

Desk Based Assessment:

Land to the west of Kelham, Nottinghamshire

September 2023



Report No. 2027

by

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Prepared for Sirius Planning

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Summary

In September 2021, Archaeology England Ltd was commissioned by Sirius Planning Ltd to carry out an Archaeological Desk Based Assessment and site visit to determine the archaeological potential of land located to the west of Kelham, Nottinghamshire (NRG SK 76640 55525).

It is recognised that the River Trent floodplain was inhabited during prehistory. Furthermore, Roman occupation of the area away from the floodplain – west of Kelham – is also evidenced and imprinted on the land in the form of numerous cropmarks recorded by the National Mapping Programme and by previous geophysical initiatives. While the date and function of many cropmarks has yet not been proven, their value must be considered as a whole as they represent the remains of past landscapes. Therefore, the value is likely to be High. The cropmarks are present within the proposed development area. It is therefore necessary to understand their nature and character (through non-intrusive and intrusive initiatives) to be able to define a project design that advocates preservation in situ.

The proposed development does not have any direct or indirect impact on Scheduled Monuments. The impact of the proposed development on Averham Conservation Area and its listed buildings is considered Negligible. Kelham Conservation Area borders the proposed development area and, without mitigation, indirect impacts to the Kelham Conservation Area and its listed buildings is possible. The magnitude of the potential impact is therefore considered Moderate. Suitable mitigation measures should be drawn through the results obtained during the production of a Heritage Impact Assessment.

1. Introduction

- 1.1.1 In September 2021 Archaeology England Ltd was commissioned by Sirius Planning Ltd to carry out an Archaeological Desk Based Assessment and site visit to determine the archaeological potential of land located to the west of Kelham, Nottinghamshire (NRG SK 76640 55525) (Figure 1-2)¹.
- 1.1.2 The purpose of the Desk Based Assessment (DBA), which is detailed in the following report, is to provide the Local Planning Authority with the information they have requested in respect of the proposed development, the requirements for which are set out in Paragraph 189 of the National Planning Policy Framework (NPPF 2023). The work is to highlight and assess the impact upon standing and buried remains of potential archaeological interest and to ensure that they are fully investigated and recorded if they are disturbed or revealed as a result of subsequent activities associated with the proposed development.

2. Site Description and Development Plans

- 2.1.1 The proposed development site is situated west of Kelham and to the north of Averham. It measures c. 71 hectares, and it is bounded to the north and northwest by a series of rectangular fields adjacent to Kelham Hills, to the west by open fields, to the south by Averham, and to the east by Kelham. The site is divided into four large fields with linear boundaries (Figure 1-2).
- 2.1.2 The underlying geology is defined by Triassic Rocks – mudstone, siltstone and sandstone formed during the Triassic Period. No superficial soils are recorded for this area (BGS 2023). However, some understanding is gathered through available borehole data which note that the superficial deposits comprise of sand with occasional graves – part of the Holme Pierrepont Sand and Gravel Member (Sirius Environmental 2021).

¹ The present report was revised in September 2023 taking into consideration new Project Design.

- 2.1.3 The proposed development consists of a solar farm and battery energy storage system. The current project design can be viewed on Figure 14 of the present report².

3. Methodology

- 3.1.1 The primary objective of this Desk Based Assessment is to assess the impact of the development proposals on the historic environment. This will help inform future decision making, design solutions and potential mitigation strategies. The aim is to make full and effective use of existing information in establishing the archaeological significance of the site, to elucidate the presence or absence of archaeological material, its character, distribution, extent, condition, and relative significance.
- 3.1.2 The work includes a comprehensive assessment of the regional context within which the archaeological evidence rests and aims to highlight any relevant research issues within national and regional research frameworks.
- 3.1.3 This report provides information of sufficient detail to allow informed planning decisions to be made which can safeguard the archaeological resource. Preservation in situ has been advocated where at all possible, but where engineering or other factors could result in the loss of archaeological deposits, preservation by record has been recommended.
- 3.1.4 This assessment considers the following:

The nature, extent, and degree of survival of archaeological sites, structures, deposits and landscapes within the study area through assessment of various readily available primary sources:

Collation and assessment of all relevant information held in the regional HER within 1km radius of the proposed development site (Figure 2).

² Current design – September 2023.

Collation and assessment of the impact on all designated archaeological sites within 1km radius (Figure 2).

Assessment of all available excavation reports and archives including unpublished and unprocessed material affecting the site and its setting.

Assessment of aerial photographic (AP) and satellite imagery evidence.

Assessment of archive records held at the County Archive.

Records held by the developer e.g. bore-hole logs, geological/geomorphological information, aerial photographs, maps, plans.

Map regression analysis using all relevant cartographic sources e.g. all editions of the Ordnance Survey County Series, Tithe and early estate maps (as available).

Place-name evidence.

Historic documents (e.g. charters, registers, estate papers)

The significance of any remains in their context both regionally and nationally and in light of the findings of the Desk Based study.

- 3.1.5 In assessing the value of archaeological assets, and the potential impacts upon them by the proposed development, the terms and guidance used in the Design Manual for Roads and Bridges, Volume 11, Section 3 (Highways England 2007) has been utilised. Values are given as:

Very High (World Heritage Sites and other sites of international importance);

High (Scheduled Monuments, undesignated assets of schedulable quality, assets of National importance that can contribute significantly to acknowledged national research objectives);

Medium (Designated or undesignated assets of Regional importance that contribute to regional research objectives);

Low (assets of local importance, assets compromised by poor preservation or poor survival of contextual associations);

Negligible (assets with little or no surviving archaeological interest);

Unknown (the importance of the resource has not been ascertained).

- 3.1.6 The magnitude of the potential impact on the archaeological assets (which can be either positive or negative), is given as:

Major (change to most or all key archaeological materials, such that the resource is totally altered; comprehensive changes to setting);

Moderate (changes to many key archaeological materials, such that the resource is clearly modified; considerable changes to setting that affect the character of the asset);

Minor (changes to key archaeological materials, such that the asset is slightly altered; slight changes to setting);

Negligible (very minor changes to archaeological materials, or setting);

No Change

- 3.1.7 This work conforms to the Standard and Guidance for Historic Environment Based Assessment, as produced by the Chartered Institute for Archaeologists (CIfA 2020).

4. Archaeological and Historical Background

4.1 Historic Environment Records (Figure 3 and 6; Appendix III)

- 4.1.1 A total of 249 HER records have been retrieved from within the assessment area (see Appendix III, Figure 3), twelve of which lie within or adjacent to the proposed development area (Table 1). A large concentration of entries corresponds to the results obtained by the National Mapping Programme (NMP) carried out by Historic England (see Figure 6).

4.1.2 Other valuable sources of information for the present report are found on a series of non-intrusive and intrusive works carried out within the bounds of Kelham Hall (see Evans 2017, Lane 2020).

4.1.3 The work carried out by Phoenix Consulting Archaeology Ltd at land of Flash Farm, Averham is also of particular significance not only as it conducted work adjacent to the western boundary of the proposed site but also because it targeted cropmarks which are directly associated with the proposed development area (see Edwards et al 2015).

4.1.4 The following HERs are located within/adjacent to the proposed site:

Table 1: HERs within proposed development site.

MI_PRINX	Mon UID	Pref Ref	Name	Period
8316	MNT2937	L2958	Enclosures At Kelham	Unknown
6271	MNT17089	M8317	Roman Settlement at Averham	Roman
13658	MNT8238	L8317	Cropmark Complex at Averham	Unknown
15210	MNT9643	L9740	Enclosures At Kelham	Unknown
4298	MNT14309	M2959	Settlement At Kelham	Unknown
4423	MNT14460	M3242	Well At Kelham	Unknown
4424	MNT14461	M3243	Well At Kelham	Unknown
6273	MNT17090	M8320	Settlement At Kelham	Roman
8317	MNT2938	L2959	Cropmark Complex at Kelham	Unknown
8621	MNT3212	L3242	Map Depiction of Well At Kelham	Unknown
8622	MNT3213	L3243	Map Depiction of Well At Kelham	Unknown
13662	MNT8241	L8320	Cropmark Complex at Kelham	Unknown

4.1.5 The following account introduces the HER records integrated within the assessment area in chronological order.

Prehistoric: Palaeolithic (c.450,000 –10,000 BC), Mesolithic (c.10,000 –4400 BC), Neolithic (4400 BC –2300 BC), Bronze Age (2300 BC – 700 BC)

4.1.6 Human activity dating to these time periods is likely to be concentrated along the banks of the River Trent and its floodplains.

- 4.1.7 A total of 17 records are contained within the HER results dating to prehistoric periods.
- 4.1.8 The earliest sets of evidence date to the Palaeolithic – see L12050 and L5686. The latter records a flint implement found in a recently ploughed field, while the former represents part of a flint assemblage recovered during fieldwalking at Staythorpe, Averham.
- 4.1.9 All entries documenting Mesolithic activity within the assessment area are also defined by flint assemblages. A number of worked flints were recovered during a series of works associated with the replacement water main between Newark and Kelham (see L11345-6). Furthermore, the HER records a number of flints recovered from fieldwalking 900m northeast from the site as well as an assemblage retrieved during a field evaluation at Staythorpe (see L11721).
- 4.1.10 A total of nine entries document finds dating to the Neolithic. For instance, L3122 documents a Langdale axe found around 450m to the east of the proposed development. A further two axes are also recorded 450m to the east of the site –L3121- and 700m WSW from the site –L8313. A leaf shape arrowhead of Early Neolithic date was found 500m southeast of the site.
- 4.1.11 A total of three entries characterise flint assemblages within the assessment area recovered during fieldwalking: L11856, L1114 and 11340. One final entry describes pottery fragments recovered during a field evaluation at Staythorpe –L12132.
- 4.1.12 There are two entries recording Bronze Age activity. The first entry –L3182- documents a near complete Hallstatt bronze sword, whilst two antlers several and several timbers were found within a paleochannel around 1km south from the site.

