and view data. The value is for display purposes only and does not affect the recorded data. A value of 80ns (nanoseconds) was chosen for the time sweep (two way GPR signal travel time) in order to balance potential depth of penetration and resolution.

2.2.2 Data were collected from scans recorded at 0.0295m along parallel traverses separated by 0.25m. The data captured along each traverse were logged to an internal disk drive to allow further processing and analysis.

2.3 Survey grid and base mapping

2.3.1 Ground penetrating radar data were collected along traverses originating from a separate baseline for each survey area. Referencing of baselines to the Ordnance Survey OSGB36 datum was achieved using a Leica GS10 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).

2.3.2 Digital base mapping was derived from a combination of site survey using RTK GPS and georeferenced images from Google Earth.

2.4 Data processing

2.4.1 Ground penetrating radar data were analysed using REFLEX v8 software. Each traverse was analysed as an individual profile to allow a manual assessment of anomalies. In addition, profiles across each survey area were combined and processed in order to create time slices showing the variation in reflector amplitude at various depths. The following processing has been carried out on GPR data captured during this survey:

- background removal - improves the appearance of the data by removal of strong horizontal bands,
- gain - increased with time in order to amplify weaker reflections from deeper features,
- bandpass filtering - lowers noise by the removal of energy below 200MHz and above 800MHz.

2.4.2 Time slices were analysed using both absolute and envelope reflectivity strengths. The latter use a square root function of the energy at an instant in time and is generally the preferred option; however, occasionally the absolute values provide more detailed anomalies.

2.5 Data presentation

2.5.1 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. Approximate depths to anomalies is added to the abstraction and interpretation plot.

2.5.2 The main form of data display prepared for this report is the greyscale plot derived from Reflex as a TIF. Anomalies are abstracted using colour coded points, lines and polygons. All plots are scaled to landscape A3 for paper printing.

2.5.3 The raster images are combined with base mapping using ProgeCAD Professional 2016 creating DWG file formats. All images are externally referenced to the CAD drawing in order to maintain good graphical quality. A digital archive, including raster images, is produced with this report, see Appendix D below.

3 RESULTS

3.1 General overview

3.1.1 The GPR survey located linear, discrete and complex anomalies within the survey areas. The majority could not be confidently interpreted and have been classified as of uncertain origin. Several anomalies were interpreted as having archaeological potential.

3.1.2 Anomalies clearly associated with modern and extant features were not abstracted in order to simplify the plots. High magnitude and shallow reflectors were encountered across some of the paths and roads and GPR penetration may be limited in these areas.

3.1.3 A velocity of 0.06m/ns was calculated using hyperbola matching. There were very few clear hyperbola that could be used for the analysis but the velocity would be consistent with the soil encountered across the site. The velocity of the electromagnetic wave will vary with depth, and as a consequence calculations will be an approximation only.

3.2 Statement of data quality

3.2.1 The GPR data were collected with due consideration given to surface conditions, obstructions and area constraints. GPR signals appear to have achieved moderate penetration with maximum depth likely to be approximately 1.5m. Uneven surfaces were frequently encountered and as a consequence antenna coupling is occasionally poor resulting in very small patches of increased noise. Some hard surfaces and their sub-base material have produced high levels of near surface reflectance possibly limiting the depth to which features may be located.

3.3 Data interpretation

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 radar 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 GPR LINEAR ARCHAEOLOGY	Anomalies have the characteristics of a range of archaeological features such as walls, structures, etc..
Anomalies with an uncertain origin AS-ABST GPR LINEAR UNCERTAIN AS-ABST GPR 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.
Anomalies with a modern origin AS-ABST GPR SERVICE AS-ABST GPR PATH	Reflections clearly related to modern features such as services, inspection chambers etc.

Table 1: List and description of GPR interpretation categories

3.4 List of ground penetrating radar anomalies - Area 1

Area centred on OS NGR 418380 168560, see Figs 03 & 11.

Anomalies with an uncertain origin

(1) - A zone of shallow, complex reflectors adjacent to a building. The anomalies may well relate to relatively recent ground consolidation and make-up.

Anomalies with a modern origin

(2) - A broad, linear zone of reflectors appearing at approximately 0.4m depth and extending to around 1m in depth. The feature appears to be cut through by a service and correlates with a former access road.

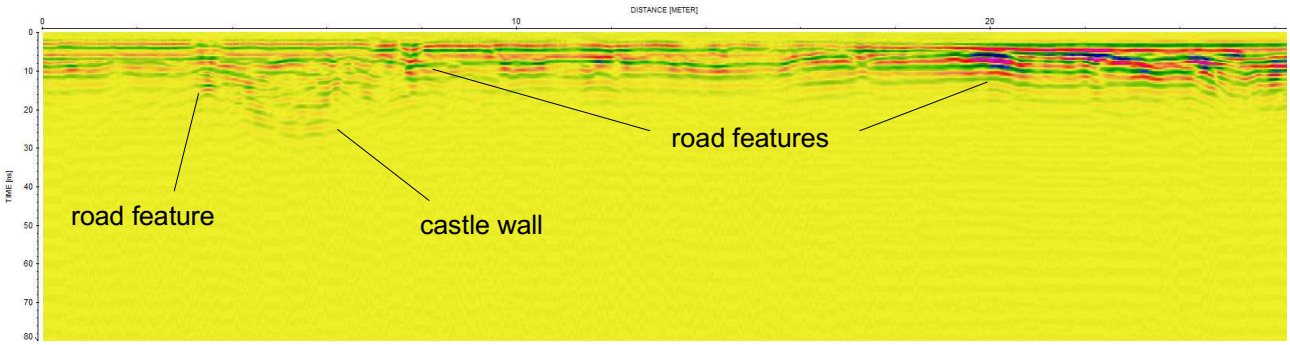
(3) - A linear feature that appears to correlate with a former path of modern origin.

3.5 List of ground penetrating radar anomalies - Area 2

Area centred on OS NGR 418426 168625, see Figs 04 & 11.

Anomalies with archaeological potential

(4) - A linear feature adjacent to a plaque marking the location of an excavated section of the castle wall. The response is approximately 2.5m wide and can be resolved between depths of around 0.3m and 1.3m, see Radargram 1. Deeper reflectors were obtained from the south eastern side of the survey area.



Radargram 1: Traverse across castle wall within Area 2 (File MC081)

Anomalies with an uncertain origin

(5) - A narrow, curvilinear feature at around 0.3m depth extending to about 0.6m. It may well relate to a former road layout.

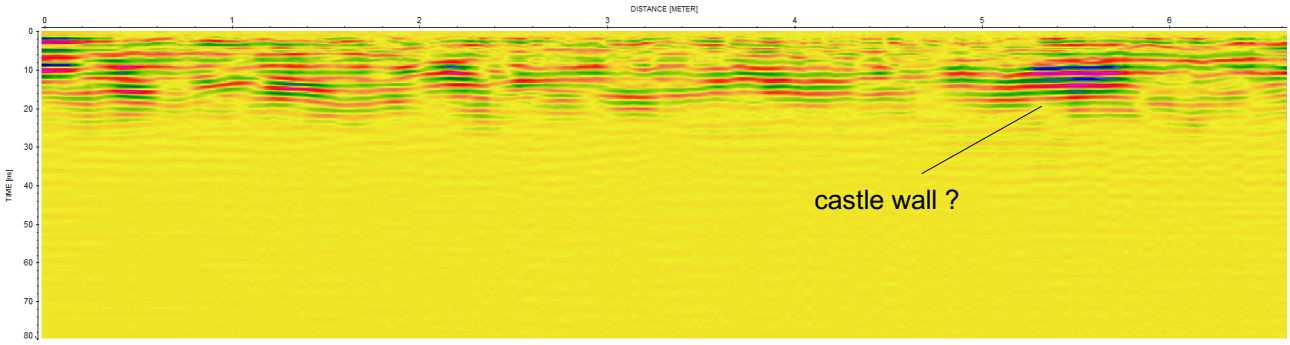
(6) - Near surface linear and planar reflectors of uncertain origin are possibly related to the road make-up and services.

3.6 List of ground penetrating radar anomalies - Area 3

Area centred on OS NGR 418447 168608, see Figs 05 & 11.

Anomalies with archaeological potential

(7) - A fragmented linear feature to the south of a plaque marking the location of an excavated section of the castle wall. The response is approximately 0.7m deep and can be resolved to around 1.1m in depth. It is not as clear or as wide as anomaly (4) in Area 2 but given its location and depth, it may well be of archaeological significance.



Radargram 2: Traverse across possible castle wall in Area 3 (File MC141)

Anomalies with an uncertain origin

(8) - A broad zone of linear reflectors between approximately 0.5m and 0.8m in depth. The feature is of uncertain origin but could be a former path.

(9) - Several linear anomalies of uncertain origin visible between 0.3m and 0.6m in depth. It is possible that they relate to former garden features and/or services.

3.7 List of ground penetrating radar anomalies - Areas 4 & 5

Area centred on OS NGR 418463 168601, see Figs 06 & 11.

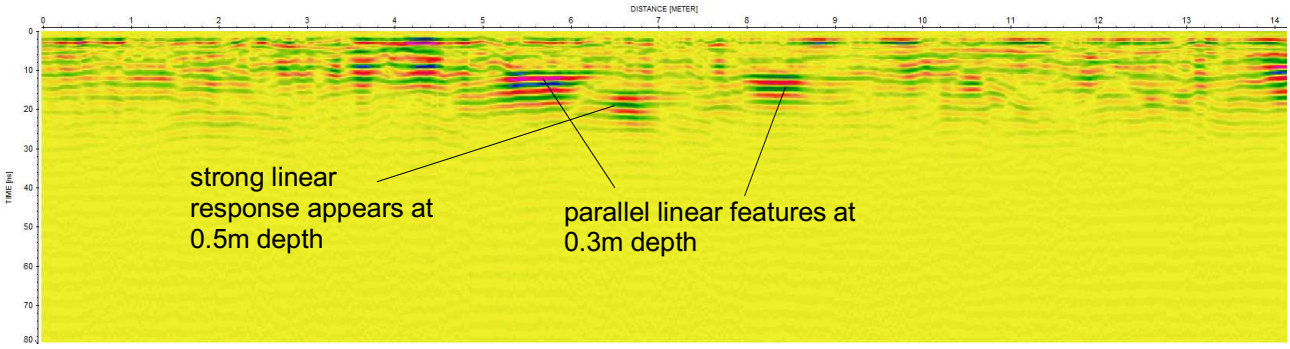
Due to very strong near surface reflectors associated with the surface and sub-base make-up of the paths, it was not possible to resolve deeper anomalies. A single linear feature was abstracted but this is located at or near to the surface and likely to be modern in origin.

