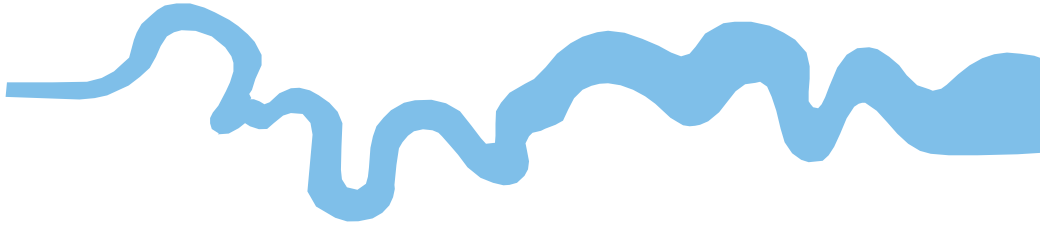


T V A S



NORTH MIDLANDS

**St Michaels and All Angels Church,
Penkridge, Staffordshire**

Geophysical Survey (Ground Penetrating Radar)

by Garreth Davey

Site Code: MAC17/50

(SJ 9215 1413)

**St Michaels and All Angels Church,
Penkridge, Staffordshire**

Geophysical Survey (Ground Penetrating Radar) Report

For St Michaels and All Angels Church

by Garreth Davey

Thames Valley Archaeological Services Ltd

Site Code MAC 17/50

May 2017

Summary

Site name: St Michaels and All Angels Church, Penkridge, Staffordshire

Grid reference: SJ 9215 1413

Site activity: Ground Penetrating Radar survey

Date and duration of project: 15-16th May 2017

Project manager: Steve Ford

Site supervisor: Garreth Davey

Site code: MAC 17/50

Area of site: 0.5 ha

Summary of results: A number of hollows have been identified as well as possible linear features which may be of a former building.

Location of archive: The archive is presently held at Thames Valley Archaeological Services, Reading in accordance with TVAS digital archiving policies.

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www.tvas.co.uk/reports/reports.asp.*

Report edited/checked by: Steve Ford✓ 25.05.17 Tim Dawson✓ 25.05.17
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St Michaels and All Angels Church, Penkridge, Staffordshire A Geophysical Survey (Ground Penetrating Radar)

by Garreth Davey

Report 17/50

Introduction

This report details the results of a ground penetrating radar survey conducted over land at St Michaels and All Angels Church, Penkridge, Staffordshire (NGR SJ 9213 1417) (Fig 1). The geophysical survey was commissioned by Ms Helen Martin-Bacon of Commercial Archaeology Limited on behalf of St Michaels and All Angels Parochial Church Council

An application to extend the church with new meeting rooms is to be made to South Staffordshire District Council. This survey is to form party of a staged programme of works to inform the planning application in accordance with the Department for Communities and Local Governments National Planning Policy (NPPF 2012) and the Staffordshire County Councils policies on archaeology. The work was conducted in line with a written scheme of investigation approved by Mr. Stephen Dean, Principle Archaeologist of Staffordshire County Council.

The fieldwork was undertaken by Garreth Davey and Mike Johnson, 15th and 16th May 2017 and the site code is MAC 17/50. The archive is presently held at TVAS Stoke-on-Trent in accordance with TVAS digital archiving policies.

Location, topography and geology

The site comprises an approximately 0.05 ha parcel of land, located in the centre of Penkridge (Fig. 2) and approximately 9.5 km south of Stafford, Staffordshire. The site is currently an unused area of the existing graveyard. The site lies on a generally flat area at approximately 85 m above Ordinance Datum (aOD). It is bounded to the south by the existing church building, to the east by the active graveyard and to the north and west by residential properties. The solid geology of the site is recorded as of the Bromsgrove Sandstone Formation with no superficial deposits recorded (BGS, 2017).

Site history and archaeological background

The aims of the survey are to identify and understand the range and nature of sub-surface anomalies with a view to gaining a more complete understanding of the history of the survey area of the churchyard at St. Michael's & All Angels, Penkridge as well as to inform the preparation of subsequent phases of archaeological evaluation/mitigation and the general design of the scheme to minimise impacts upon sensitive archaeological remains wherever possible.

The archaeological potential of the site has been highlighted in a brief for the project prepared by Mr. Stephen Dean of Staffordshire County Council. In summary, Penkridge has late Saxon origins with a minster church established in the 10th century and which is thought to lie on the same site as the later parish church. Penkridge is documented in Domesday Book of AD1086 (Williams and Martin 2002) and is thought to be a well established settlement at that time. It is claimed that King Eadred (946-55) founded a collegiate church here and it subsequently held great importance through the Anglo-Saxon period which continued post Norman conquest, due to its status as a chapel royal. The settlement is considered to have prospered in medieval times but perhaps with some decline in early post-medieval times. The church is listed grade 1 and contains 13th century fabric. Twelve burial monuments in the church yard are also listed grade II.

Methodology

The purpose of the survey was to identify geophysical anomalies that may be archaeological in origin in order to inform a targeted archaeological investigation of the site prior to development. The survey and report generally follow the recommendations and standards set out by both English Heritage (2008) and the Chartered Institute *for* Archaeologists (2002, 2011, 2014).

Ground penetrating radar (GPR) was chosen as a survey method as it is a common option for locating graves and burial plots. This is due to its ability to detect small targets at a variety of depths and providing an estimate depth for these features.

Equipment

The Ground Penetrating Radar (GPR) survey was conducted using an Utsi Groundvue 3 instrument with 400MHz and 250MHz antennas. The instrument is comprised of an antenna and a control tablet mounted onto a wheeled caddy frame. The caddy is then run along the surface in lines. This required a temporary grid to be

established across the survey area using pegs at 10m intervals with further subdivision where necessary. The data were then collected along traverses spaced 1m apart.

