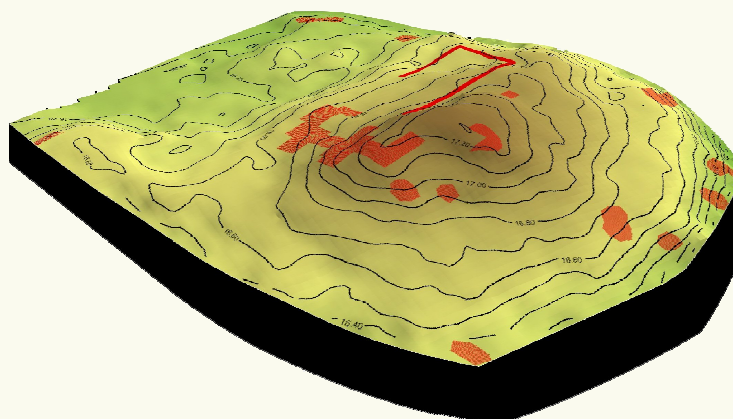




**ST ANDREW'S CHURCH
APLEY
LINCOLNSHIRE**

**GEOPHYSICAL AND
TOPOGRAPHIC SURVEY**

**Work undertaken for
Apley Parochial Church Council**



July 2012

**Report produced by
S J Malone BSC PhD MIFA**

OASIS record: archaeo11-131074
National Grid Reference: **TF 10914 75036**

APS Report No: **53/12**

**ARCHAEOLOGICAL
PROJECT
SERVICES**



APLEY, ST ANDREW'S: ARCHAEOLOGICAL SURVEY

CONTENTS

List of Figures

1.	SUMMARY	1
2.	INTRODUCTION	1
2.1	BACKGROUND	1
2.2	TOPOGRAPHY AND GEOLOGY	1
2.3	ARCHAEOLOGICAL BACKGROUND	1
3.	AIMS	2
4.	METHODS	2
5.	RESULTS	3
6.	DISCUSSION	4
7.	ACKNOWLEDGEMENTS	4
8.	PERSONNEL	4
9.	BIBLIOGRAPHY	4
10.	ABBREVIATIONS	4

List of Figures

Figure 1 Site location map

Figure 2 Location and layout of survey area

Figure 3 Resistivity survey plots - base plot and smoothed data

Figure 4 Resistivity survey interpretative plot

Figure 5 Interpretative plot

Figure 6 Contour survey results (contours at 0.1m intervals)

Figure 7 Digital Surface Model perspective views

APLEY, ST ANDREW'S: ARCHAEOLOGICAL SURVEY

Figure 8 Resistivity survey results overlaid on topographic survey

Figure 9 DSM from SW with contours and resistivity survey results overlain

1. SUMMARY

Geophysical and topographic survey was undertaken for Apley Parochial Church Council on land at St Andrew's Church, Apley, Lincolnshire in connection with proposed badger exclusion works in the church grounds. The survey area encompassed the site of the medieval church of St Andrew, a Scheduled Monument.

Resistivity survey was undertaken over the 1350m² area of the mound. The survey identified probable wall lines on the northeastern part of the mound probably indicating the position of the early church.

Topographic survey mapped the form of the mound in detail. A slight bench in the northeastern side matches the geophysical anomalies and reinforces interpretation as the location of the earlier church structure.

2. INTRODUCTION

2.1 Background

The site of the church and graveyard at St Andrew's, Apley, Lincolnshire lies within the scheduled monument Apley Medieval Settlement (ref. 22734). The site has been occupied by badgers which are causing significant damage to the fabric of the monument. It is proposed to exclude the badgers with one-way gates and ground anchored steel mesh. As the proposed works will cause some change to the site and inhibit future survey, topographic and geophysical survey were proposed to precede the exclusion works.

Archaeological Project Services was commissioned by Apley Parochial Church Council to undertake the surveys which took place on the 2nd and 3rd July 2012.

Resistivity survey was undertaken over an area of some 1350m² at the southern end of the churchyard supplemented by topographic surveying in order to provide a record of the form of the mound.

2.2 Topography and Geology

Apley is located 13km northeast of Lincoln and 4km southwest of Wragby in the West Lindsey District of Lincolnshire. The old church site now forms the southern end of the churchyard of the present St Andrew's Church centred on National Grid Reference TF 10914 75036 (Fig. 1).

The site lies in a rolling landscape at c.15m O.D. in the Lincolnshire clay vale north of the Witham Valley. Soils are mapped as fine loamy over clayey soils of the Beccles 1 Association developed on glacial till (Hodge *et al.* 1984, 117). British Geological Survey mapping shows a band of glacial sand and gravel underlying the village core.

2.3 Archaeological Background

The remains of the medieval settlement of Apley, including those of a monastic manor or grange and associated ridge and furrow cultivation, survive well as a series of substantial earthworks and associated buried deposits and are protected as a Scheduled Monument (22734)

The monument includes the remains of the medieval settlement of Apley, a small hamlet established by the late 11th century and later managed as a monastic manor or grange of Stainfield Priory. The medieval church at Apley remained standing until the beginning of the 18th century; the present St Andrew's Church, which stands on an adjacent site and is not included in the scheduling, was constructed in 1871. The remains of the medieval settlement of

Apley and the surviving parts of its open fields are visible as earthworks with associated buried remains and lie in two separate areas of protection.

About 50m to the south of the present St Andrew's Church is a low sub-circular mound about 30m across and 1m high representing the site of the medieval church and churchyard at Apley. The buried foundations of the church are preserved within the mound. It is possible that the churchyard was formerly defined by a sub-circular ditched enclosure part followed by an existing fenced boundary.

3. AIMS

The aims of the survey were:

- to provide a record of the form of the mound prior to the implementation of badger exclusion works which may cause some change to the site and inhibit future works;
- to investigate the potential for buried structural remains within the mound through geophysical survey; and
- to provide interpretation of the results of the surveys and any new information this may provide on the form and nature of the monument.

4. METHODS

Resistivity Survey

Survey was undertaken using a Geoscan RM4 resistivity meter with readings logged on a Psion data-logger. Resistivity survey consists of taking a series of electrical readings, the electrical resistance providing a proxy for moisture contrasts within the ground. The fills of earth-cut features – ditches, pits etc. – generally

retain more moisture than the undisturbed natural subsoil and can show as areas of low resistance. Conversely walls or metalled surfaces retain less moisture and show as high resistance anomalies. The technique is preferable to magnetic survey where masonry structures are suspected and may give complementary results where there is only a weak magnetic contrast in the fills of cut features. However, it is more time-consuming and less suitable for large area survey.

Sampling interval and data capture

Survey was undertaken on a 20m x 20m grid with readings taken at 1m intervals on traverses 1m apart. Location and layout of the survey area is shown in Fig. 2.

Processing and presentation of results

Processing was undertaken using specialist ArcheoSurveyor software.

The following shows the basic processing carried out on all processed resistivity data used in this report:

1. Despike (useful for display and allows further processing functions to be carried out more effectively by removing extreme data values)

Parameters: X radius = 1; Y radius = 1; Threshold = 3 std. dev.; Spike replacement = mean

2. Clip (excludes extreme values allowing better representation of detail in the mid range): +/-3SD = 15-65 Ohm

X/Y interpolation has been used for the purposes of display to remove blockiness. This increases clarity but can introduce processing artefacts. Unprocessed plots are therefore also provided for reference.

Topographic Survey

Topographic survey was undertaken using a survey grade differential GPS system

linked to Ordnance Survey National Grid providing locational control to centimetre accuracy. Where tree cover interfered with satellite visibility this was supplemented by Total Station survey using control points established with the GPS.

Spot heights were taken at *c.*1m intervals supplemented where necessary by points at salient positions such as top, bottom, and along the centreline and mid-point of slopes, ditches, embankments and earthworks.