3.8 List of ground penetrating radar anomalies - Area 6

Area centred on OS NGR 418415 168606, see Figs 07 & 11.

Anomalies with archaeological potential

(10) - A broad linear feature up to 3.5m in width crosses through the survey area with a south south west to north north east orientation. There is some complexity to the response with depth, see Radargram 3. Initially at round 0.3m depth two linear, parallel, planar reflectors about 1m wide separated by about 1.5m are resolved. The linear zone between the two appears to be absorbing or scattering energy; however, strong reflectors are recorded from this zone at a depth of about 0.5m down to approximately 1m. It is possible that the feature may relate to a garden feature or drain, although this is uncertain.



Radargram 3: Traverse across a broad linear feature within Area 6 (File MC256)

(11) - Time slices reveal a very weak linear feature crossing the survey area with a west north west to east south east orientation. Depth is approximately 0.7m and it is perpendicular to anomaly (10). However it is unclear as to whether the feature is truncated by (10) or abuts it.

Anomalies with an uncertain origin

(12) - The south eastern part of the survey area contains several circular anomalies, approximately 1.5m in diameter, and a broad linear anomaly possibly formed by similarly sized circular features. The anomalies may relate to former garden features and/or removed trees.

(13) - A broad linear zone of complex reflectors crosses the northern part of the survey area. It contains a 'T' shaped anomaly that may be associated. The depth of the reflectors within this zone ranges from around 0.2m to 0.9m. The responses may indicate made ground or a former track.

(14) - Very weak reflectors possibly forming a linear anomaly at a depth of between 0.6m and 1m. The origin of the anomalies cannot be confidently determined although the depth may indicate a feature of archaeological potential.

(15) - Possible linear response at approximately 0.5m depth to 0.8m.

Anomalies with a modern origin

(16) - A weak linear feature representing a former path running north - south through the survey area.

(17) - A service has been abstracted as it truncates part of anomaly (10) and passes through Areas 7 and 8.

3.9 List of ground penetrating radar anomalies - Area 7

Area centred on OS NGR 418422 168598, see Figs 08 & 11.

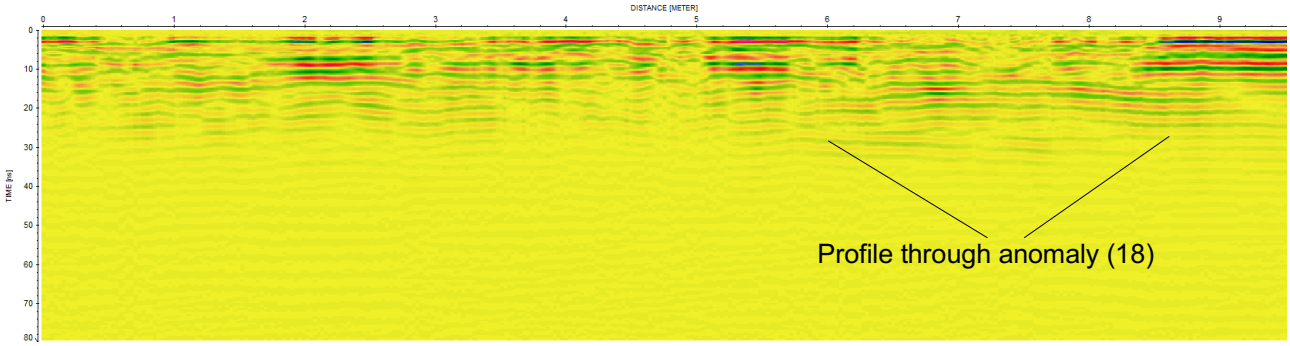
Due to very strong near surface reflectors associated with the surface and sub-base make-up of the path, it was not possible to resolve deeper anomalies. A service that extends through adjacent survey areas was abstracted.

3.10 List of ground penetrating radar anomalies - Area 8

Area centred on OS NGR 418428 168588, see Figs 08 & 11.

Anomalies with archaeological potential

(18) - A broad linear anomaly up to 2.8m in width crosses the majority of the survey area with a north north east to south south west orientation. The northern end of the feature appears to fade away suggesting that it may have been truncated. There is also evidence of truncation by a possible service trench. Reflectors appear at a depth of 0.7m and are visible to approximately 1.1m. The feature appears parallel with anomalies (10) and (23) in Areas 6 and 9 respectively and could represent a former track, garden feature or low bank. Radargram 4 demonstrates the low bank or camber associated with the feature.



Radargram 4: Traverse across broad linear feature in Area 8 (File MC347)

Anomalies with an uncertain origin

(19) - A short curvilinear anomaly located at a depth of approximately 0.4m. The feature cannot be resolved beyond approximately 0.6m and its origin is uncertain.

(20) - Several linear anomalies are visible within the survey area. They are often weak or variable in response and range in depth from approximately 0.5 to 0.8m. It is possible that some relate to services.

(21) - Near surface, strong, planar and complex reflectors may relate to a former surface or made ground.

Anomalies with a modern origin

(22) - At least two linear anomalies within the survey area relate to services.

3.11 List of ground penetrating radar anomalies - Area 9

Area centred on OS NGR 418405 168577, see Figs 09 & 11.

Anomalies with archaeological potential

(23) - A linear anomaly approximately 0.3m in depth crosses through the north eastern part of the survey area. It is a continuation of anomaly (10) located in Area 6.

Anomalies with an uncertain origin

(24) - A near surface linear feature.

3.12 List of ground penetrating radar anomalies - Area 10

Area centred on OS NGR 418397 168595, see Figs 10 & 11.

Due to very strong near surface reflectors associated with the surface and sub-base make-up of the path, it was not possible to resolve deeper anomalies.

3.13 List of ground penetrating radar anomalies - Area 11

Area centred on OS NGR 418384 168594, see Figs 10 & 11.

Anomalies with an uncertain origin

(25) - Strong linear anomalies at a depth of approximately 0.35m may relate to a rectilinear feature which can be resolved to a depth of around 0.7m The origin of the anomalies is uncertain as several linear responses in the vicinity may relate to services.

4 DISCUSSION

4.1.1 The results of the GPR survey indicate the presence of numerous features across the site. For clarity, the abstraction and interpretation plots do not include extant features clearly of modern origin such as roads, kerbs, paths, etc. and their associated subsurface make-up. However, a small number of services and former paths/tracks have been included.

4.1.2 An initial trial survey was carried out within the south western part of the site (Area 1). The survey targeted the postulated location of the castle's curtain wall. Analysis of the data revealed three broadly linear zones defined by planar and complex reflectors. Although anomaly (2) appears in the expected location for the curtain wall, it is clear from earlier site plans that this is the location of a former road that was recently removed and re-landscaped. Linear anomaly (3) also appears to correlate with a mapped path, with a linear zone of complex reflectors (1) probably related to made ground adjacent to buildings.

4.1.3 Survey within Area 2 crossed the known location of the castle's curtain wall as identified by excavation. A broad response was located with a width of approximately 2.5m at a shallow depth of around 0.3m extending to around 1.3m suggesting a substantial foundation. Unfortunately the survey area was located between buildings and only a small section of wall was traced. Other anomalies within the area are unlikely to be related.

4.1.4 Area 3, in the eastern part of the site, also appears to contain weak evidence of the curtain wall in the vicinity of a previous excavation. The response was weak and appears at a depth of approximately 0.7m down to 1.1m. Similar to Area 2, only a short section was revealed and no associated features could be confidently resolved.

4.1.5 Several linear and discrete anomalies were located across Area 6 within the central part of the site. Two linear anomalies were considered to have archaeological potential. Anomaly (10) is a broad linear feature up to 3.5m in width and appearing at a depth of around 0.3m. Initially two parallel linear features separated by 1.5m are resolved. At a depth of around 0.5m the gap between the two linear responses also produces a strong linear reflector continuing down to approximately 1m. The GPR responses suggest something similar to a channel with made or paved surfaces on both sides and a solid surface in the base of the channel. The gap between the two surfaces implies a non reflective fill, and the 2001 magnetometer survey by GeoQuest located a positive linear anomaly that correlates with this. It is possible that the feature has been backfilled with magnetically enhanced soil. Anomaly (11) is very weak and located at a depth of around 0.7m. As it appears perpendicular with (10) it is considered potentially associated.

4.1.6 A number of linear and discrete anomalies of uncertain origin were also located within Area 6 (12 & 13). Generally they appear to have orientations

similar to extant buildings to the north east but this may also be similar to former structures associated with the castle. With the reflectors occurring at depths of 0.4m to 0.6m, their archaeological potential should be considered.

4.1.7 Several anomalies were located within Area 8 and (18) was classified as having archaeological potential based on its depth of 0.7m and its orientation parallel with anomalies (10 & 23). The profile of (18) suggests a camber perhaps related to a low bank or former track. Several other linear anomalies within the area do not form any coherent pattern and may relate to services.

4.1.8 Survey Area 9 is conjoined with Area 1 and represents a north easterly extension of the trial survey. There is evidence of modern landscaping to some depth which may effectively prevent the location of features below the original ground surface in some parts of the survey area. Anomaly (23) represents a continuation of anomaly (10) towards the south west although it is poorly defined and may have been disturbed by the sub-base to the current path.

4.1.9 Survey Area 11, in the north western part of the site, contains several linear anomalies of uncertain origin. Strong reflectors, possibly related to a structural feature, form a 'T' shape; however, they are located in the vicinity of services.