Iron Age (700 BC –AD 43) and Roman (AD 43 –c. AD 410)

- 4.1.13 The Trent Valley was densely occupied during the Roman period. Two settlements are confirmed close to Kelham: South Muskham and Lamb

Close. Evans (2017) highlights that further Roman settlement may be found west of Kelham Hall where the land is less susceptible to periodic flooding.

- 4.1.14 A total of 13 records belong to the Iron Age and Roman periods. Two records are contained within the site: M8320 and M8317.
- 4.1.15 M8320 documents a series of cropmarks observed in aerial photographs within the northeast region of the proposed development area. These include a square enclosure, a linear feature and a possible circle (see Section 6 for further detail). Similarly, M8317 documents a series of cropmarks within the development area, recorded as possible Roman settlement – M8317. These features have been documented by the Nottinghamshire NMP and documented in Figure 6.
- 4.1.16 Assemblages dating to the Roman and Iron Age periods have been found during a number of fieldwalking initiatives, including L11858, L11145, L11339 and L11346.
- 4.1.17 Further evidence has been recorded during the examination of aerial photographs. M2966 and M2968 record a number of cropmarks corresponding to enclosures, pits and other features presumed to be of Iron Age and Roman date.
- 4.1.18 An assemblage of Roman and Iron Age pottery was recovered during the construction of the Averham relief Road –L12134, L11863, L11722.

Early Medieval (c. AD 410 –AD 1086) & Medieval (1086 –1536)

- 4.1.19 A total of 17 records of medieval date were retrieved within the assessment area. The majority of the records correspond to finds assemblages recovered during fieldwalking. These include L11859, L11155, L11153, L11342, L12356, L11347, L3109, L11723 and L12133.
- 4.1.20 The records also document a watermill –M3447, the chancel screen at the church of Kelham –L9879 and the listed structure of Church of St Michael - L3157.

- 4.1.21 It is also worth mentioning that medieval activity within the area is represented by evidence of ridge and furrow, identified in areas such as within Kelham Estate (see Lane 2020) and in LiDAR Imagery (see Figure 8).
- 4.1.22 Kelham Hall may have originated as a manor in the medieval period, however land ownership here was fragmentary, and there is no mention of a house until the mid-17th century and the Civil War.

Post-Medieval (1536 –1899) and Modern (1900-)

- 4.1.23 A total of 56 records document post-medieval and modern activity within the search area.
- 4.1.24 A large number of records document features (e.g. former farms, bridges) within the assessment area observed in historic map editions. These include: L3233, L3244, L3245, L3246, L3247, L3448, L3449, L3450, L3453, L3475, L3476, L3482, L5639, L5671, L5671.
- 4.1.25 The HER also records find assemblages recovered during non-intrusive and intrusive initiatives including: L11115, L11597, L11860, L11865.
- 4.1.26 The HER records multiple entries of modern date largely within Averham. These relate to map depictions documenting the presence of a sawpits – L3450- weirs–L3436 , and glasshouses among other (e.g. L3453 and 3455).
- 4.1.27 A number of entries relate to Kelham Hall, including the Hall itself –M13970 – a glasshouse – L3247 – and two pillboxes – L10523-4. The historic significance of Kelham Hall as well as a first assessment of the possible impact that the development may have on it and its associated structures is offered below.

4.2 Portable Antiquities Scheme

- 4.2.1 The following finds are recorded within the assessment area:

Table 2: PAS within assessment area.

id	Object type	Period	Description
896520	Seal Matrix	Medieval	An incomplete Medieval lead seal matrix, dating from AD c.1200-1300. The seal is pointed oval in shape, with an integral attachment lug at one end, which has broken. The front face has an inscription running around the edge of the oval. The inscription reads + SILL' ALICIE BRVN (Seal of Alice Brown). In the centre there is a lozenge-shaped border, inside of which is a fleu de lis. The reverse is flat and undecorated and uninscribed. Length: 35.7mm; Width: 25.1mm; Thickness: 4.3mm; Weight: 23.76g
185368	Weight	Medieval	Medieval weight; Cast lead shield-shaped weight with lion rampant design, dated to the 13th-16th centuries. The weight is flat, with a narrow border decorated with incised, hatched lines, surrounding a raised inner shield-shape with a skinny lion rampant, facing left, cast in relief. The weight has a small, rectangular hole pierced through it above the lion's head. The design is very worn. The metal has a thick, white- grey patina over its surface. Length 49.9mm, width 35.3mm, thickness 9.9mm, weight 106.2g

4.3 Scheduled Monuments (Figure 5)

4.3.1 No Scheduled Monuments (SM) are located within the boundaries of the proposed development. One SM is located within the applied search area: Averham Moat and Enclosure (SM 1017687).

4.3.2 The legal listing text highlights that:

“The monument includes the moated site of Averham manor and the adjacent enclosure which extends to the south-east. Earthworks visible in the ploughed field to the south-west, and concentrations of brick further to the

south-east, indicate the existence of a second enclosure and probable building remains. However, the extent and survival of these additional features is not sufficiently understood for them to be included in the scheduling. The moat includes a rectangular island measuring 12m from north-west to south-east by 69m from north-east to south-west. Enclosing it is a steep- sided ditch, 3m deep and varying between 8m and 9m wide. The ditch levels out near the south corner, indicating a bridging point leading from the enclosure to the south-east. The visible remains of this enclosure consist of two parallel banks of which the south-western is the best preserved. It is roughly 2m wide by 100m long and projects south-eastwards from the south end of the moat. The second bank lies c.70m to the north but has been disturbed by the creation of the gardens behind the houses on Church Lane. Only its south-east end is now visible, projecting into the paddock adjacent to the two houses. The remains of domestic or ancillary buildings will survive in this enclosure and on the island. All boundary fencing and garden fixtures are excluded from the scheduling, but the ground beneath is included.” (HE 1992)

4.4 Listed Buildings and Conservation Area (Figure 4, 9-11)

- 4.4.1 There are 21 listed buildings within the assessment area. No listed structures are located within the boundaries of the proposed development. A full listing of the structures can be found below.
- 4.4.2 The proposed development site is adjacent to Kelham Conservation Area. Its western boundary runs north/south and integrates the Oak plantation. Further south it turns to the east and integrates Kelham Hall and its associated garden and features (see table below), moving east and crossing the River Trent. It then runs north encompassing Kelham Bridge and goes to the west close to Trentside Farm to reach once again the easternmost boundary of the proposed site.
- 4.4.3 Key to the Conservation Area is Kelham Hall (Grade I LB 1045982). Prior the development of the estate, Kelham would have been characterised by a

scatter of farmsteads with a small village core. At the time Averham was influential as well as the Sutton family which had links with the area since the 12th century. The Suttons gradually acquired land in Kelham but the first hall was only constructed in 1663 (Beresford 2019).

- 4.4.4 Robert Sutton was a supporter of Charles I during the Civil War. This led to him becoming Robert Sutton 1st Lord of Lexington. After the Civil War, his manor in Averham had been destroyed and that led to the construction of the first hall at Kelham. However, in 1728 it was destroyed by a fire and subsequently rebuilt for Bridget the Duchess of Rutland. She married John Manners and the family name got combined: Manners-Sutton (ibid.).
- 4.4.5 The third hall was built by the Victorian architect S George Gilbert Scott after the second hall was destroyed again by a fire in 1857 (HE 1990).
- 4.4.6 The Manner-Suttons left the premises in 1902, and the estate was purchased by the Home Grown Sugar Beet Company. From 1903, the hall was used as a theological college for the Society of the Sacred Mission until 1977. After that, the hall was acquired by the Newark and Sherwood District Community. In 2009 the hall became privately owned and was converted into a hotel and venue (Beresford 2019).
- 4.4.7 At present Kelham Hall is a Grade I listed building which retains many of its original features and subsequent extensions (e.g. west wing). There are many other listed structures within the complex, including the former monastic buildings on the west side of the Hall (LB 1045944), the gazebo, seven garden urns and the garden boundary walls to the east of the Hall (LB 104583, 1178868, 1045984).
- 4.4.8 The southernmost end of the proposed site is located some 150m north of Averham Conservation Area. The ZTV model carried out for this report suggests slight intervisibility between the site and the conservation area (Figure 9). However, this suggestion was questioned with the results obtained during the site visit (see Section 7).

Table 3: Listed Buildings within assessment area.

Id	Name	Grade
1045944	Former Monastic Buildings Adjoining Kelham Hall	II
1045982	Kelham Hall	I
1045983	Gazebo And Garden Wall at Kelham Hall	II*
1045984	Garden Boundary Wall at Kelham Hall	II
1045985	Blacksmith Cottage	II
1045986	4,6,8, Blacksmith Lane	II
1045987	Farm Buildings at Home Farm	II
1045988	Kelham Bridge	II
1046005	Yew Tree Cottage	II
1046006	Rectory Cottage	II
1046007	The Old Rectory	II
1046008	Church Of St Michael	I
1178868	Seven Garden Urns at Kelham Hall	II
1178929	Stable At No 6	II
1178966	Thirty-Six Railing Piers at Kelham Hall	II
1178972	Manor Farm House	II
1302194	6, Main Street	II
1302213	Church Of St Wilfrid	I
1369954	Lych Gate at Church Of St Michael	II
1369983	Railing And Gate at No 6	II
1369984	Lodge And Gateway at Kelham Hall	II

4.5 The Historic Landscape

- 4.5.1 The proposed site is not located within any Conservation Area, Registered Park and Garden or Registered Historic Landscape.
- 4.5.2 The Newark and Sherwood Landscape Character Assessment includes the proposed development site within the Trent Washlands –TW11.
- 4.5.3 The Trent Washlands are defined by flat large scale intensive arable lands with medium/large semi-irregular fields. Some smaller fields are located near the villages. They include former mineral extraction areas now used as ponds which are usually accompanied by tree planting on the periphery.
- 4.5.4 The HLCA highlights that the time depth of the landscape has been degraded by intense farming, transport routes and mineral extraction. However, the historic settlement and historic parkland around Kelham Hall

have been conserved. It is encouraged to restore some of the traditional patterns of hedge boundaries as well as the intensification of tree cover.