Results are illustrated below and include contour survey, profiles and DTM.

5. RESULTS

Resistivity Survey

The presentation of the data for the site involves a print-out of greyscale base plots and smoothed plots (Fig. 3). Geophysical survey anomalies have been identified and plotted onto the interpretative drawing (Fig. 4) and are described below.

Background variation

Broader changes in the response – from generally low around the west and north to somewhat higher in the south and east – appear to reflect the topography of the mound (see Fig. 8) with higher readings reflecting the greater depth, or different composition, of the material making up the mound. Elevated readings are also seen close to the positions of trees around the boundary, and on top of the mound, reflecting a moisture deficit in their vicinity.

High resistance linear anomalies

A clear high resistance linear anomaly can be seen running slightly north of east from close to the centre of the mound for some 12m, turning through a right-angle and running a further 5m, here becoming

slightly less strong. These are likely to represent wall-lines of the earlier church. A further right-angled return is perhaps evident, but responses are much less strong along this line. Areas of higher readings towards the western end of this area may also represent part of the structure, possibly also suggesting an attached structure (porch?) at the southwest corner. However, responses here are less coherent and trees on the top of the mound may have an influence on moisture content (and level of readings) here.

Discrete anomalies

Neither the graves in this area of the churchyard, nor the burrowing by the badgers produces any clear electrical response, although one or two discrete positive anomalies on the crest and south side of the mound may reflect positions of further graveyard furniture.

Topographic Survey

Results of the topographic survey are illustrated in Figs 5-7.

The mound as recorded is 1.08m high at its highest, 29.7m north-south and 31.6m east-west (see Fig. 7 profiles), although the boundary fence possibly excludes the lowest part of the slope to the south and east (the measurement of 36m SE-NW may represent the extent better). The mound is slightly elongated west-east with a slight bench in the slope on the northern face and steeper sides around the east and southeast corner.

A 3D digital surface model (Fig. 7) represents the form well and is also provided with overlay showing the geophysical survey results (Fig. 9).

6. DISCUSSION

Resistivity survey has produced good results with clear linear positive anomalies probably representing wall-lines of the earlier church. The southern and eastern ends are clearest, apparently representing a simple rectangular cell 6m wide by at least 13m long. The western end is less clear but high resistance readings here may represent further elements of the structure, giving an overall length of some 18m.

The topographic survey lends support to this suggested location for the church with a slightly flatter bench in the slope along just this side (the highest point of the mound lies just to the south). It is also notable that this area is free of gravestones/tombs which lie principally around the north, west and south sides.

A sub-circular ditched enclosure has been posited around the early church location. Although the shape of the southern boundary certainly gives this impression nothing can be seen within the resistivity or topographic survey to indicate this or to suggest continuation of any early boundary around the northern side.

7. ACKNOWLEDGEMENTS

Archaeological Project Services wishes to acknowledge the assistance of Clare Lee of Apley PCC and of Tim Allen at EH who commissioned the project. Tom Lane edited the report.

8. PERSONNEL

Project coordinator: Steve Malone
Field survey: Steve Malone, Jonathon Smith, Bryn Leadbetter
Survey processing and reporting: Steve Malone

9. BIBLIOGRAPHY

Clark, A. 1990 *Seeing Beneath the Soil*, London

English Heritage, 2008 *Geophysical Survey in Archaeological Field Evaluation*

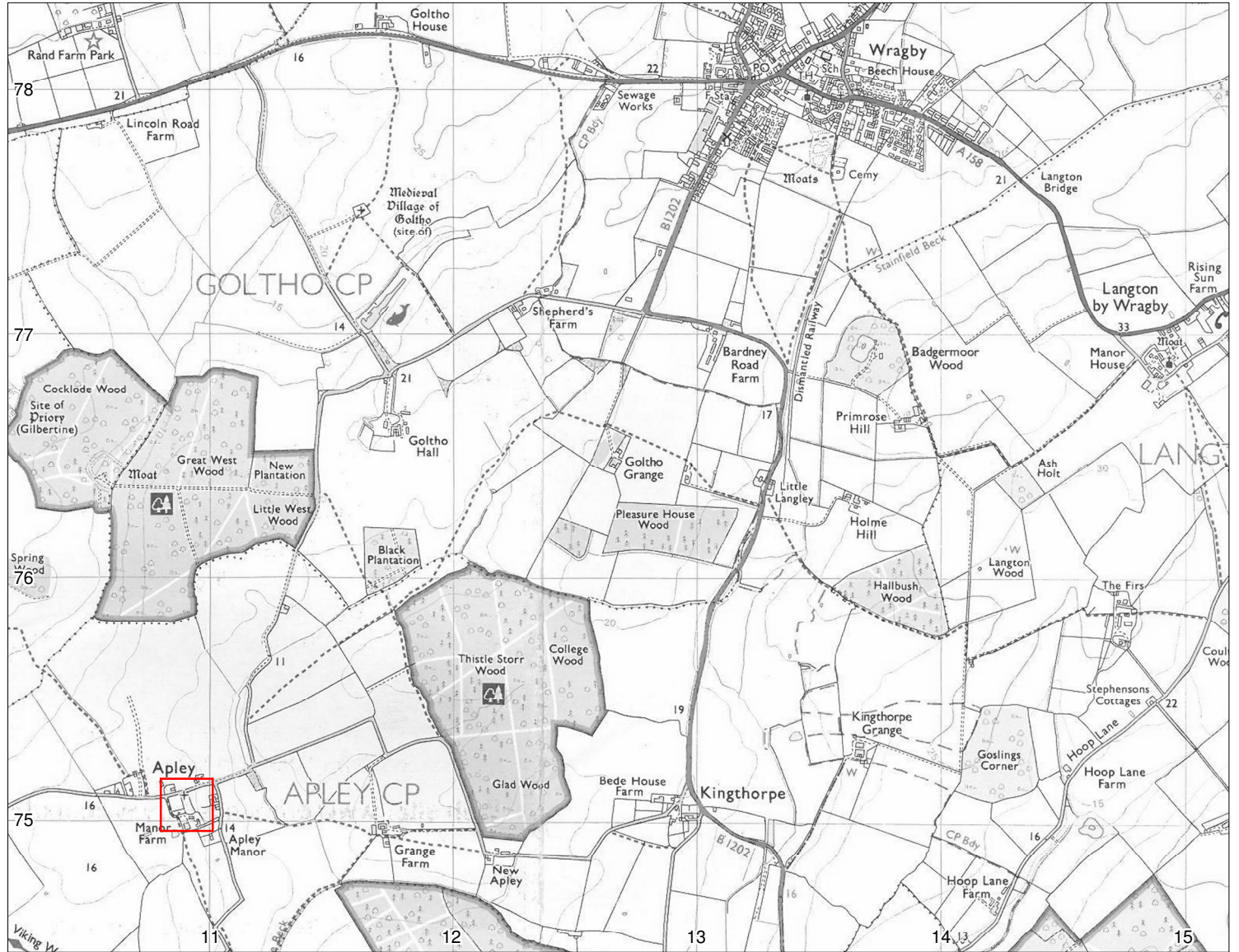
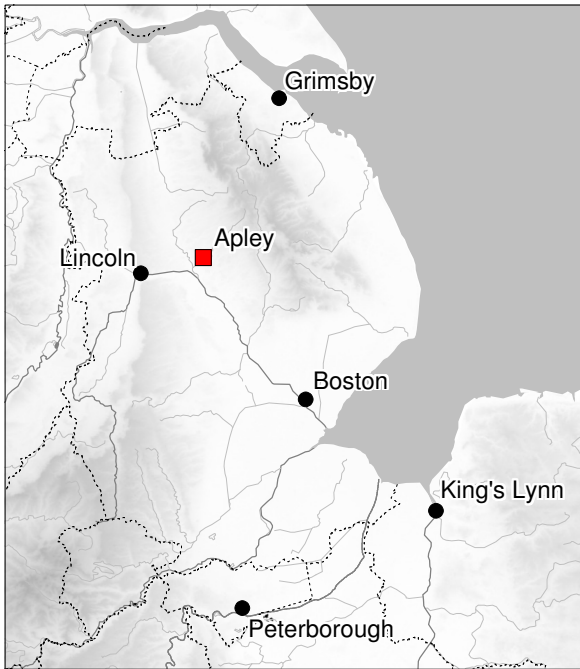
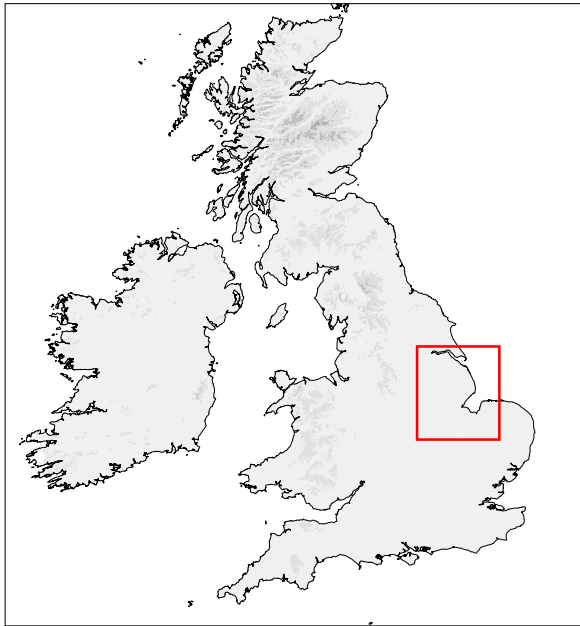
English Heritage, 2009 *Metric Survey Specifications for Cultural Heritage*