4.1.10 Survey carried out along extant paths form Areas 4, 5, 7 and 10. Very little additional information was obtained from these areas due to high magnitude near surface and shallow reflectors associated with the make-up of the paths.

5 CONCLUSION

5.1.1 The GPR survey covered the majority of accessible areas within The Wilderness at Marlborough College. The survey was fragmented due to the presence of numerous obstacles including trees, beds, walls, etc.

5.1.2 The results revealed numerous anomalies, the majority of which were associated with surface and near surface modern features. Analysis concentrated on anomalies that were not clearly associated with these features and attempted to separated those of archaeological potential from those with greater uncertainty.

5.1.3 Anomalies of archaeological potential included two linear features in the vicinity of excavated sections of castle wall. The section located within Area 2, the most northerly part of the survey, appeared substantial with a width of approximately 2.5m and depth below surface extending to around 1.3m. This would be consistent with a substantial wall surrounding the castle. The wall section revealed in Area 3, further to the south east, was much weaker and poorly defined but also extended to a similar depth.

5.1.4 A long linear feature crossing the central part of the Wilderness (Areas 6 & 9) with a north north east to south south west orientation was also highlighted as having archaeological potential. The response may indicate a former channel or drain. A parallel feature approximately 15m to the south east, within Area 8, appears as a low bank or track. These features may hint at an earlier layout with a very different orientation to that reflected by extant buildings to the north east of The Wilderness.

5.1.5 Anomalies classified as of uncertain origin were located in most of the survey areas. Whilst it is likely that many relate to modern features and services, their archaeological potential should be considered. Several located in the central part of the Wilderness (Area 6) may relate to former paths and structural remains.

5.1.6 By providing information on depth and morphology GPR has provided results that compliment and add to those obtained by previous surveys using magnetometry and earth resistance measurement. It is unlikely that additional non-intrusive survey would be useful in furthering research into the castle remains, and a programme of targeted excavation could assess targets located by the GPR survey. Priority should be given to targets within survey Areas 6 and 8 and should include anomalies classified as having archaeological potential and of uncertain origin, particularly those within Area 6 as these appear with an orientation that may fit with that expected for the former castle.

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Appendix A – digital archive

Archaeological Surveys Ltd hold the primary digital archive at offices 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 using A4 for text and A3 for plots (all plots are scaled for A3). The distribution of both hardcopy report and digital data is considered the responsibility of the Client unless explicitly stated in the survey Brief, Written Scheme of Investigation or other contractual agreement.

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

- Reflex v8 (GPR data analysis)
- ProgeCAD Professional 2016 (report plots),
- OpenOffice.org 4.1.1 Writer (document text),
- PDF Creator version 0.9 (PDF archive).