5. Mapping Surveys (Figure 6-8)

5.1 Map Regression

Old series Ordnance Survey maps of England and Wales] / engraved by Benjamin Baker & Assistants ; printed by Ramshaw 1805

- 5.1.1 This map edition offers a view of the proposed site and its surroundings prior the field enclosures characteristic of the first half of the 19th century and also at a time prior the construction of Kelham Hall (Grade I LB 1045982).
- 5.1.2 The formal gardens and the church appear located between the western bank of the River Trent and the current A617. Some dwellings are depicted to the north of the hall's parkland.
- 5.1.3 The Oak plantation located immediately west of the hall is already documented on this map edition as well as Cottage plantation. Further plantation is observed at the bottom of Kelham Hills. A path crosses the proposed development area on a roughly east to west direction.

OS County Series 1886 1:2.500 and subsequent map editions (Figure 7)

- 5.1.4 Substantial changes are documented on this map edition. Firstly, Kelham Hall is already depicted to the north of St Wilfrid Church. However, most importantly the proposed development site has at this point been subdivided into multiple rectangular plots.
- 5.1.5 Field 1 (see Figure 2 and 7 for comparison) has been subdivided into nine fields. Field 3 into 5 and Field 2 into 7. A virtually identical situation is found in all subsequent map editions up until the 1970s when the current

boundaries are documented for the first time, resulting from the transformation of the landscape due to intensive farming.

5.2 Aerial Photographs

- 5.2.1 Both Historic England and the Cambridge University Collection of Aerial Photography (CUCAP) hold aerial photographs of the proposed development and its surroundings. As noted during the examination of the HER records, these collections have been used to map out archaeological features known to exist around the site, defining the historic landscape of the area. The photographs described below document a number of features of potential archaeological origin within the boundaries of the proposed site.
- 5.2.2 CUCAP BTJ25: Oblique black and white photograph evidencing multiple parallel lines (probable drains) overlaying two parallel linear features and multiple rectilinear enclosures. The cropmarks evidenced are recorded in the HER as M2959 (see Figure 3), and as part of the NMP (see Figure 6). The cropmarks are included within Field 2 (Figure 2).
- 5.2.3 CUCAP RC8HBO68 and RC8HBL040: Oblique black and white photographs evidencing square enclosure, linear features and possible a circular feature. The cropmarks evidenced are recorded in the HER as M8320 and M16958 (see Figure 3), and as part of the NMP (see Figure 6). The cropmarks are included within Field 1 (Figure 2).
- 5.2.4 CUCAP BTJ20, AH054 and YV24: Oblique black and white photographs evidencing square enclosures, linear features and possible a square feature. The cropmarks evidenced are recorded in the HER as M8317 (see Figure 3), and as part of the NMP (see Figure 6). The cropmarks are included within Field 1 (Figure 2).
- 5.2.5 CUCAP BZF21: Oblique black and white photographs evidencing square enclosure, linear features and possible a circular feature. The cropmarks

evidenced are recorded in the HER as M8316 (see Figure 3), and as part of the NMP (see Figure 6). The cropmarks are included within Field1 (Figure 2).

5.3 National Mapping Programme

- 5.3.1 Historic England National Mapping Programme has been key in mapping the landscape development of certain areas over time, taking into consideration tools such as aerial photographs and LiDAR imagery.
- 5.3.2 The NMP has successfully documented concentrations of cropmarks within the proposed development area. The results are documented in Figure 6.
- 5.3.3 At present, most of the dating attributions result from the examination of the morphology of the features, noting that it is likely that some of the cropmarks represent settlement patterns dating to the Iron Age and Roman periods as well as post-medieval boundaries which are no longer present on site.
- 5.3.4 While no dates for these cropmarks can be ascertained, it is worth examining the results obtained in two field evaluations, one carried out by PCAS within the bounds of Kelham Hall, and the other one carried out immediately W from the westernmost end of the proposed development area carried out by Phoenix Consulting Archaeology Ltd in 2015. The latter is of particular significance as it contains cropmarks that run into the proposed development area.
- 5.3.5 The field evaluation carried out by PCAS documented mid-Saxon features as well as medieval ditches, pits and evidence for ridge and furrow (Lane 2020).
- 5.3.6 The field evaluation carried out by Phoenix Consulting Archaeology Ltd at Flash Farm involved cutting 47 trenches most of them targeting geophysical anomalies. The results indicated that a large proportion of the features dated to the Iron Age and Roman periods. Some isolated features of Bronze Age date were also recorded (Edwards 2015).

5.4 LiDAR

- 5.4.1 LiDAR data at 2m DTM Hillshade was produced to examine any sub-surface feature that might be present within the proposed development area. The results are documented in Figure 8.
- 5.4.2 The results highlight the presence of possible medieval ridge and furrow in Field 8 and immediately north of the built area of Kelham.

5.5 Geophysical Survey

- 5.5.1 Between 2021 and 2022, Archaeology England Ltd carried out a geophysical survey of the development area (Muller and Garcia Rovira 2021 & Muller 2022).
- 5.5.2 The survey identified anomalies of archaeological origin spread throughout the proposed development area which are in keeping with the records from the National Mapping Programme. The survey was able to provide with further detail of the internal character of the recorded enclosures. Based on the morphology of the cropmarks, they have been interpreted as the remains of a Roman settlement.
- 5.5.3 The survey also further enhanced cropmarks recorded by the NMP in the south eastern area, as well as identified another linear anomaly that the NMP had not recorded.

5.6 Soil Survey

- 5.6.1 In November 2021, Land Research Associates Ltd carried out a soil survey within the proposed development area. The survey took samples (auger and test pits) using a 100 x 100m grid and going as deep as 1.1m below the ground level.
- 5.6.2 The results highlighted three situations within the site:

The deepest soil sequences were more than 1m in depth concentrated within the central regions of the proposed development site with soils that are alluvial in nature (see A Figure 13).

Deep soil sequences were also concentrated at the bottom of Kelham Hills, likely representing material which accumulates at the foot of Kelham Hills. The soil sequence also reaches in areas more than 1m in depth (see B Figure 13).

Contrastingly, other areas were a lot shallower in character (around 0.6m) reaching area of gravel at the lowermost levels (see C Figure 13).

5.6.3 Figure 13 provides with a visual representation of the results. The information produced by Land Research Associated Limited can be used, in conjunction with other data sets, to produce development designs that reduce the impact that the proposed development could have on the archaeological resource.

6. Site Visit

6.1.1 A site visit was carried on the 4th and 5th of November 2021. The weather conditions were generally cloudy; however, visibility was good. The ground conditions differed slightly in different fields, with areas of standing water. The fields were largely used for arable purposes and the topography was largely flat.

6.1.2 The site visit is divided into three fields. The position of each field is outlined in Figure 2.

6.1.3 Field 1 is located adjacent to Kelham and Kelham Hall. At the time of the visit, the field had indications of having recently been harvested. This situation constrained the examination of cropmarks – both known to exist or new ones – but gave the opportunity the opportunity to look for surface finds. The inspection did not reveal any finds of archaeological significance.

- 6.1.4 Plates 1 to 9 document Field 1. As noted, the field has a flat topography. Its eastern boundaries conceal views towards the field with mature trees toward the northern regions of the field and by the plantation further to the south. Despite it, slight views of the uppermost regions of Kelham Hall can be viewed from the field as noted in Plate 1.
- 6.1.5 The south end of the field is demarcated by two ditched boundaries limiting access to field 3.
- 6.1.6 The NMP documents concentrations of cropmarks toward the north and the south of this field. Furthermore, these features as well as some more detail were recorded during the geophysical survey carried out by Archaeology England in 2021 and 2022. No features were observed at the time of the survey, however.
- 6.1.7 Field 3 is the southernmost field of the proposed scheme. It borders Field 1. Plates 13 to 17 document its nature. This field although close to Averham it is protected from views due to its flat topography and boundaries to the S. Contrastingly, the A617 is visible from different points within the field. The northern boundaries are characterised by well-demarcated ditches. Recent harvesting was observed with stumps occupying most of the field. A small circular cropmark is recorded by the NMP. However, this was not evidenced at the time of the survey.
- 6.1.8 Field 2 is located adjacent to Fields 1 to the south (Plates 18-23). At the time of the survey, it was noticeable that the southern half of the field had been harvested whilst the northern end was characterised by short grass. The field is defined by hedgerows, and it is occupied by pylons running southwest to northeast. Plates 18, 20 and 21 are all zoomed images which identify some views toward Kelham Hall. Far afield views toward the north go as far as the Kelham Hills. Figure 6 highlights a concentration of cropmarks which runs from the middle of the field toward the northeast. No evidence of them was perceived during the site visit.

- 6.1.9 The site visit also examined any intervisibility issues that could be caused by the proposed development site. To do so, the team examined the presence/absence of views from a number of distinct regions within Kelham Hall, associated gardens. The results highlighted that the listed buildings within the Conservation Area were generally well screened, in most cases, by tree cover but in others by the distance between the site and the structures (Figure 12).

7. Impact Assessment

7.1 Assessment of Archaeological Potential and Importance

- 7.1.1 The assessment carried out for this report highlights the importance that the River Trent and its floodplains had in different times of the history of development of Kelham and its surroundings.
- 7.1.2 As noted during the examination of the HER records, the river was a rich resource during prehistoric times. Furthermore, it is known that the Trent Valley was densely occupied during the Roman period, and it is likely that further settlement may be located west of Kelham Hall where the land is less susceptible to periodic flooding.
- 7.1.3 The origins of Kelham may certainly correspond to medieval times. It has been noted that the significance of Kelham increased once Robert Sutton moved his headquarters from Averham to Kelham after the Civil War. Kelham Hall and its historic surroundings are nowadays protected as a designated area.
- 7.1.4 The historic map regression has highlighted the patterns of development of the fields contained within the proposed development site over time. The large fields documented in the early 1800s are divided into multiple parcels by the 1880s; a situation that will change around the 1970s with the advent of intensive farming.

