University of Reading

Geophysical Survey Report

Ground Penetrating Radar, Magnetic and Earth Resistance Survey

HURLEY PRIORY
BERKSHIRE

14/01/2020

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Summary

A series of geophysical surveys were undertaken on land within, and surrounding the medieval monastic site of Hurley Priory (Scheduled Monument List No. 100793, NGR SU8268884074) in September 2019. Ground Penetrating Radar (GPR) survey was undertaken in a number of locations, supported by magnetic (fluxgate gradiometer) and earth resistance surveys in trial areas. The work was conducted in collaboration between Reading University, The Hurley History Society, and Marlow Archaeology; and facilitated by Mr. Paul Seddon, Chairman of the Maidenhead Archaeological and historical Society.

The surveys were particularly successful in identifying the buried remains of the Priory, and the extent of Ladye Place Mansion. In specific terms, the surveys were able to provide further detail on the internal layout of the known remains of the priory, and add evidence for further structures within the footprint of the Priory. There are also possible traces of formal garden layouts existing to the south of Ladye Place, and to the north of the Cloisters.

The 'tunnels' were successfully chased north into the tennis court of the Cloisters area, however, the surveys were unable to trace the tunnels south, and link them to the Old Bell Inn, as has been suggested by local historians.

Version Control

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1. INTRODUCTION

1.1 Historical Background

The following abridged historical background to the site was conducted by Edmund Cush, an Undergraduate Research Opportunities Placement (UROP) student at the University of Reading, who also worked on this project:

Hurley Village

The earliest historical reference to Hurley concerns a reference to a Saxon church, likely built in the same location as the priory, c. AD 700 and dedicated to St. Birinus after he passed up the River Thames. The next mention is in AD 894 when the Danes were said to have Traversed Hurley during their march from Essex to Gloucester.

During the time of Edward the Confessor the lands around Hurley were controlled by the nobleman, Easgar, who held the title Master of Horse to King Edward. A charter from the reign of King Richard II claims that the Saxon church was the possible burial site of Editha, the sister of Edward the Confessor.

The Domesday Book states that the vill of Hurley held by Geoffrey de Mandeville, consisted of a church, two fisheries, a mill, 25 villagers, 12 cottagers, and 10 slaves.

Hurley Priory

The Medieval Priory at Hurley was located on the southern bank of the River Thames in Hurley, Berkshire. The Priory was established in AD 1085 by the Norman lord Geoffrey de Mandeville. De Mandeville was one of the ten richest lords in William's court and held his lands in direct tenure from the King. (Ditchfield & Page, 1907).

The Priory was a cell, a daughter monastery or small dependant, of Westminster Abbey and followed the Benedictine order. As such, when it was first founded it likely only housed a small number of monks. Throughout the 11th and 12th centuries, additions were made to the Priory. The church, on the south side of the cloister, for example, was made cruciform in shape. To the east stood the chapter house and dormitories and to the north were the refectory and kitchens. Storerooms and offices stood on the western side of the cloister (Burfitt, n.d.).

In 1535, during the dissolution of the monasteries, the Priory was valued at a clear annual rate of £12, 18s, 5d. The lands of the Priory were handed back to Westminster Abbey and after Westminster Abbey was dissolved in 1540 the lands at Hurley were sold into Lay hands.

The main area of the priory was initially owned, for three years, by Charles Howard, Esq., next by Leonard Chamberleyn, Esq., and then by John Lovelace. Lovelace built a mansion in the grounds of the priory in 1600 which he called Ladye Place (or Lady Place). Richard Lovelace (John's grandson) had sailed on expeditions with Sir Frances Drake and it is likely that the mansion was part financed by that buccaneering, but perhaps more so by his second marriage (Fieldhouse 2016).

Under the tenure of John, the 3rd Baron Lovelace, some of the most important events to happen at Lady Place took place. John was a strong anti-Catholic and his home was used as the meeting place between the plotters of the Glorious Revolution of 1688. The conspirators were said to have held their meetings in the cellar of Ladye Place (which was once part of the priory) and used the drain tunnel leading to the moat as a means of secret access (Fieldhouse 2016). Because of its significance in the plotting of the revolution Hurley became a place of pilgrimage for people who

valued the ideals protected and promoted by the plot. Tablets in the crypt record and commemorate this event in English history.

In the 1930s the site of the former priory underwent two excavations overseen by the owner of the property, Colonel Rivers-Moore (Rivers-Moore 1934, 1939).

St Mary's church is the most complete and perhaps only surviving part of the original cloister buildings although the remains of the rectangular moat and the fishponds are still visible. The dovecote and the tithe barn, along with another large barn across the road from the churchyard, are three of the oldest surviving buildings in the village, dating from the fourteenth century AD. The parish church has been constructed from the remaining - western end - of the nave of the Priory church (Burfitt, n.d.).

Some of the extant properties forming components of the original medieval Priory have continuously recorded histories dating back to the 12th century. 'The Olde Bell', which was built as the guest house for the priory, is one such property, it's occupation and use spanning from its construction in 1135 to the present day. The name of the inn is a reference to the Sanctus Bell that hangs over the door of the inn. The bell was used to signal to the monks that an important guest had arrived and was on their way (Fieldhouse, 2016).

Colonel Rivers-Moore Excavations

Rivers-Moore started his excavations at Hurley in the August of 1930 looking for a well near the east end of the church. This excavation discovered four floor layers from Ladye Place including a fireplace with a bread oven. On the 26th of August the excavators found a wall "faced with good flints" and about four feet thick. The alignment of the wall seemingly matched up with the line of the church buildings – possibly the south wall of a south transept or chapel. Two feet down and abutting the wall a broken section of tile floor was found in situ. After 12 feet of searching the edge of a wall appeared; the wall curved and was revealed to be the head of a well. The first two feet of the well was built of alternate layers of brick and chalk – bellow that only chalk blocks lined the well. Internally the well was 3 feet in diameter. 10ft down the well the excavators struck water and at 14ft work was stopped. A new attempt in 1933 pumped 2ft of water out of the well but the fire brigade were called away before discovering anything new. The only thing found in the well was a teapot of late date.

An 18 inch wall made of chalk blocks, many of which were carved was found running north of the well – this was followed for 15 feet before being lost. Fragments of 12th and 13th century floor tile were found while excavating around the well. A portion of pavement of weak mortar with impressions of the floor tiles that used to lay on it was found near well which led Rivers-Moore to conclude that this was the original level of the church floor – 2 feet below the lawn level at the time. In some places three distinct layers of flooring had to be excavated through. The latest layer consisted partly of bricks on edge and partly of flagstones – one flagstone, when turned over, was revealed to be a reused Normal column with a 'claw' ornament in the angle. The shape of the column showed it would have been placed against a wall. Rivers-Moore notes this as a surprising find as all the other surviving parts of the Normal buildings were clunch and flint.

Another wall, of chalk faced with flints, was found running east-west and almost in line with the south wall of the existing church. This wall was five feet thick at the footings and stepped back to four feet at floor level. A break occurred in the wall at 55 feet east of the east wall of the church. The wall turned to the north and another break was found three feet after this turn. From plans it can be seen that these breaks are the cuts from the main drainage tunnels of the Tudor mansion.

Once the church was cleared down to floor level it could be seen that all the tiles had been robbed out leaving only a layer of rammed chalk or poor lime mortar.

The east wall was completely gone at the southern corner where it intersected with the corner of Layde Place. Nearby the remains of a window frame and small fragments of glass and lead, likely from the window, were found. On the north side of the chancel the foundation walls were more distinct – at three points the original plinth stones of a door were found in position. Just outside the door, excavators found a large portion of coloured tile flooring still in situ though damaged in some places.

A wall believed to be the north transept wall was found joining to Paradise at a depth of 4 feet below the ground. Further digging showed that a south aisle or chapel had been added, reaching the extreme east end of the church.

1.2 Location

PROJECT NAME	HURLEY PRIORY, BERKSHIRE
Country	England
County	Berkshire
Nearest Settlement	Hurley Village
Central Co-ordinates	SU8268884074

1.3 Environment

Soil	River terrace Sand/Gravel (UKSO)
Superficial 1:50000 (BGS)	Shepperton Gravel Member – Sand and Gravel
Bedrock 1:50000 (BGS)	Lewes Nodular chalk formation – Chalk
Current Land Use	Grassland/Private Gardens/Recreation
Historic Land Use	Priory Building / Tudor/Stuart Mansion
Vegetation Cover	Grass (& Tennis courts), Gardens
Sources of Interference	Nearby buildings/Garden ornaments

1.3.1 Comments

The geology and soils of the site is not likely to hinder the geophysical techniques adopted for this survey. The response to each technique is, however, dependant on the overburden to archaeology and how well the archaeological deposits contrast in their physical characteristics to the natural or deposited soils around.

The land surveyed - flat grassland - was ideally suited to GPR, Magnetic and Resistance survey. Weather on the days of survey was generally good with sunshine and clouds.

2. METHODOLOGY

2.1 Survey

The following section will outline the instruments used, and the field method and data processing employed.

2.2 Ground Penetrating Radar (GPR) Survey

2.2.1 Technical Equipment

Instrument	GSSI 400MHz Shielded Antenna
Measured variable	Interfaces of dialectic permittivity / reflected electromagnetic signal
Configuration	Single antenna connected via cable to GSSI SIR-20 system
QA Procedure	Continuous observation of measurements on screen
Spatial Resolution	0.02m along line interval, 0.25m between traverses

2.2.2 Traverse Locations

The positon of each traverse was recorded using a GNSS instrument (Leica GS16/CS20) connected via radio-link to a base station over a known point. The start and end locations for the traverses therefore are accurate to approx. 2cm.

2.2.3 Data Processing

Data processing is generally kept to a minimum to reduce any significant alteration of the measured data and prevent artefacts within the data being falsely created. Processing of the dataset therefore is designed to remove and reduce aspects of noise, or positional or heading errors.

During the data processing, an estimate is generated which converts the two-way travel time of the radar wave into an approximate depth. This is performed by a method known as 'hyperbola fitting', where the form and shape of the reflected wave is analysed to gain information about the speed of the reflected wave, and thus, the relative dialectic permittivity (RDP) of the soil. RDP can of course change throughout the site, and with depth, so deducing depth based on this method is approximate and represents the *most likely* depth for the purpose of interpretation.

Process	**Software**	**Parameters**
Correct Time Zero Position	Radan 7	Manually adjust time zero to first positive peak of ground coupled wave
FIR Filter – Stacking	Radan 7	Boxcar filter, Length = 3
FIR Filter – Background removal	Radan 7	Boxcar filter, Length = 257
Velocity (migration) analysis	Radan 7	Hyperbola fitting (RDP estimate = 12)

2.3 Magnetic (Fluxgate Gradiometer) Survey

2.3.1 Technical Equipment

Instrument	Bartington 601-2 Dual Sensor Fluxgate Gradiometer
Measured variable	Magnetic flux / nT
Configuration	Gradiometer
QA Procedure	Continuous observation of measurements. Regular balancing of instrument to reduce drift.
Spatial Resolution	0.5m between lines, 0.25m along line interval

2.3.2 Data Processing

Data processing is generally kept to a minimum, to reduce any significant alteration of the measured data and prevent artefacts within the data being falsely created. Processing of the dataset therefore is designed to remove and reduce aspects of noise, or positional or heading errors.

Process	**Software**	**Parameters**
Download data from instrument	Grad 601	N/A
Zero mean traverse	Geoplot 4.0	Grid = All, LMS = On.
Destagger (if necessary)	Geoplot 4.0	As necessary
Despike (if necessary)	Geoplot 4.0	X = 1, Y = 1, Thr = 3, Repl=Mean
Interpolation	Geoplot 4.0	Y, Expand, SinX/X
Export in GRD format	Geoplot 4.0	
Import and Position in ArcGIS	ArcGIS 10.2	Import, Georeference

2.4 Earth Resistance Survey

Earth resistance survey measures the electrical energy needed to pass an electrical current through the subsoil. Where the current flow is impeded, the resistance is higher (more energy is needed to pass the electrical current), and where less energy in needed, the resistance decreases. Because of this, pits, ditches and buildings are usually reliably detected using this technique. The detection of buried objects or features relies on a detectable contrast of soil moisture content above anything else. The ER method is active, as it places an electric current into the ground to detect anomalies.