Archaeological Surveys Ltd

Geophysical Survey
Marlborough College
Marlborough
Wiltshire

Map of survey area

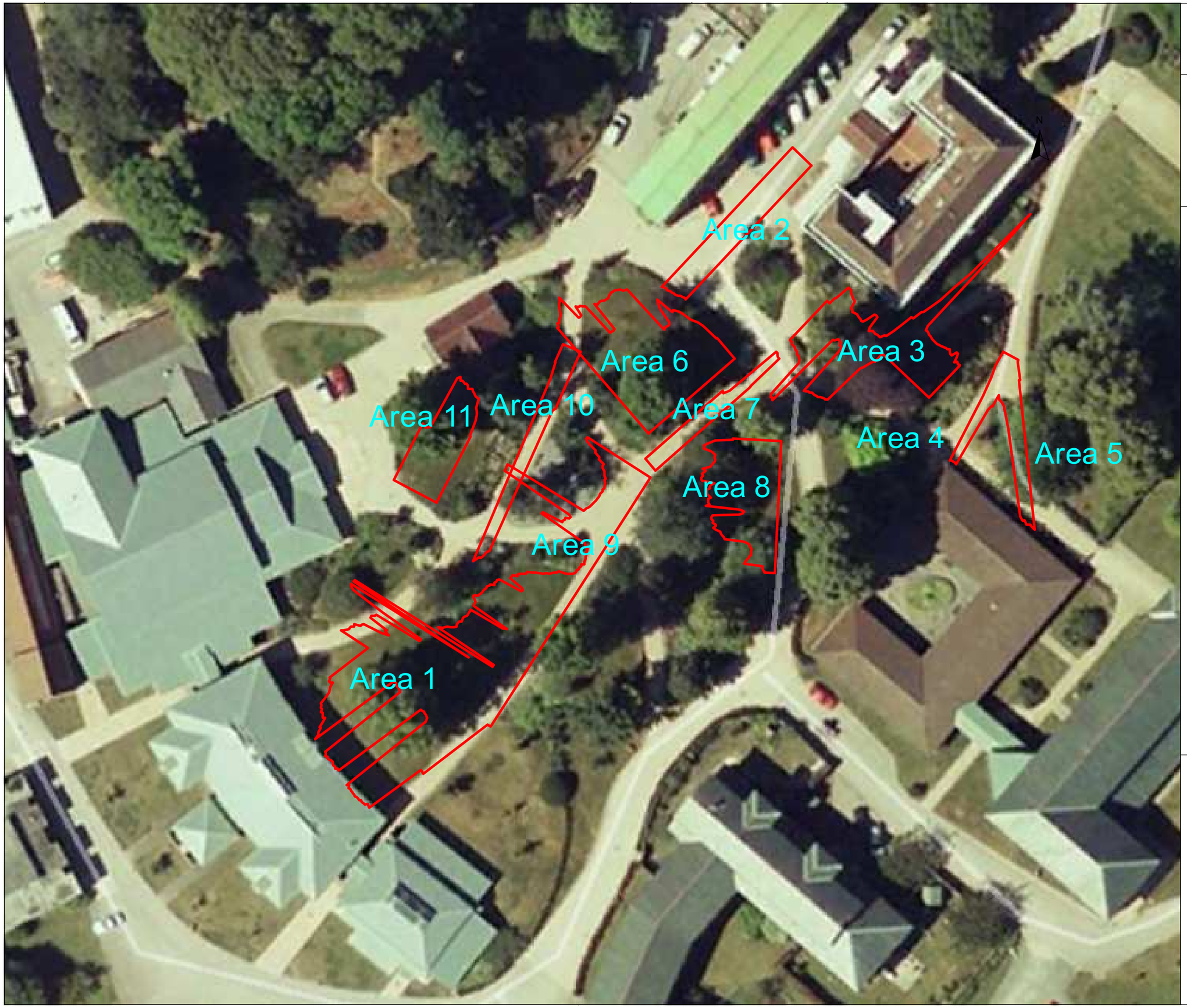
Site centred on OS NGR
SU 184 686

SCALE 1:25 000

0m 500m 1000m

SCALE TRUE AT A3

FIG 01



Archaeological Surveys Ltd

Geophysical Survey
Marlborough College
Marlborough
Wiltshire

Location of survey areas

SCALE 1:500

0m 5 10 15 20 25m

SCALE TRUE AT A3

FIG 02

Area 1 - location of traverses

Area 1

168570.2

418380.71

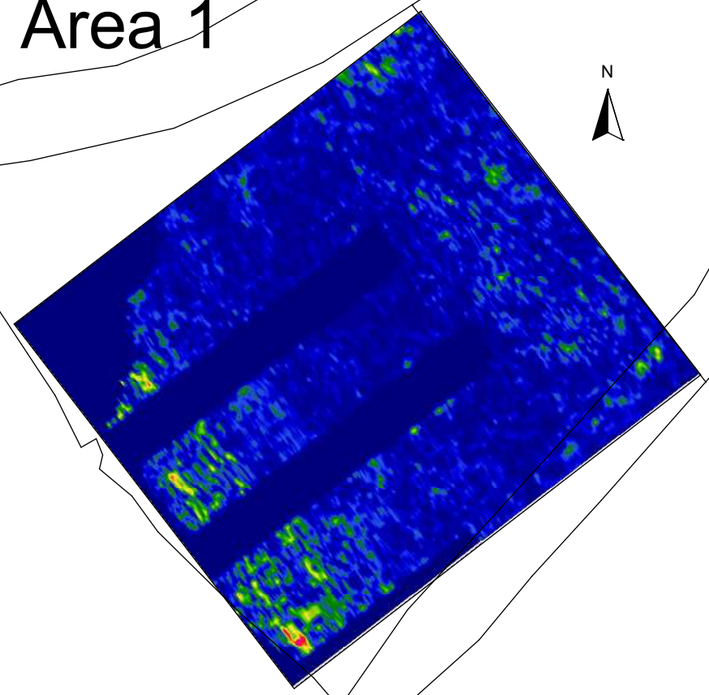
418392.02

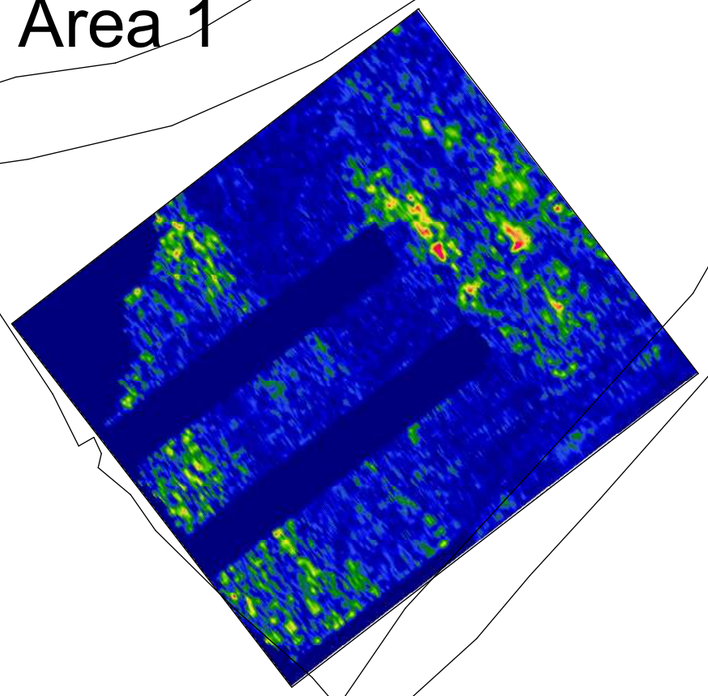
168555.55

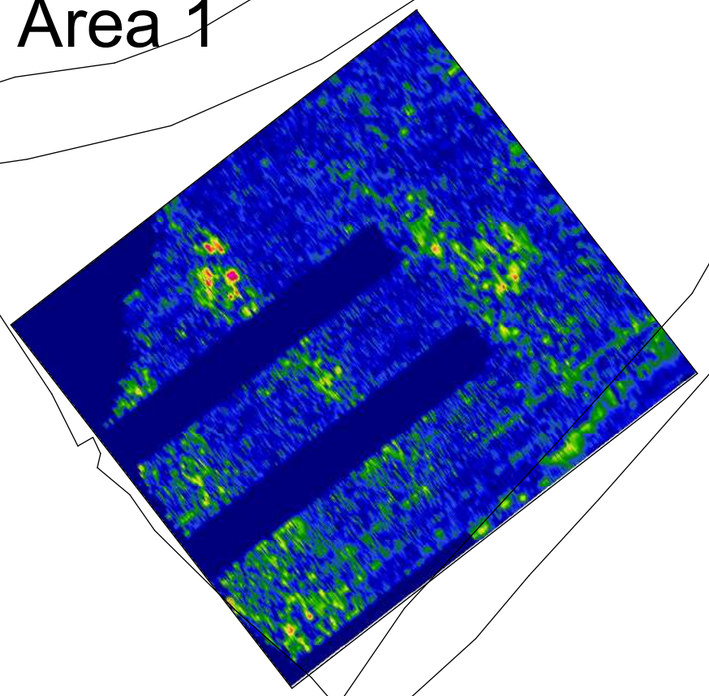
File MC075

Files MC001 - MC075
progress as parallel
0.25m separation

File MC001 (baseline
start, heading SW)







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Ground penetrating radar time slices - Area 1

high amplitude reflection

low amplitude reflection

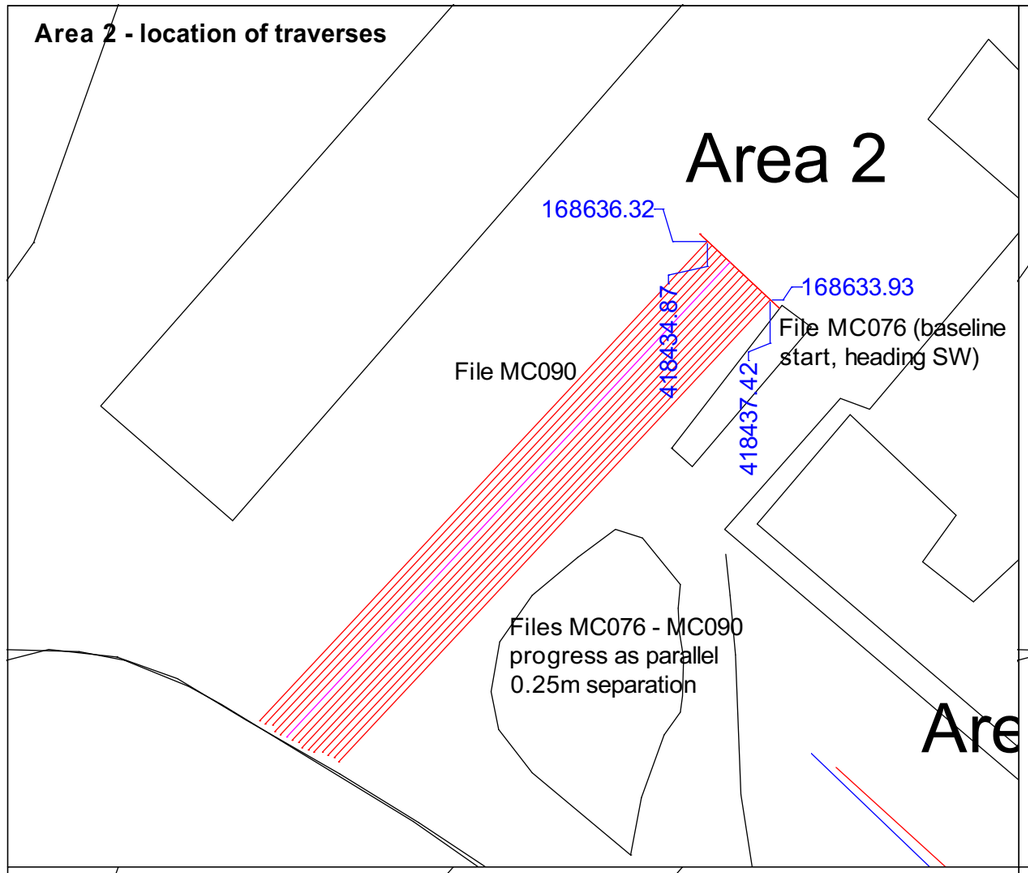
SCALE 1:250

0m 5 10m

SCALE TRUE AT A3

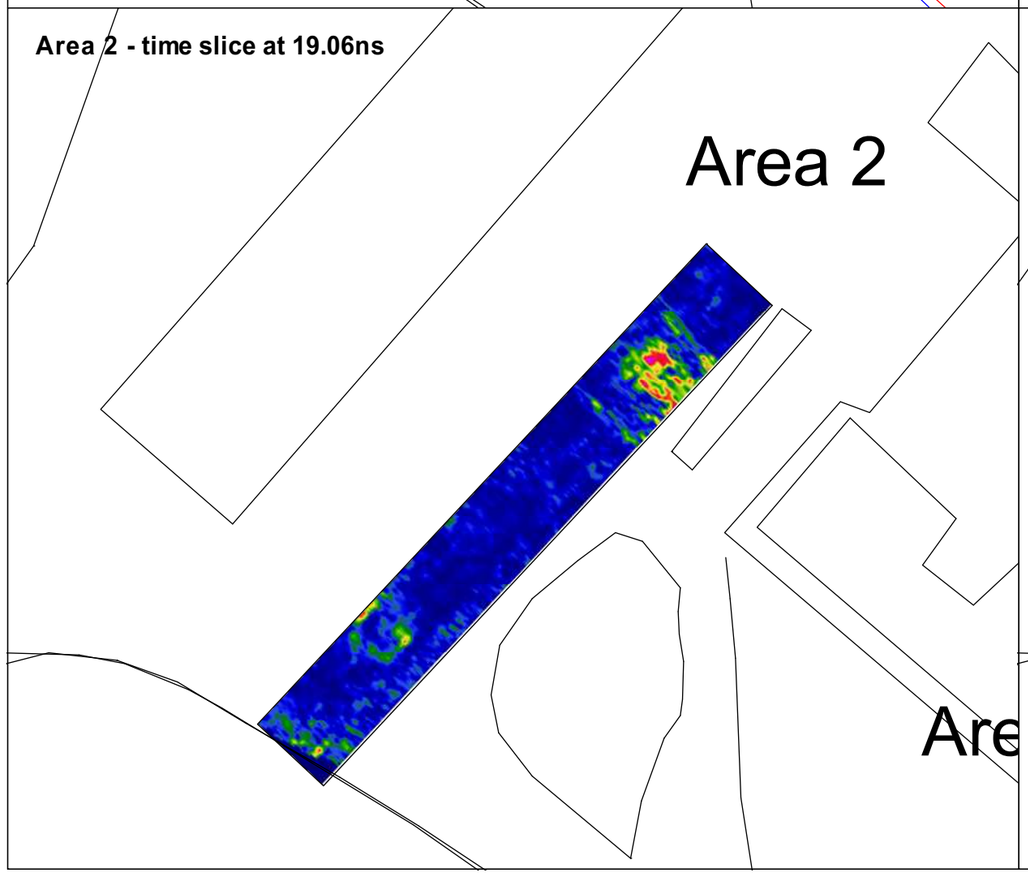
FIG 03

Area 2 - location of traverses



Area 2 - time slice at 12.81ns

Area 2 - time slice at 19.06ns



Area 2 - time slice at 30ns

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Ground penetrating radar time slices - Area 2

high amplitude reflection

low amplitude reflection

SCALE 1:250

0m 5 10m

SCALE TRUE AT A3

FIG 04

Area 3 - location of traverses

Files MC091 - MC167
progress as parallel
0.25m separation

File MC091 (baseline start,
heading NE)

Area 3

168614.78

168614.43

File MC210

418439.82

418440.18

418447.4

168607.51

418453.9

File MC168 (baseline start,
heading SW)