7.2 Previous Impacts

- 7.2.1 The fields within the proposed development site are mostly devoted to the production of potatoes, maize and sugar beet. It is therefore necessary to take into consideration two factors that might directly impact on the existing archaeology within the site: the plough depths and the loads of the farming equipment regularly used on site.
- 7.2.2 The plough levels for this kind of crops are generally less than 0.25m in depth. The soil survey carried out by Land Resources Associates Limited (Thomas 2021) highlights that in most situations, the topsoil is around 0.3m in depth. Contrastingly, the loads of the farming equipment used onsite will trigger the compression of soils, potentially impacting on the sub-surface archaeology.

7.3 Potential Impacts of the Proposed Development

- 7.3.1 The proposals include a 49.9MW solar farm with battery storage system. Photovoltaic (PV) panels would be aligned east –west and orientated south. The panels would be mounted on frames with a maximum height of 2m above ground level. Rows would be between 4m and 6m apart.
- 7.3.2 Located on the north-west boundary of the southernmost field would be the battery storage system compound, with the batteries in steel containers. Cabling will be below ground.
- 7.3.3 The site will be surrounded by deer fencing c. 2m in height. The site access would be through existing field gates off the A617. Internal service roads, 4m wide, of crushed stone would largely follow existing tracks on the site.
- 7.3.4 Any of the following activities associated with the proposed development could therefore expose, damage or destroy archaeological remains:

Surface stripping and levelling;

Construction of infrastructure

Service installation;

Any other ground disturbing works

7.4 Conservation Areas and Listed Buildings

7.4.1 The proposed site is not contained within any Conservation Area, Registered Park and Garden or Registered Historic Landscape. Two Conservation Areas are located within the assessment area: Averham and Kelham.

7.4.2 The ZTV model (Figure 9) as well as the results obtained during the site visit have highlighted that the proposed development site would not have a direct or indirect impact on the Averham Conservation Area or the listed buildings within, therefore, while the value of the Conservation Area and its listed buildings is High, the magnitude of the impact would be Negligible.

7.4.3 Kelham Conservation Area borders the proposed development area and, without mitigation, views across the site are probable from parts of the Conservation Area. The magnitude of the impact is therefore considered Moderate. Suitable mitigation measures should be drawn through the results obtained during the production of a Heritage Impact Assessment (HIA).

7.5 Scheduled Monuments

7.5.1 No Scheduled Monument (SM) will be directly or indirectly affected by the proposed development.

7.5.2 Averham Moat and Enclosure (SM 1017687) is located some 400m south from the southernmost point of the proposed development. Intervisibility is constrained by the built environment and vegetation that exists between the site and the Scheduled Monument.

7.6 Non-designated Archaeological Sites

- 7.6.1 The NMP has recorded multiple cropmarks within the fields of the proposed development site. While the date and nature of these cropmarks are largely unknown, it is assumed that they correspond to possible Iron Age and Roman features as well as extant boundaries.
- 7.6.2 As mentioned in section 6.11 above, targeted field evaluation on adjacent land concluded that a large proportion of features dated to the Iron Age and Roman periods. A number of these features continue in the proposal site. Some isolated features of Bronze Age date were also recorded (Edwards 2015).
- 7.6.3 Based on current understanding, the value of these features has to be considered as a whole as they potentially represent the remains of past landscapes. Therefore, the value is likely to be High. Development designs that are not sympathetic with the presence of sub-surface features could result in a Moderate/Adverse impact over the archaeological resource.

8. Conclusion and Mitigation

- 8.1.1 Identified Scheduled Monuments will not experience a direct or indirect impact from the proposed development. It is proposed that the Conservation Area of Averham and its Listed Buildings will not be impacted by the proposed development, although a HIA will be undertaken to allow full consideration of potential indirect impacts.
- 8.1.2 Both the ZTV model and the site visit determined that the majority of the Listed Buildings within Kelham will not be indirectly impacted. However, the highest points of Kelham Hall may be seen from certain areas of the proposed site. Overall the magnitude of the impact is considered Negligible.
- 8.1.3 Kelham Conservation Area is located adjacent to the site and although it is well protected by parkland cover and by the existing plantations, the development may cause a visual and acoustic impact to some regions of the

Conservation Area. Due to proximity of the proposals, a HIA will be undertaken to allow full consideration of potential indirect impacts such as visual amenity and noise generation.

- 8.1.4 It has been noted that the NMP has recorded numerous cropmarks within the proposed development site. Their presence has been confirmed by a geophysical survey was carried out in 2021 and 2022 (Muller and Garcia Rovira 2021, Muller 2022). Furthermore, some of these features have been tested through a field evaluation during the work carried out for proposed development at Flash Farm located immediately west of the proposed site.
- 8.1.5 At present, a development of this nature would have a Moderate to Adverse impact on the archaeological resource. However, it is suggested that some of the datasets produced for this site and adjacent sites can work in conjunction to define a series of mitigation measures, such as trenched evaluation.
- 8.1.6 The location of cropmarks, an understanding of the character of the soils within the site as well as the depths at which archaeological remains were found during the field evaluation at Flash Farm already provide key parameters that can be used to define project designs (e.g. with the avoidance of certain areas, or the use of different mounting methods). This approach would require further understanding of location and depths at which the archaeological remains are found in other areas of the site.

9. Sources

Bennett, G. & Stobbs, F., 1980, Kelham Hall: A Family and a House. Newark & Sherwood District Council. Newark.

Beresford, M. 2019. Kelham Revealed! Archaeology Report.

Edwards. 2015. Flash Farm, Averham, Nottinghamshire Trial Trenching

Evans, P. 2017. Desk-based Assessment: Land at Kelham Hall, Newark on Trent, Nottinghamshire. PCAS doc ref: 1888

Lane, A. 2020. 'Land at Kelham Hall, Main Road, Kelham, Nottinghamshire, NG23 5QX Archaeological Evaluation Report'

Muller, J. 2022. Land to the west of Kelham, Nottinghamshire. AE Report 2092

Muller, J., Garcia Rovira, I. 2021. Land to the west of Kelham, Nottinghamshire. AE Report 1954.

Richmond, A & Thomas A 2013 Land at Flash Farm, Averham, Nottinghamshire.

Archaeological Desk-based Assessment Phoenix Report PC409a

Sirius Environmental. 2021. Solar Loading Assessment for Underlying Archaeology for Kelham Solar Farm. Report reference HC1003/01Rev 0.

Thomas, L. 2021. Soil Resources and Agricultural Quality of Land at Kelham, Newark. Land Research Associates, Report 1909/1.

9.1 Online Resources

British Geological Survey 2021

<https://www.bgs.ac.uk/>

National Planning Policy Framework

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1182995/NPPF_Sept_23.pdf

Design Manual for Roads and Bridges

<https://www.standardsforhighways.co.uk/dmr/b/>

Historic Environment Desk Based Assessment

https://www.archaeologists.net/sites/default/files/CI%26AS%26GDBA_4.pdf

Portable Antiquities Scheme Website

<https://finds.org.uk/>

Historic England –Listed Buildings

<https://historicengland.org.uk/listing/the-list/list-entry/1045982>

<https://historicengland.org.uk/images-books/photos/item/IOE01/06802/08>

<https://historicengland.org.uk/images-books/photos/item/IOE01/06802/09>

<https://historicengland.org.uk/listing/the-list/list-entry/1045944>

<https://historicengland.org.uk/images-books/photos/item/IOE01/06802/02>

<https://historicengland.org.uk/listing/the-list/list-entry/1045983>

<https://historicengland.org.uk/images-books/photos/item/IOE01/06802/06>

Newark and Sherwood Conservation Areas

<https://www.newark-sherwooddc.gov.uk/conservationareas/>

Landscape Characterisation Area

<https://www.newark-sherwooddc.gov.uk/media/newark-and-sherwood/images-and-files/planning-policy/pdfs/adopted-lca/4.-Trent-Washlands.pdf>