Hodge, CAH, Burton, RGO, Corbett, WM, Evans, R, and Seale, RS, 1984 *Soils and their use in Eastern England*, Soil Survey of England and Wales 13

IFA 2002 *The use of Geophysical Techniques in Archaeological Evaluations*, IFA Paper No. 6

10. ABBREVIATIONS

APS	Archaeological Project Services
BGS	British Geological Survey
EH	English Heritage
IFA	Institute of Field Archaeologists
OS	Ordnance Survey



Ordnance Survey © 1999. All rights reserved.
License number AL5041A0001


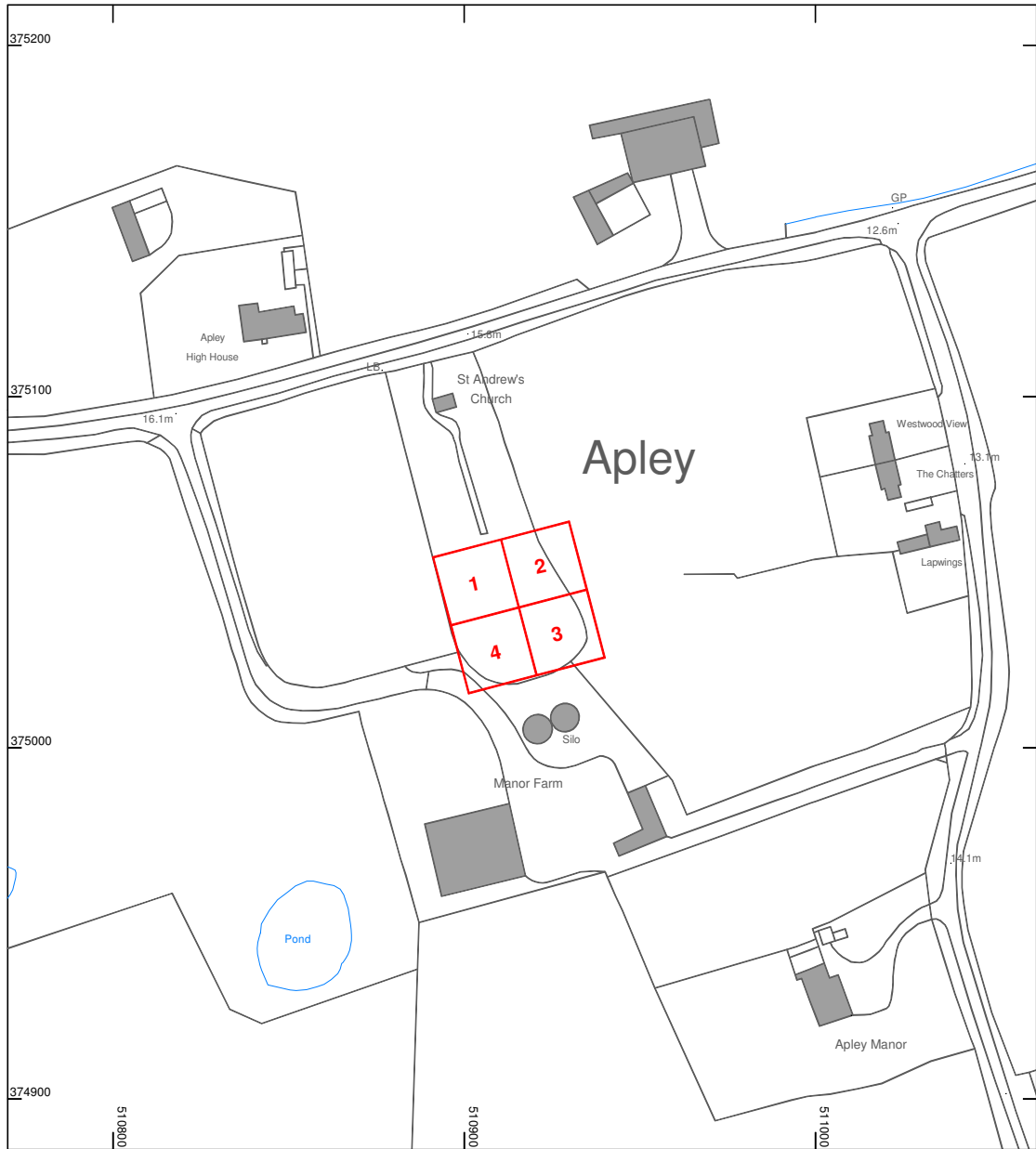
 Archaeological Project Services		
Project: Apley St Andrews Church (ASAC12)		
Scale: varies	Drawn by: SJM	Report No: 53/12

Figure 1 Site location map



Ordnance Survey © 2012. All rights reserved.
License number AL5041A0001




	Archaeological Project Services	
Project Name: Apley St Andrews Church (ASAC12)		
Scale 1:2000	Drawn by: SM	Report No: 53/12