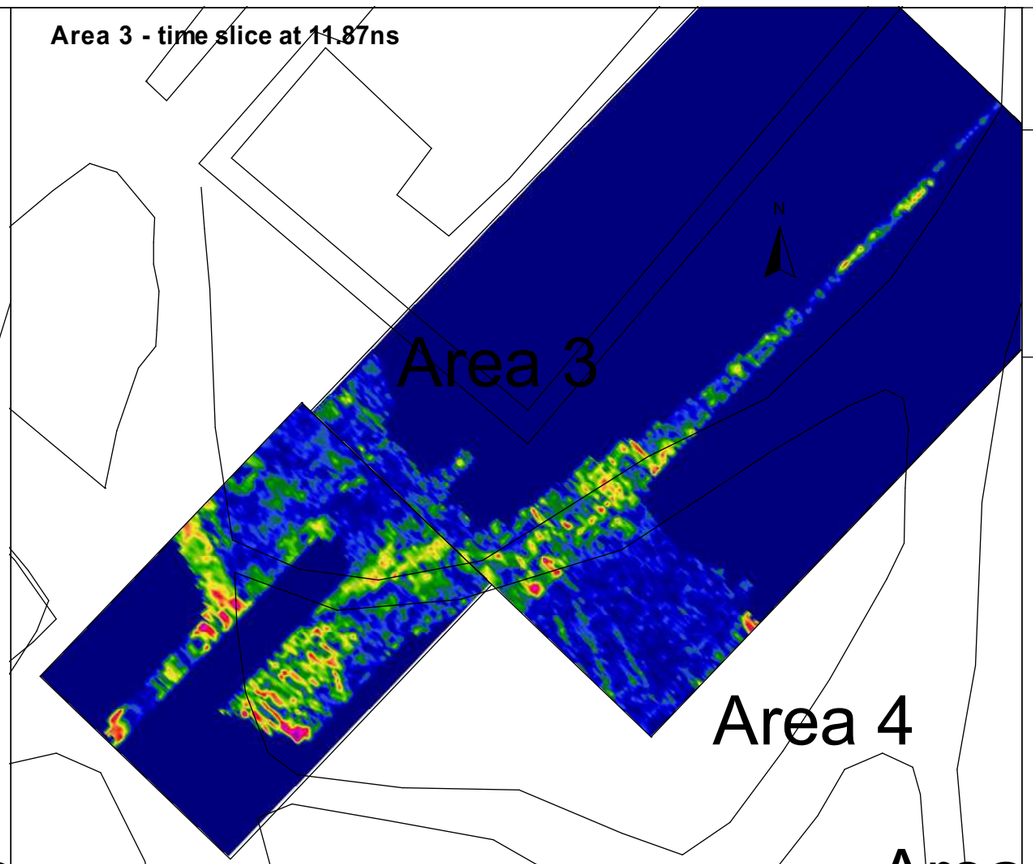
168601.29

File MC167

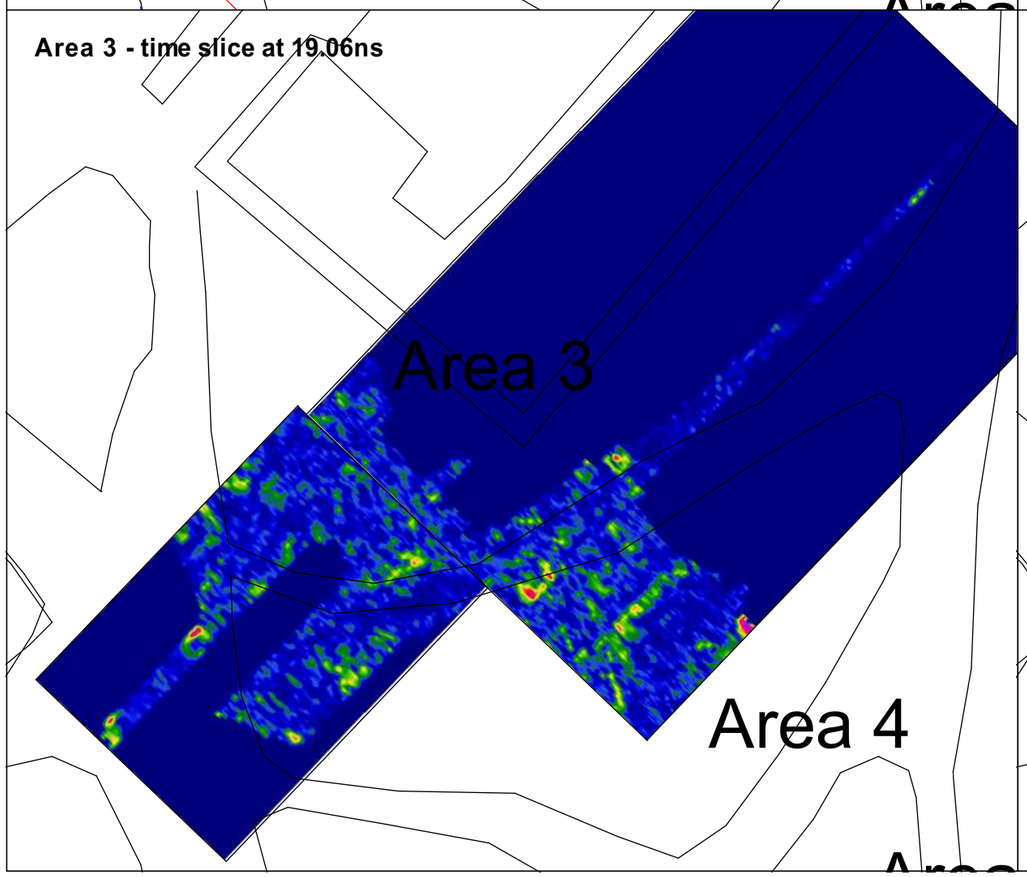
Area 4

Files MC168 - MC210
progress as parallel
0.25m separation

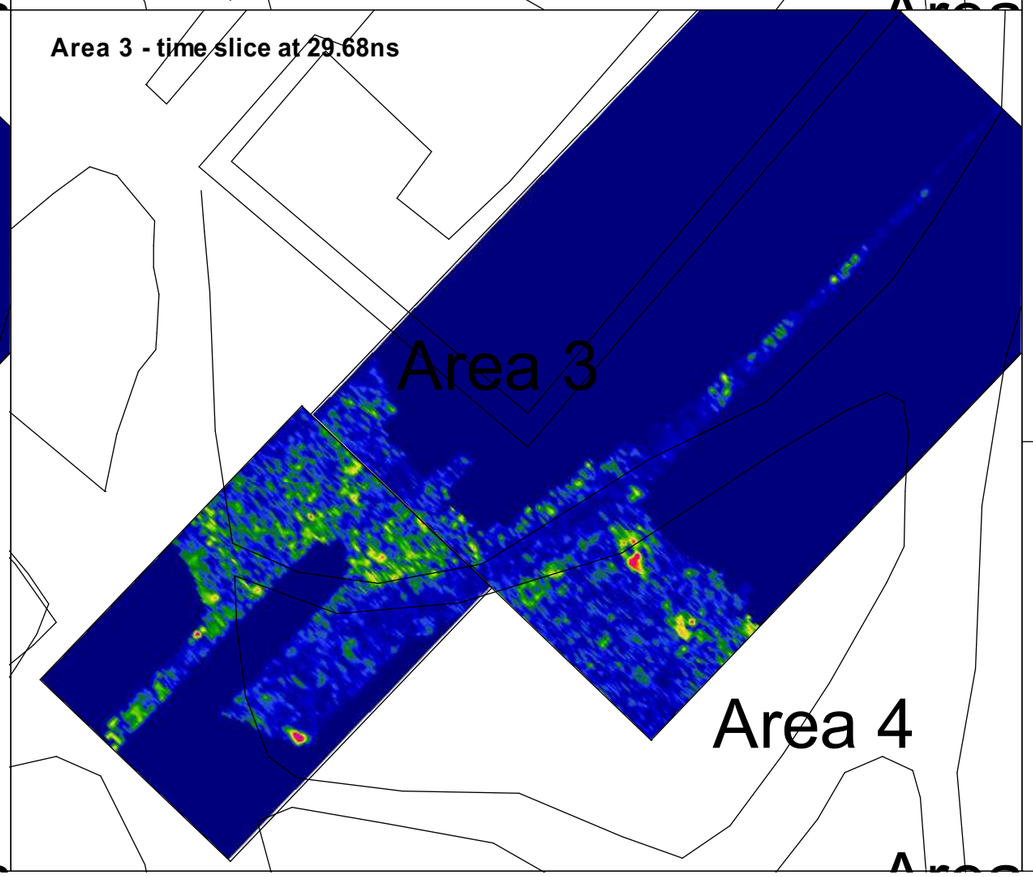
Area 3 - time slice at 11.87ns



Area 3 - time slice at 19.06ns



Area 3 - time slice at 29.68ns



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Ground penetrating radar time slices - Area 3