9.2 Aerial Photographs

CUCAP	BTJ25
CUCAP	RC8HB068
CUCAP	RC8HB040
CUCAP	BTJ20
CUCAP	AH054
CUCAP	YV24
CUCAP	BZF21

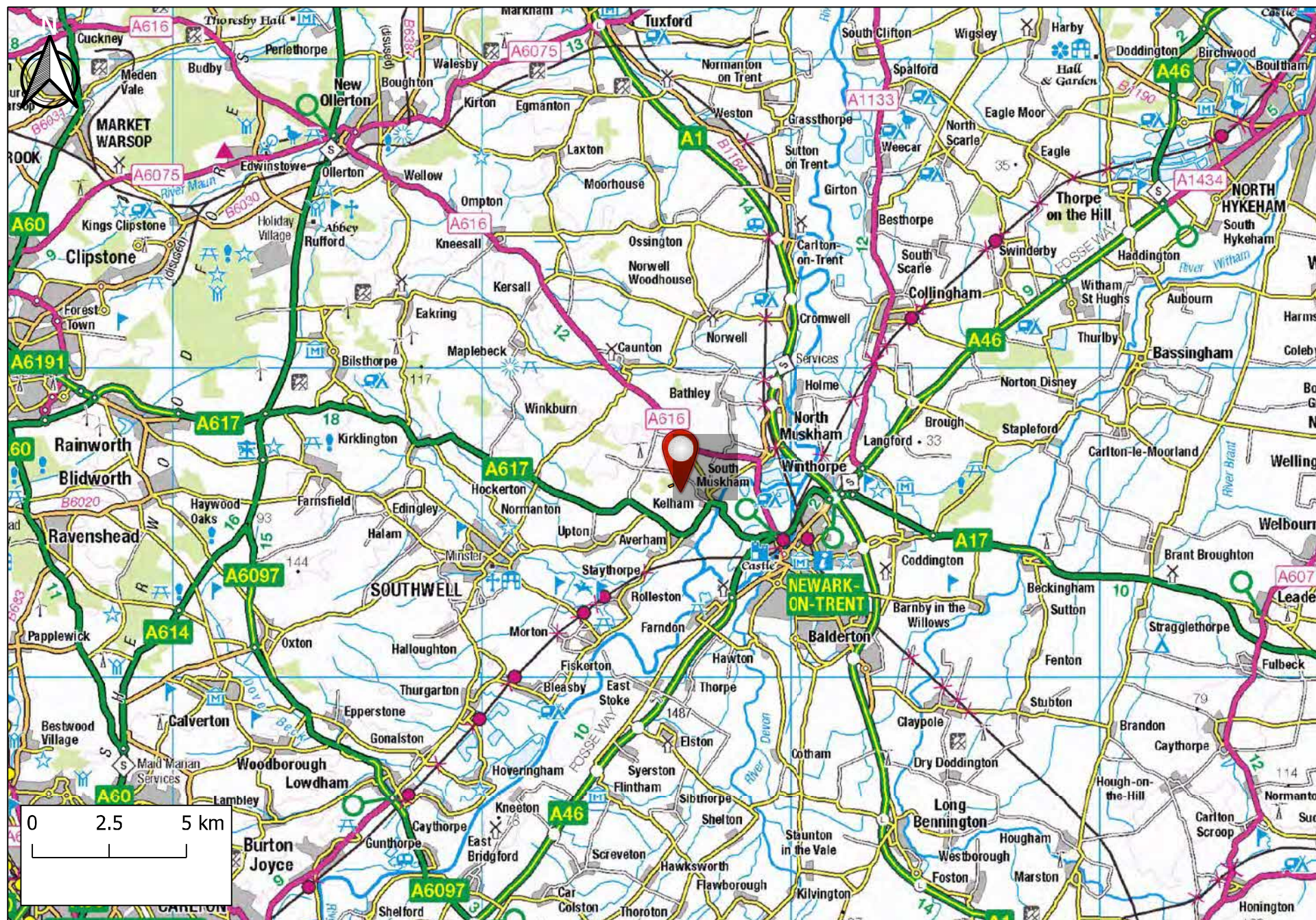
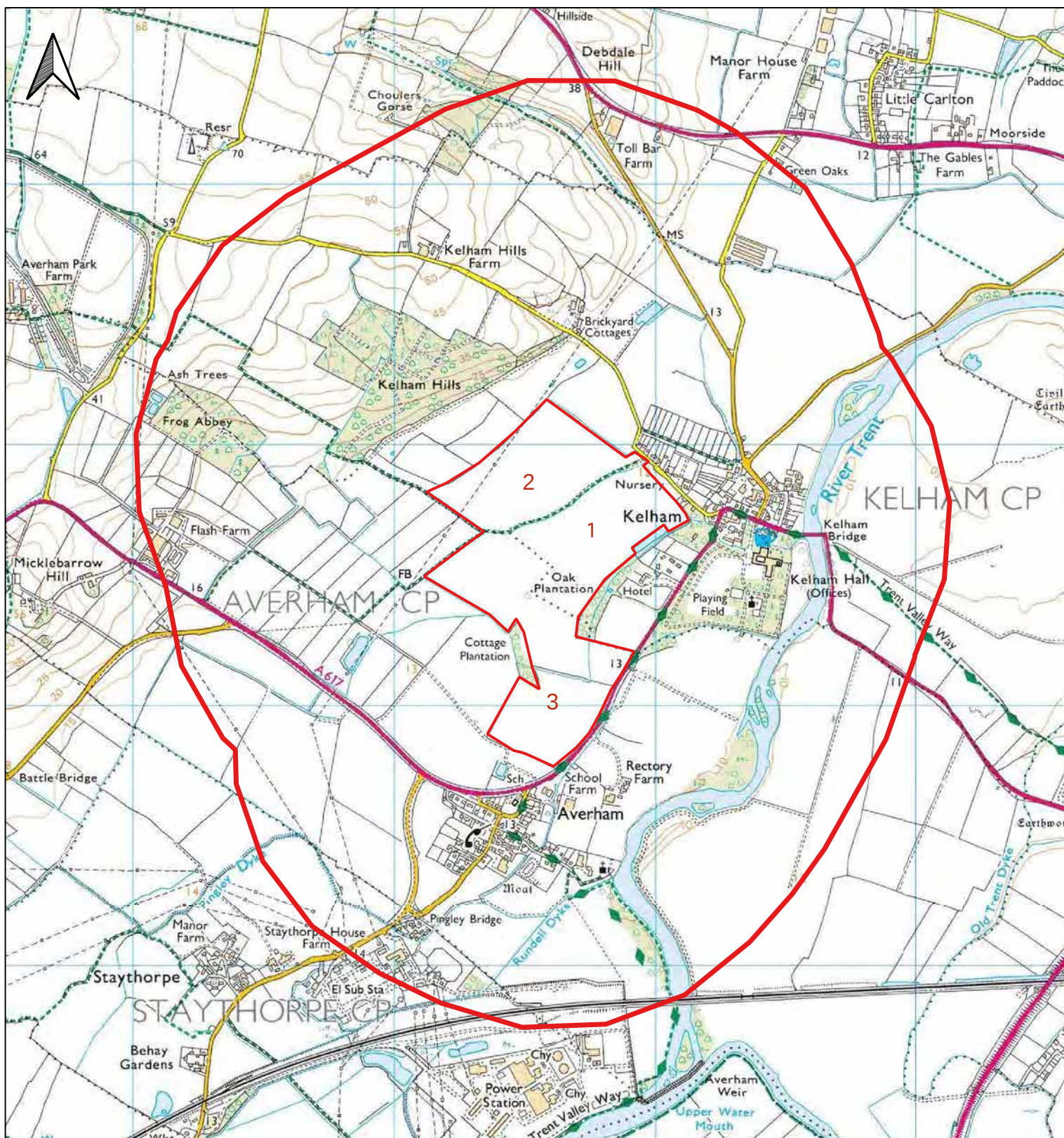
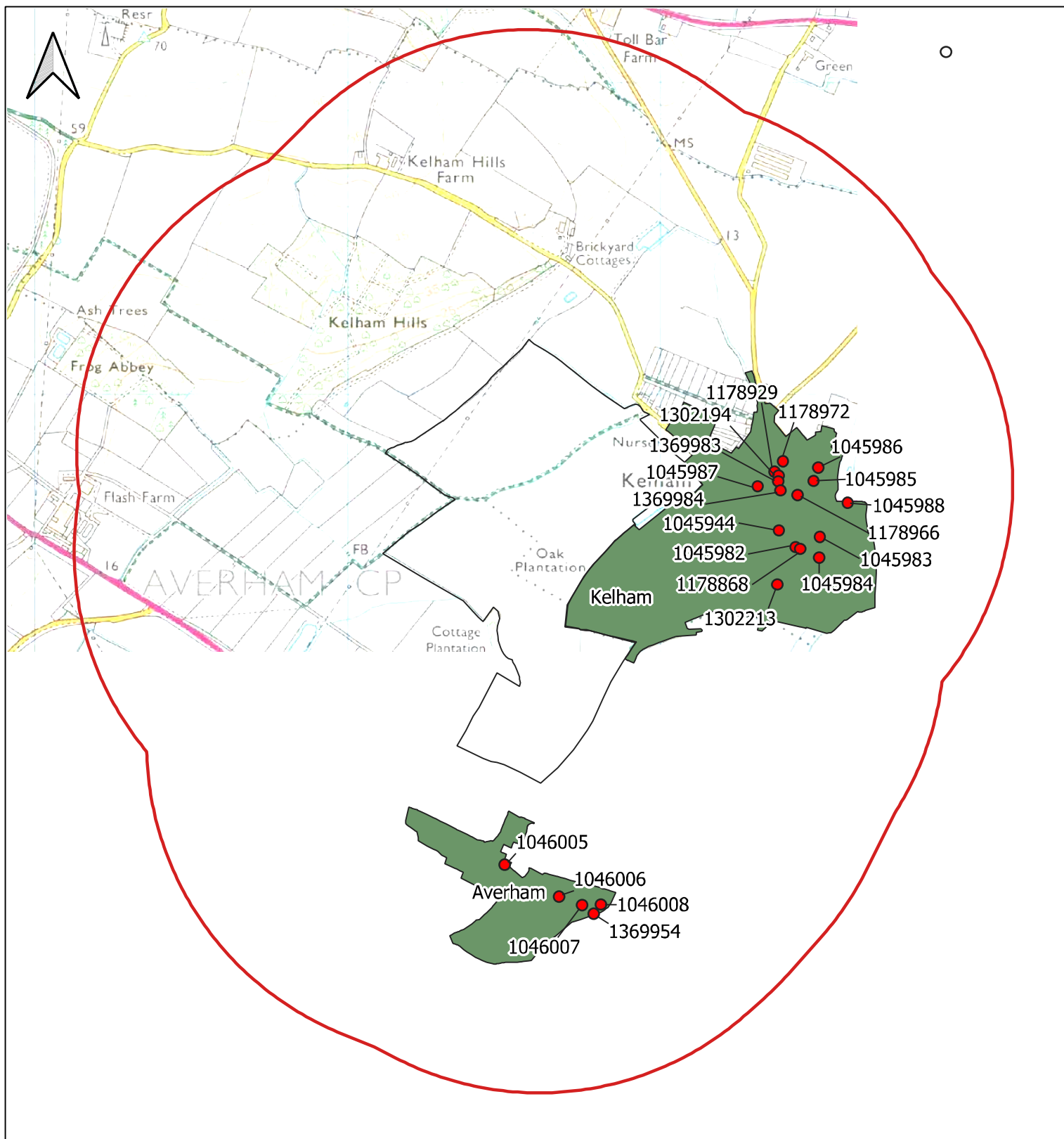


Figure 1. Location of site.



0 500 1000 m

Figure 2. Proposed development area within 1km search area (Numbered fields).



0 500 1,000 m



Conservation Areas

Figure 4. Listed Buildings and Conservation Areas within assessment area.

