GeoArch

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Dr DG Smith memorial project, geophysical survey 2: The Orchard

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Abstract

A geophysical survey of The Orchard (centred at [296550, 168775]) has been conducted as part of the broader aims of the Dr DG Smith memorial project to examine areas with potential for illuminating the early medieval history of Llantwit Major.

Geophysical survey by ground resistivity was undertaken over the accessible area of the Orchard. The area was vegetated by somewhat tussocky long grass that precluded the application of magnetic gradiometry.

The survey produced some slight evidence for the infill of a pond, mapped in the 18th century, but infilled by the mid-19th century, that has been interpreted as the holding pond for a possible manorial mill (Manor of West Llantwit) to the southwest of the churchyard. The mill may have medieval origins as a part of the Grange of Tewkesbury Abbey. To the north of the location of the pond, a broad resistivity anomaly crosses the valley floor, apparently in continuation of a property boundary to the east, which apparently enclosed some ruins (now destroyed) alleged to be of medieval age. Taken together, these observations suggest an interpretation of the grange enclosure in which its northern boundary passed eastwards from the excavated section, across the Ogney brook, and enclosed the area to the north of the church.

The Orchard appears to have undergone major changes in the period 1766x1844, with the construction of a new stone-lined stream channel past the site of the former pond, the creation of a kitchen garden within the northern section of what had been a large orchard, and, arguably, the construction of a barn in the northwest angle.

Both the western side of the Orchard and probably the central part are cut by recent service trenches.

Contents

Abstract 1

Methods 2
- Survey rationale and background 2
- Historical background 2
- Map regression 2
- Survey layout 2
- LiDAR topographic base 3
- Ground resistivity survey 2
- Use of this report 3

Results 3

Interpretation 3

Discussion 4

References 5

Figure captions 6

Figures 7

Methods

Survey rationale and background

The survey was undertaken as a component of the project "Early Christian Llantwit Major and Llancarfan - an archaeological study (supported by the Dr Dennis G Smith Memorial fund)", to be conducted by Cardiff University. The overall objective of the survey is to use geophysical techniques to examine areas around Llantwit Major that might provide evidence for the nature and context of early medieval settlement and monasticism in the area. Specific areas for investigation, of which The Orchard was one, were identified by a desk-based assessment (Young 2018).

The site is centred at [296550, 168775] and lies to the northern side of Llantwit Major churchyard. It is bisected by the Ogney brook (Figure 1). The Orchard is approximately 70m N-S and has a maximum width of 45m E-W.

The survey was conducted in August 2019, under good weather conditions following a period of very wet weather, to CIfA (2014) and HE (2008) guidelines.

The survey was conducted with the kind cooperation of the owners, Jean Williams and Ruth Thomas. The assistance of Mr Steven George with the survey is very gratefully acknowledged.

Historical background

Llantwit Major is widely believed to have been the site of a significant early medieval *clas* monastery. This may date from the period of Illtud in the 6th century and appears to have included the burial ground of local kings in the 9th century (for fuller discussion see Young 2018). It seems likely that Llantwit was eclipsed by other monastic centres even during the 10th and 11th centuries, and after the Norman conquest it was granted to Tewkesbury Abbey. The grant of Llantwit to Tewkesbury Abbey is widely believed to have been by Fitzhamon (i.e. before 1107, and probably before 1104, when he left the country). He granted not only Llantwit, but also Llandough and Cardiff to Tewkesbury (an abbey refounded by Fitzhamon in 1092). The period between the grant of Llantwit to Tewkesbury and the end of the twelfth century includes the period of writing of the 'Life' of Illtud, with its descriptions of the *clas*, and also, probably, the construction of the Norman parish church.

Both the extant and investigated buried remains of the grange seem to show origins in the 13th century, and it appears likely that Tewkesbury had encouraged or permitted the continuation of the earlier management of the estate through the 12th century, but imposed a grange during the 13th. Substantial remains of the grange complex survive on the hill to the west of the church and Ogney brook (Figure 8; RCAHMW 1982, 299, Rodgers 1913, 1915; Nash William 1952).

By the 15th century much of the grange land was leased to various tenants and substantial information about its buildings and lands is provided by an account roll of the year 1449-50 (RCAHMW 1982, 299).

At the Dissolution, the estate (known as the Manor of West Llantwit) was sold in 1543 to Edward Stradling of St. Donat's for £183.13s.9d. From the Stradlings, the manor eventually passed to the Plymouth estate. The survey area formed part of the Manor of West Llantwit, held by the Plymouth Estate, when it was surveyed (GRO DPL/1-5) in 1766. Plymouth House (RCAHMW 1981, 151), of which the survey area was a garden, may have been the chief house of this manor for all or part of its post-medieval history.

Map Regression

The map of West Llantwit of 1766 (one of the Plans of the Earl of Plymouth's estates in Glamorgan surveyed by Edward John Eyre; GRO DPL-1) depicts the parcel now known as The Orchard as 'a4', an orchard, under pasture, with an area of 2r 24p (part of the lands of John Deer, '*a farm at Lantwit Major at rack*'. This map shows the stream slightly to the east of its present course in the northern part of the site and swelling to a substantial pond across almost the whole width of the enclosure immediately north of the road adjacent to the churchyard (Figure 5).

The tithe Map of c.1846 shows a stream course similar to that on the subsequent OS mapping.

The first edition 1:2500 OS (published 1877) provides a detailed plan of the parcel, suggesting continued use of the southern half as an orchard, but with parallel paths in the northern section suggesting use as a kitchen or market garden. The stream course is shown with a widening close to the central bend.

The first and second revisions of the 1:2500 (1899 and 1919) show no detail within the orchard and indicate the same stream course as the 1st Edition. More modern mapping depicts a narrow stream course throughout.

Survey layout

The survey was laid-out using a Trimble survey-grade RTK GPS system (5700 base station and 5800 rover). A temporary base-station was located near the northern margin of the area. The survey was staked out to design locations at 20m intervals of National Grid using the Trimble 5800 rover. The grid pegs were positioned to within 40mm of the relative design

location reported by the GPS. The survey was post-processed using the *datfixweek*, *convert-to-rinex* and *rinexweek* utilities, to produce rinex files from the logged GPS data and from the nearest 5 OS-Net stations, backdated to permit baseline process in *Trimble Geomatics Office*. The resultant GPS accuracy means that all grid locations are known to within 50mm.