2.4.1 Technical Equipment

Instrument	TR/CIA Resistivity Meter
Measured variable	Electrical resistance (Ohms)
Configuration	Twin Probe
QA Procedure	Continuous observation of measurements.
Spatial Resolution	1m between lines, 1m along line interval

2.4.2 Data Processing

Data processing is generally kept to a minimum, to reduce any significant alteration of the measured data and prevent artefacts within the data being falsely created. Processing of the dataset therefore is designed to remove and reduce aspects of noise, or positional or heading errors.

Process	**Software**	**Parameters**
Download data from instrument	Proprietary	N/A
Despike (if necessary)	Geoplot 4.0	X = 1, Y = 1, Thr = 3, Repl=Mean
Edge Match	Geoplot 4.0	N/A
Interpolation	Geoplot 4.0	X & Y, Expand, SinX/X
Export in GRD format	Geoplot 4.0	N/A
Import and Position in ArcGIS	ArcGIS 10.5	Import, Georeference

2.5 Interpretation

The geophysical data collected are characterised into meaningful categories, which represent the best idea of any features beneath the soil. In reality, the nature, form and magnitude of a geophysical anomaly may alter, depending on a wide extent of variables ranging from the instrumentation and methodology used, to the nature of the soils and the grade of preservation of any archaeological remains.

For the data to present a meaningful summary of identified features, it is interpreted within set categories which may best describe the anomaly shape, form and size. In some cases, this information is 'best-matched' to a corresponding archaeological feature, for example a 'wall'. Such classes do not necessarily mean the anomaly is in reality a buried wall, but aim to provide the best estimate of the archaeological context which may produce such anomalies. This interpretation is

also based on any background information gained about the site, combined with the experience on the geophysicist interpreting the data.

2.5.1 Interpretation Categories

2.5.1.1 Priory Wall (GPR and earth resistance data)

A series of large well-defined enhanced reflections, producing a substantial linear anomaly, indicating a strong contrast (or interface) in dialectic permittivity within the soil. Their interpretation is relatively certain due to previous excavation.

2.5.1.2 Wall (GPR, magnetic and earth resistance data)

A series of well-defined enhanced reflections, moisture contrast or reduced magnetic flux producing a linear anomaly, indicating a strong contrast (or interface) in dialectic permittivity within the soil. Their form is indicative of a wall feature, and not known to be part of the main Priory building.

2.5.1.3 Possible Wall (GPR, magnetic and earth resistance data)

A series of enhanced reflections, moisture contrast or reduced magnetic flux, producing a linear anomaly, indicating a strong contrast (or interface) in dialectic permittivity within the soil. Their form is suggestive of a wall feature, but the interpretation is not certain. This category may indicate parts of a wall or similar linear archaeological feature.

2.5.1.4 Tunnel (high/low amplitude) (GPR data)

A series of well-defined hyperbolic reflections, producing a clear curvilinear or linear anomaly, indicating a strong contrast (or interface) in dialectic permittivity within the soil. The interpretation of these features is relatively certain due to the known location of tunnels, highlighted from previous excavation.

2.5.1.5 Metal Grate (GPR data)

The location of a metal grate located at the ground surface, over one of the tunnels.

2.5.1.6 Path (GPR data)

A series of well-defined reflections, producing a linear (or curvilinear) anomaly. These features as generally much wider than a wall, and do not have a hyperbolic response of a tunnel. Interpretation for these features is suggested, and not certain.

2.5.1.7 High Amplitude Area (GPR data)

An area of relatively enhanced reflection anomalies or single large reflection anomaly without any definite form or shape to be interpreted archaeologically, indicating a strong contrast (or interface) in dialectic permittivity within the soil. Such areas might indicate the presence of structures, or rubble within the soil, or could indicate geological layers.

2.5.1.8 Trend (GPR, magnetic or earth resistance data)

Used to identify weak trends or textural changes visible within the data, of which may not be thought of as substantial enough to occupy an interpretation category of their own right. Such items may include a visible texture change between soils or geology, the trend of a line of pits, or a set of increased amplitude linear anomalies without a certain form or function. These are also usually referred to in the interpretation text to group several anomalies together.

2.5.1.9 High/Low Resistance Area (earth resistance data)

An area containing a concentration of relatively enhanced or reduced earth resistance readings without any definite form or shape to be interpreted archaeologically, indicating boundary of contrast of moisture held within the soil. Such areas might indicate the presence of structures, or rubble within the soil, or could indicate geological layers.

2.5.1.10 Dipole (magnetic data)

A single, strongly enhanced and reduced magnetic field anomaly which generally indicates the presence of ferrous metal or possible area of burning. It is uncertain if dipoles will be of archaeological significance or caused by modern debris.

2.5.1.11 Modern Interference (magnetic data)

An area affected by modern infrastructure such as underground pipes, metal fences, buildings, overhead wires etc. Not of archaeological interest. Likely to obscure any possible archaeological anomalies being identified.

2.6 Standards and Guidance

All work was conducted in accordance with the following standards and guidance:

- David *et al*, 2008. Geophysical Survey in Archaeological Field Evaluation. English Heritage.
- Institute for Archaeologists (IFA), 2008. Standard and Guidance for Archaeological Field Evaluation.

All personnel involved with the survey are experienced surveyors trained to use the equipment in accordance with the manufacturer's expectations. All fieldwork was supervised by an experienced and fully qualified geophysicist.

3. INTERPRETATION

3.1 Introduction

The following section describes the results of the geophysical survey with archaeological interpretations provided to explain the results in the geophysical data. The nature of geophysical anomalies is complicated and often varied. Interpretations which are made must therefore considered provisional.

The discussion below should be followed with the associated interpretation figures for each technique and area.

3.2 Principal Results

3.2.1 Survey Areas (see Figure 1 for more details)

LOCATION ZONE	WORKING NAME	SURVEY SIZE (M^2)	LOCATION (BNG)	GEOPHYSICAL TECHNIQUE*	FIGURES
A	Gate House	98	482579, 184086	GPR	2, 5
A	Tennis Court	496	482622, 184134	GPR	2, 5
A	Cloisters	1465	482633, 184077	GPR, FG, ER	2,3,4,5,6,7
B	HL Back Garden	328	482648, 184019	GPR	8, 9
B	HL Front Garden	533	482642, 183984	GPR	8, 9
B	Monks Garden	360	482625, 183953	GPR	8, 9
C	Warren Tennis Court	180	482672, 184041	GPR	10, 11
C	Warren Garden	196	482676, 184082	GPR	10, 11
D	HH Big Garden	1186	482629, 183765	GPR	12, 14

D	HH Small Garden	199	482664, 183823	GPR, ER	12, 13, 14, 15
E	The Green	204	482612, 183918	ER	16, 17

* GPR: Ground Penetrating Radar, ER: Earth Resistance, FG: Fluxgate Gradiometer

3.2.2 Principle Results

Generally, the data from the GPR surveys have been relatively clear and highlight a variety of archaeological features within the subsurface. It was certainly the best method at this site, not affected by modern infrastructure, buildings, or pipes. The magnetic dataset was unfortunately less useful for archaeological identification of anomalies, and was affected by nearby buildings, and struggled to detect the priory walls altogether – this is probably in part due to the material used for these walls not having a very high magnetic contrast to the background geology. It is also of note that the previous excavation might have been backfilled with a mix of soil and magnetic material (such as metal nails etc), masking any subtle responses from archaeological deposits below. The resistance surveys were unfortunately marred by technical issues in the field, however some areas were able to be surveyed using Marlow Archaeology's TRS twin-probe system – which was able to identify potential archaeological features.

3.2.3 Geophysical Interpretation

See table above (section 3.2.1) and Figure 1 as a guide for use with the following discussion on the interpretation of the geophysical anomalies. As these data cover many different survey areas, the interpretation will be a thematic one, focussing on the main points of interest taken from the entire collection of surveys.

3.2.3.1 Priory Remains

Within the area of the Cloisters, the subsurface remains of the thick walls of the priory are clearly identified within all depth levels of the GPR data (Fig 2 & 5) **[001]**. The results indicate that these archaeological remains are buried very close to the ground surface, especially on the northern extent of the buried priory structure (<25cm bgl). This is mirrored within the earth resistance dataset, where the northern part of the priory remains are much more identifiable, indicating that here, the walls of the north aisle are either much more substantial, or closer to the surface **[R001]** than the rest of the priory (Figs 4 & 7). The walls of the priory are most clear between 0.5-1.25mbgl. The plan of the walls in the geophysical data follow almost exactly with the excavation plans published by Rivers-Moore (1934, 1939) and as such suggest these early excavations represented a good level of understanding of the layout of the buried structure.

The surveys have however added extra details to the plan of the structure; such as the addition of a south aisle **[002]**, almost a mirror image of the north aisle. The GPR data also show a series of walls in a rectangular configuration at the eastern end of the structure which might represent the footings for a tower, or perhaps more likely, a Lady Chapel or similar (approximately 10m * 6m in dimensions) **[003]**. Two smaller 'rooms' (4m*4m and 4m*3m respectively) flank either side of this large addition to the priory **[004]**, **[005]**. Room **[004]** has an increased amplitude reflection within it, which might suggest fallen debris within, or a solid stone or tiled floor exists within this area.

The apsidal wall identified within the 1939 account by Rivers-Moore has also been identified at lower levels (>1mbgl), however it appears it has been intersected by later the tunnel trench **[006]**.

Within the small parcel of land surveyed at the Gate House, a high amplitude linear anomaly was identified which may represent either a wall or a path connecting the two buildings within this cloister **[019]**.

To the north of the priory, a circular, high amplitude anomaly is interpreted as a path for formal gardens **[020]**. A discovery of an aerial photo from the 1930s showed such formal garden layouts adjacent to this area, to the west. It is unknown if such a garden was part of the priory, the estate of Ladye Place, or a more recent design, however the relatively substantial depth (0.5-0.75mbgl) would suggest an earlier date. It is worth noting that this feature appears to be cut north-south by a low amplitude linear anomaly which is suggestive of a substantial trench cut.

Within the magnetic dataset (Fig 3), the walls of the priory were not identified. A number of magnetic 'spikes' or dipoles have however been identified, which do cluster around the known priory remains **[M001]**. It is unclear whether these anomalies are archaeological.

3.2.3.2 Tunnel/Drain

There is clear evidence for a tunnel/drain running through this survey area. It is clear that the tunnel cuts the original Priory foundations and therefore must be later; and most likely associated with the Tudor mansion of Ladye Place to the south. The extant metal grate within the survey area is a known entrance to this tunnel complex – still used as recently as the 1970s, however at time of survey this was locked and blocked up **[007]**.

Within the shallowest data layers, (0–0.5mbgl) the route of the tunnel is represented as a low amplitude anomaly, suggesting a homogenous soil fill overlying the tunnel itself **[008]**. At depths of 0.5-1.25mbgl, the response changes to a high amplitude anomaly, suggestive of the big brick or stone-lined tunnel which is known to exist from photographs and local historical sources **[009]**.

Prior to the geophysical survey, the route of the tunnel was only mapped from Rivers-Moore's excavations at the Abbey within the cloisters survey area – so a survey was conducted within the tennis court to the north of the cloisters. This was successful at detecting the continuation of the tunnel northwards, which rather interestingly appeared to turn north-east, before heading north again, towards the extant moat **[010]**.