Figure 2 Location and layout of survey area

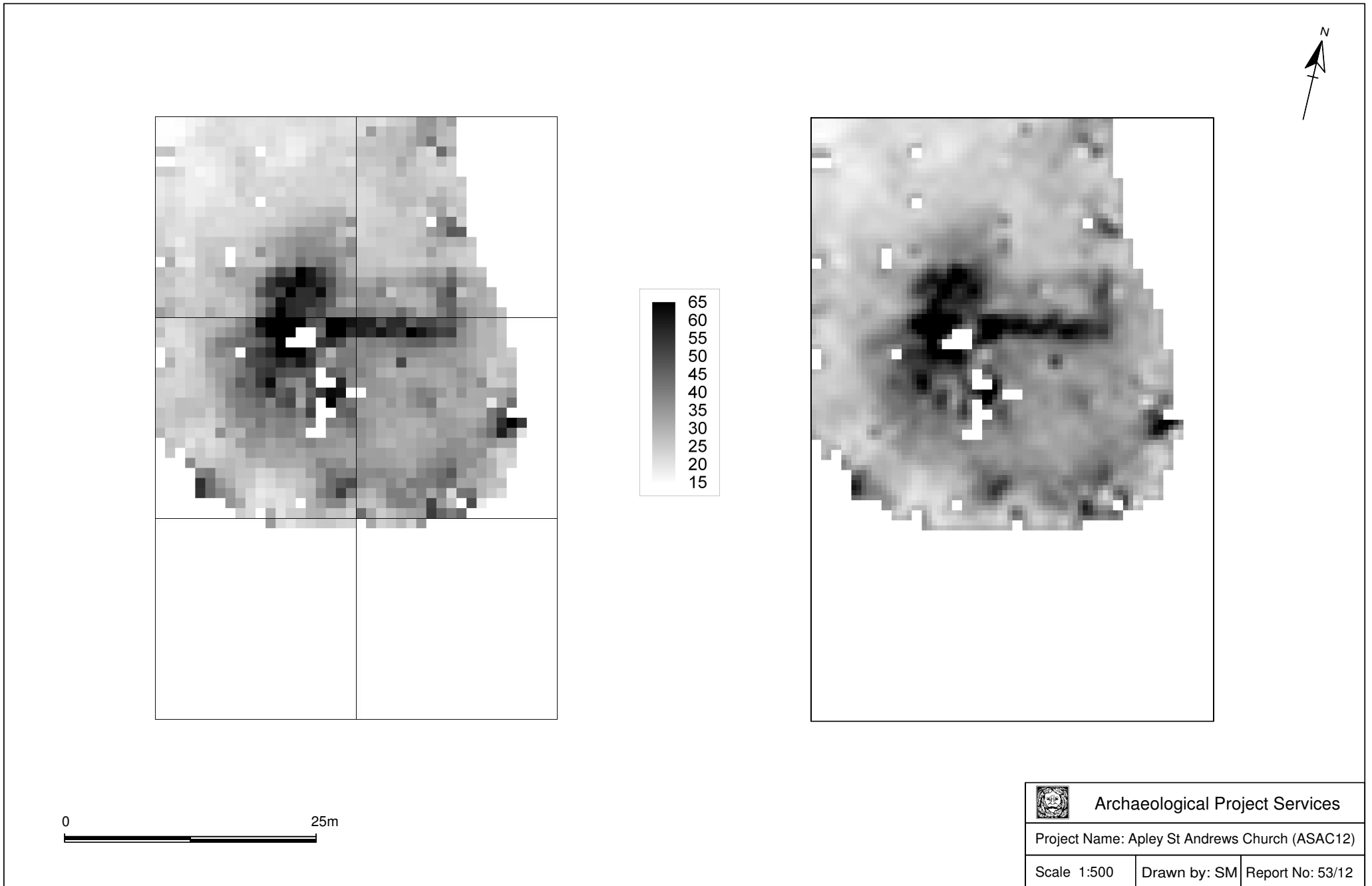
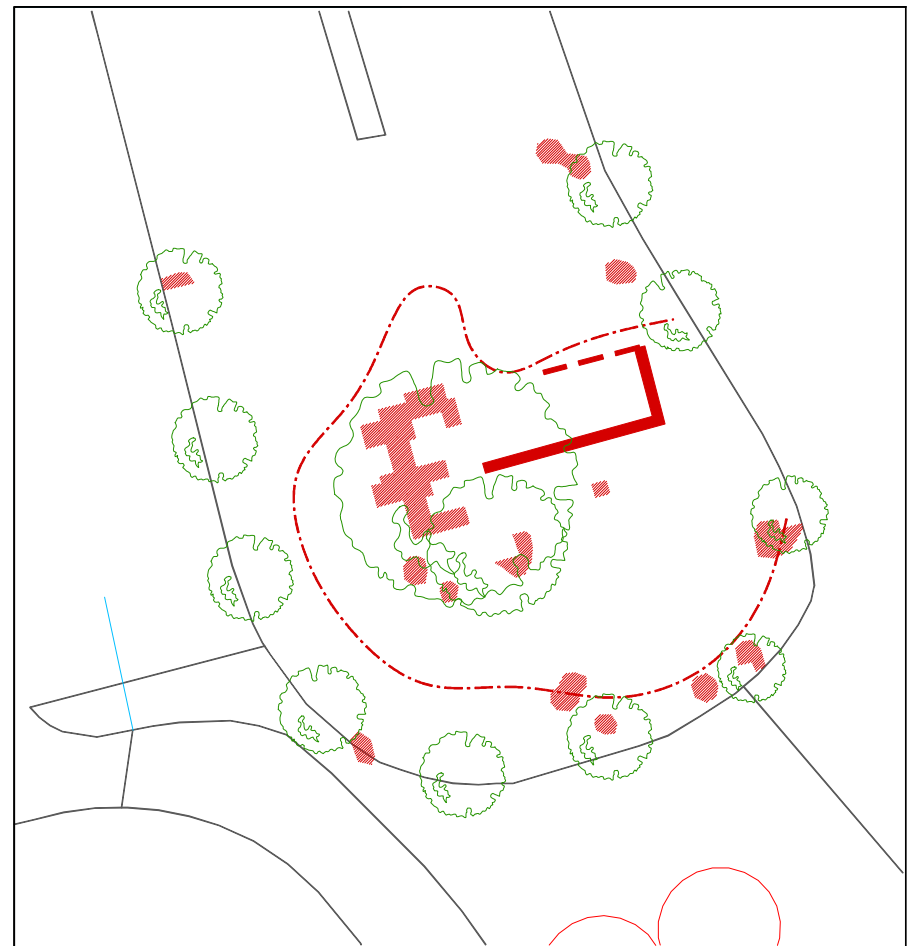
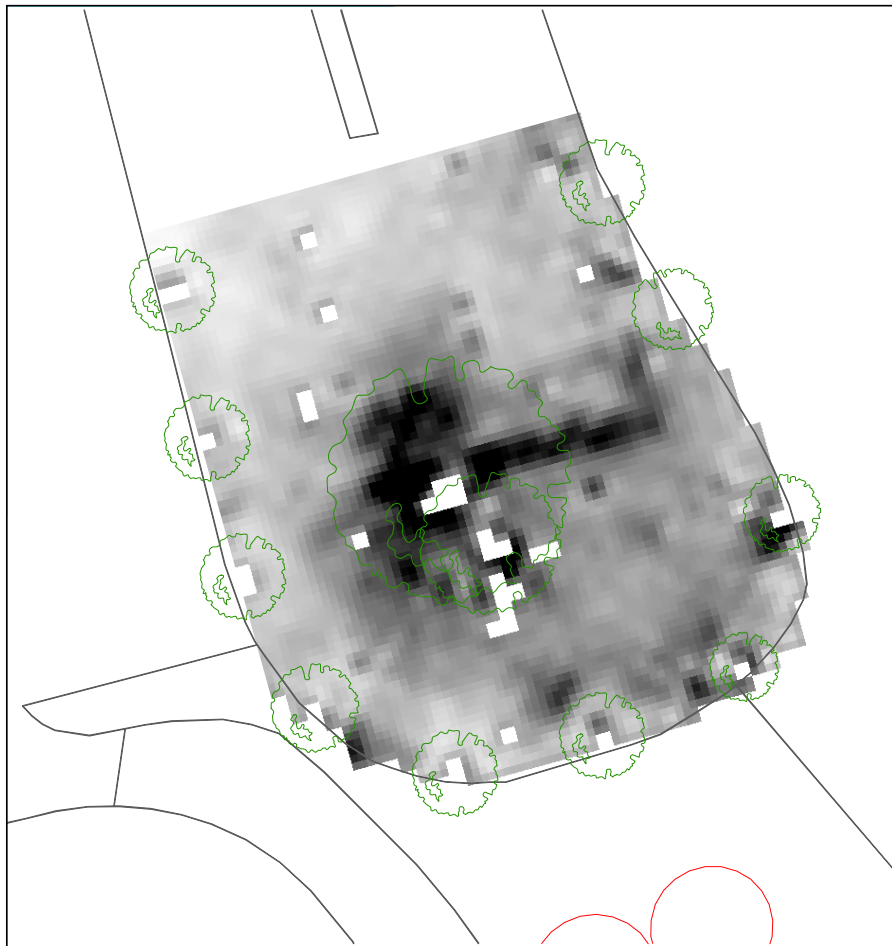