Ground resistivity

The ground resistivity survey was undertaken with a Geoscan RM15 resistivity meter, operating a 'parallel twin electrode' configuration, employing two pairs (three electrodes) with 0.5m probe spacings placed at 0.5m centres on a PA5 frame, via an MPX15 multiplexer.

In this configuration, two datasets were acquired:

1. Using the outer probes, a mobile probe spacing of 1.0m give the predicted main component of the response from 1.0-1.4m depth. Data were collected with a 0.5m sample interval on 1.0m instrument traverses (i.e. the raw data has 1.0 x 0.5m node spacing).

2. Using the three probes as two pairs, a mobile probe spacing of 0.5m gives the predicted main component of the response from 0.5-0.7m depth. Data were collected with a 0.5m sample interval on 1.0m instrument traverses (i.e. the raw data has 0.5 x 0.5m node spacing).

The 20m grids were walked in zig-zag mode.

Data were downloaded from the instrument and collated using Geoscan Research's *Geoplot* software. Data processing was limited to one pass of the 'despike' function in Geoplot (to remove rogue points of poor ground contact), with radius set to 1 and a threshold of 3 standard deviations, using Gaussian statistics.

Data were then exported from Geoplot and imported to Golden Software's *Surfer*. The data were gridded by kriging to a node-spacing of 0.125m for production of the final, less pixelated, image.

Use of this report

The technique chosen for the survey, ground resistivity, was chosen because this tool can provide information on cut features and stone constructions in which the substrate and feature do not have markedly different magnetic susceptibilities but differ in texture (leading to different water retention).

Absence of detectable geophysical anomalies cannot be taken as indicative of the absence of archaeological features. All anomalies have been interpreted as far as possible, with contrasting possible interpretations given where appropriate. Geophysical techniques cannot provide an unambiguous evaluation of buried features. Where a higher degree of certainty is required, physical ground-truthing of any geophysical anomalies resolved by the survey will be required.

Results

There were no technical issues with either set-out or survey. Somewhat long vegetation slowed down the survey but does not appear to have had any major detrimental effect on the data quality.

The ground resistivity survey was of good quality, with relatively few points of poor ground contact, reflecting the good ground contact established in the damp vegetation.

The ground resistivity data are illustrated in figures 2 and 3 and their interpretation indicated on figures 4 and 7.

Interpretation

The interpretation of the geophysical survey is indicated on figures 4 (on a modern OS base) and 7 (on the 1st Edn OS base).

The stream bank shows two areas of raised ground, apparently formed of material cleared from the stream in recent times. Area 'a' is a persistent artificial levee. Immediately adjacent to spot indicated by the letter 'a' on the plan, this includes a large quantity of building stone, suggesting that clearance of the stream course has involved removal of the stone wall of the east bank (or its collapsed debris) and thus that the wall 'd' formerly continued at least as far north as the letter 'a'.

The surviving stone walling visible from the surface was mapped by RTK GPS and is indicated in orange on Figure 4 and labelled 'c' on the west side and 'd' on the east. These walls contain several courses of dry stonework and rise 300-400mm above stream level. The ground resistivity surveys clearly indicate narrow linear positive anomalies, interpreted as buried continuations of these wall, to the south. These are indicated as narrow gold lines on Figure 4 and labelled 'e' to the west and 'f' to the east of the stream.

A strong linear positive anomaly (Figure 4 'g') connects the area in which the stream broadens with the southwest side of the enclosure around The Barn. This is identifiable as a substantial stone structure, but that might interpretable either as a wall footing or a stone conduit or drain. No exit for a drain into the stream was, however, observed.

To the east of the stream, a substantial positive resistivity anomaly (Figure 4 'h') is visible on the eastern margin of the survey. This anomaly must represent a stony bank or wall and is coincident with the former property boundary (1st Edn OS; Figure 7) of what is now Tynant.

The central part of the survey area is traversed by a somewhat diffuse, but distinct, zone of elevated resistivity oriented northeast-southwest (Figure 4 'i'). This is likely to represent a buried deposit that is stonier than the areas to north and south.

In the southeast of the survey there is a zone (Figure 4 'j') including a very high resistivity area adjacent to the road and a more 'speckled' zone to the north, suggestive of stony material (much building rubble occurs at surface adjacent to the gateway) having been dumped into a wet area. The high groundwater level here is further indicated by an extremely low

resistivity anomaly (Figure 4 'k'), with a form suggestive of a waterlogged service trench.

To the north a narrow linear resistivity anomaly (Figure 4 'l') runs from close to the stream in the north, parallel to the eastern field margin, before becoming irresolvable after passing through the positive anomaly 'j'. The course of this anomaly suggests it may pass towards the inspection cover at 'm', but alternatively it might swing eastwards and be confluent with anomaly 'k'.

The large inspection covers at 'o and 'n' suggest a large drain passes through The Orchard along, or immediately outside the southwest margin of the survey area. The cover at 'm' has inlets from the northeast, suggesting a possible connection with anomaly 'l', despite a lack of geophysical evidence for a connection.

Discussion

The ground resistivity survey has, along with surface observation, revealed that parts of the stream channel are faced with stone walls, in particularly covering a length over which the stream turns and is altered from being very narrow to a lined channel several metres wide.

The 1766 Manor of West Llantwit estate plan depicts the southern part of the orchard as containing a pond. Trevelyan (1910, 107) identified the southern part of the survey area as the mill pond for the 'Abbot's mill':

> *'The garden of Plymouth House was the site of the Abbot's Tithe Barn, indicated by the ancient walls still standing, To the south of the garden and enclosed by its walls, was the mill pond, and below it, on the stream to the west of the Church, stood the Abbott's mill for grinding tithe and other corn. Below the mill was the Miller's house, which is still standing*.'

The thesis of a mill adjacent to what is usually described as the Chantry Priest's house (i.e. the house of the priest for the Raglan chantry) has more recently been taken up by George (2015). The arguments in favour of a small mill on the Ogney at this location are strong. George's article was illustrated by an extract from the 1766 estate plan showing the mill building straddling the stream, but only quotes Trevelyan's statement for the location of the pond. His argument is strengthened by the depiction of a pond on a different section of the 1766 plans (which he did not illustrate).