As the tunnel passes through the priory southwards, it becomes apparent that the tunnel splits into two. An attempt was made to try and 'chase' these tunnels south, to their expected destinations of Ladye Place crypt, and/or to the Olde Bell Inn, which local legend had it the tunnels led to. Neither of the area surveys in the gardens surrounding Ladye Place (Zone B, Figs 8-9) or at Hurley House (Zone D, Fig Figs 12-13), were able to identify a continuation of either tunnel in this direction however. A single GPR transect was conducted just to the north of the crypt of Ladye Place which did support the theory of a tunnel heading towards the extant remains of the crypt – so it seems likely that at least one of the tunnels heading south, terminated here.

3.2.3.3 Ladye Place

The location of the extent of the east-wing of Ladye Place mansion is identified clearly within the geophysical data, enhancing the accuracy and resolution of the previous location plan (Rivers-Moore, 1934) **[011], [012] & [M002]**. The east-wing measures 55m long, and approx. 8m wide. This building is well defined within the GPR data, with architectural details such as bay-windows and separate rooms easily identifiable **[013]**, **[014]**, **[015]**. At shallow depths (0.25mbgl), there appears to be connecting walls between Ladye Place and the south aisle of the abbey, suggesting

that parts of the abbey structure might still have used and incorporated into the mansion post-dissolution **[016]**.

Between depths of 0.25-0.5mbgl, there are high amplitude linear anomalies which hint at the presence of further walls, which might suggest of a return of the west-wing **[017]**. However this seems unlikely as these walls represent relatively small, unsubstantial reflections which, unlike the anomalies at the east-wing, lack any kind of distinct architectural form or connectivity to any further features.

To the south of the east-wing, a high amplitude linear anomaly running perpendicular to the mansion **[018],** is suggestive of a garden wall. South of this wall, large linear areas of high amplitude appear to show three parallel lines, representing paths of a formal garden, with a central circular feature connecting all three within the northern extent of the survey area **[019]**. This is best seen at a depth of 0.5-0.75mbgl. At shallower levels (0-0.5mbgl), there appears to be evidence for more recent, large, though less substantially built structures overlying the formal garden **[020]**, **[021]**.

3.2.3.4 Survey at Warren House garden

At the two areas surveyed at Warren House (Zone C, Fig 10-11), no anomalies of archaeological interest were identified.

3.2.3.5 Survey at Monks Garden

At the area surveyed at Monks Garden (Zone B), no anomalies of archaeological interest were identified.

3.2.3.6 Hurley House Gardens

Within the small survey area to the north-east, a definite rectangular anomaly is present within both the GPR, and the earth resistance datasets **[022]**, **[R002]**. This anomaly, measuring 5m * 6m, can be identified on aerial images dating from the late-1990s to 2004, and appears to be a garden structure such as a pond. It is of note, that this pond does not appear on OS maps prior to the 1980s.

A linear high amplitude anomaly at the shallowest layers **[023]** also appears to relate to this period, as the same aerial photographs show a path, leading to the house in this location and orientation.

Within the datasets at Hurley House, a linear high amplitude feature dominates **[024]**. At first sight, this looks most convincingly like is might relate to the tunnel (see Section 3.2.3.2), however this feature caused a very different anomaly within the 2D GPR radargram (the known tunnel at the Cloisters and the Tennis Court produced a very distinctive hyperbola, whereas here the reflection was extremely flat and noisy). Having seen a photograph provided by the current owners of the house taken in the early 20th Century – it seems more likely to be the remains of an old garden path which can also be identified within the 1870s OS map.

A high amplitude linear reflection **[025]** aligned east-west across the survey area may indicate an old garden path or utility running through. Within an aerial photo of the site from 1999, this feature can be seen faintly within the garden.

3.2.3.7 Survey at the Village Green

A linear high resistance area **[R003]** within the survey might suggest a possible road or pathed entrance into the priory, as the alignment seems to head towards what appears to be an old

gateway (now blocked up) through the bounding wall. This interpretation is troublesome however, as it would seem more logical to align any road here with the main road directly heading south. An area of noisy low resistance **[R004]** in the centre of the survey area is of uncertain origin, but thought not to be of archaeological interest.

3.3 Discussion and Conclusions

The combination of survey methods employed at Hurley was useful, and allowed a greater interrogation of the subsurface archaeology at the site than possible with a single technique. However, ground penetrating radar proved to be the most useful in achieving the clearest data across all the survey areas. The GPR survey has identified and located a number of anomalies of potential archaeological interest. The datasets have allowed approximate depths to archaeological sediments to be located, and provide potential ground-truthing targets for further investigation.

The geophysical data was able to add a new dimension to the buried remains at Hurley. The priory layout has now been made clearer, and the new discovery of a potential tower/Lady Chapel is perhaps a highlight here. One of the objectives of the survey was also to explore the pre-conquest remains at Hurley; however, the extent of modern gardening and landscaping on the site has limited the scope of the available survey area - so unfortunately no data was collected over the areas containing potential pre-conquest priory footings, or the area containing a shrine – as identified by Rivers-Moore (1939).

The eastern wing of Ladye Place has been clearly and accurately mapped within the geophysical datasets which show clear extents of this side of the mansion house. Unfortunately the western extent of the building has not been identified within this survey. The west wing of the mansion (if existed) therefore, is thought likely further west, possibly within the extant graveyard, suggesting that the crypt does not represent the centre of the mansion layout. It is notable that Rivers-Moore also struggled to definitively identify this western extent of the mansion within the Abbey excavations.

The tunnels running through the priory are certainly fascinating. The GPR survey has managed to trace the tunnel further north than was previously known – and intriguingly it does not appear to continue straight. Due to time constraints, ‘chasing’ the route of the tunnel further north was not possible on this occasion. Further GPR survey north of the tennis court would help to track the route of this tunnel further, perhaps to the suggested destination of the moat. Southwards, one branch of the tunnel appears to head for the crypt, which is supported by the GPR data. The western branch was not traced any further south than the Cloisters field. Whilst surveying, one of the members of Marlow Archaeology mentioned that he remembered a tunnel entrance within the garden of Hurley Lodge, and pointed out the rough location – which would perhaps (by eye) match with the line of the eastern branch tunnel, and therefore suggest a reason why the tunnel was not traced any further south. The surveys to the south of Ladye Place unfortunately failed to identify any sign of further tunnels continuing south, despite the apparent tunnels existing at the Olde Bell Inn. This remains a mystery for now, and further investigative work would be needed to see where these tunnels head.

4. PROJECT METADATA

PROJECT NAME	
Project Code	Hurley Priory, Berkshire
Client	Mr Paul Seddon, Hurley History Society, Marlow archaeology Group
Fieldwork Dates	18- 20th, 24th-26th September 2019
Field Personnel	Robert Fry, Edmund Cush, Hurley History Society and Marlow Archaeology
Data Processing Personnel	Robert Fry
Report Personnel	Robert Fry
Interim Report Date	Presentation given to Hurley History Society on results: 15/10/2019
Draft Report Date	8th January 2020
Final Report Date	14th January 2020

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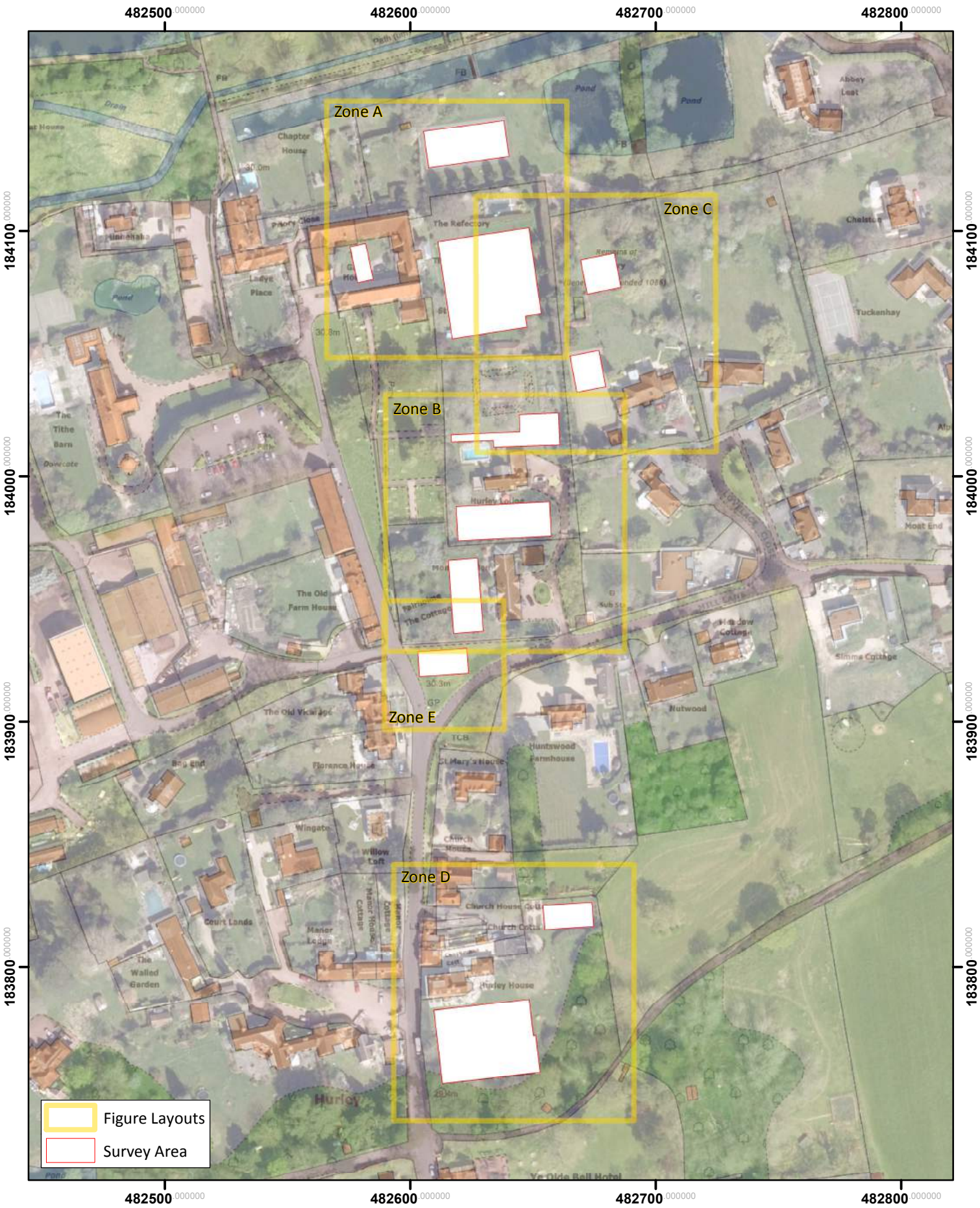


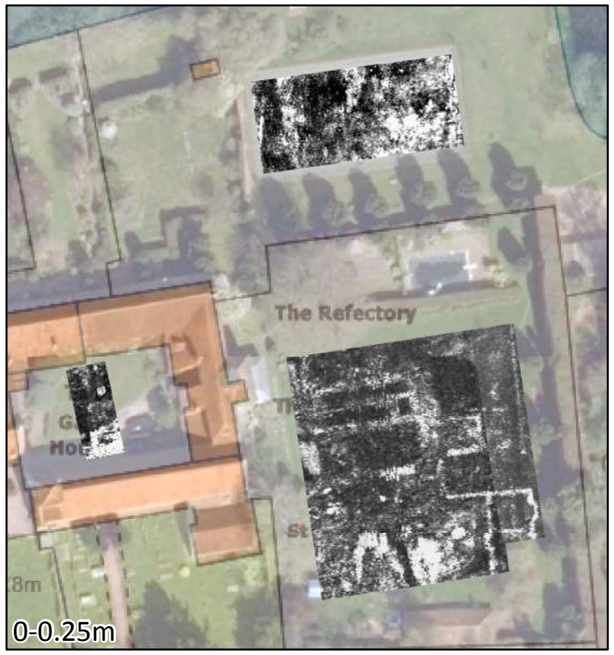
Figure 1 Hurley Priory
Geophysical Survey Areas