The instrument emits pulses of which it measures the response strength and time. On this basis, each pulse will travel and reflect from objects, whilst some of the pulse will continue through an object and will go on to reflect from deeper features thus creating a profile of pulse responses at different depths. Metals however are considered complete reflectors and will reflect the entire pulse and thus obscure features below. Water also dissipates the signal significantly and reduces effectiveness.

Data gathered in the field was processed using the ReflexW software package and subject to minimal processing operations which include static correction, gain adjustment and a subtract mean process.

Results

The GPR data are presented as a series of time slices and interpretations at a scale of 1:500. A number of anomalies have been identified within the survey data. The majority of these consist of irregular sub circular hollows and the potential for some linear features (Figs, 3-8).

The most effective frequency for survey on the site was the 250MHz range, a number of large features have been identified within this dataset. A large area of responses [4] and [6] is evident in Time slices 2 and 3. These appear to form linear features and may be evidence for former structures as there is no clear feature evident on the surface of the survey area. These responses are also evident in the 400MHz dataset in Time slices 7 – 8 which show a more detailed shape to the features.

Further anomalies include the large sub-rectangular features to the east of the survey data and the more fragmented responses on the southern boundary of the survey area. The large eastern feature [1] lies beneath a large concrete pad and is likely related to this, whilst another on the southern extent [2] lies beneath a crypt structure and is likely to be evidence for the burial beneath. These features are evident at all depths within the frequency data as can be seen in the Time slices.

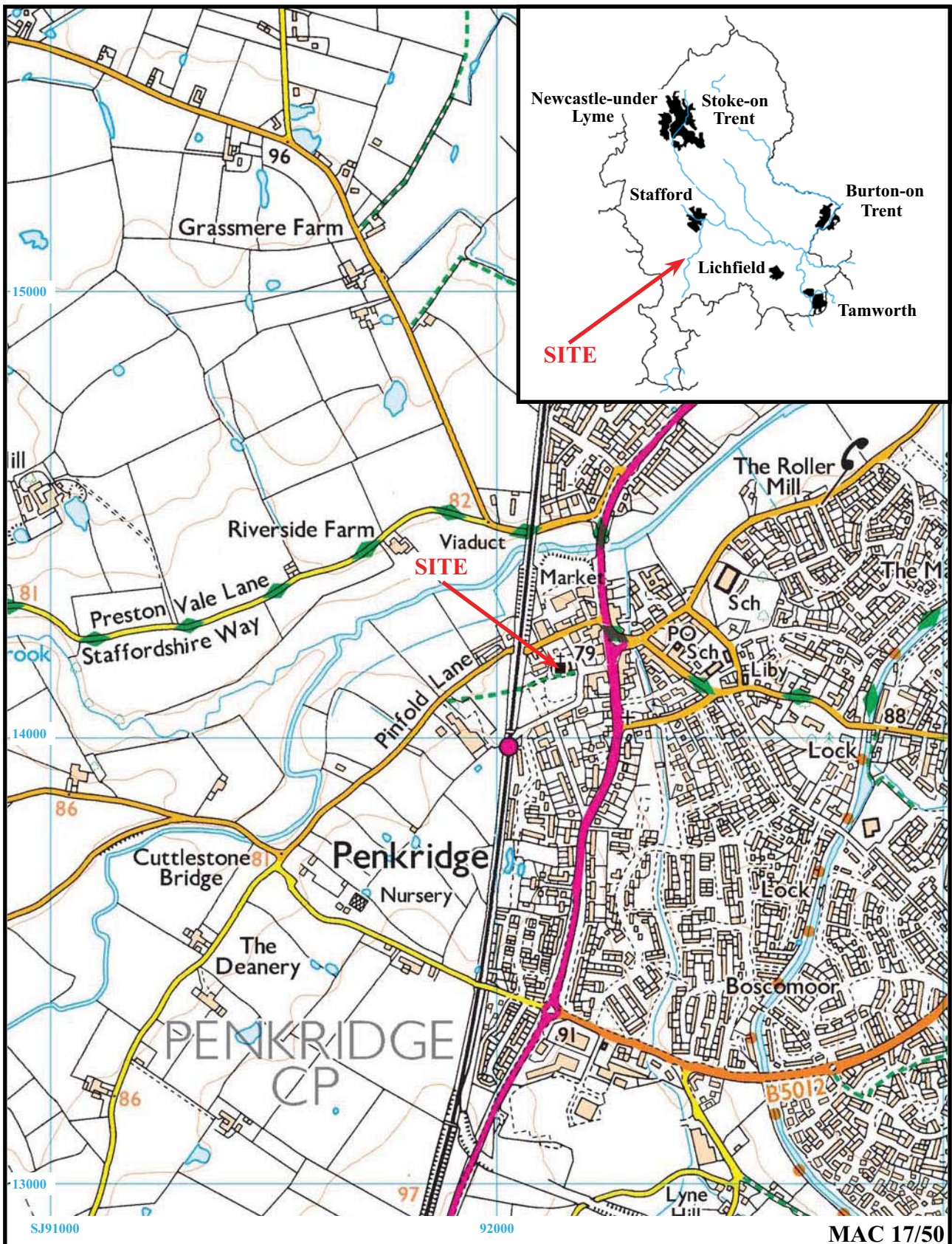
A number of sub circular features are also evident, primarily at shallower levels [3] and [5] with no clear surface features corresponding to the location. These appear to have no clear shape or form and would need further investigation for interpretation.

Conclusion

In conclusion, a number of possible hollows have been identified within the survey data. These correlate with the presence of crypts and slabs on the surface and it is likely that these are related to the graves beneath the surface features. The weak linear features however are currently of unknown origin and may prove to be evidence of former structures. The results of the survey will form the basis of trench location, and it is likely that these trenches will be primarily aligned to target the potential features of [4] and [6] whilst also covering features [3] and [5] to assess their origin. Local anecdotal evidence suggests that the area was a former entrance to the church and that burials were unlikely to be present due to it formerly being an access route which may explain the absence of further features.