high amplitude reflection

low amplitude reflection

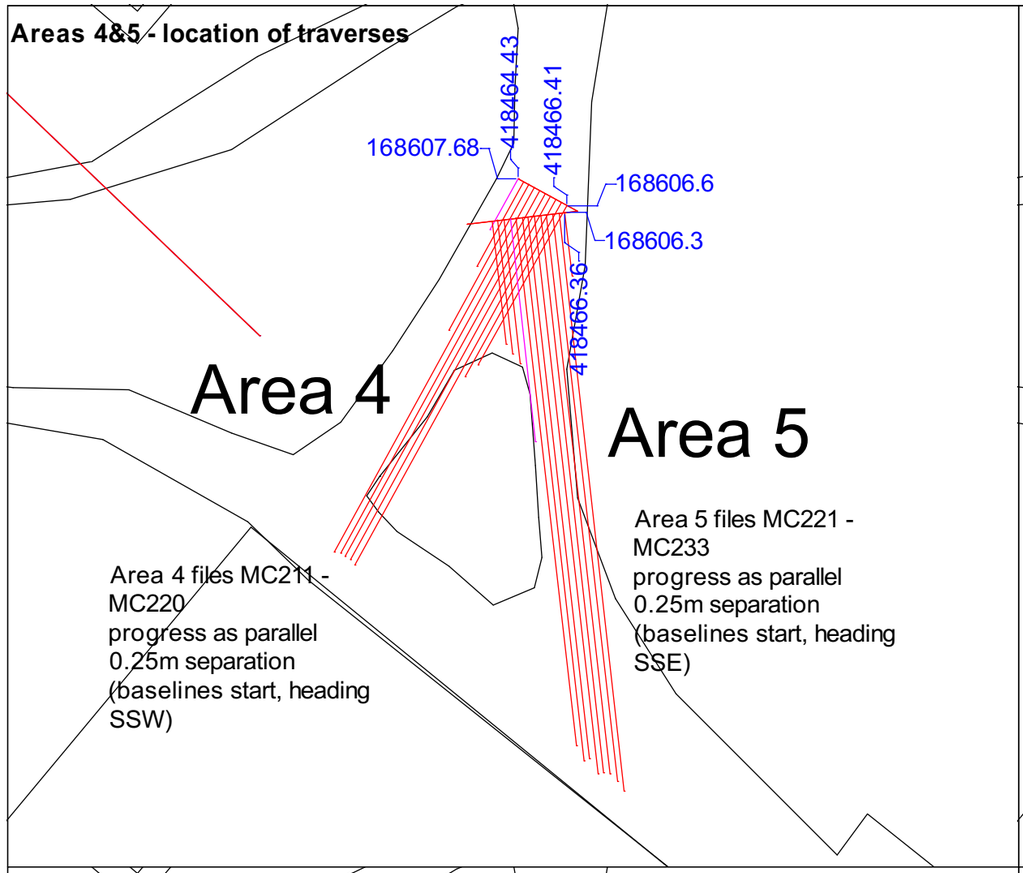
SCALE 1:250

0m 5 10m

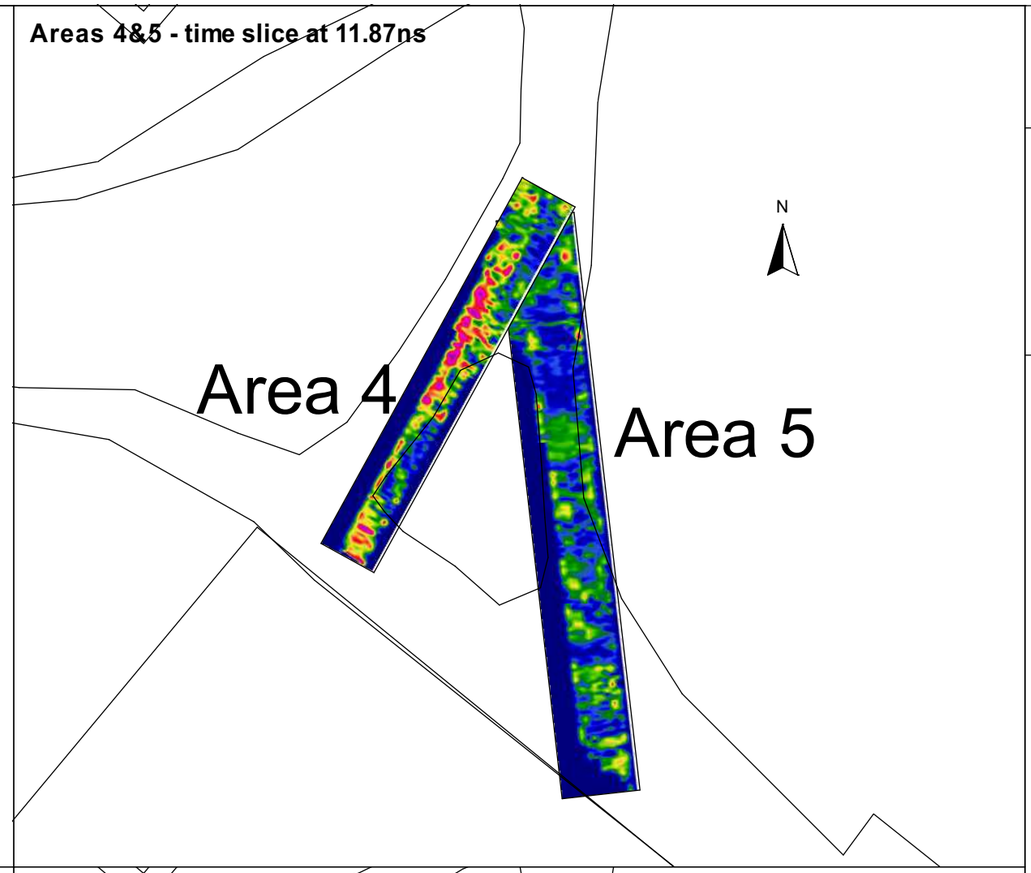
SCALE TRUE AT A3

FIG 05

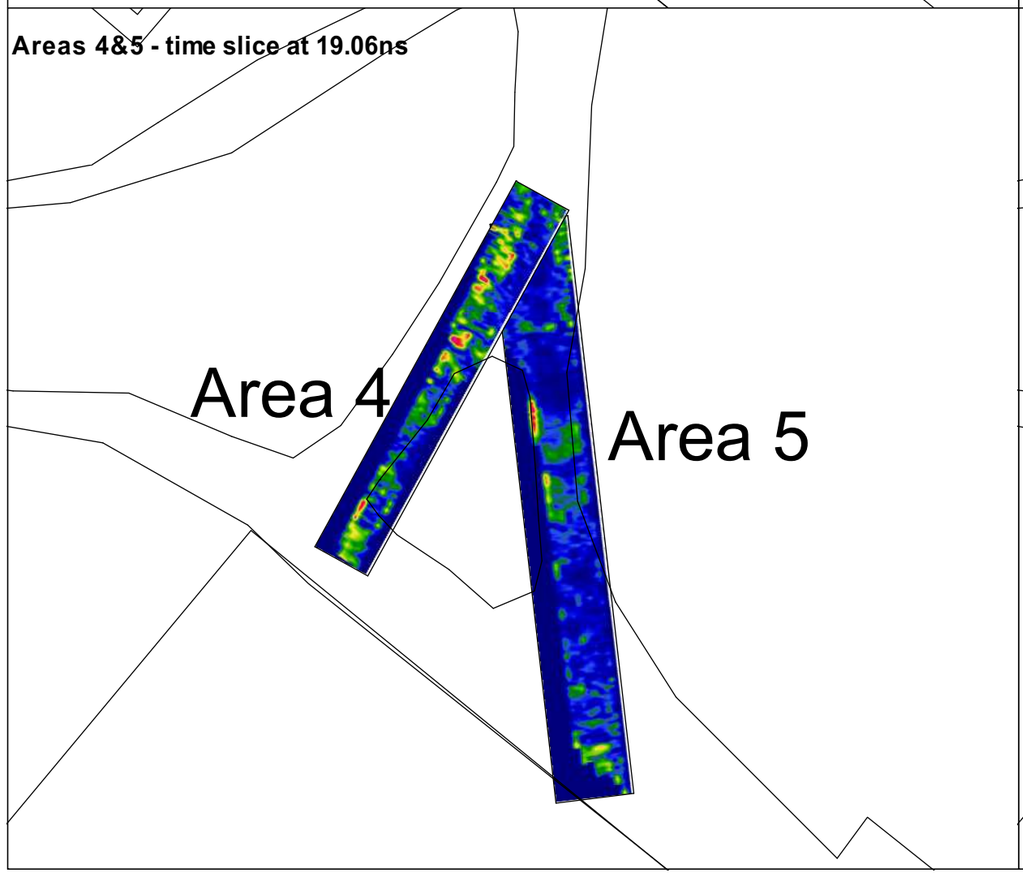
Areas 4&5 - location of traverses



Areas 4&5 - time slice at 11.87ns



Areas 4&5 - time slice at 19.06ns



Areas 4&5 - time slice at 29.68ns

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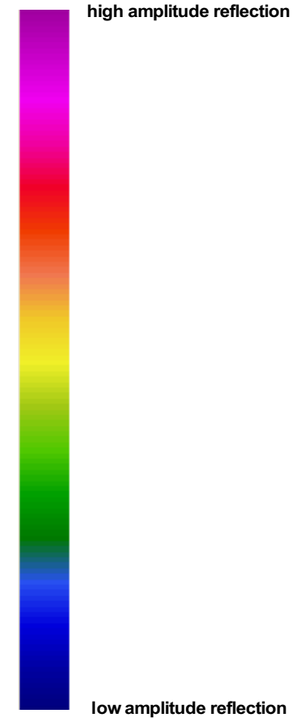
Ground penetrating radar time slices - Areas 4 & 5



SCALE 1:250

0m 5 10m

SCALE TRUE AT A3

FIG 06

Area 6 - location of traverses

Area 6

a 10

418426.7

File MC 297

168606.65

Area 6 files MC234 - MC297
progress as parallel
0.25m separation

File MC 234 (baseline start,
heading NW)

168596.36

418414.77

Area 7

Area 6 - time slice at 6.56ns

Area 6

a 10

N

Area 7

Area 6 - time slice at 17.81ns

Area 6

a 10

Area 7

Area 6 - time slice at 27.18ns

Area 6

a 10

Area 7

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Ground penetrating radar time slices - Area 6