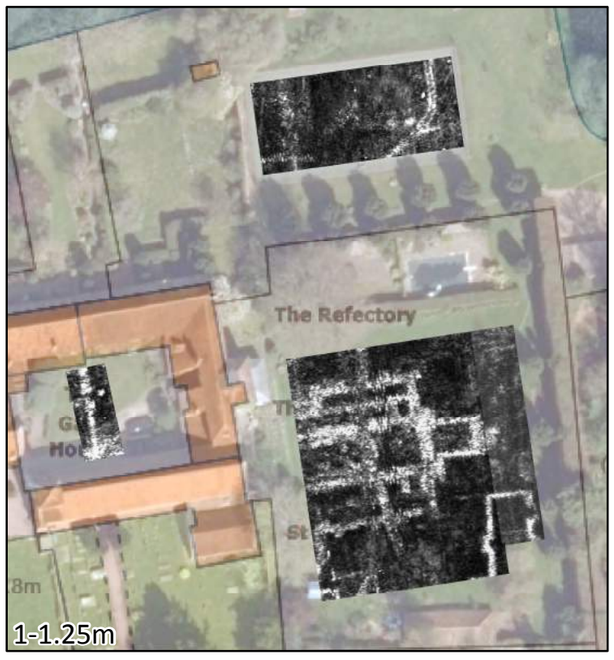
1:2,000 @ A4 Page Size

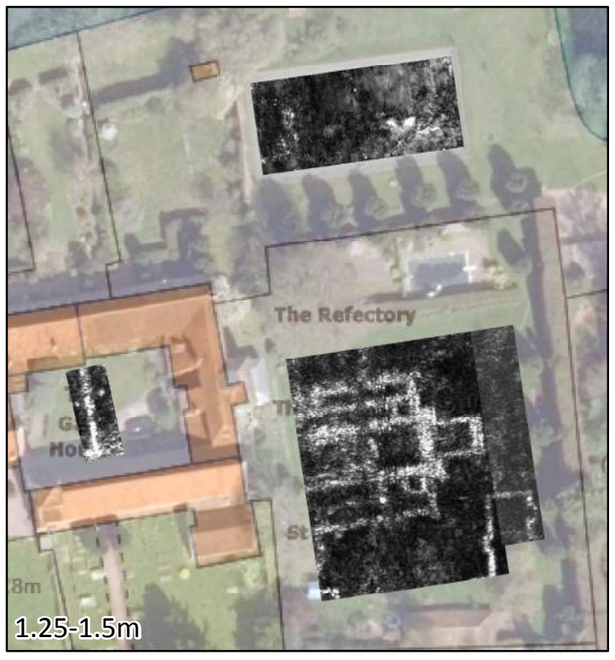
0 25 50 100 m

Surveyed: 18th - 26th September 2019

N







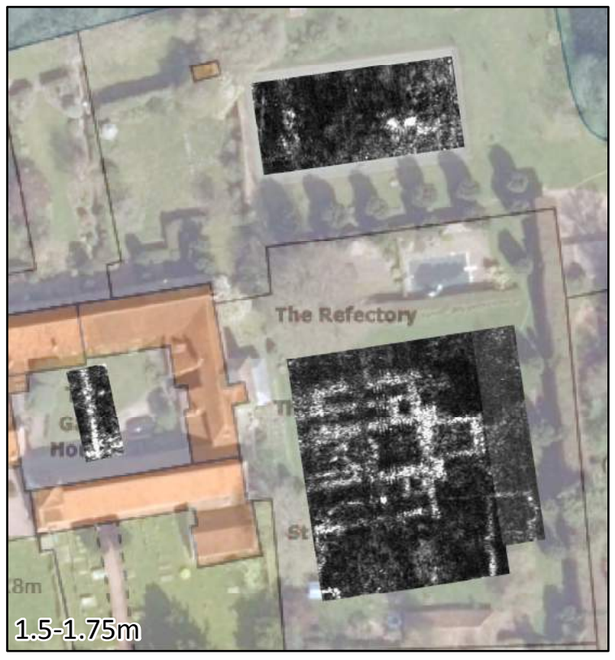


Figure 2 Hurley Priory: Zone A GPR Survey

1:1,000 @ A3 Page Size

0 12.5 25 50 m

N

Depths provided are approximate +/-25cm
Surveyed: 18th 19th & 20th September 2019

Amplitude

High

Low

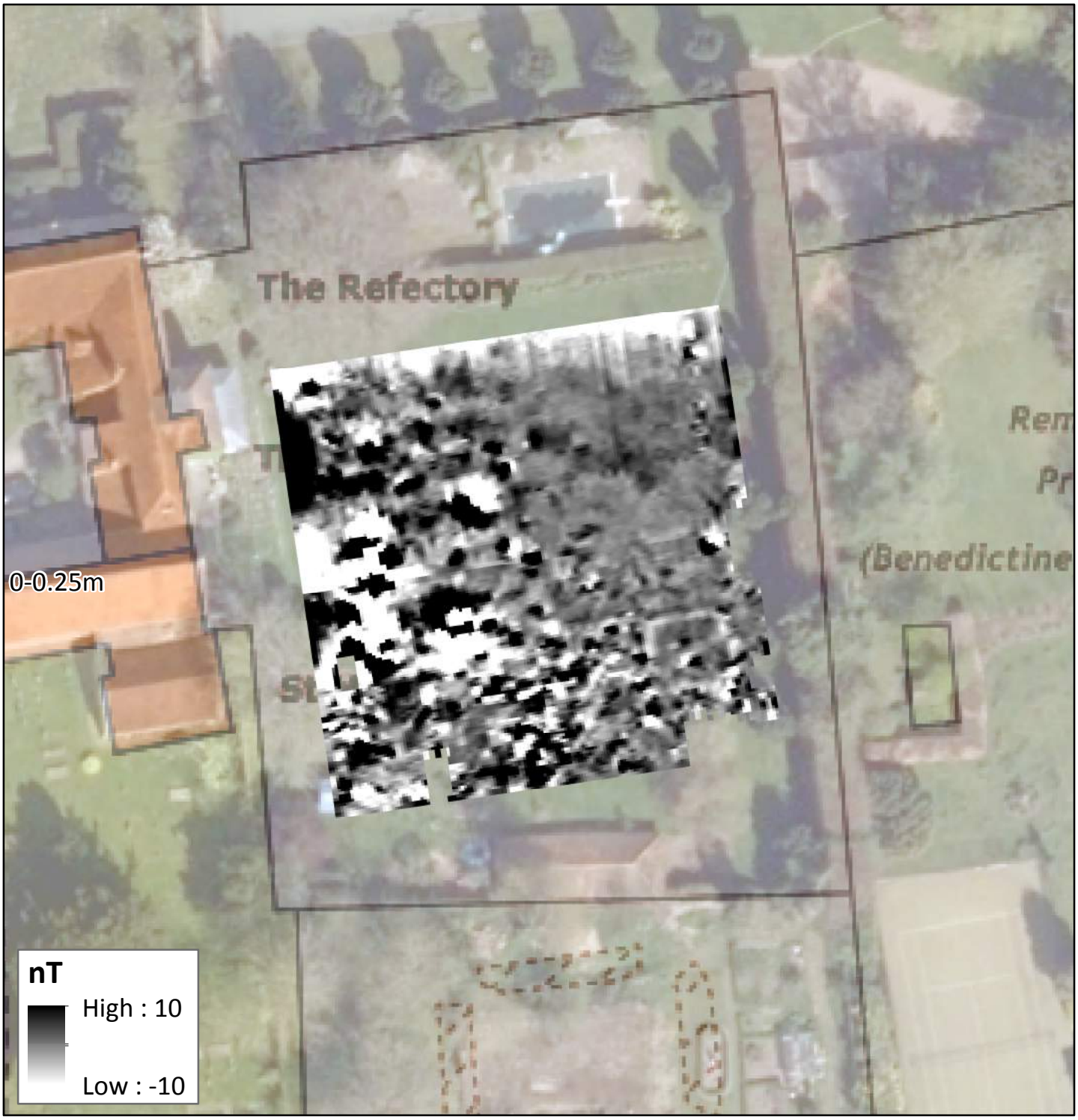


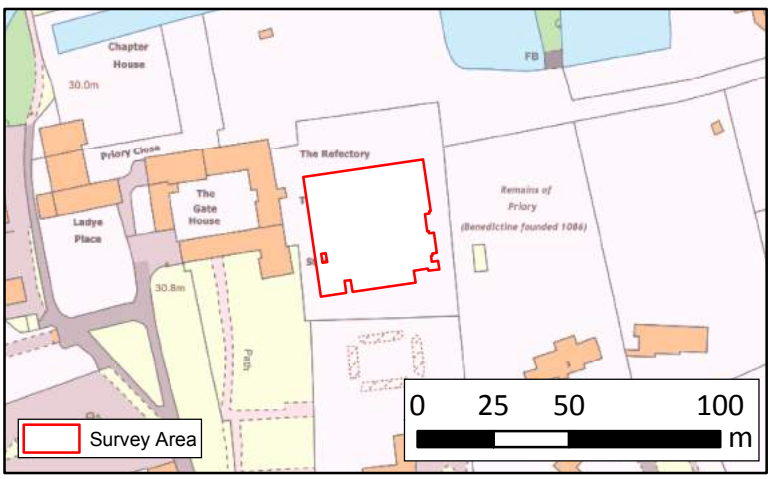
Figure 3 Hurley Priory: Zone A
Fluxgate Gradiometer Survey

1:500 @ A4 Page Size

0 5 10 20 m

Surveyed between: 18th - 26th September 2019

N



482500.000000

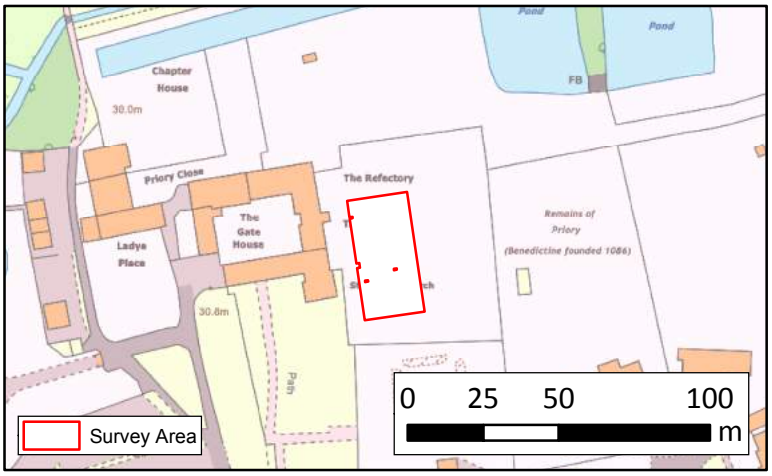
Figure 4 Hurley Priory: Zone A
Earth Resistance Survey

1:500 @ A4 Page Size

0 5 10 20 m

Surveyed between: 18th - 26th September 2019

N



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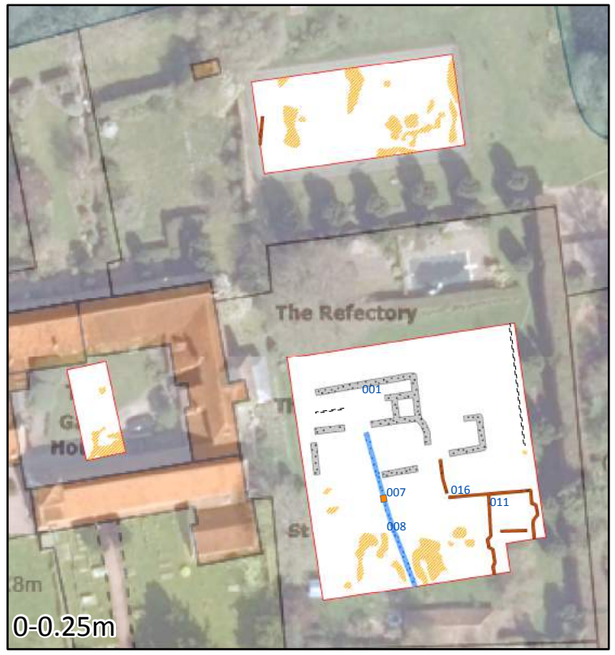