References

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- English Heritage, 2008. *Geophysical Survey in Archaeological Field Evaluation*, Portsmouth (2nd edn)
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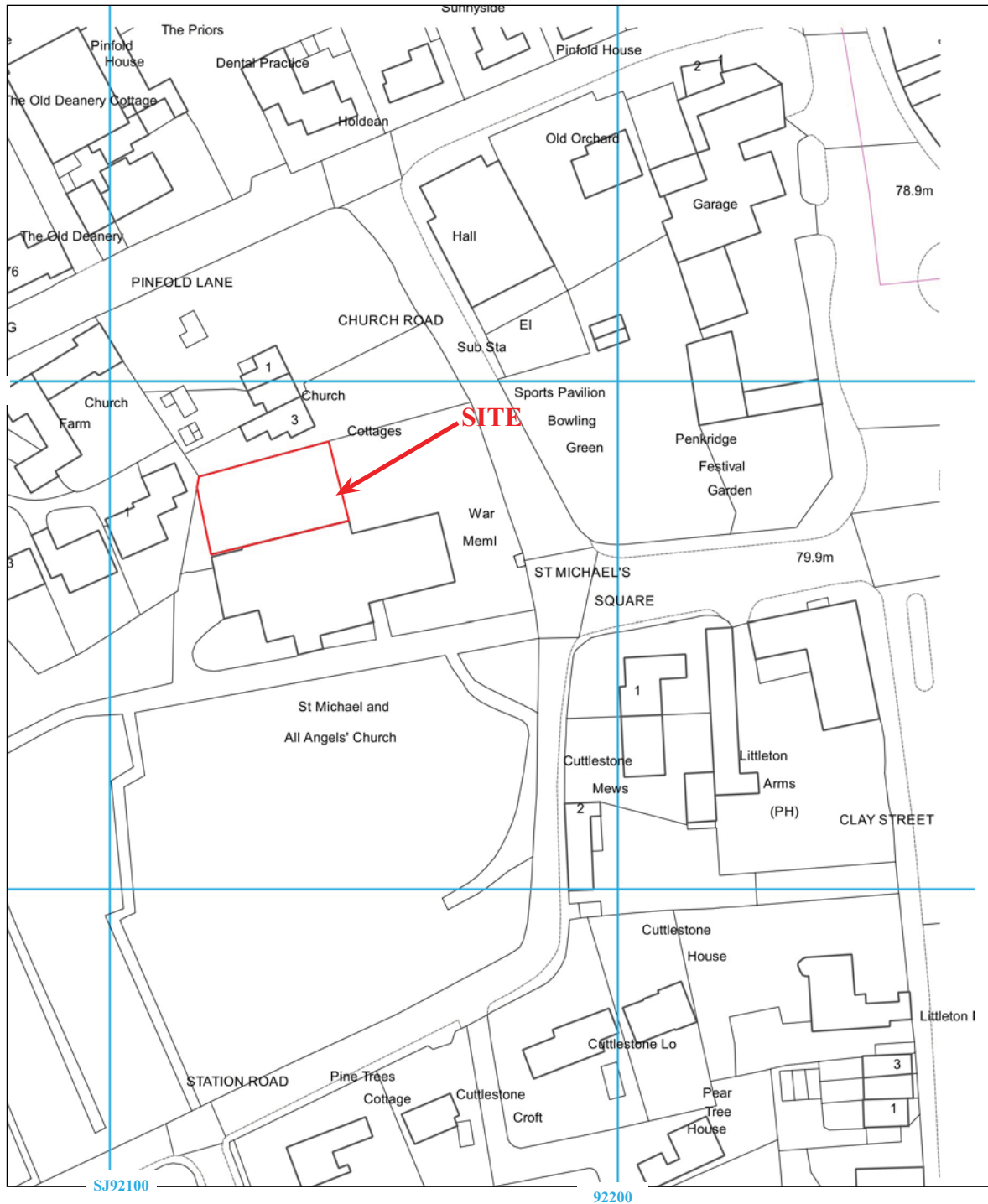
**St Michaels and All Angels Church,
Penkridge, Staffordshire, 2017
Geophysical Survey**

Figure 1. Location of site within Penkridge and Staffordshire.