Figure 3 Resistivity survey plots - base plot and smoothed data



Ordnance Survey © 2012. All rights reserved.
License number AL5041A0001



0 25m

-  area of elevated readings
-  linear positive anomaly
-  uncertain linear anomaly
-  area positive anomaly


 Archaeological Project Services		
Project Name: Apley St Andrew's Church (ASAC12)		
Scale 1:500	Drawn by: SJM	Report No: 53/12

Figure 4 Resistivity survey interpretative plot

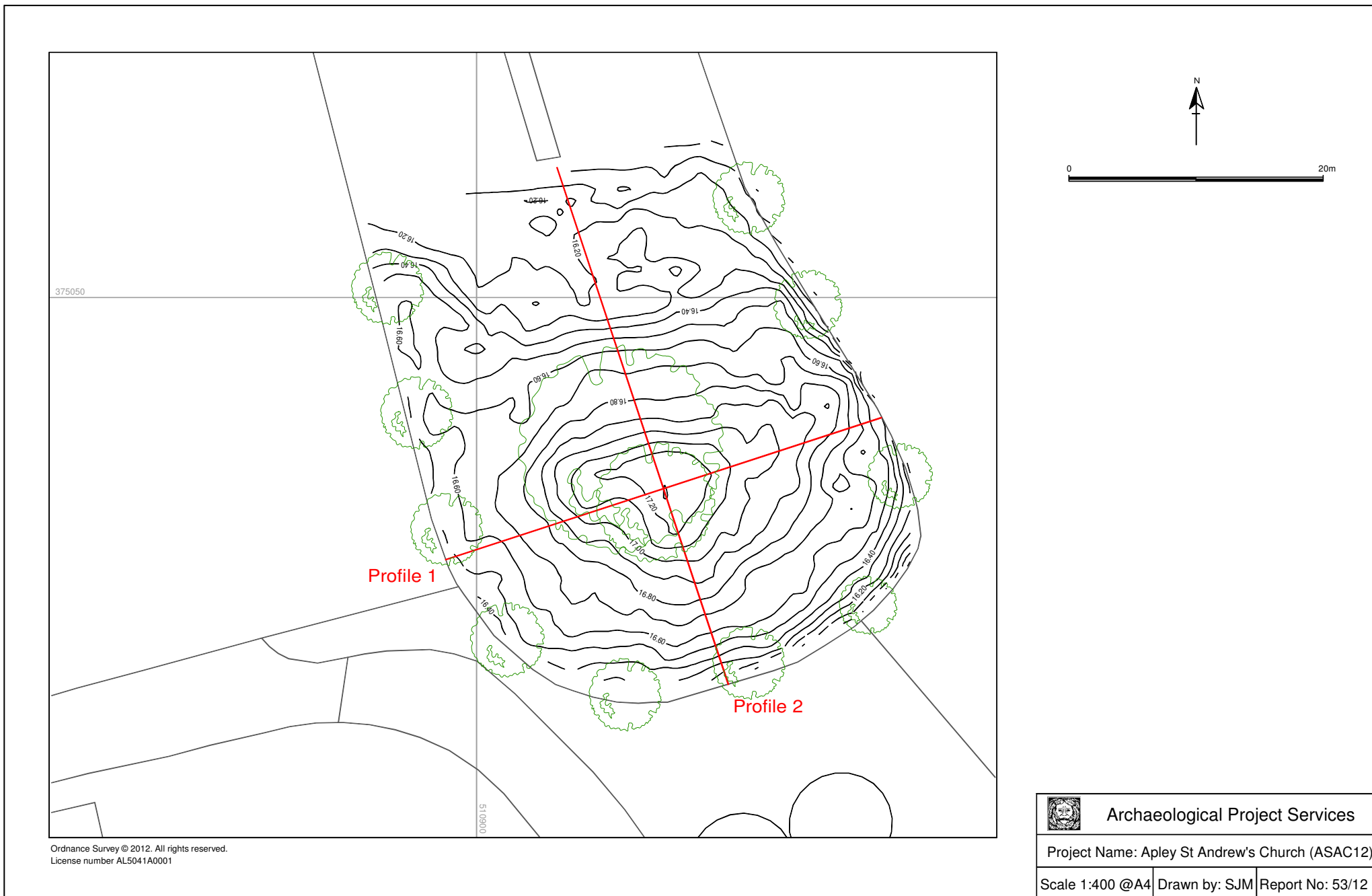


Figure 5 Topographic survey (contours at 0.1m intervals)