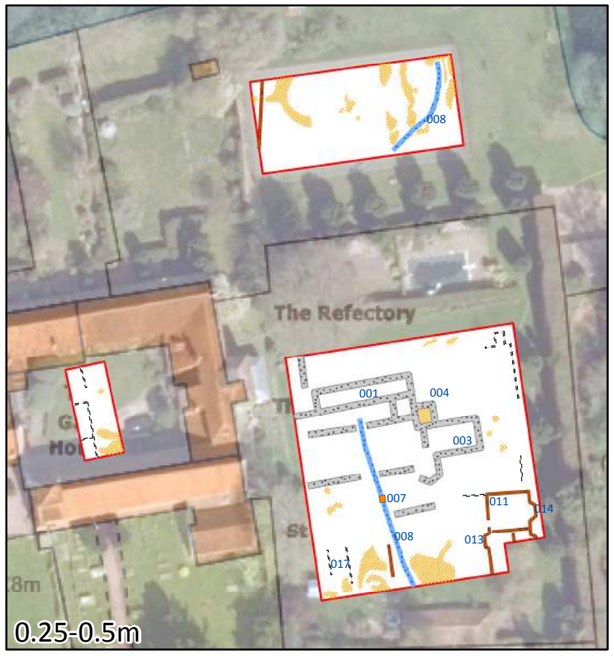

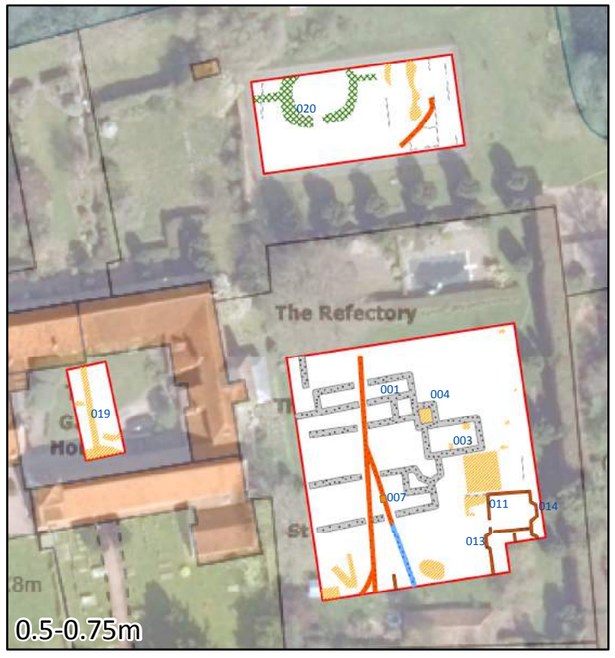

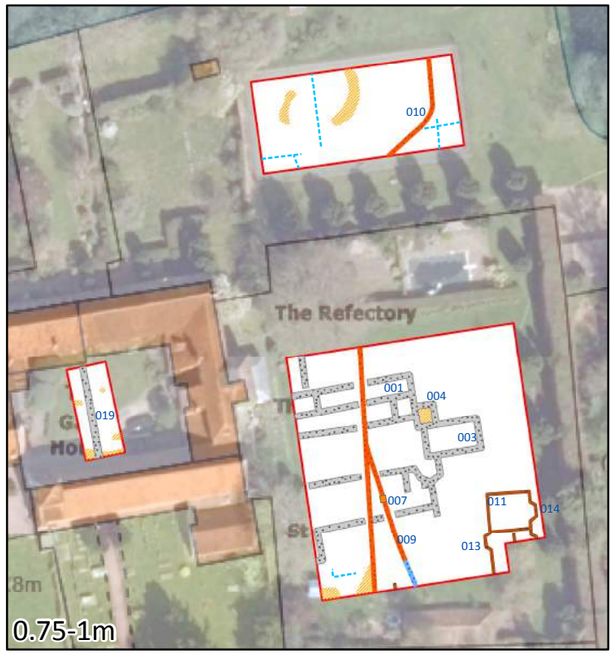

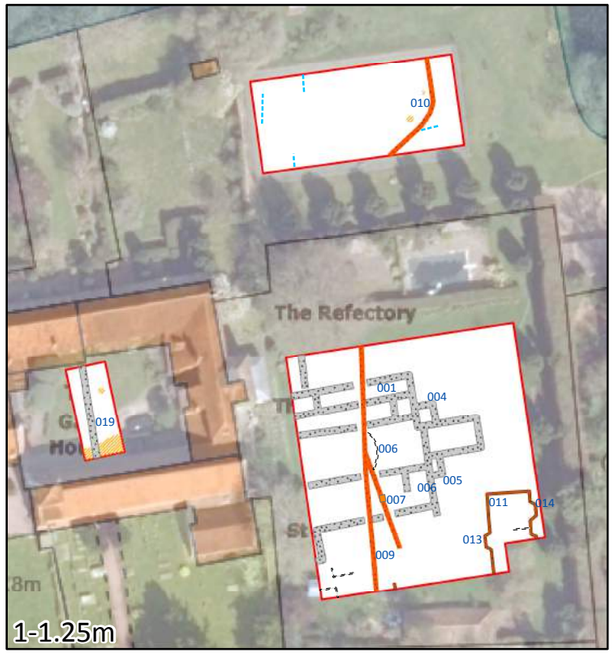

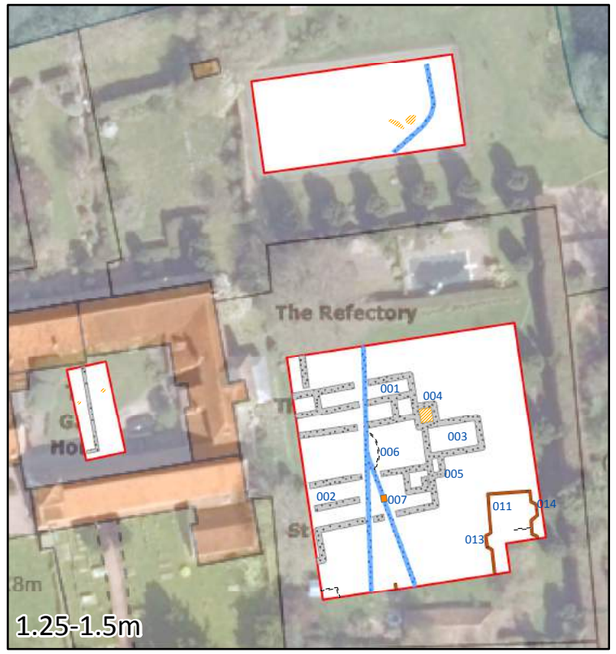

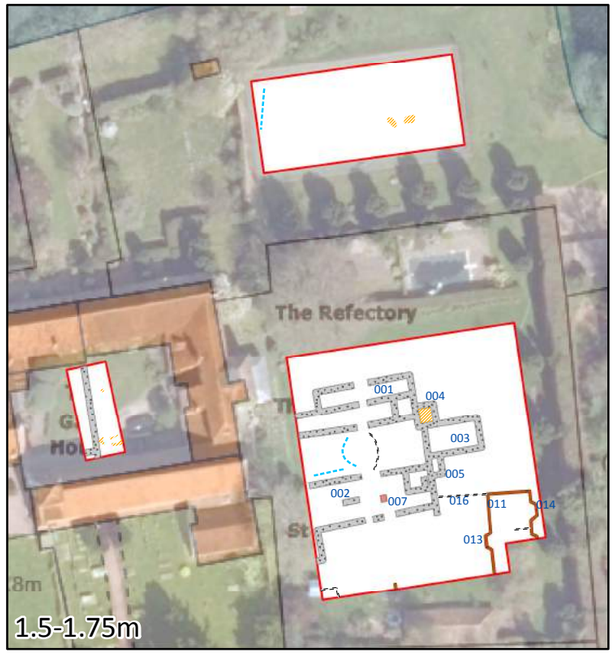

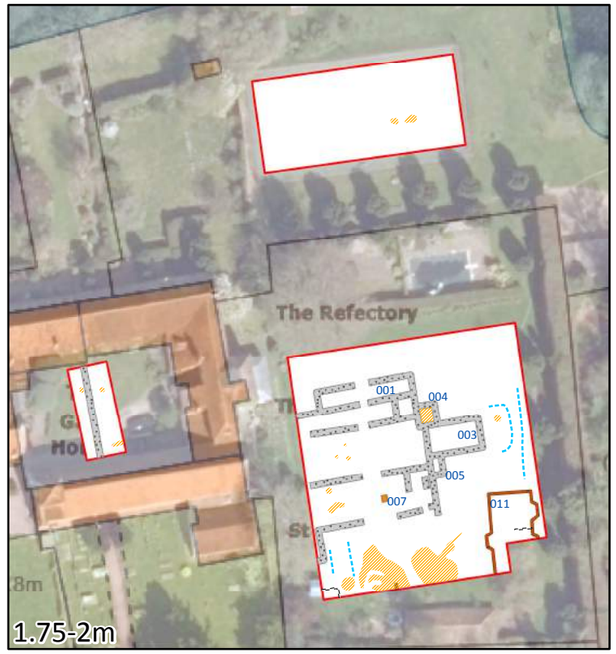

Figure 5 Hurley Priory: Zone A
GPR Survey Interpretation

1:1,000 @ A3 Page Size

0 12.5 25 50 m

Depths provided are approximate +/-25cm
Surveyed between: 18th - 26th September 2019

N

Priory Wall
Wall
Possible Wall
Tunnel (low amplitude)
Tunnel (high amplitude)
High amplitude Area
Path
Trend
Metal Grate
Survey Area

Figure 6 Hurley Priory: Zone A Fluxgate Gradiometer Survey Interpretation

1:500 @ A4 Page Size

0 5 10 20 m

N

Surveyed between: 18th - 26th September 2019

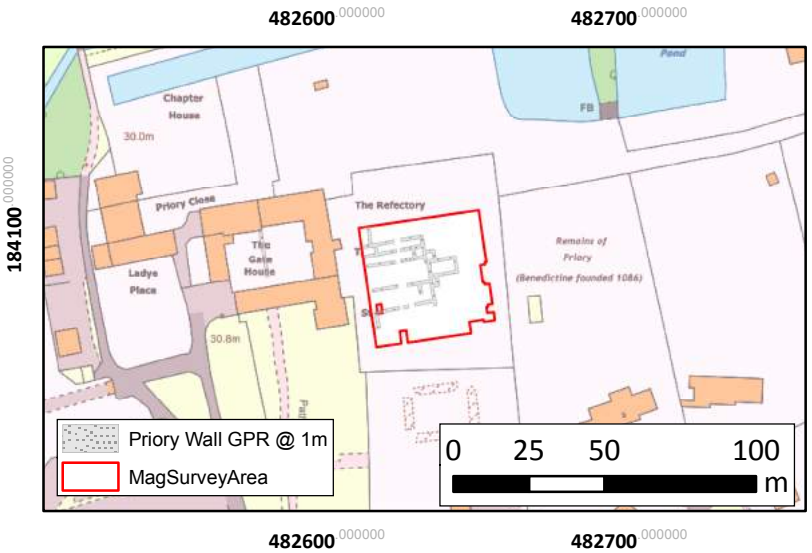

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Figure 7 Hurley Priory: Zone A Earth Resistance Survey Interpretation