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MAC 17/50



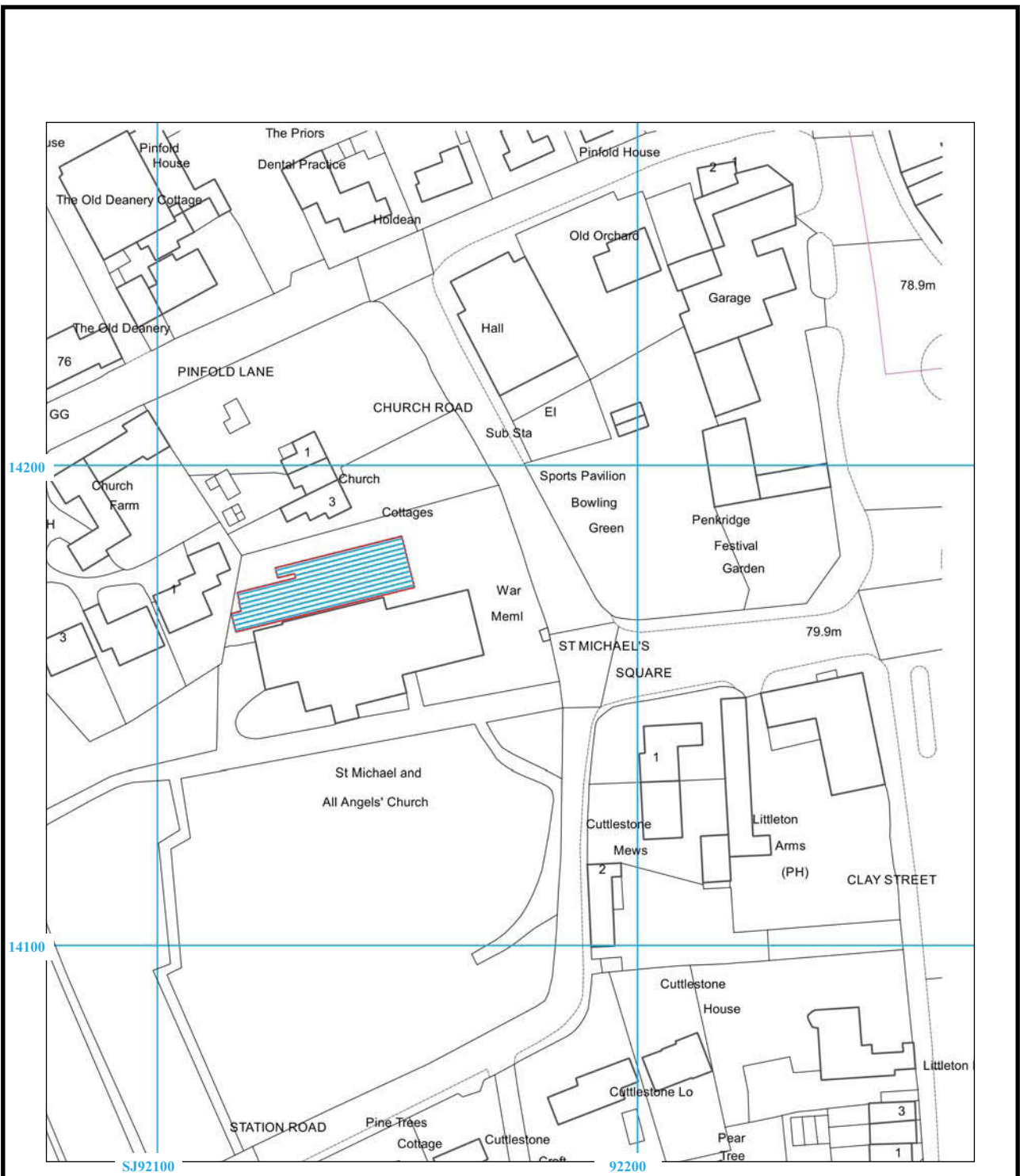
MAC 17/50



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Geophysical Survey**
Figure 2. Detailed location of site off Church Road.

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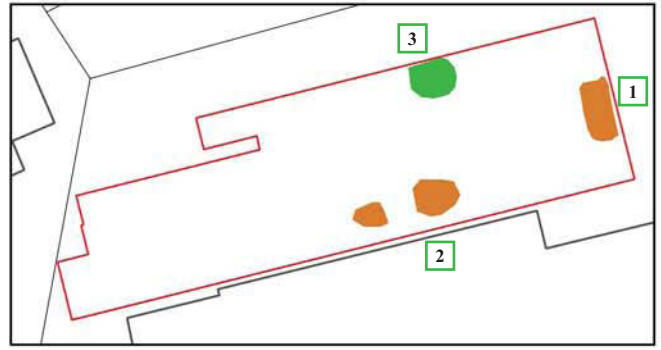
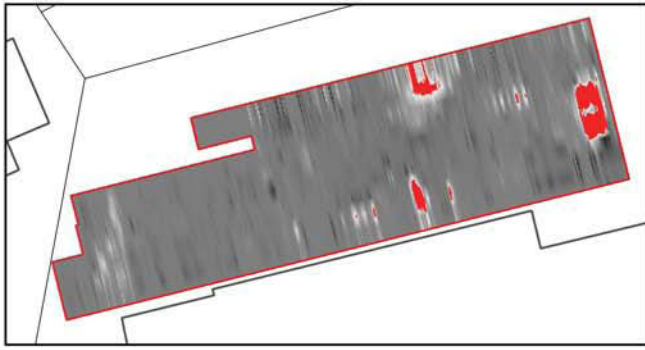
MAC 17/50



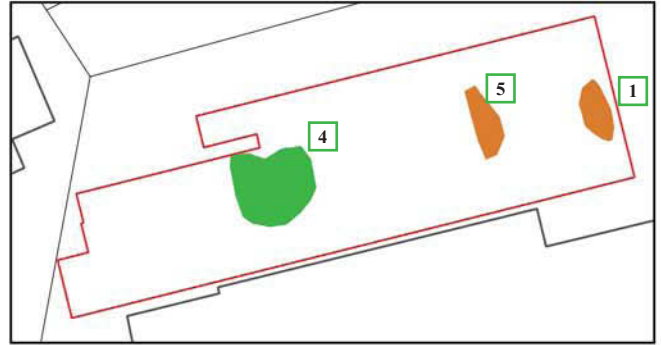
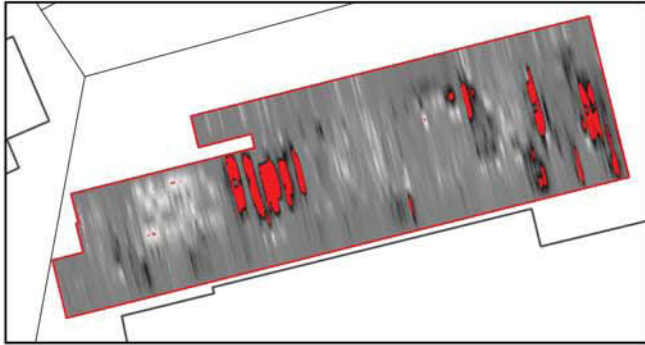
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Geophysical Survey**
Figure 3. Survey extents and profile lines