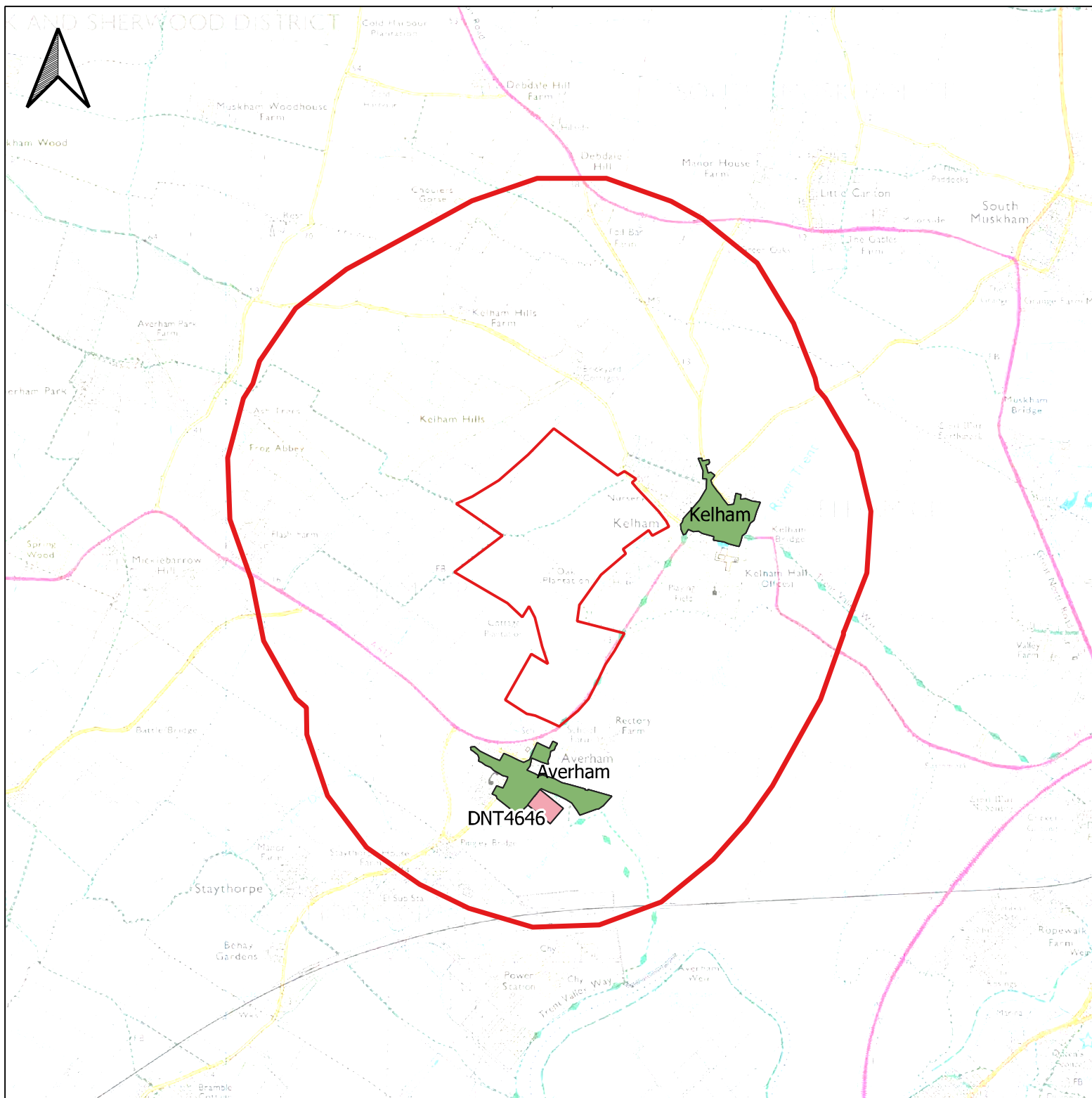


Figure 5. Scheduled monuments and village cores within assessment area.

- Scheduled Monument
- Village cores

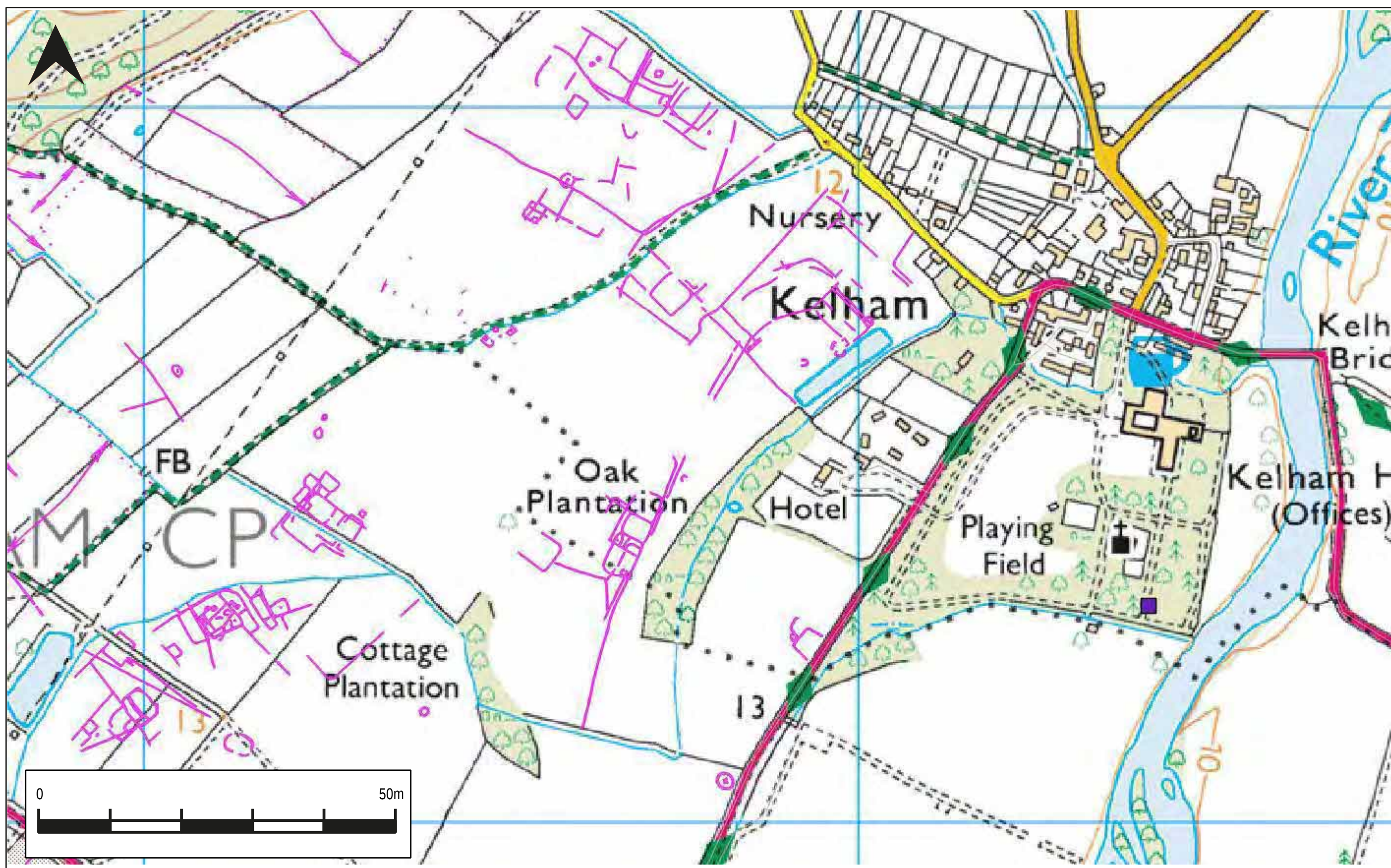
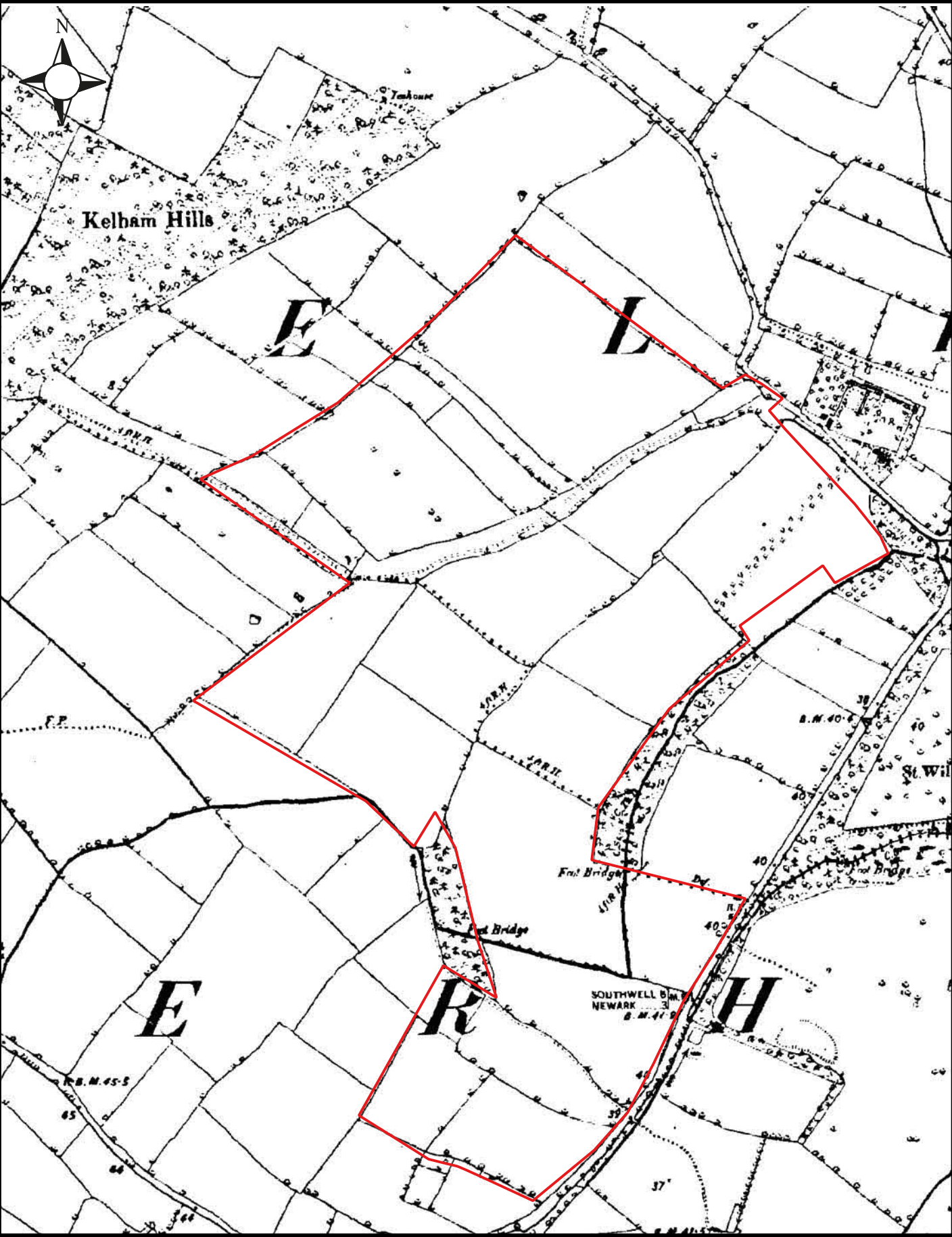
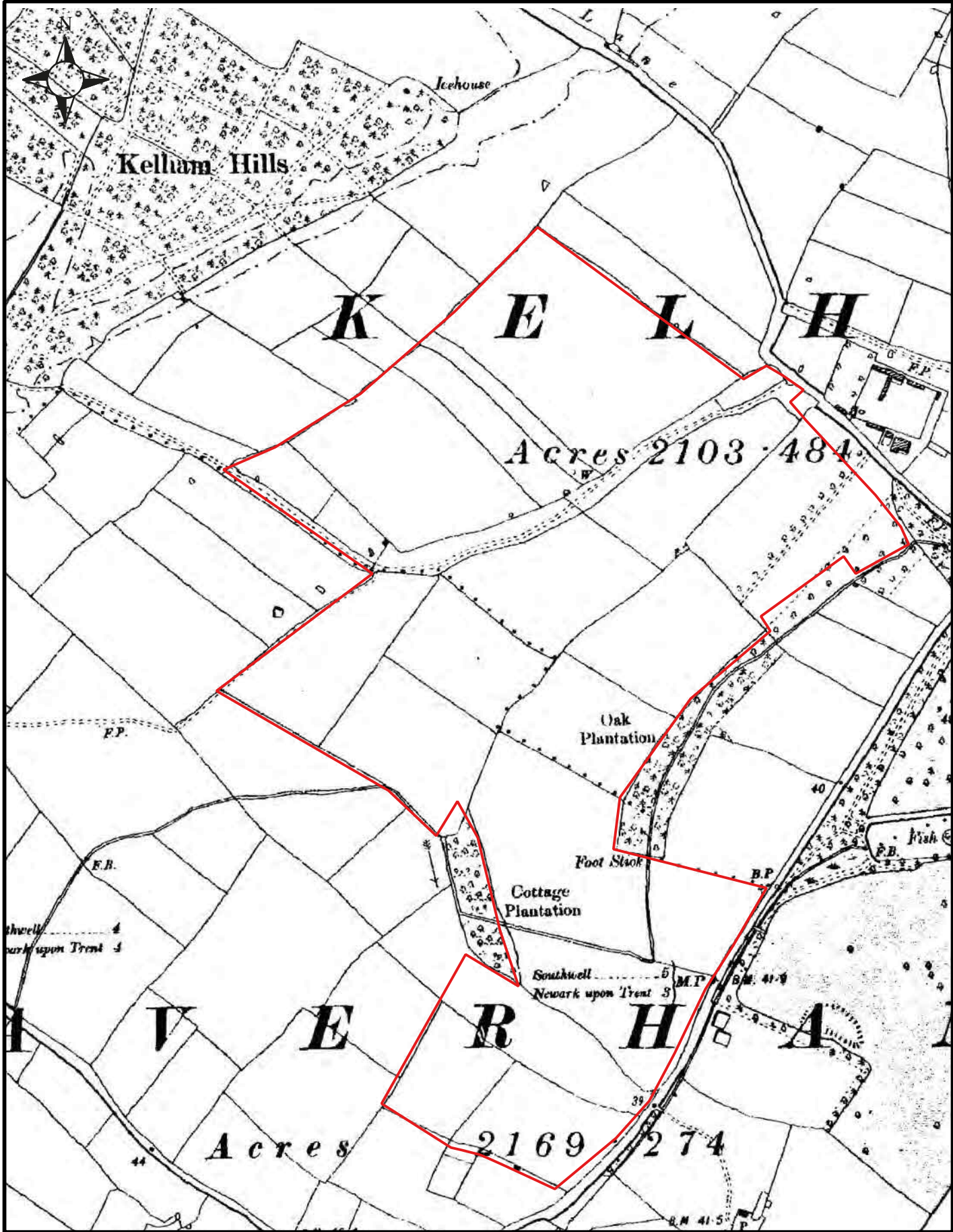