1:500 @ A4 Page Size

0 5 10 20 m

Surveyed between: 18th - 26th September 2019

N

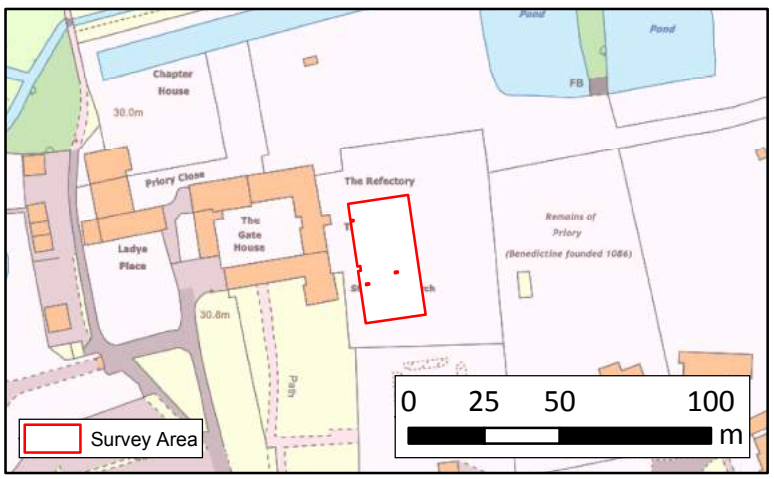

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Figure 8 Hurley Priory: Zone B GPR Survey

1:1,000 @ A3 Page Size

0 12.5 25 50 m

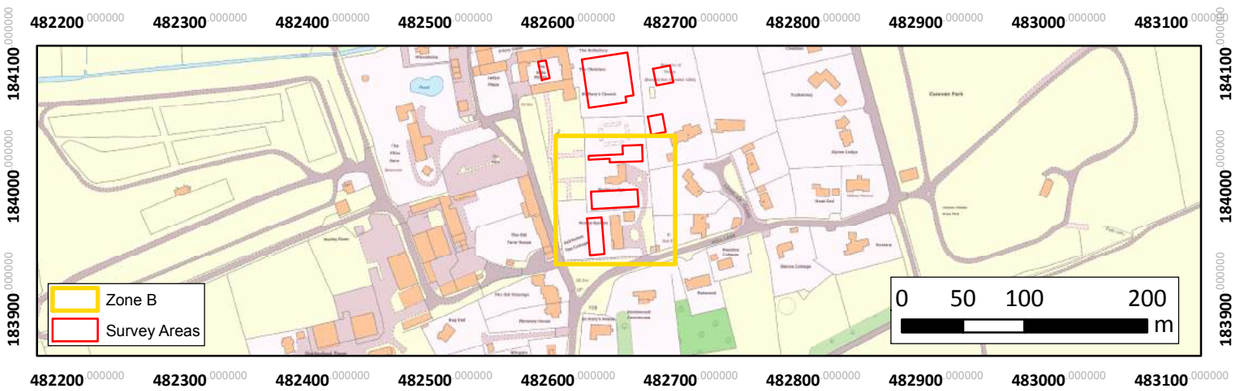
N

Depths provided are approximate +/-25cm
Surveyed: 18th 19th & 20th September 2019

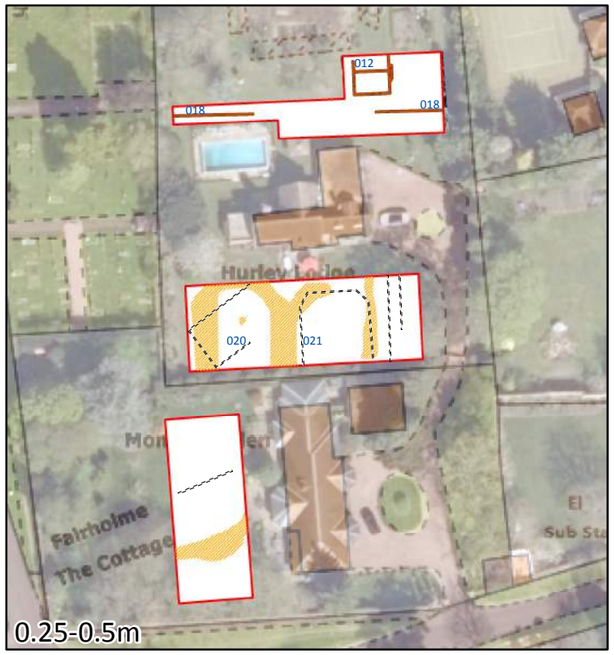
Amplitude

High

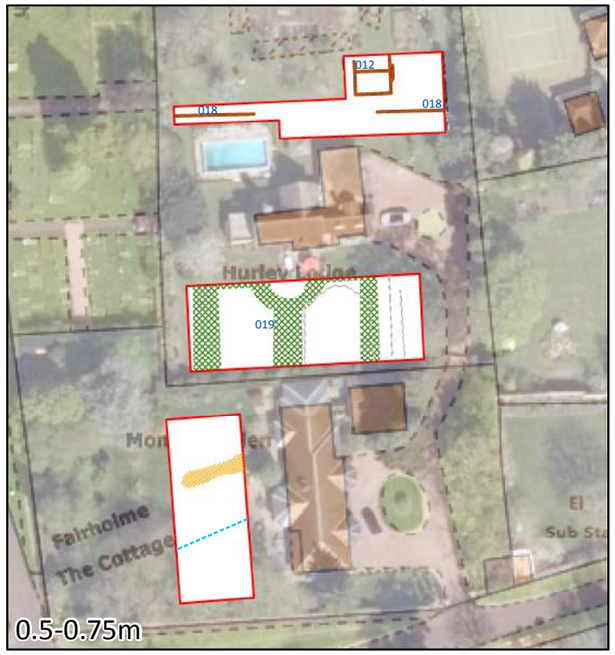
Low



0-0.25m



0.25-0.5m



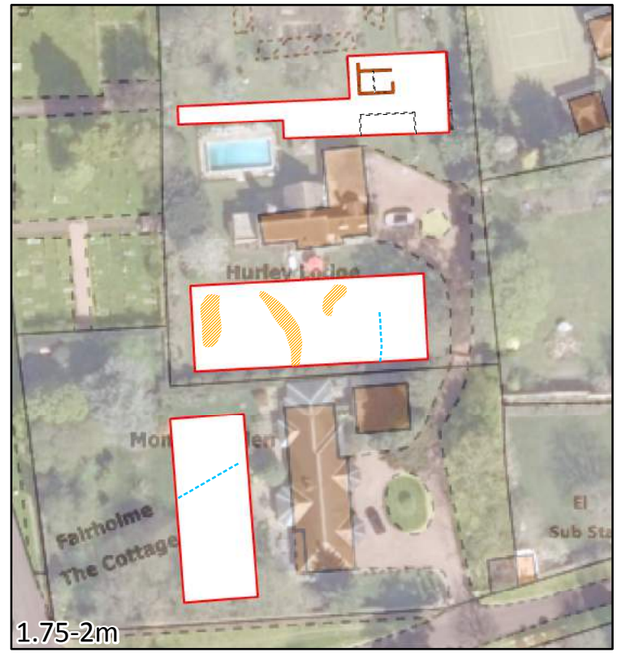
0.5-0.75m

0.75-1m

1-1.25m

1.25-1.5m

1.5-1.75m



1.75-2m

Figure 9 Hurley Priory: Zone B
GPR Survey Interpretation

1:1,000 @ A3 Page Size

0 12.5 25 50 m

N

Depths provided are approximate +/-25cm
Surveyed between: 18th - 26th September 2019

Priory Wall
Wall
Possible Wall
Tunnel (low amplitude)
Tunnel (high amplitude)
High amplitude Area
Path
Trend
Metal Grate
Survey Area

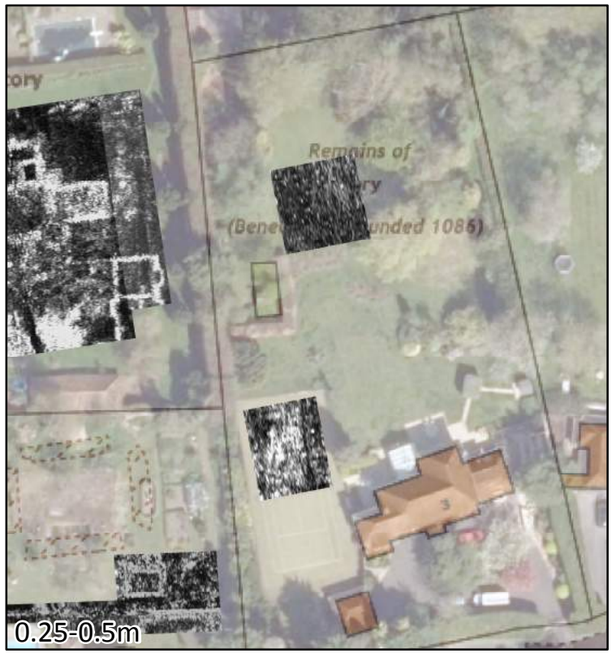


Figure 10 Hurley Priory: Zone C GPR Survey

1:1,000 @ A3 Page Size

0 12.5 25 50 m

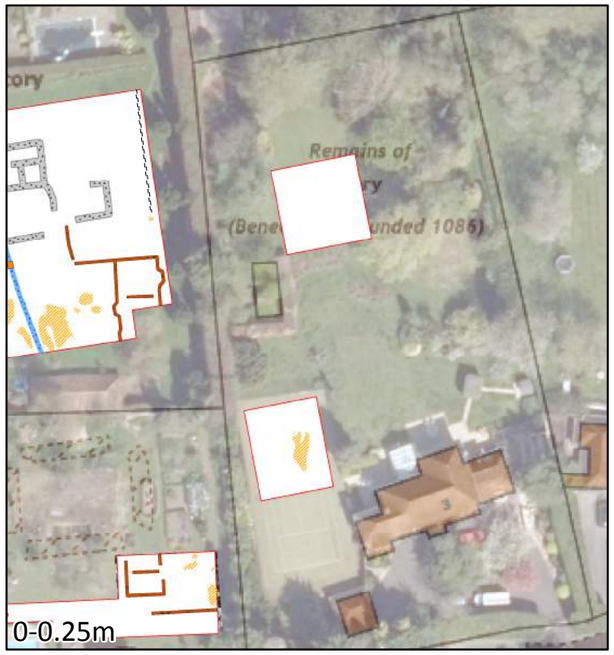
N

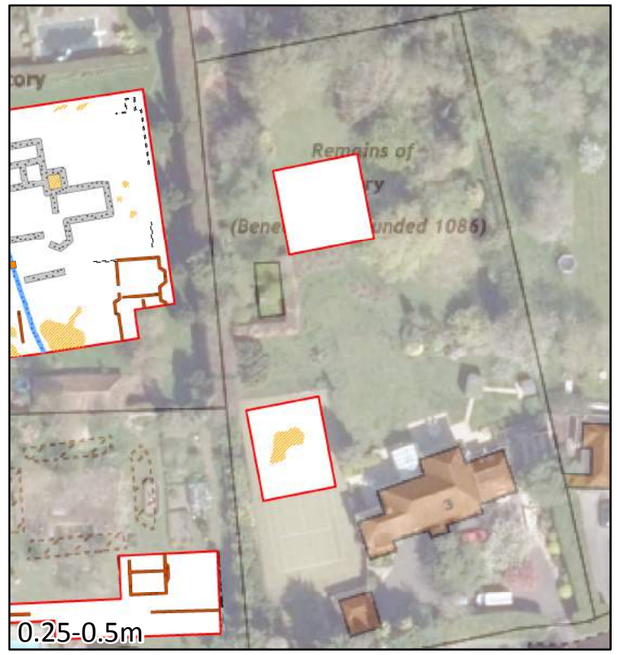
Depths provided are approximate +/-25cm
Surveyed: 18th 19th & 20th September 2019