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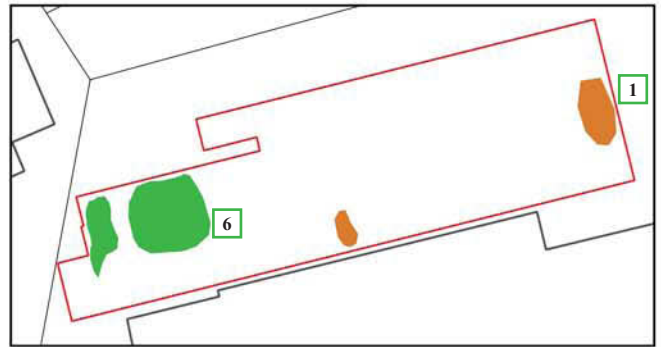
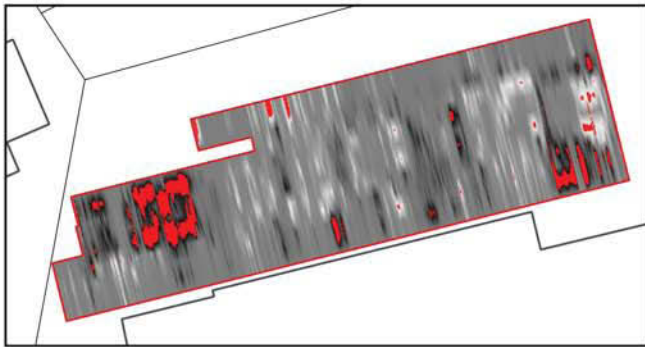




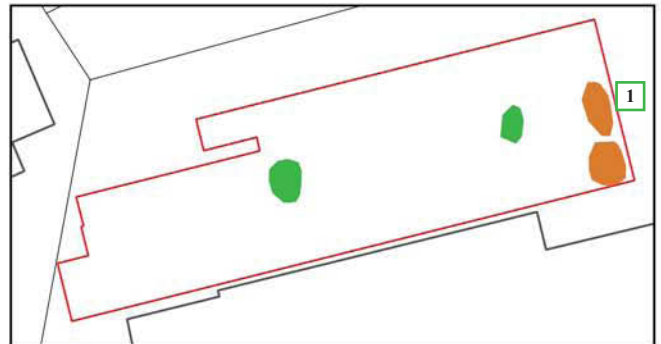
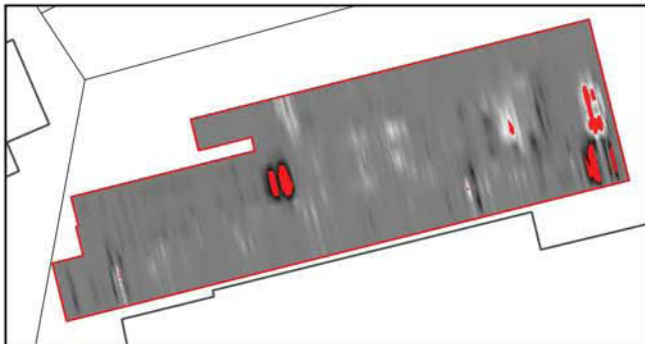
Timeslice 1. 250MHz Data and Archaeological Interpretation (approximate depth 0.2 m)



Timeslice 2. 250MHz Data and Archaeological Interpretation (approximate depth 0.4 m)



Timeslice 3. 250MHz Data and Archaeological Interpretation (approximate depth 0.6 m)



Timeslice 4. 250MHz Data and Archaeological Interpretation (approximate depth 0.8 m)

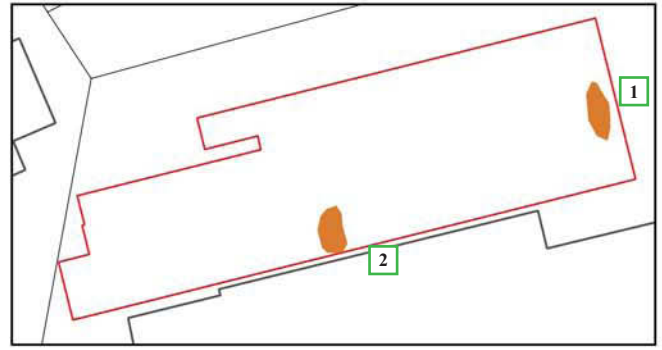
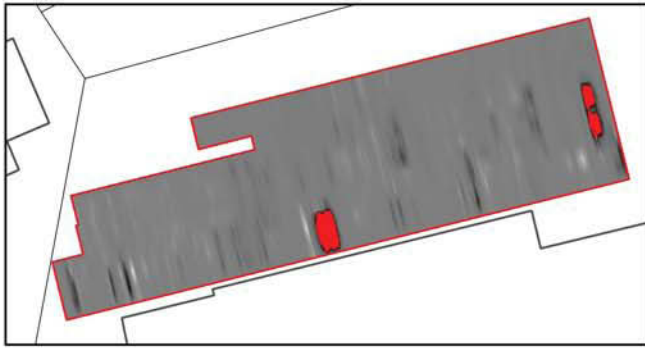
 Possible feature (archaeology)
  Possible modern feature (not archaeology)