high amplitude reflection

low amplitude reflection

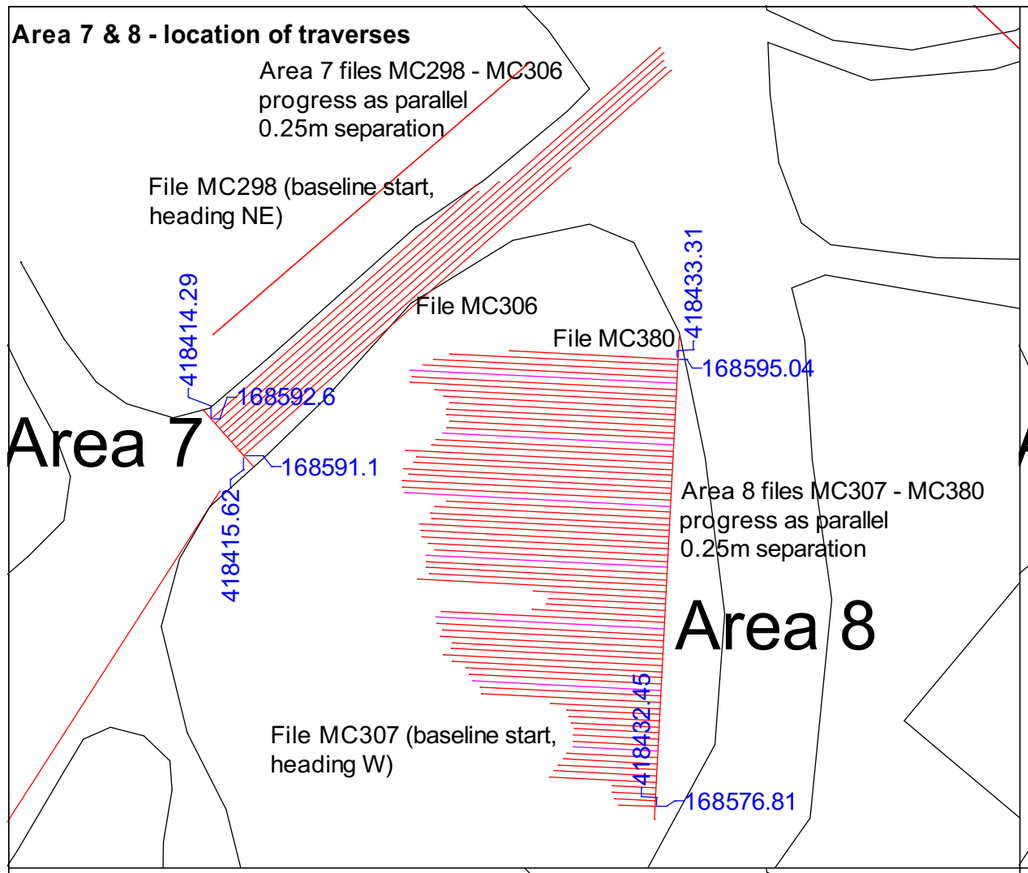
SCALE 1:250

0m 5 10m

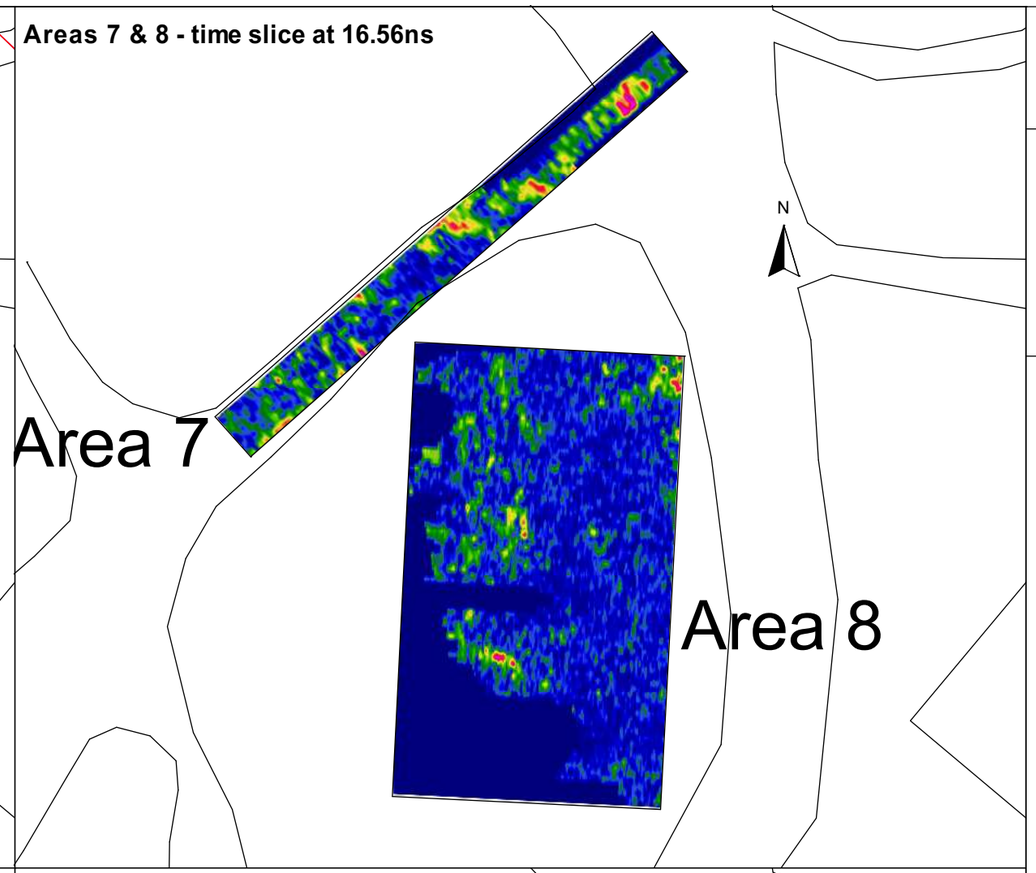
SCALE TRUE AT A3

FIG 07

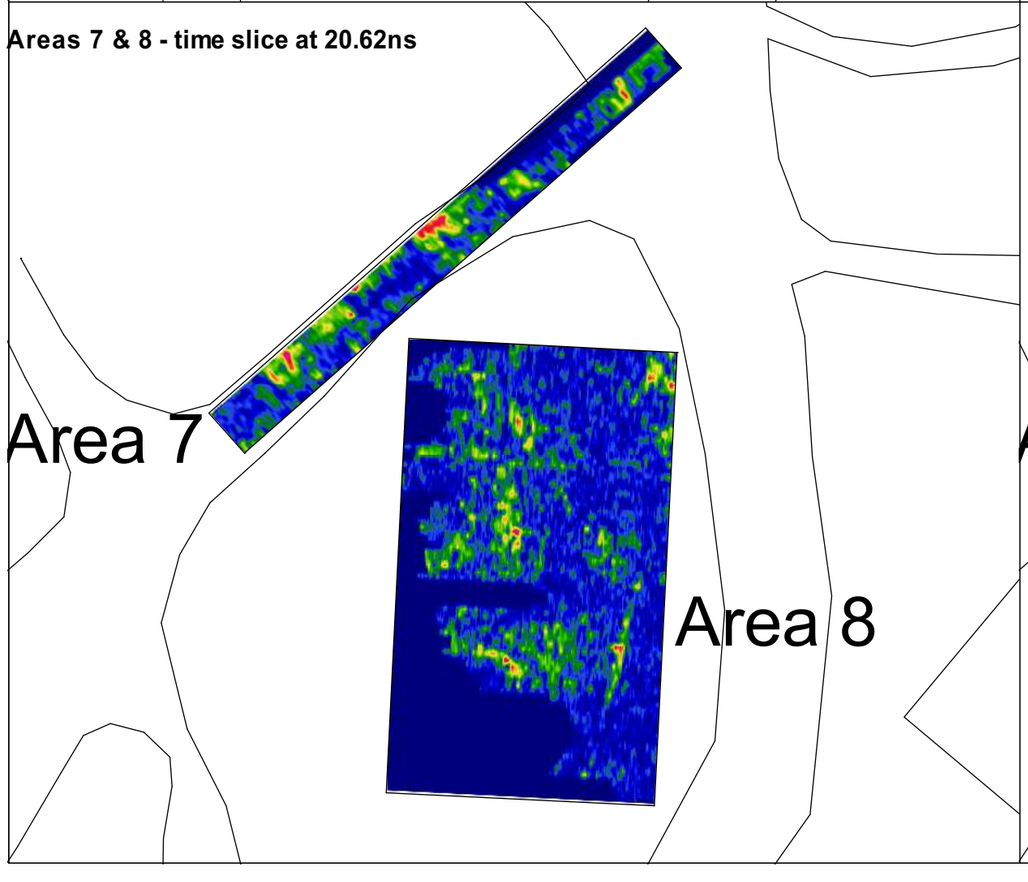
Area 7 & 8 - location of traverses



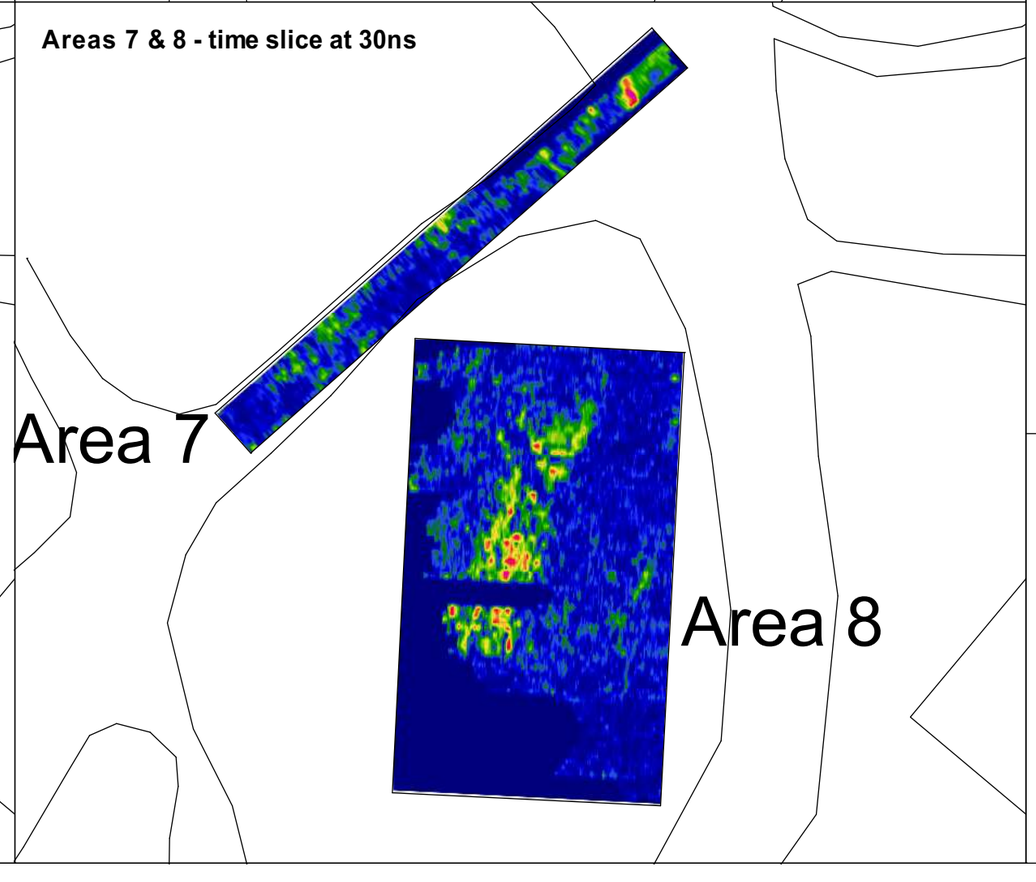
Areas 7 & 8 - time slice at 16.56ns



Areas 7 & 8 - time slice at 20.62ns



Areas 7 & 8 - time slice at 30ns



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Ground penetrating radar time slices - Areas 7 & 8