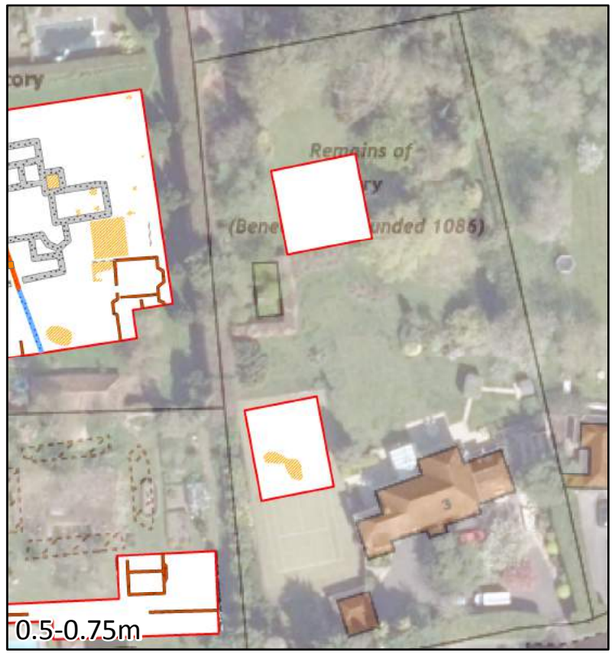
Amplitude

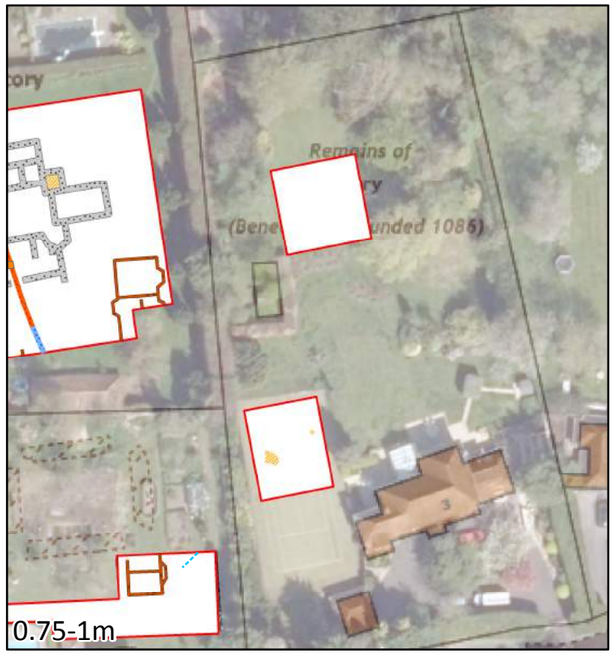
High

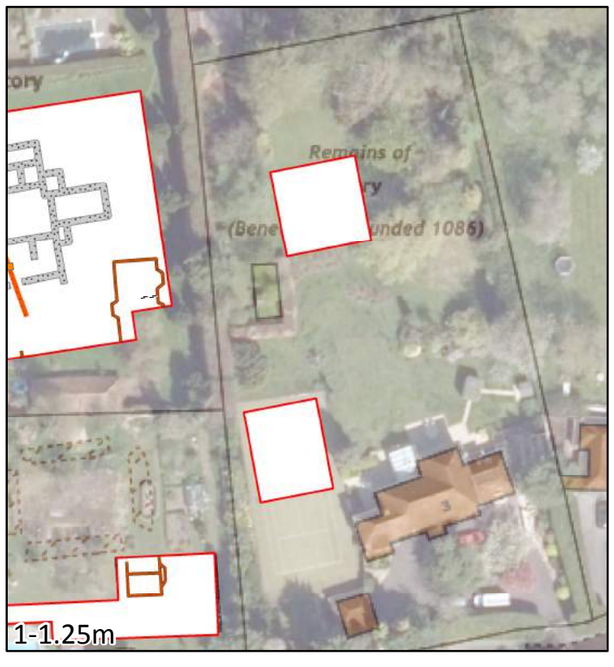
Low

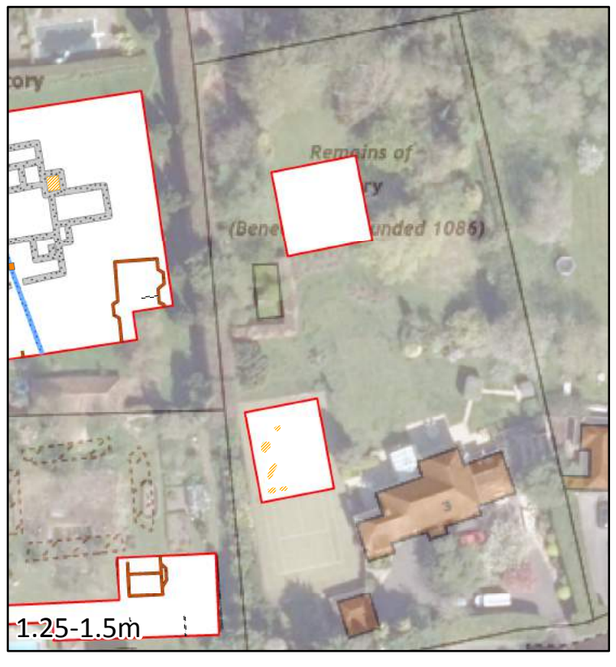


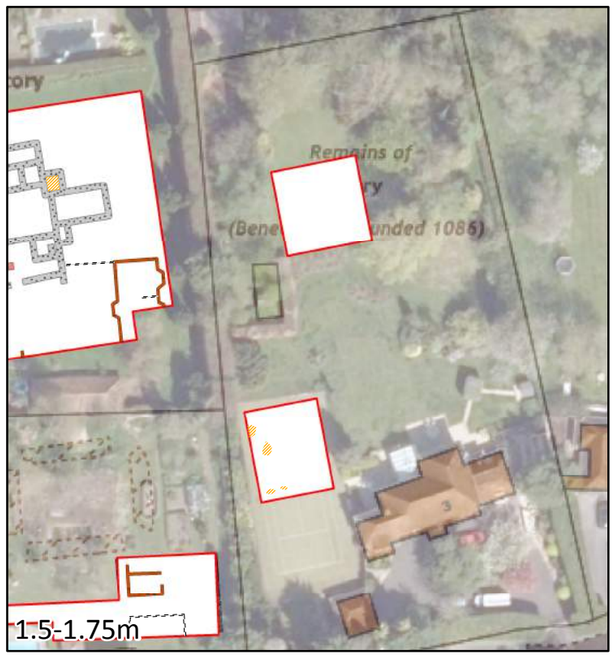












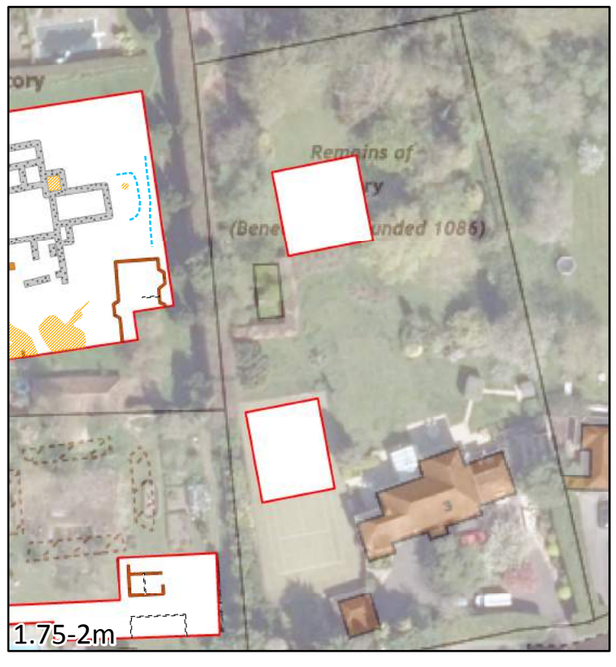


Figure 11 Hurley Priory: Zone C
GPR Survey Interpretation

1:1,000 @ A3 Page Size

0 12.5 25 50 m

Depths provided are approximate +/-25cm
Surveyed between: 18th - 26th September 2019

N

- Priory Wall
- Wall
- Possible Wall
- Tunnel (low amplitude)
- Tunnel (high amplitude)
- High amplitude Area
- Path
- Trend
- Metal Grate
- Survey Area

Figure 12 Hurley Priory: Zone D GPR Survey

1:1,000 @ A3 Page Size

0 12.5 25 50 m

N

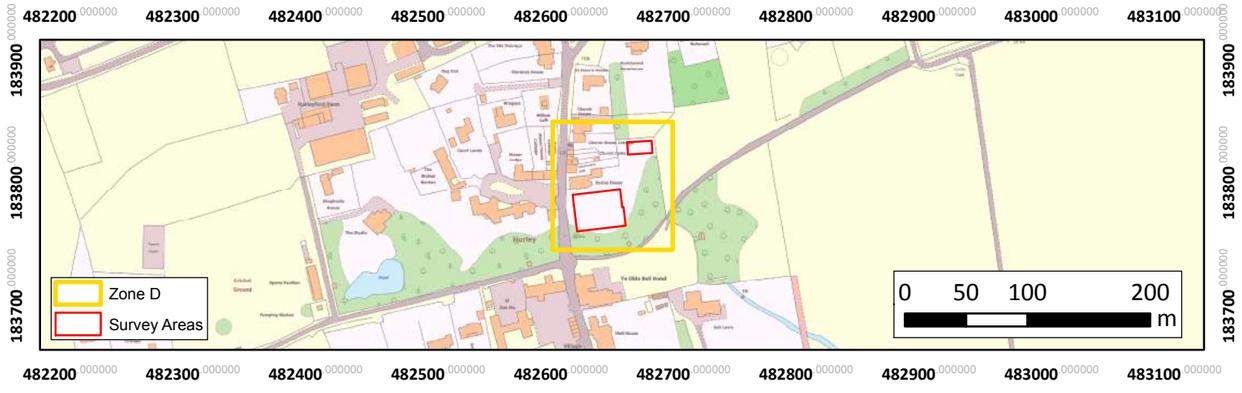
Depths provided are approximate +/-25cm

Surveyed: 18th 19th & 20th September 2019

Amplitude

High

Low



482750 000000

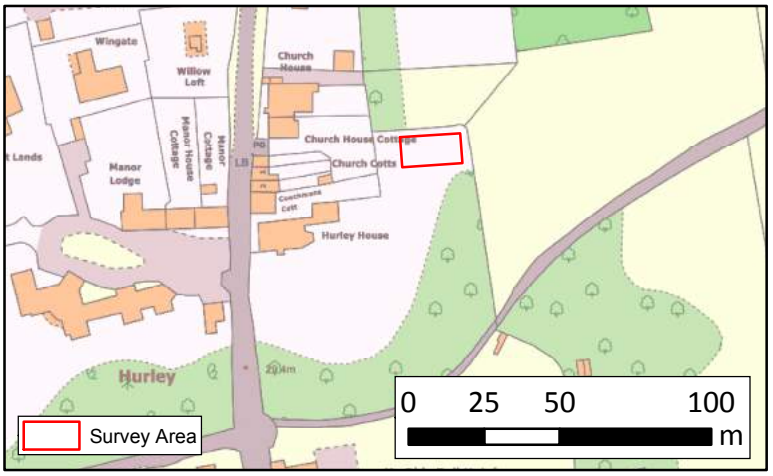
Figure 13 Hurley Priory: Zone D
Earth Resistance Survey