Figure 6. Recorded cropmarks within and adjacent to proposed development area.

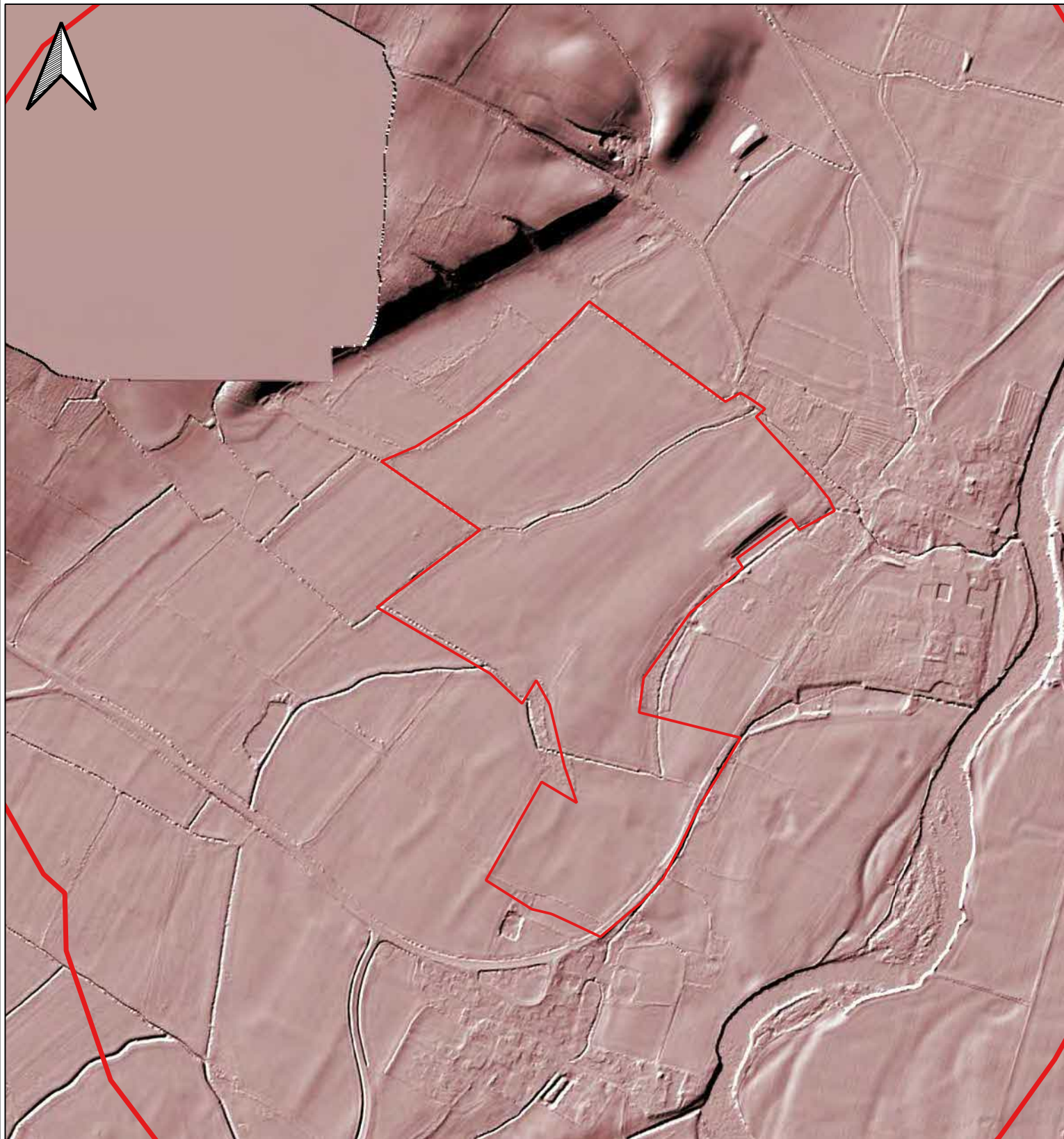
Figure 7. Historic maps.