SCALE 1:250

0m 5 10m

SCALE TRUE AT A3

FIG 08

Area 9 - location of traverses

Area 7

File MC547

168590.09

418414.99

Area 9

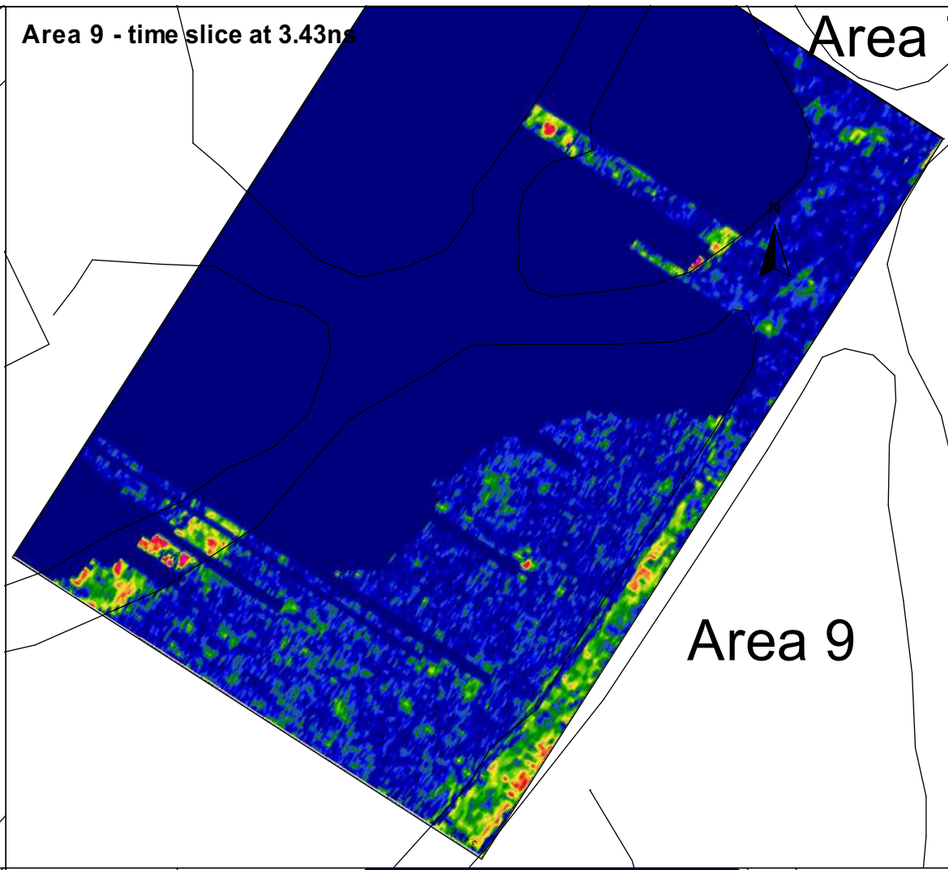
Area 9 files MC381 - MC547
progress as parallel
0.25m separation

File MC381 (baseline start,
heading NW)

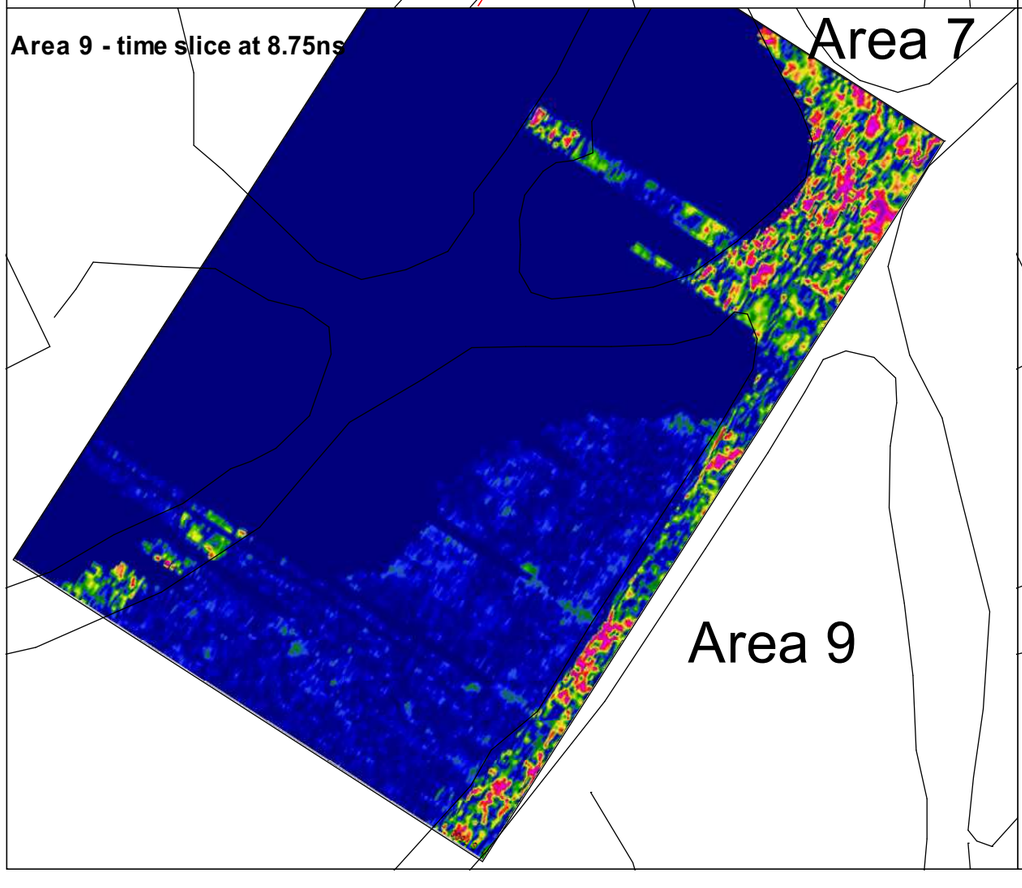
418392.49

168555.17

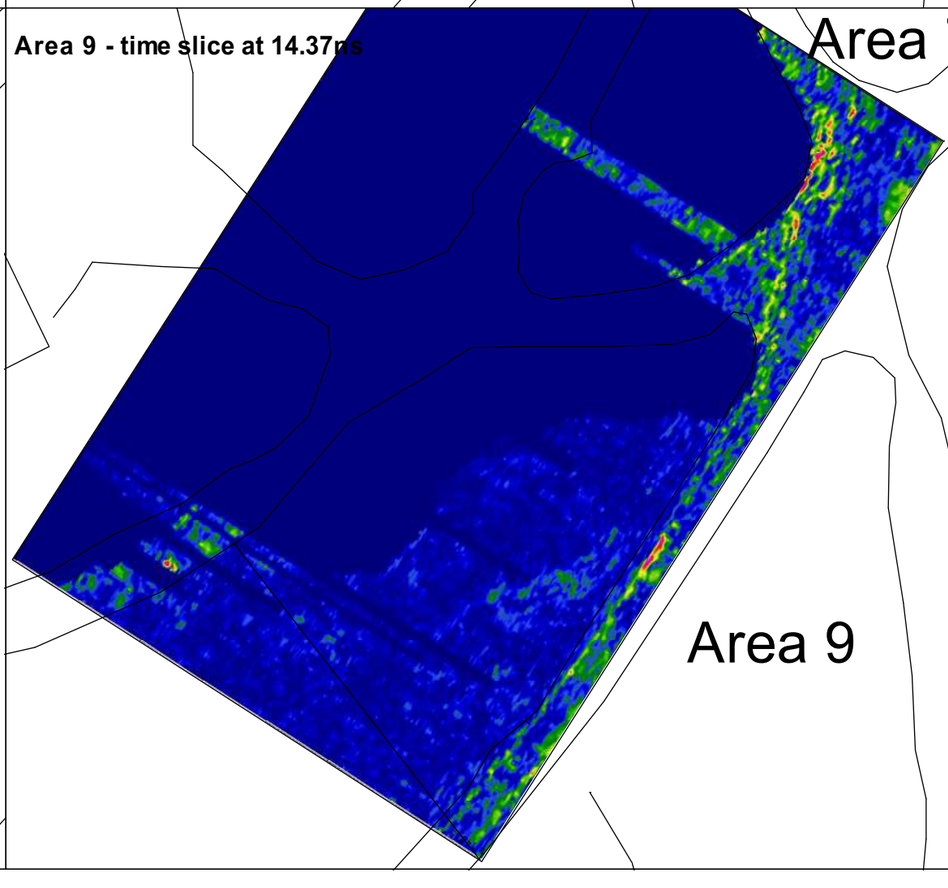
Area 9 - time slice at 3.43ns



Area 9 - time slice at 8.75ns



Area 9 - time slice at 14.37ns



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Ground penetrating radar time slices - Area 9

high amplitude reflection

low amplitude reflection

SCALE 1:300

0m 3 6 9 12 15m

SCALE TRUE AT A3

FIG 09

Areas 10 & 11 - location of traverses

Area 10

168608.73

168607.73

File MC558

418402.71

418405

Area 11

File MC548 (baseline start, heading SW)

Area 11 files MC559 - MC585 progress as parallel 0.25m separation

418379.03

File MC585

168589.62

File MC559 (baseline start, heading NE)

168586.62

Area 10 files MC548 - MC558 progress as parallel 0.25m separation

418384.8

Areas 10 & 11 - time slice at 10ns

Area 10

Area 11

N

Areas 10 & 11 - time slice at 18.12ns

Area 10

Area 11

Areas 10 & 11 - time slice at 31.25ns

Area 10

Area 11

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Ground penetrating radar time slices - Areas 10 & 11

high amplitude reflection

low amplitude reflection

SCALE 1:250

0m 5 10m

SCALE TRUE AT A3

FIG 10

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Abstraction and interpretation of ground penetrating radar anomalies

- Linear anomaly - feature of archaeological potential
- Linear anomaly - uncertain origin
- Linear anomaly - service
- Linear anomaly - path
- Linear and planar reflectors - path/track
- Complex and variable reflectors - uncertain origin

SCALE 1:500

0m 5 10 15 20 25m

SCALE TRUE AT A3

FIG 11