MAC 17/50

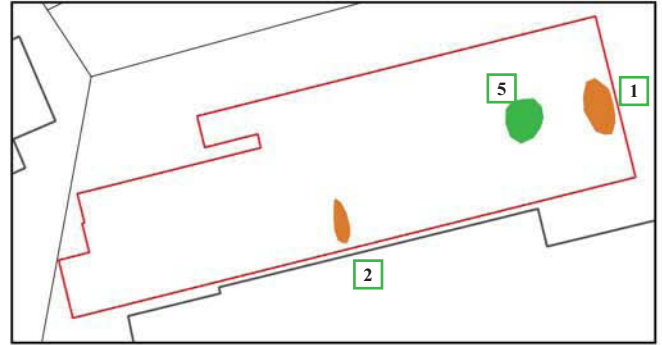
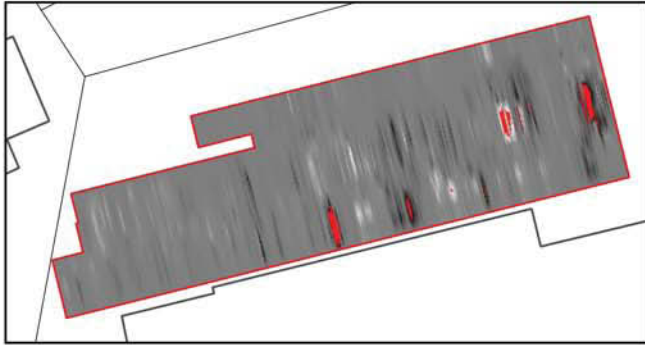


St Michaels and All Angels Church,
Penkridge, Staffordshire, 2017
Geophysical Survey
 Figure 4. Timeslices 1-4

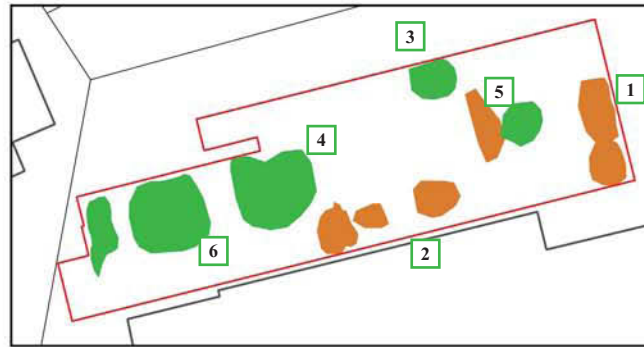




Timeslice 5. 250MHz Data and Archaeological Interpretation (approximate depth 1.0 m)



Timeslice 6. 250MHz Data and Archaeological Interpretation (approximate depth 2.0 m)



250MHz Combined Archaeological Interpretation

- Possible feature (archaeology)
- Possible modern feature (not archaeology)

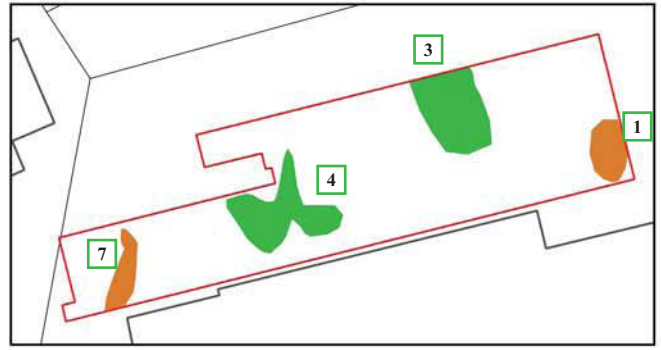
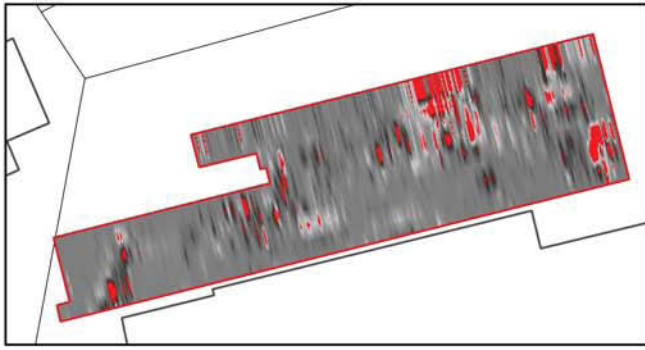
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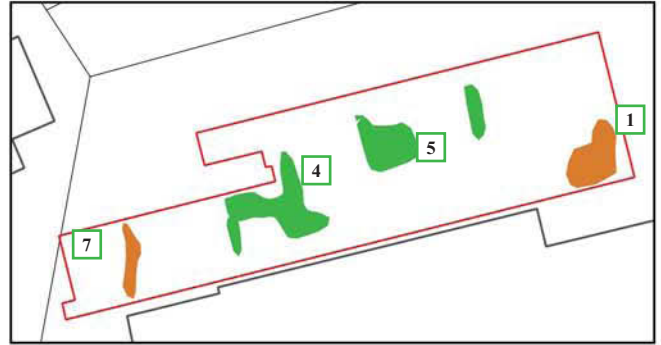
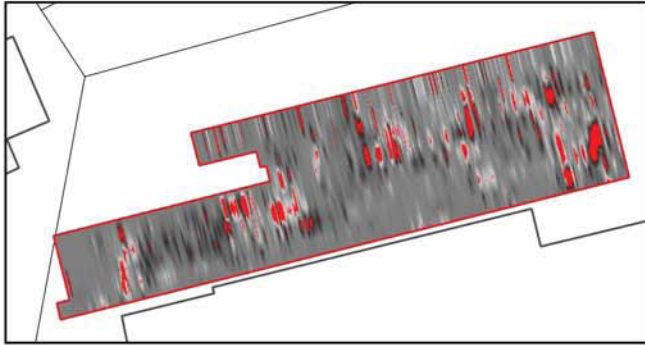
**St Michaels and All Angels Church,
Penkridge, Staffordshire, 2017
Geophysical Survey**