The pond is not well imaged by the resistivity survey, but the zone extending into the Orchard from College Street in the south by about 17m shows a very 'speckled' texture to the resistivity data. Such a texture may result from the dumping of coarse rubble into an area of very fine, wet, sediment. This texture becomes more 'solid' towards the southern field boundary, where a larger amount of building waste appears to have been dumped. Such a pattern is consistent with, but not diagnostic of, the infilling of a pond.

The relationship between the infilled area and the walling bounding the stream is partially obscured by areas of undergrowth as well as potentially having been damaged by later service trenches. To the west of the stream the walling is visible in the north of its distribution, lining the southern-most part of the narrow stream course before swinging to the west. At the southern end of the western bulge a line of visible stonework at low level appears to guide the stream back to the east, but the geophysical survey suggests a line of stonework continuing to the south and bounding the stream channel at a much higher level. It is unclear whether the low-level stonework within the broader channel is a separate phase, or whether there are two contemporary walls forming a stepped profile, or indeed whether the lower wall is simply an artefact of the evolution of the modern stream. The upper wall may be traced on the geophysical survey as far as some modern inspection covers that break its line just a few metres inside the southwest corner of the field.

To the east of the stream a similar set of features was observed, but here the amount of undergrowth has led to small breaks in geophysical coverage. The upper wall is not traceable so far south, but this does not necessarily imply its absence.

If the southern limit of the detected stonework on the east side of the stream is a real termination, then it is conceivable that the stonework is contemporary with the pond, but in this case the lack of stonework forming a northern boundary to the pond might perhaps be surprising. If the stone walls are to be interpreted as being associated with the pond, then this has implication that the 1766 plan must be very inaccurate, for it shows the stream course as lying close to the east side of the field. The 1766 plan is not a fully measured survey, and the details of the course of the stream would not really be pertinent to purpose of the plan, so a lack of accuracy is not necessarily to be viewed as unlikely.

It is possible to interpret the incomplete geophysical data as suggesting the eastern wall extends as far south as the western. Thus, although an early origin of the stream walling, contemporary with the pond, cannot be excluded, it would appear more likely the walling post-dates the backfilling of the pond. One reason for defining the stream course in such a manner might be to protect the easily eroded backfill of the pond. A potential reason for the change in stream width and profile defined by the walls is that the artificial widening and shallowing of the bed might have been designed to reduce flow rate over the ford that existed at the junction of College Street and Church Lane.

If the stone-walled stream course does indeed post-date the abandonment of the mill pond, then the accuracy of the 1766 plan requires further consideration. In the small space between the angle within the former eastern boundary of the field and the current stream course there are several linear anomalies on the resistivity data that could correspond to such a channel, but none has an entirely convincing southward course.

The central belt of slightly raised resistivity (Fig 4i) suggests a transverse zone of stonier ground. The coincidence of this zone with the line of the property boundaries to the east of the field is striking. This property boundary was in existence by the time of the 1766 plan. The positive anomaly (Fig 4i) might represent a buried field or enclosure bank on the same line as the wall to the east.

The significance of this boundary is that appears to provide a northern margin to the area from which ruins, allegedly of medieval age, were recorded in the 19th century. The name College has frequently been applied to these ruins and they therefore have a central place in some of the Iolo Morgannwg-derived myths of early Llantwit Major.

Freeman (1858) reported that:

> *'There are traces of buildings called collegiate, and a small portion of what is said to have been a cloister in a garden adjoining the whole extent of the northern wall of the church-yard.'*

The first edition OS 1:2500 of 1877 labels these ruins 'Côr Tewdws'

Trevelyan (1910, 105) described them as follows:

> *'about fifteen years ago the ivy-covered walls and archway of the ruins formed an interesting memorial of the past and the demolition of it was an act of destruction which should have been prevented,…*
> *A very old cottage stood on one part of the college ground, and behind it, another very delapidated dwelling bordered the brook, where a new house now stands.'*

Rodgers (1915, 150) also described finds in that area, but described them as Roman, not medieval:

> *'Some twenty years ago remains of Roman buildings were uncovered on the north side of the church, outside the churchyard walls',*

Williams reports a 1941 address by Hughie Andrews as saying:

> *'In College Terrace, where this stands, was a ruin known as Cock's tower*.'

The area interpreted as the core of the medieval village lies higher up the slope to the east, in the area around the later Town Hall. If the ruins close to the church are indeed medieval, then a role more closely associated with the church or grange would be likely. Their apparent architectural complexity (with mentions of towers and cloisters) also hints at something more elaborate than vernacular housing.

Figure 8 shows a very tentative interpretation in which these ruins might be enclosed within the outer boundary of the Grange complex, continued from its course adjacent to the buildings excavated by Nash Williams in 1937, traversing the valley floor along the line of the possible bank (anomaly Fig 4i) and around the post-medieval boundary surrounding the ruins of 'The College'. The width of the positive resistivity anomaly in The Orchard (approximately 5m) compares favourably with that recorded by Nash Williams in the northern part of the main Grange enclosure (the stone facing wall and bank together were approximately 4m wide).

Such an arrangement would imply that the pond for the mill was created within the grounds already enclosed for the Grange. The stone walling lining the present stream is likely to date from the period of disuse of the pond, the laying-out of a new garden and the construction of The Barn (there was no structure on this in 1766, but it is possible ruins of an earlier structure survived within the orchard as suggested by tradition) as a redesign of the grounds of Plymouth House, at some date 1766x1844.

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Figure Captions

Figure 1. Location of survey area. Dotted line gives the limits of the ground resistivity survey. North to top. Map coordinates given on margins are National Grid coordinates in metres. Displayed on OS MasterMap raster basemap.

Figure 2. Ground resistivity data. Instrument with 1m mobile probe spacing. Greyscale 15Ω measured resistance (black) to 40Ω measured resistance (white). Map with NG coordinates given on margins. Displayed on OS MasterMap base.

Figure 3. Ground resistivity data. Instrument with 0.5m mobile probe spacing. Greyscale 18Ω measured resistance (black) to 56Ω measured resistance (white). Map with NG coordinates given on margins. Displayed on OS MasterMap base.

Figure 4. Interpretation of ground resistivity data. For key see text. Map with NG coordinates given on margins. Displayed on OS MasterMap base.

Figure 5. Georeferenced boundaries as depicted on the 1766 Estate Map of West Llantwit (GRO DPL/1)

Figure 6. 1st Edition 1:2500 OS mapping of 1877.