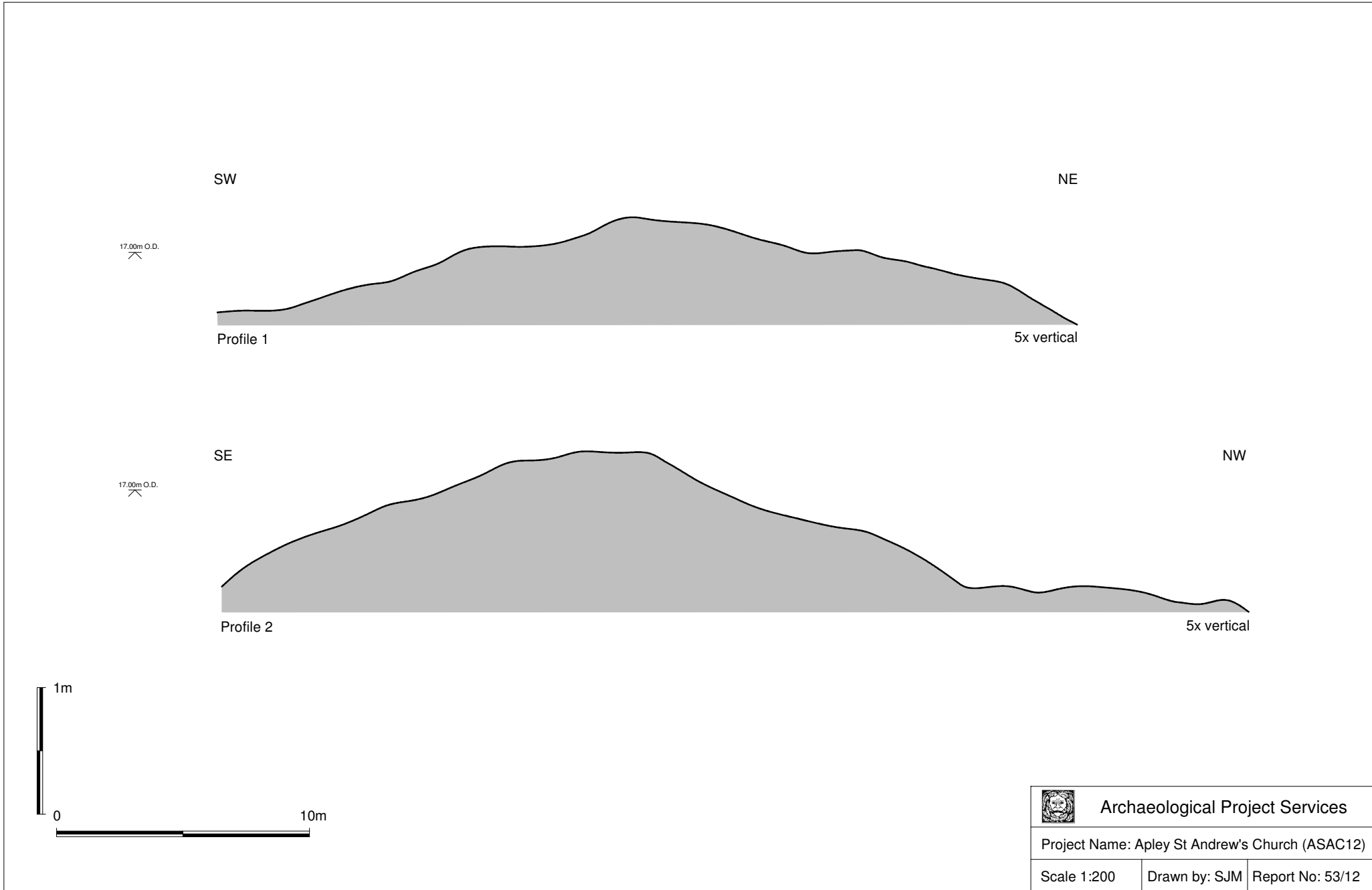
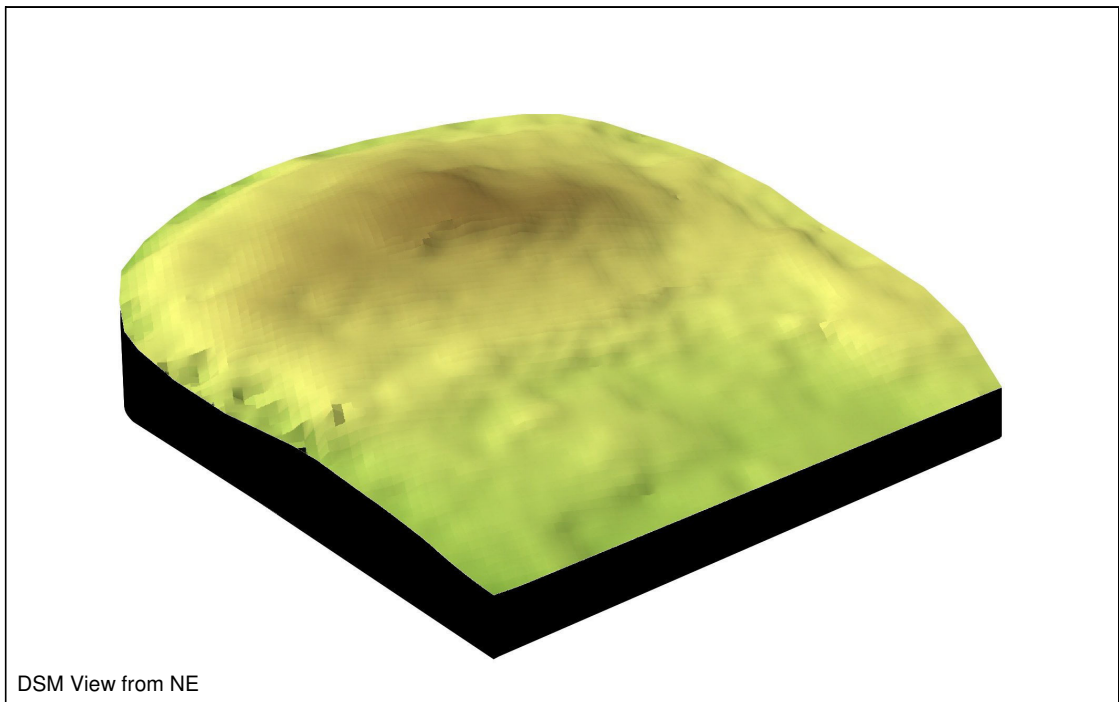
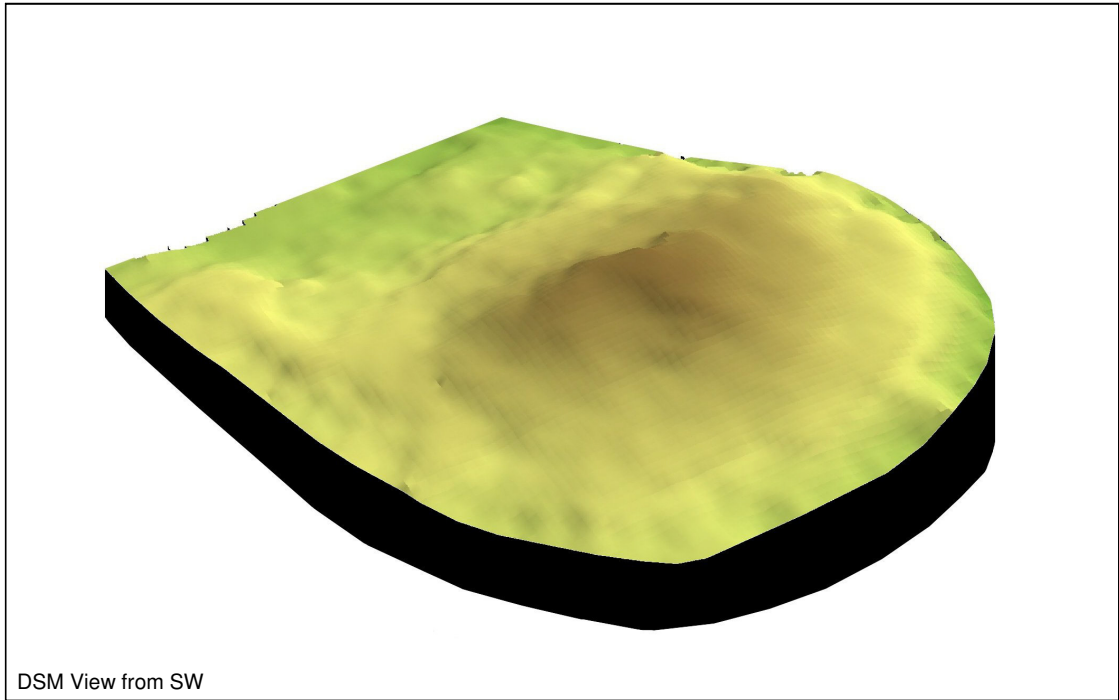


Figure 6 Profiles across earthwork mound




	Archaeological Project Services	
Project Name: Apley St Andrew's Church (ASAC12)		
Scale NTS	Drawn by: SJM	Report No: 53/12