Figure 5. Timeslices 5-6 and 250MHz combined interpretation

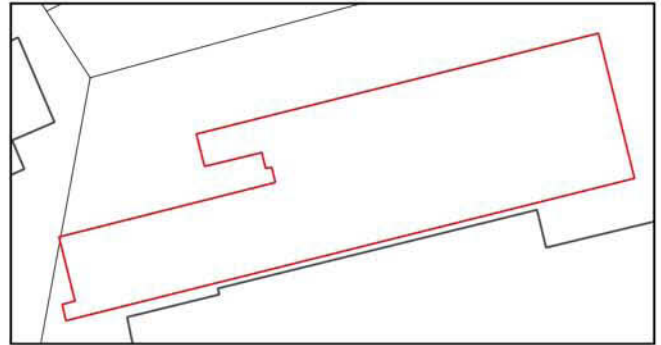
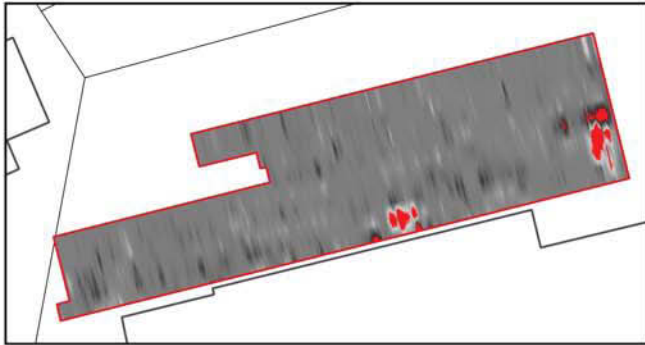




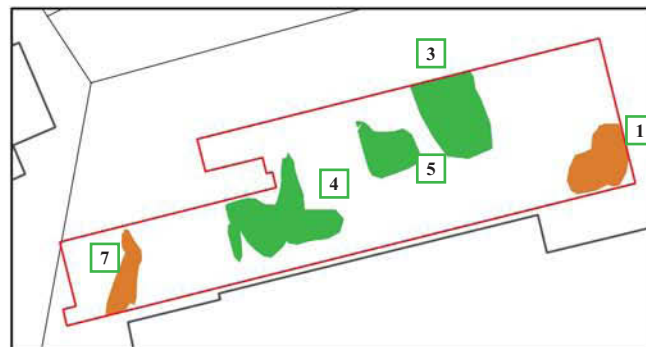
Timeslice 7. 400MHz Data and Archaeological Interpretation (approximate depth 0.1 m)



Timeslice 8. 400MHz Data and Archaeological Interpretation (approximate depth 0.2 m)



Timeslice 9. 400MHz Data and Archaeological Interpretation (approximate depth 1.0 m)



400MHz Combined Archaeological Interpretation

- Possible feature (archaeology)
- Possible modern feature (not archaeology)

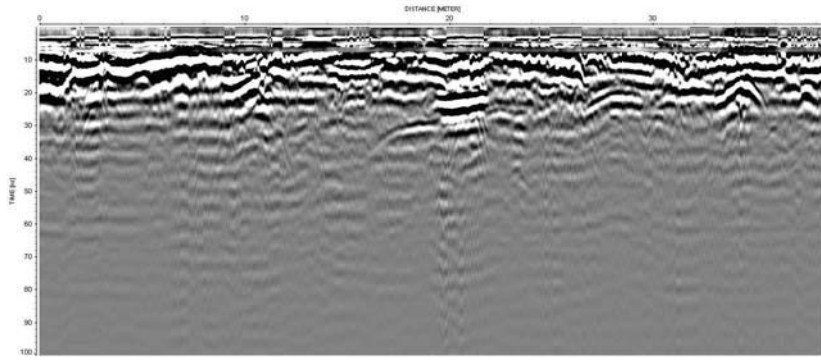
MAC 17/50



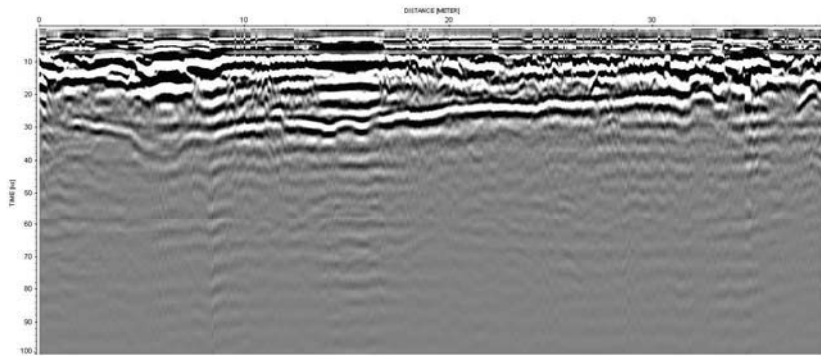
**St Michaels and All Angels Church,
Penkridge, Staffordshire, 2017
Geophysical Survey**