Figure 7. As Figure 6, but with interpretation of geophysical survey superimposed.

Figure 8. Tentative interpretation showing known features of the medieval grange, the former ruins known as 'The College' and their relationship to the present site. The possible buried bank (anomaly Fig 4i) in The Orchard is coloured gold. The stream course, pond and mill are shown as on the 1766 estate plan (GRO DPL/1). Displayed on OS MasterMap base.

Figure 1

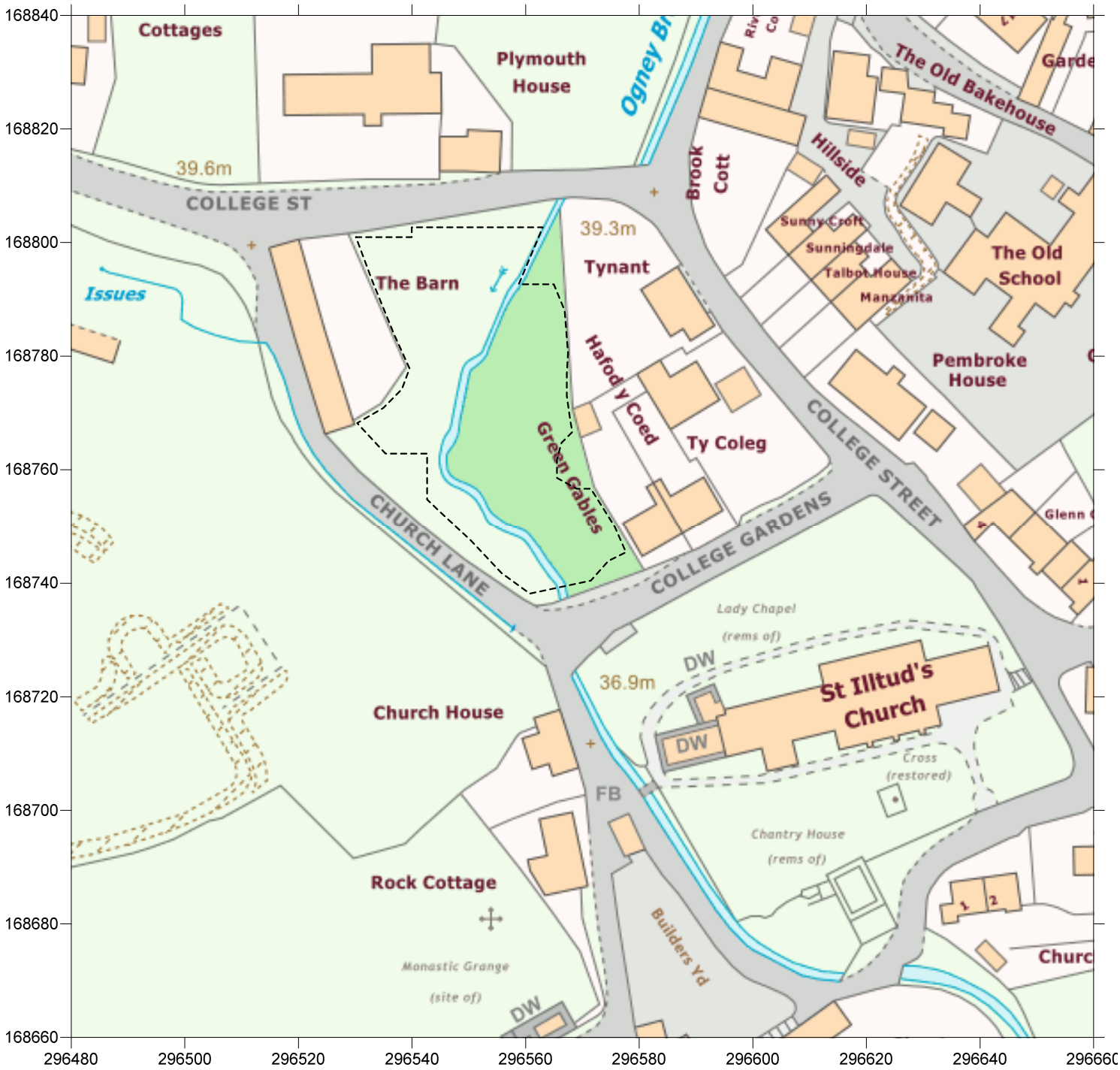