Figure 7 Digital Surface Model perspective views

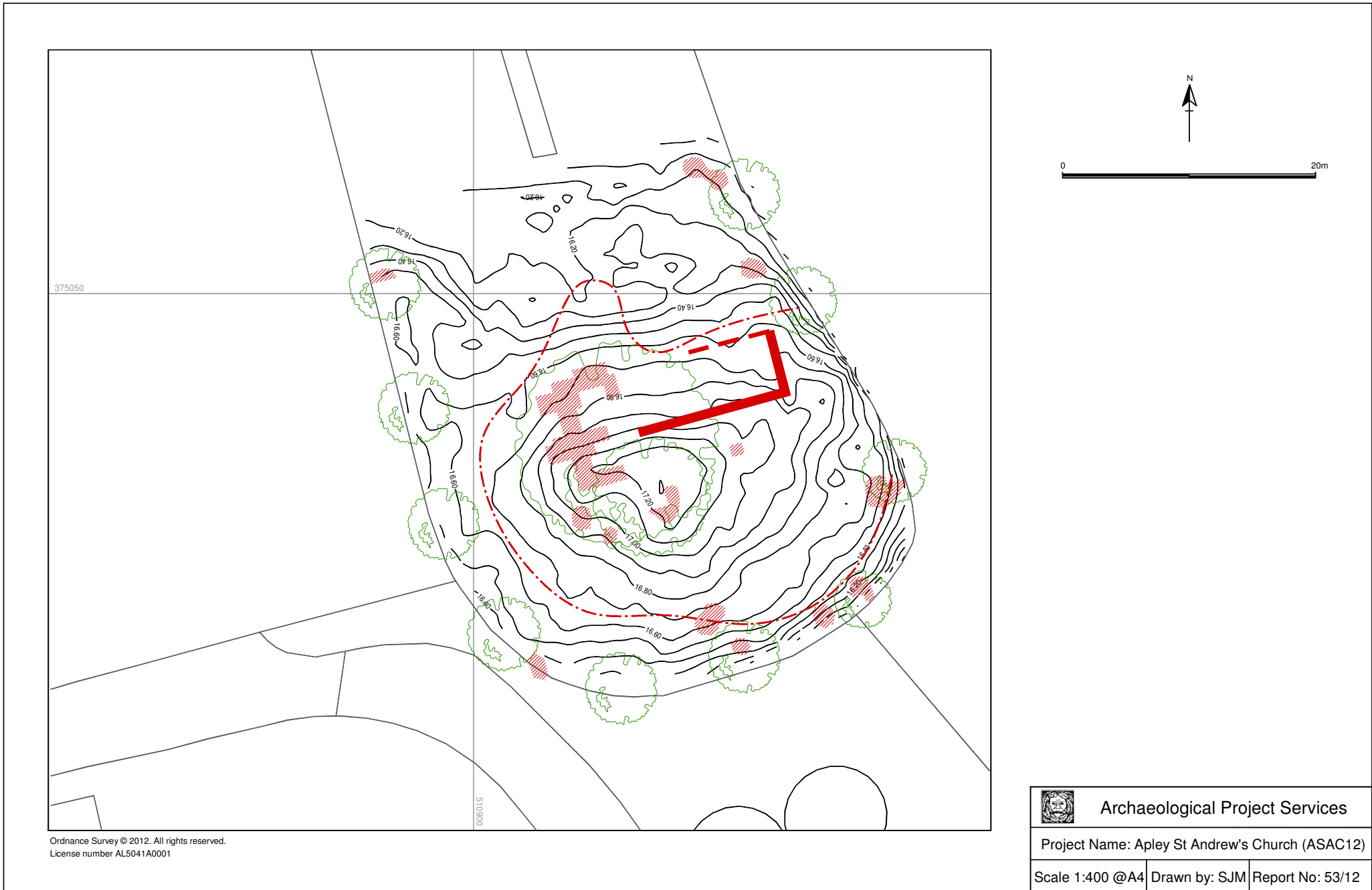
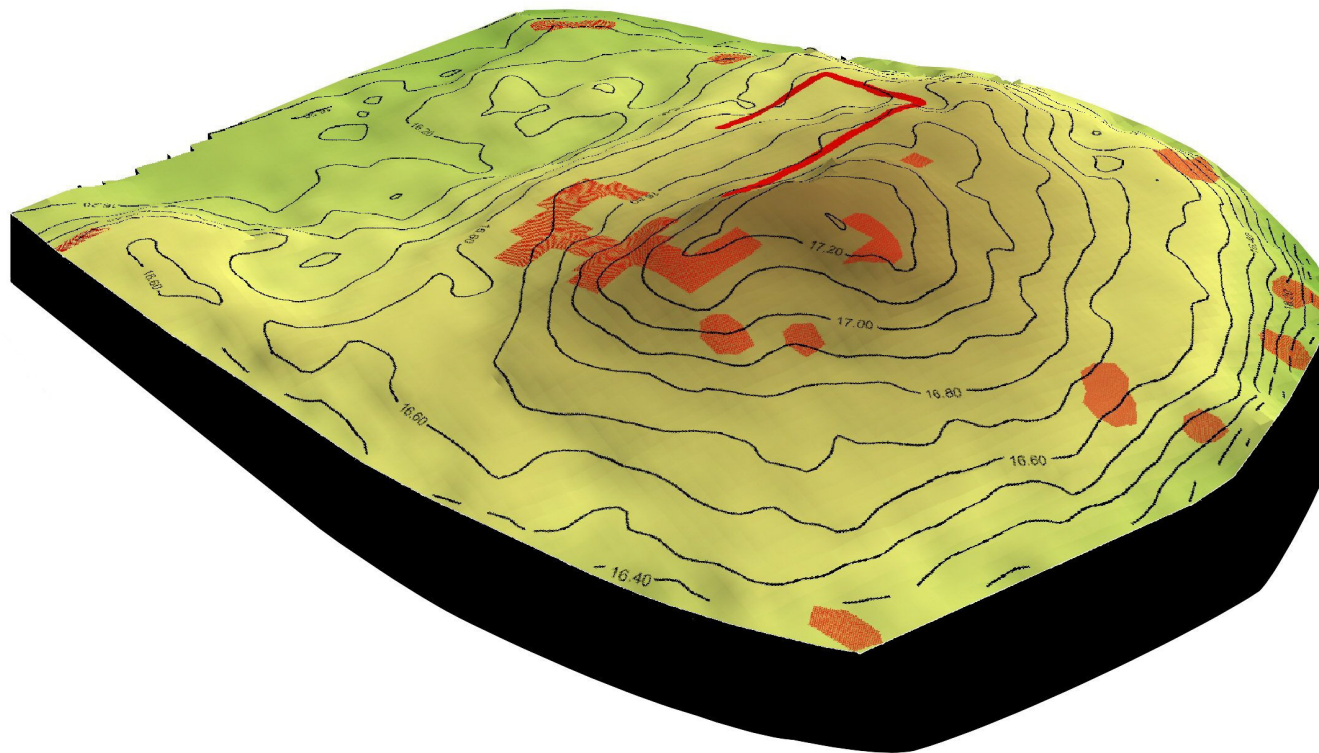


Figure 8 Resistivity survey results overlaid on topographic survey




	Archaeological Project Services
Project Name: Apley St Andrew's Church (ASAC12)	
Scale NTS	Drawn by: SJM Report No: 53/12

Figure 9 DSM from SW with contours and resistivity survey results overlain

Appendix 1

Written Scheme of Investigation for Archaeological Surveys

1 SUMMARY

- 1.1 *A scheme of archaeological works is required prior to the undertaking of badger exclusion works at St Andrew's Church, Apley, Lincolnshire.*
- 1.2 *The site of the medieval church and graveyard lies within the scheduled monument Apley Medieval Settlement. A raised area to the south of the present St Andrew's Church represents the site of the medieval church. This is currently under threat from the activities of badgers.*
- 1.3 *The archaeological work will consist of geophysical and topographic survey of the area of the medieval church and churchyard.*
- 1.4 *On completion of the fieldwork a report will be prepared detailing the results of the archaeological survey. The report will consist of a narrative supported by illustrations and plans.*

2 INTRODUCTION

- 2.1 This document comprises a written scheme of investigation for archaeological survey to be undertaken prior to the implementation of badger exclusion works at St Andrew's Church, Apley, Lincolnshire (Fig 1). The site is located at National Grid Reference TF 10914 75036.
- 2.2 This document contains the following parts:
 - 2.2.1 Overview.
 - 2.2.2 Stages of work and methodologies.
 - 2.2.3 List of specialists.
 - 2.2.4 Programme of works and staffing structure of the project

3 SITE LOCATION

- 3.1 Apley is located 13km northeast of Lincoln in the West Lindsey District of Lincolnshire. The old church site now forms the southern end of the churchyard of the present St Andrew's church centred on National Grid Reference TF 10914 75036.