1:500 @ A4 Page Size

0 5 10 20 m

Surveyed between: 18th - 26th September 2019

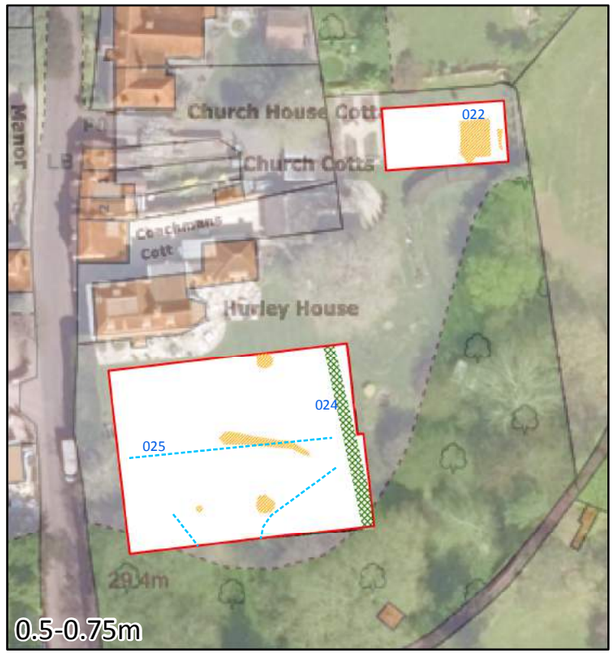
N

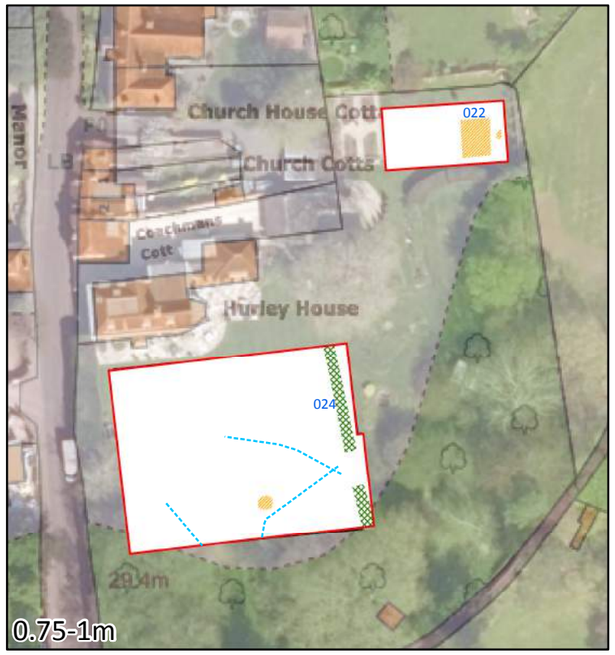


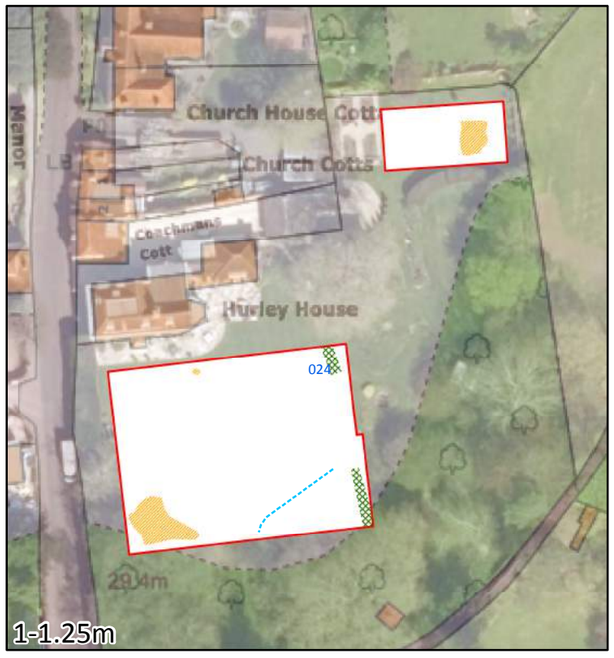
183750 000000

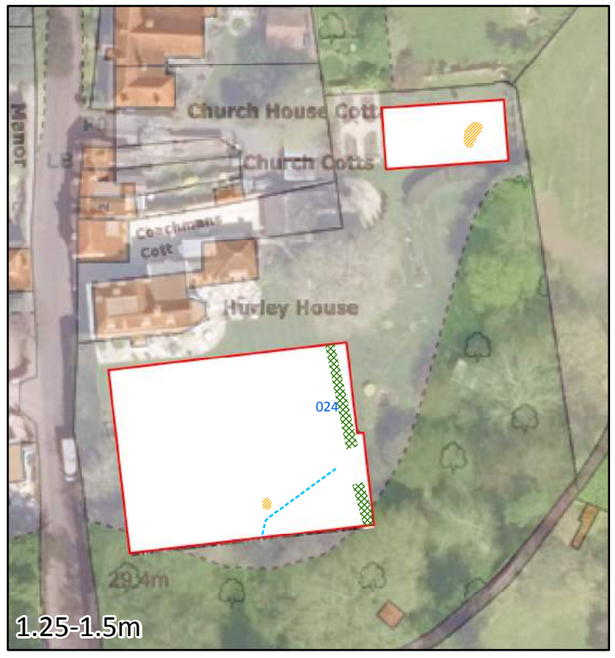
183750 000000

482750 000000









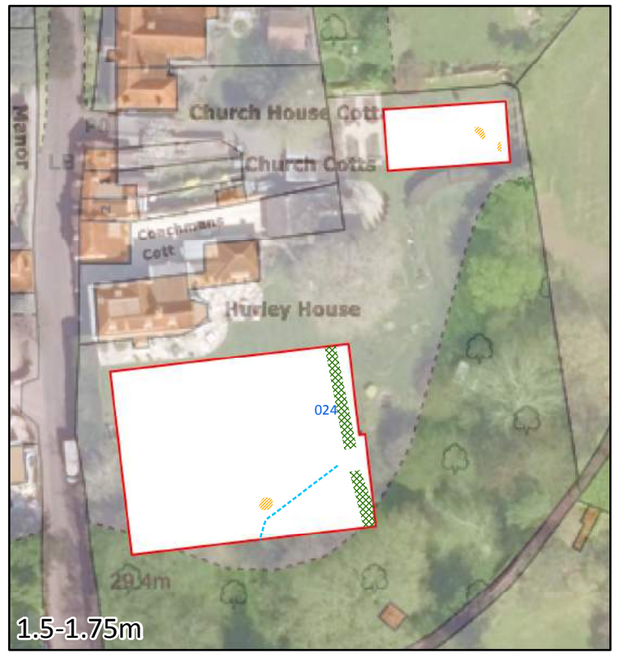


Figure 14 Hurley Priory: Zone D
GPR Survey Interpretation

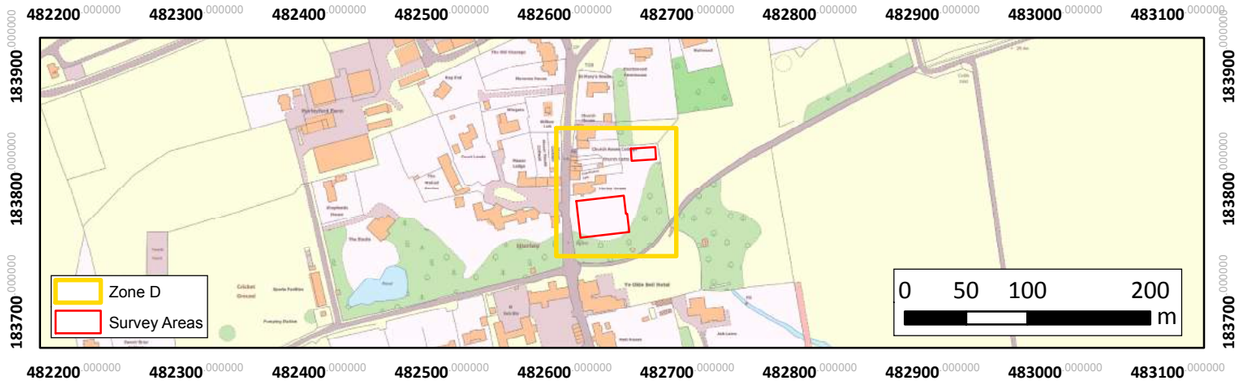
1:1,000 @ A3 Page Size

0 12.5 25 50 m

N

Depths provided are approximate +/-25cm
Surveyed between: 18th - 26th September 2019

- Priory Wall
- Wall
- Possible Wall
- Tunnel (low amplitude)
- Tunnel (high amplitude)
- High amplitude Area
- Path
- Trend
- Metal Grate
- Survey Area



482750 000000

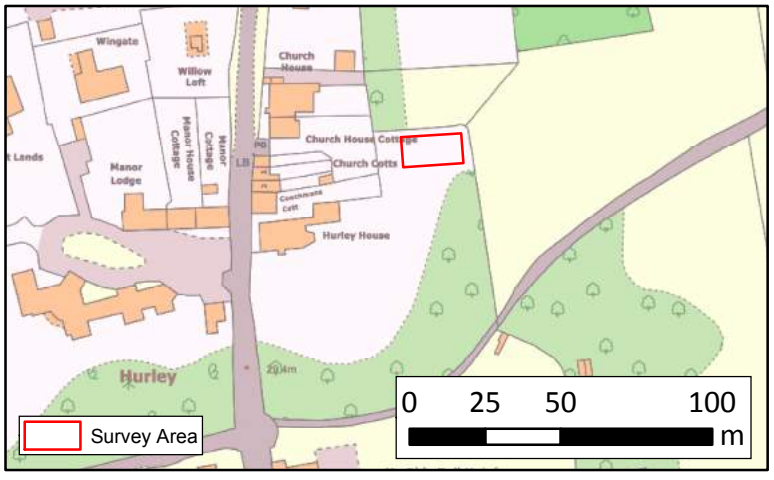
Figure 15 Hurley Priory: Zone D Earth Resistance Survey Interpretation

1:500 @ A4 Page Size

0 5 10 20 m

Surveyed between: 18th - 26th September 2019

N



183750 000000

183750 000000

482750 000000

482500.000000 482750.000000

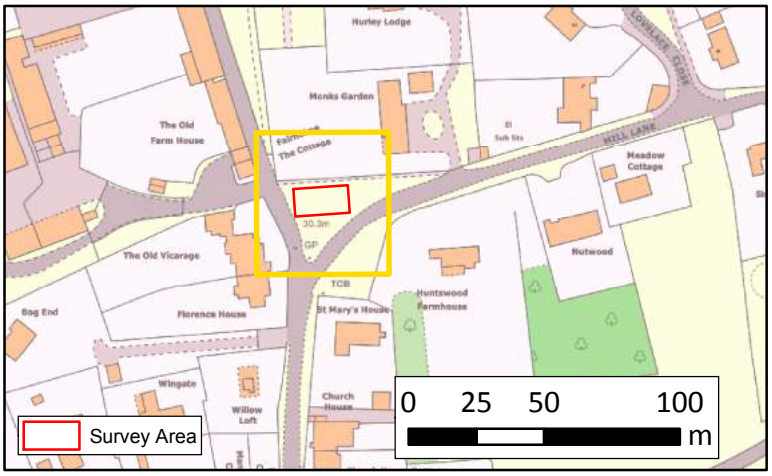
Figure 16 Hurley Priory: Zone E
Earth Resistance Survey

1:250 @ A4 Page Size

0 2.5 5 10 m

Surveyed between: 18th - 26th September 2019

N



482500.000000 482750.000000

Figure 17 Hurley Priory: Zone E Earth Resistance Survey Interpretation

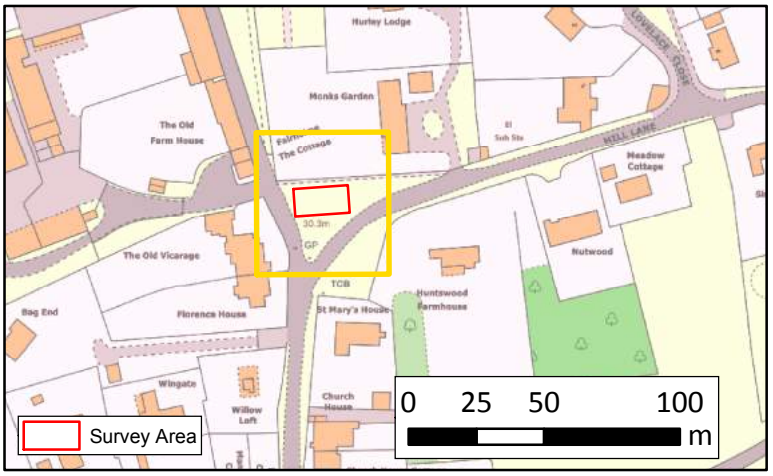
1:250 @ A4 Page Size

0 2.5 5 10 m

Surveyed between: 18th - 26th September 2019

N

482500.000000 482750.000000



482500.000000 482750.000000