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Figure 2

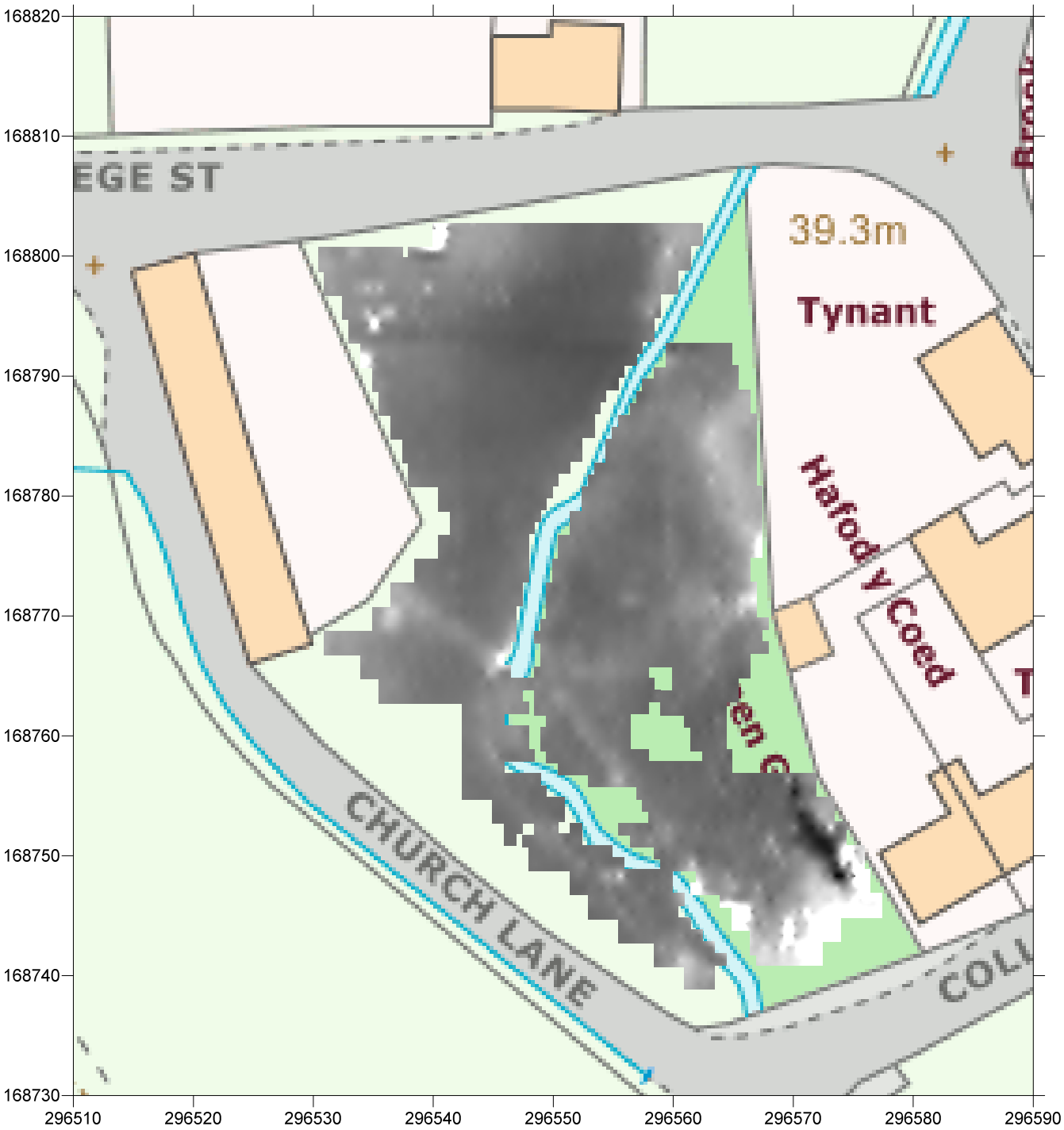

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Figure 3

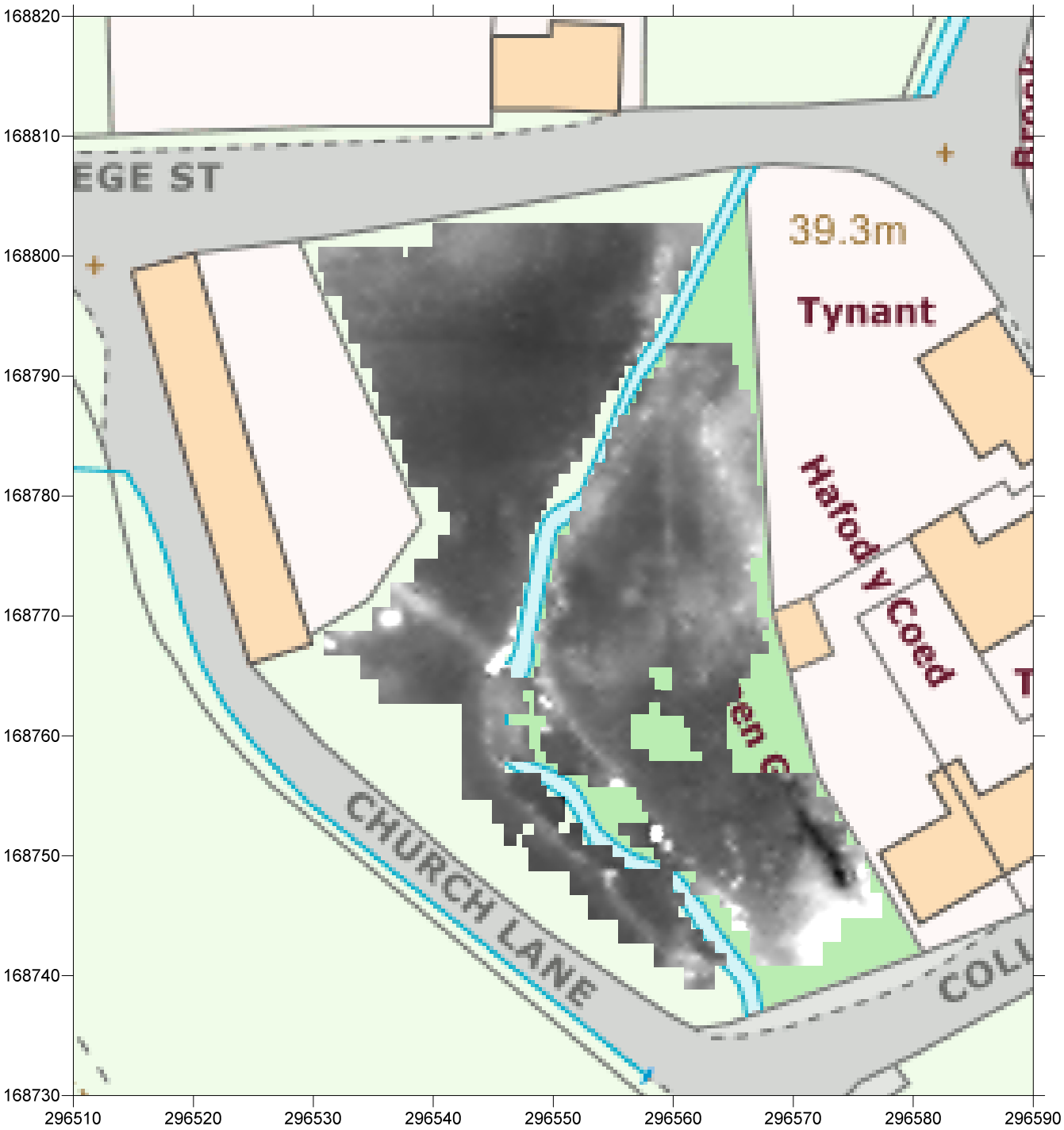

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Figure 4