4 BACKGROUND

- 4.1 The site of the church and graveyard at Apley lies within the scheduled monument Apley Medieval Settlement (ref. 22734). The site has been occupied by badgers which are causing significant damage to the fabric of the monument. It is proposed to exclude the badgers with one-way gates and ground anchored steel mesh. As the proposed works will cause some change to the site and inhibit future survey, topographic and geophysical survey are proposed to precede the exclusion works.

5 SOILS AND TOPOGRAPHY

- 5.1 The site lies on fairly level ground at c.15m OD in the Lincolnshire clay vale north of the Witham Valley. Soils are mapped as fine loamy over clayey soils of the Beccles 1 Association developed on glacial till (Hodge *et al.* 1984, 117). British Geological Survey mapping shows a band of glacial sand and gravel underlying the village core.

6 ARCHAEOLOGICAL BACKGROUND

- 6.1 The remains of the medieval settlement of Apley, including those of a monastic manor or grange

and associated ridge and furrow cultivation, survive well as a series of substantial earthworks and associated buried deposits and are protected as a Scheduled Monument (22734).

- 6.2 The monument includes the remains of the medieval settlement of Apley, a small hamlet established by the late 11th century and later managed as a monastic manor or grange of Stainfield Priory. The medieval church at Apley remained standing until the beginning of the 18th century; the present St Andrew's Church, which stands on an adjacent site and is not included in the scheduling, was constructed in 1871. The remains of the medieval settlement of Apley and the surviving parts of its open fields are visible as earthworks with associated buried remains and lie in two separate areas of protection.
- 6.3 About 50m to the south of the present St Andrew's Church is a low sub-circular mound about 30m across and 1m high representing the site of the medieval church and churchyard at Apley. The buried foundations of the church are preserved within the mound. It is possible that the churchyard was formerly defined by a sub-circular ditched enclosure part followed by an existing fenced boundary.

7 AIMS AND OBJECTIVES

- 7.1 The aims of the survey works will be:
- 7.1.1 To provide a record of the form of the mound prior to the implementation of badger exclusion works which may cause some change to the site and inhibit future works;
- 7.1.2 To investigate the potential for buried structural remains within the mound through geophysical survey; and
- 7.1.3 To provide interpretation of the results of the surveys and any new information this may provide on the form and nature of the monument.

8 SITE OPERATIONS

8.1 General considerations

- 8.1.1 All work will be undertaken following statutory Health and Safety requirements in operation at the time of the monitoring.
- 8.1.2 The work will be undertaken according to the relevant codes of practise issued by the Institute of Field Archaeologists (IFA), under the management of a Member of the institute (MIFA). Archaeological Project Services is IFA registered organisation no. 21.
- 8.1.3 Any loose human bone will be handled with respect, not removed from site, and if collected in the course of works handed over to the PCC at the earliest opportunity for reburial.

8.2 Resistivity Survey

- 8.2.1 Resistivity survey consists of taking a series of electrical readings, the electrical resistance providing a proxy for moisture contrasts within the ground. The fills of earth-cut features – ditches, pits etc. – generally retain more moisture than the undisturbed natural subsoil and can show as areas of low resistance. Conversely walls or metalised surfaces retain less moisture and show as high resistance anomalies. The technique is preferable to magnetic survey where masonry structures are suspected and may give complementary results where there is only a weak magnetic contrast in the fills of cut features.
- 8.2.2 Survey will be undertaken using a Geoscan RM4 resistivity meter with readings logged on a Psion data-logger. Readings will be undertaken on a 20m x 20m grid with readings taken at 1m intervals on traverses 1m apart using a twin electrode array with mobile electrode separation of 0.5m.
- 8.2.3 Processing is undertaken using specialist ArcheoSurveyor software. The presentation of

the data for the site will include plots of minimally processed, raw data as well as processed/filtered imagery. Geophysical survey anomalies will be identified and plotted onto interpretative drawings.

8.3 Topographic Survey

- 8.3.1 Topographic survey will be undertaken using a survey grade differential GPS system providing centimetre accuracy (supplemented by Total Station survey if tree cover interferes with satellite visibility).
- 8.3.2 Survey and survey products will be undertaken in accordance with the document *Metric Survey Specifications for Cultural Heritage* (English Heritage 2009).
- 8.3.3 Spot heights will be taken at 1m intervals supplemented where necessary by points at salient positions such as top, bottom, and along the centreline and mid-point of slopes, ditches, embankments and earthworks.
- 8.3.4 Brief illustrated report will include plan, profiles and DTM

9 **REPORT DEPOSITION**

- 9.1 Copies of the integrated reports will be sent to the PCC, English Heritage and to the County Council Historic Environment Record.

10 **ARCHIVE**

- 10.1 The documentation and records generated during the investigation will be sorted and ordered into the format acceptable to The Collection, Lincoln. This will be undertaken following the requirements of the document titled *Conditions for the Acceptance of Project Archives* for long-term storage and curation.

11 **PUBLICATION**

- 11.1 Details of the investigation will be input to the Online Access to the Index of Archaeological Investigations (OASIS).
- 11.2 If appropriate, notes on the findings will be submitted to the appropriate national journals: *Medieval Archaeology* and the *Journal of the Medieval Settlement Research Group* for findings of medieval or later date.

12 **CURATORIAL RESPONSIBILITY**

- 12.1 Curatorial responsibility for the archaeological work undertaken on the site lies with English Heritage. They will be given notice in writing of the commencement of the project in order to arrange the necessary S42 license for geophysical survey.

13 **VARIATIONS AND CONTINGENCIES**

- 13.1 Variations to the proposed scheme of works will only be made following written confirmation of acceptance from the archaeological curator.
- 13.2 Any contingency requirement for additional fieldwork or post-excavation analysis outside the scope of the proposed scheme of works will only be activated following full consultation with the archaeological curator and the client.

14 **PROGRAMME OF WORKS AND STAFFING LEVELS**

- 14.1 The archaeological work will be undertaken by a team of experienced archaeological surveyors. Site work will take one day. Survey and reporting will be undertaken before the end of June 2012 in order to inform subsequent badger exclusion works.

15 INSURANCES

- 15.1 Archaeological Project Services, as part of the Heritage Trust of Lincolnshire, maintains Employers Liability Insurance of £10,000,000, together with Public and Products Liability insurances, each with indemnity of £5,000,000. Copies of insurance documentation can be supplied on request.

16 COPYRIGHT

- 16.1 Archaeological Project Services shall retain full copyright of any commissioned reports under the Copyright, Designs and Patents Act 1988 with all rights reserved; excepting that it hereby provides an exclusive licence to the client for the use of such documents by the client in all matters directly relating to the project as described in the Project Specification.
- 16.2 Licence will also be given to the archaeological curators to use the documentary archive for educational, public and research purposes.
- 16.3 The author of any report or specialist contribution to a report shall retain intellectual copyright of their work and may make use of their work for educational or research purposes or for further publication.

17 BIBLIOGRAPHY

Bryan, P., Blake B. and Bedford, J. 2009 *Metric Survey Specifications for Cultural Heritage*, Swindon

English Heritage, 2008 *Geophysical Survey in Archaeological Field Evaluation*

Hodge, CAH, Burton, RGO, Corbett, WM, Evans, R, and Seale, RS, 1984 *Soils and their use in Eastern England*, Soil Survey of England and Wales **13**

IFA 2002 *The use of Geophysical Techniques in Archaeological Evaluations*, IFA Paper No. 6

Royal Commission on Historical Monuments 1999 *Recording Archaeological Field Monuments* Swindon: RCHME

Specification: Version 1, 20/02/11