Figure 6. Timeslices 7-9 and 400MHz combined interpretation

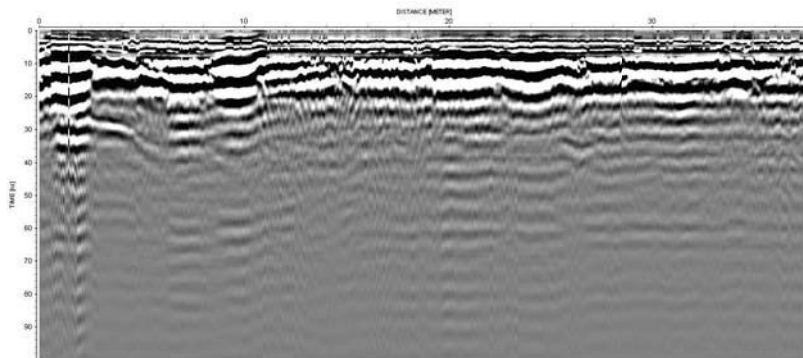




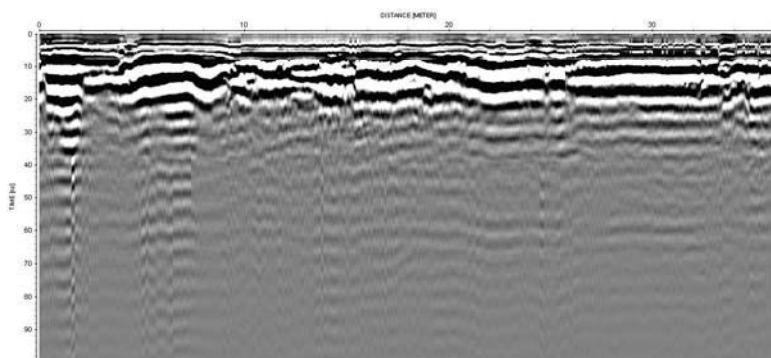
Profile 1
250MHz



Profile 2
250MHz



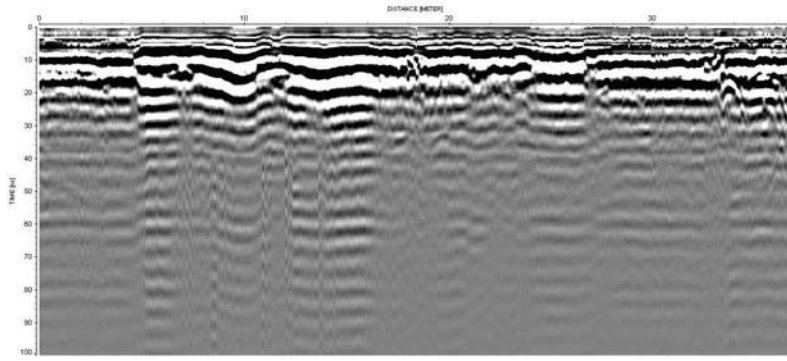
Profile 3
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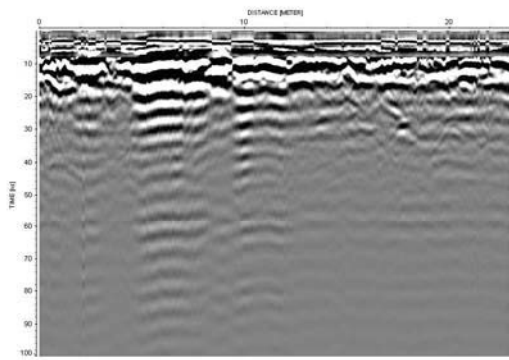
Profile 4
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**St Michaels and All Angels Church,
Penkridge, Staffordshire, 2017
Geophysical Survey
Figure 7. Profiles 1-4**

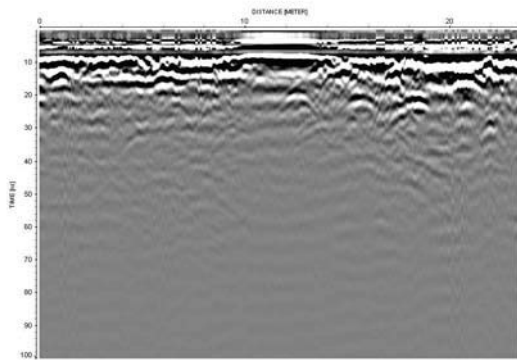




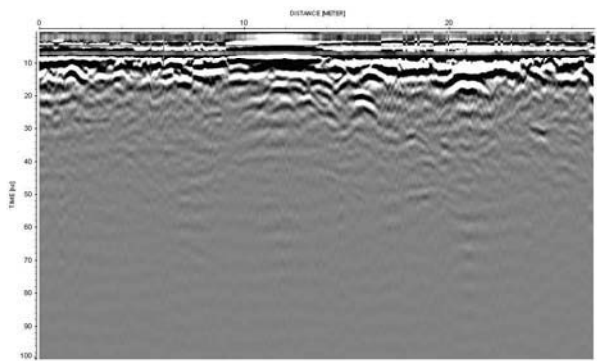
Profile 5
250MHz



Profile 6
250MHz



Profile 7
250MHz



Profile 8
250MHz

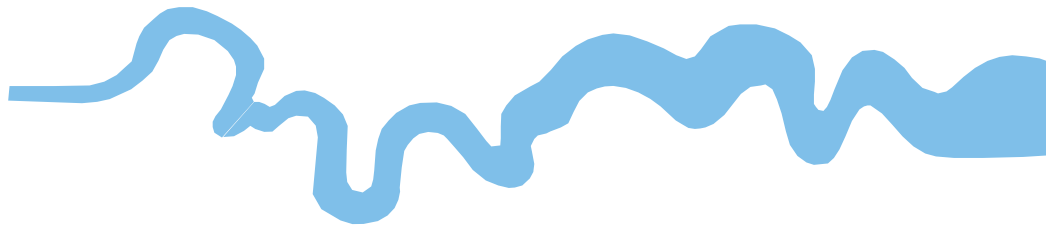
**St Michaels and All Angels Church,
Penkridge, Staffordshire, 2017
Geophysical Survey
Figure 8. Profiles 5-8**



TIME CHART

	Calendar Years
Modern _____	AD 1901
Victorian _____	AD 1837
Post Medieval _____	AD 1500
Medieval _____	AD 1066
Saxon _____	AD 410
Roman _____	AD 43 AD 0 BC
Iron Age _____	750 BC
Bronze Age: Late _____	1300 BC
Bronze Age: Middle _____	1700 BC
Bronze Age: Early _____	2100 BC
Neolithic: Late	3300 BC
Neolithic: Early	4300 BC
Mesolithic: Late	6000 BC
Mesolithic: Early	10000 BC
Palaeolithic: Upper	30000 BC
Palaeolithic: Middle	70000 BC
Palaeolithic: Lower	2,000,000 BC





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