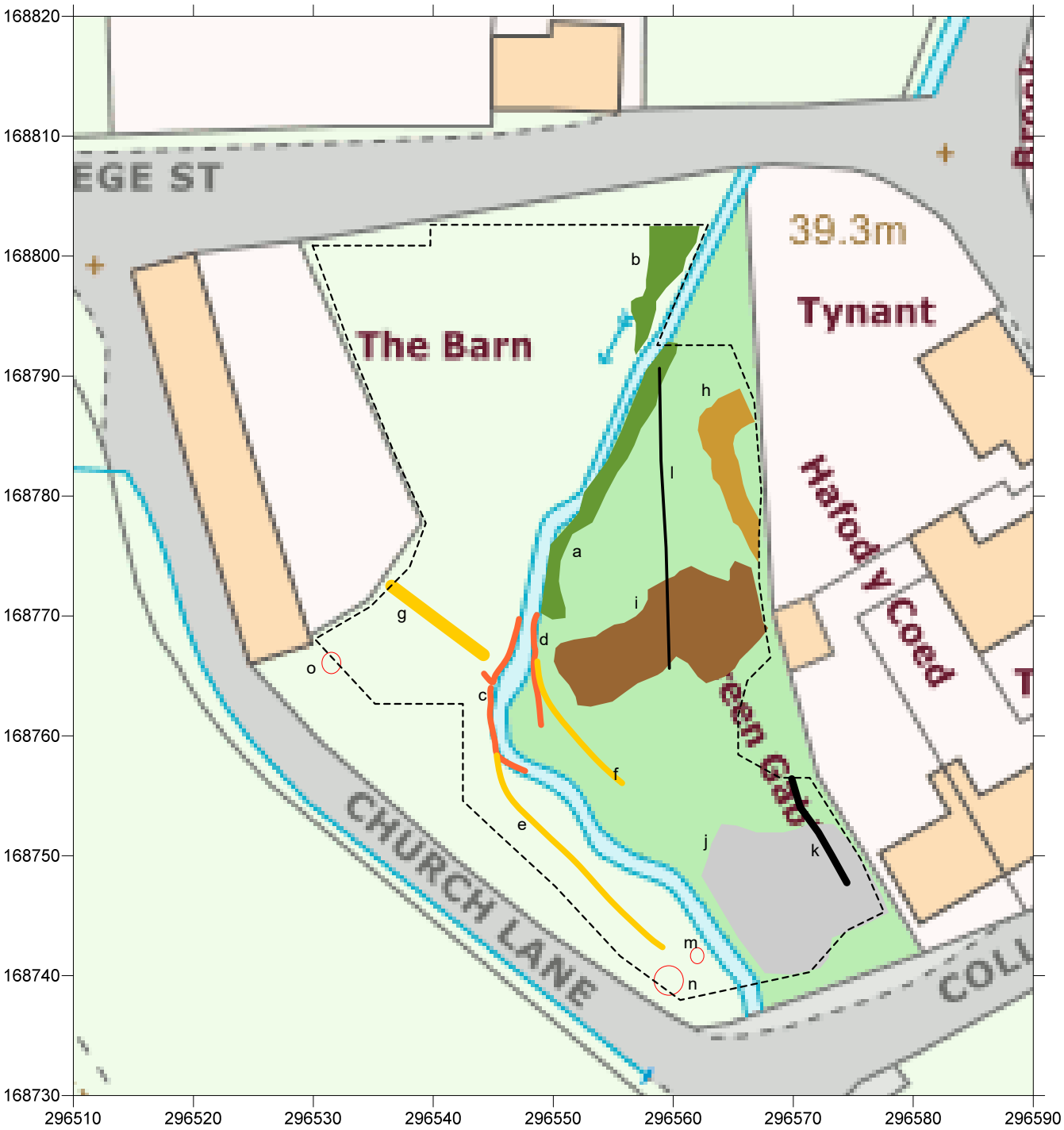

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Figure 5

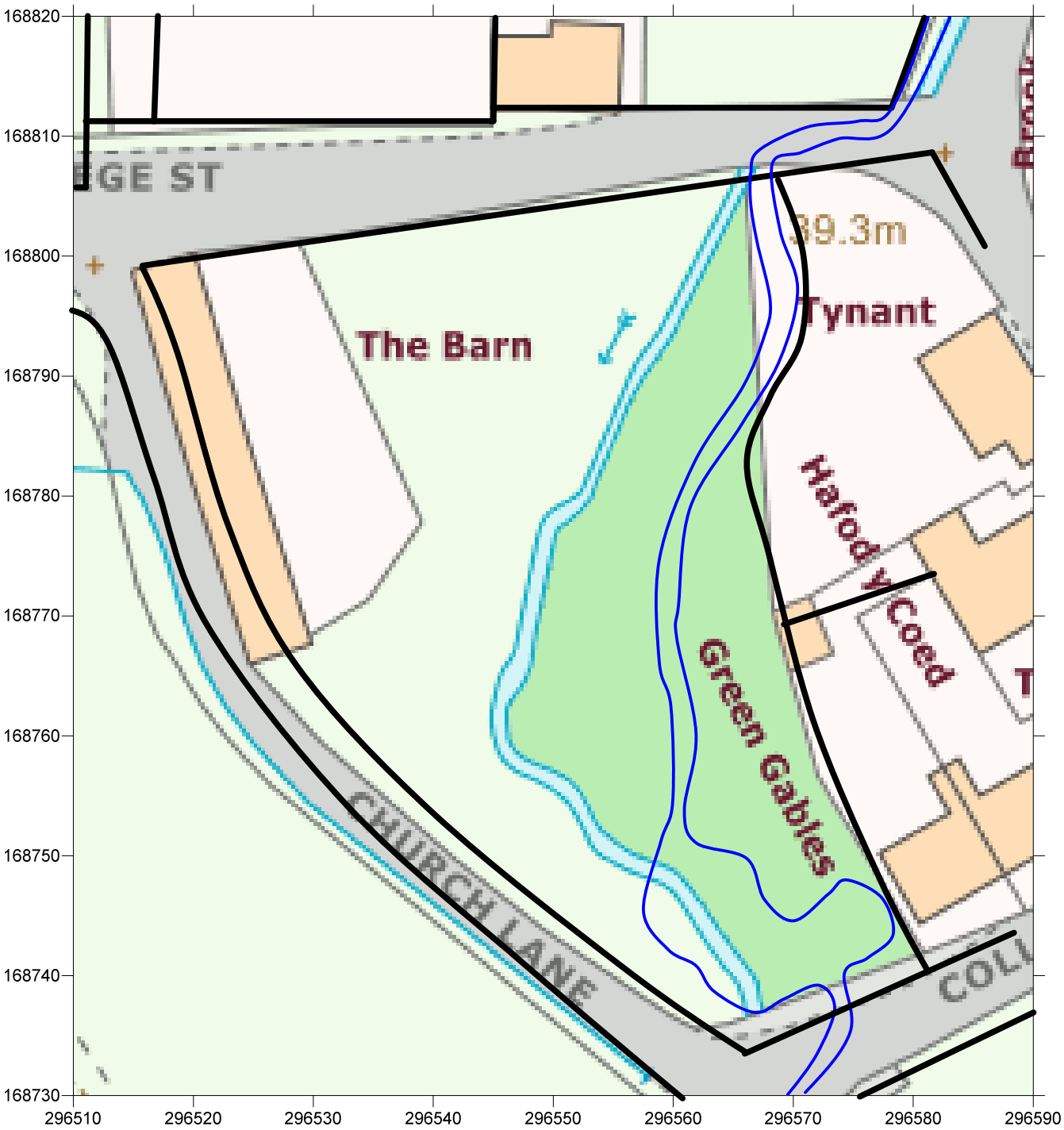

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Figure 6

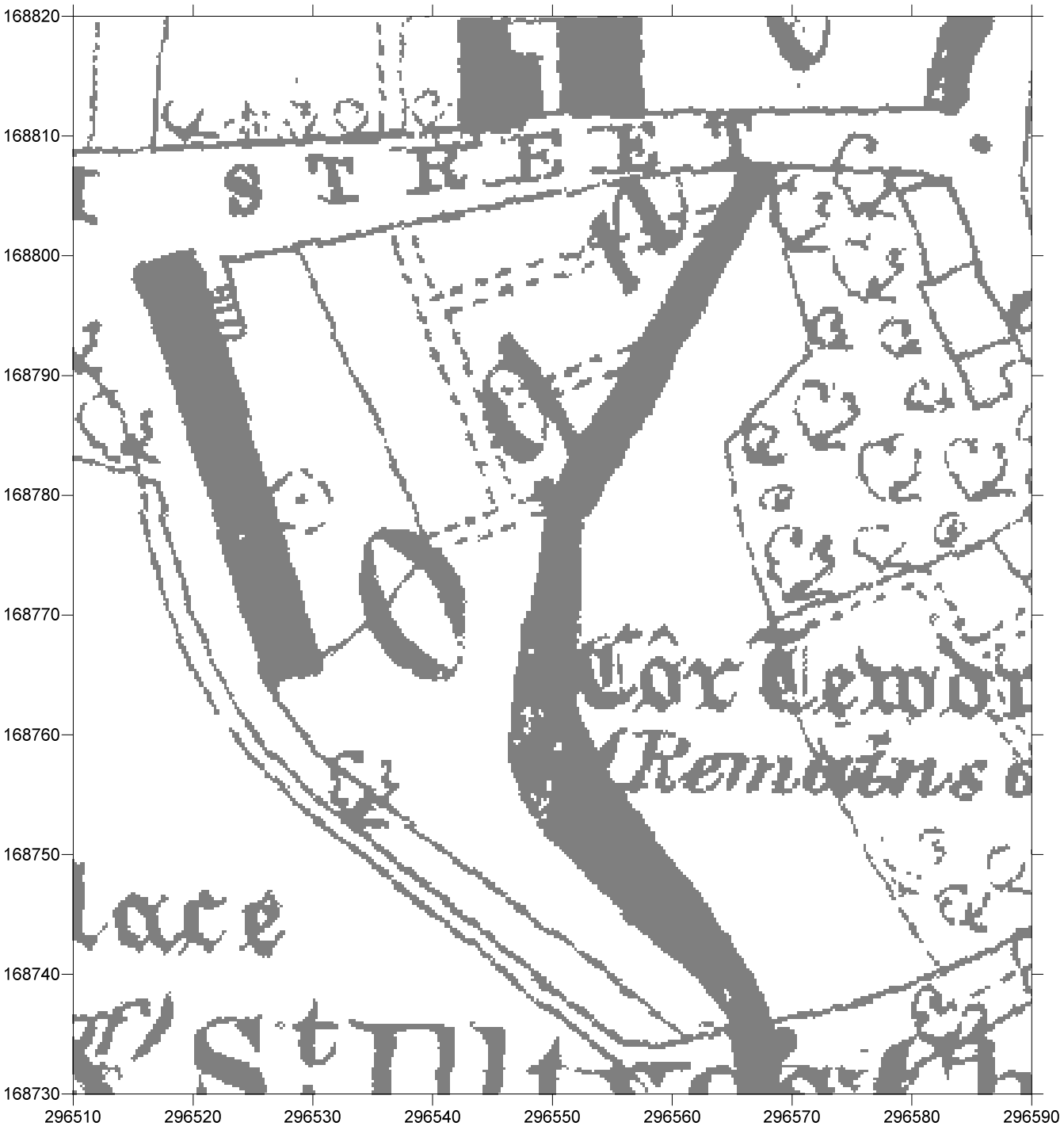

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Figure 7

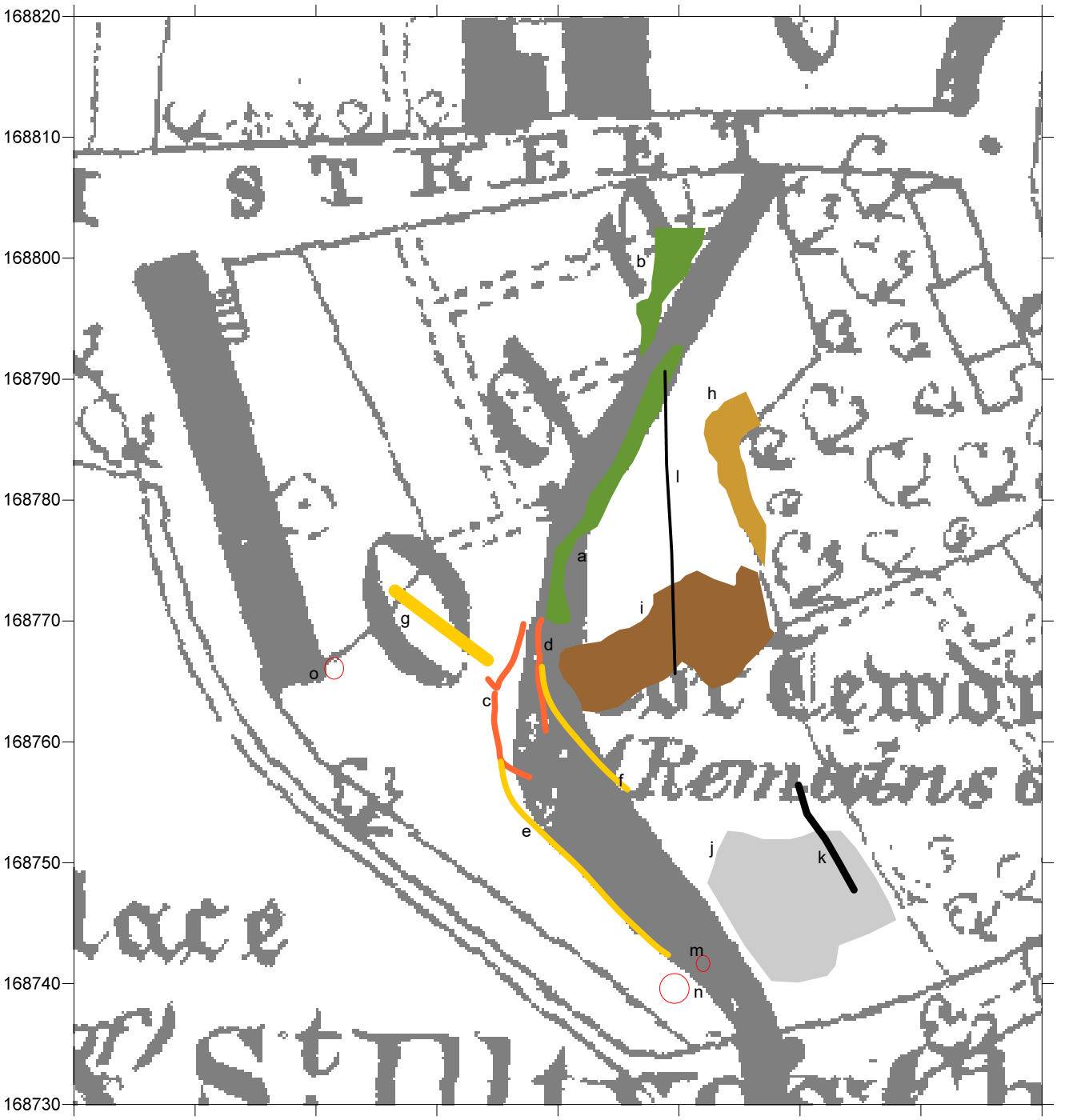

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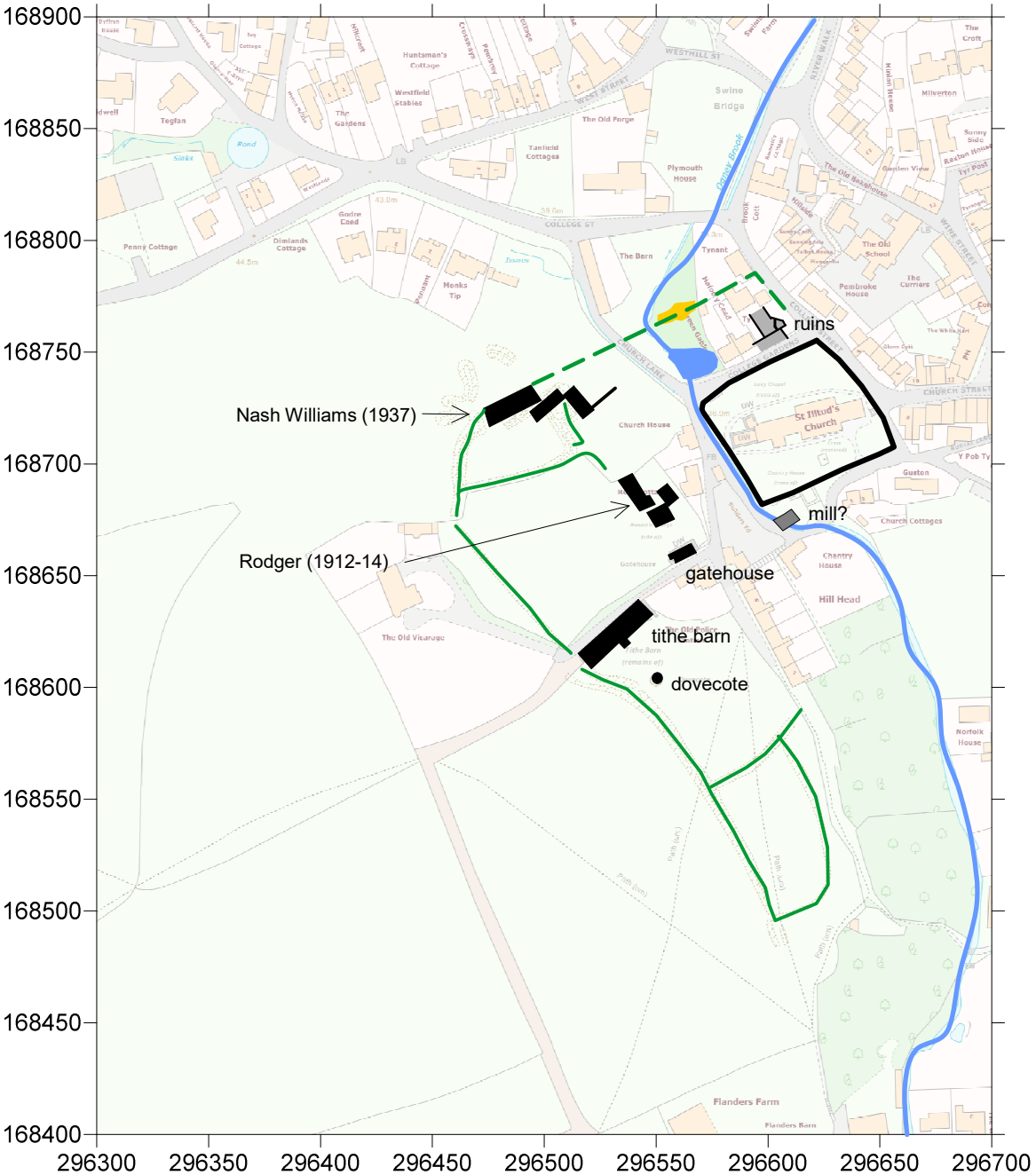
Figure 8



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