OS CS 1886 1.2500

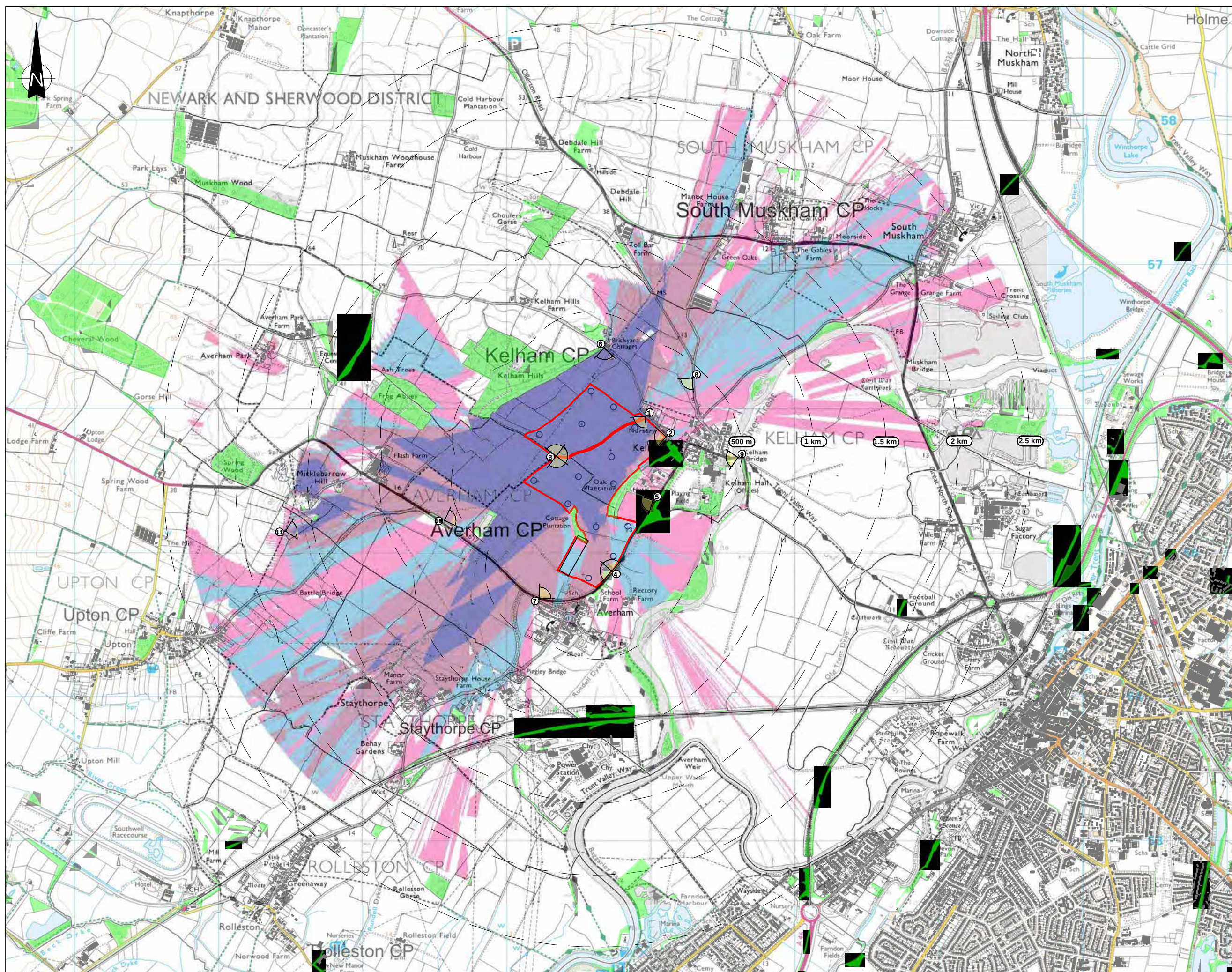


OS CS 1900 1.2500



0 1000 m

Figure 8. LiDAR 2m DTM –Hillshade.



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- KEY**
1. THIS DRAWING IS BASED UPON A COMPUTER GENERATED ZONE OF THEORETICAL VISIBILITY (ZTV) WHICH ILLUSTRATES AREAS FROM WHERE IT MAY BE THEORETICALLY POSSIBLE TO VIEW ALL OR PART OF THE PROPOSED DEVELOPMENT. THE ZTV IS GENERATED USING REPRESENTATIVE HEIGHT POINTS (2m agl) SPACED WITHIN THE SITE. THE (SCREENING) ZTV INCORPORATES THE SCREENING EFFECTS OF BUILDINGS (C.8m HIGH BARRIER) AND WOOLAND COVER (C.12m HIGH BARRIER) AS MAPPED ON ORDNANCE SURVEY VECTOR MAP DISTRICT DATA, BUT OMITTS SMALLER VEGETATION (EG HEDGEROWS) AND LOCALISED LANDFORM VARIATIONS. AS A RESULT THERE MAY BE RECEPTORS WITHIN THE STUDY AREA WHICH ALTHOUGH SHOWN AS FALLING WITHIN THE ZTV, ARE SCREENED OR FILTERED WHICH PRECLUDES VIEWING OPPORTUNITIES.
 2. THE ZTVS ARE CALCULATED USING WINDFARM RESOFT SOFTWARE THROUGH THE COMBINATION OF A DIGITAL TERRAIN MODEL (DTM) OF THE LANDSCAPE, DERIVED FROM THE ORDNANCE SURVEY 'TERRAIN 5' 5m RESOLUTION DTM DATA COMBINED WITH THE REPRESENTATIVE ILLUSTRATIVE HEIGHT POINTS FOR THE SOLAR ARRAYS. IN CALCULATING INTER VISIBILITY, THE SOFTWARE INCORPORATES EARTH CURVATURE AND THE EFFECTS OF REFRACTION THROUGH THE ATMOSPHERE. THE RESULTING ZTV IS OVERLAID ON OS MAPPING AT AN APPROPRIATE SCALE. 1.6M VIEWING HEIGHT.

- KEY**
- SITE BOUNDARY
 - STUDY AREA (500m bands / 2.5km)
 - c.1 - 25% OF SOLAR ARRAYS THEORETICALLY VISIBLE
 - c.26 - 50% OF SOLAR ARRAYS THEORETICALLY VISIBLE
 - c.51% - 75% OF ARRAY THEORETICALLY VISIBLE
 - c.76% - 100% OF ARRAYS THEORETICALLY VISIBLE
 - ZTV HEIGHT SURVEY REFERENCE POINT
 - PROPOSED VIEWPOINT
 - WOOLAND
 - BUILDINGS

REV	DESCRIPTION	DATE	BY
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JOB TITLE

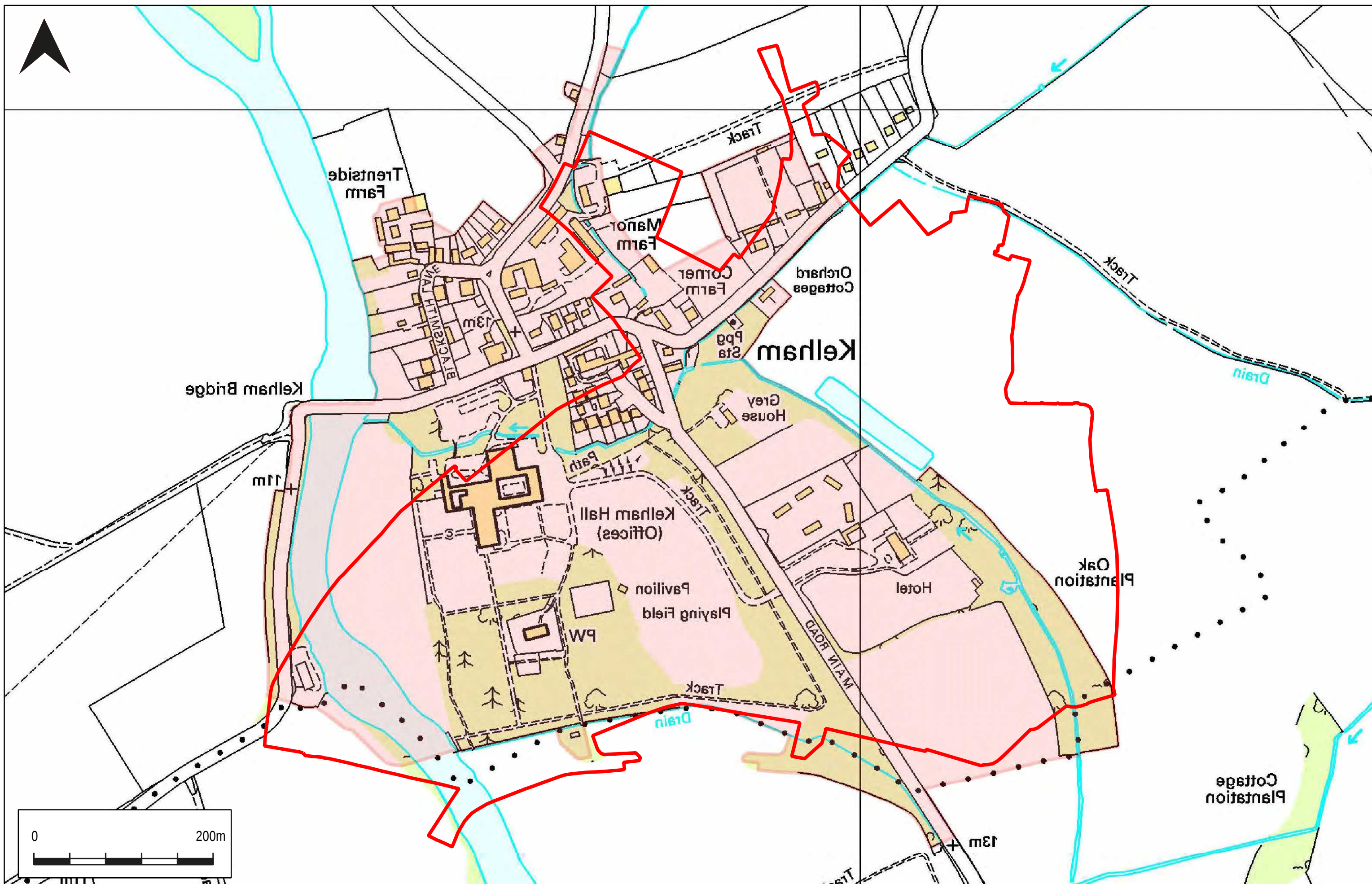
KELHAM SOLAR FARM AND BESS

DRAWING TITLE

ZONE OF THEORETICAL VISIBILITY - BARRIERS

DRAWN	DATE	APPROVED	DATE
A.S.	11/7/2023	J.C	11/7/2023
SCALE	SHEET	DRAWING NUMBER	REVISION
1:25,000	(2)	HOR1002/02/03	0

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Averham Conservation Area

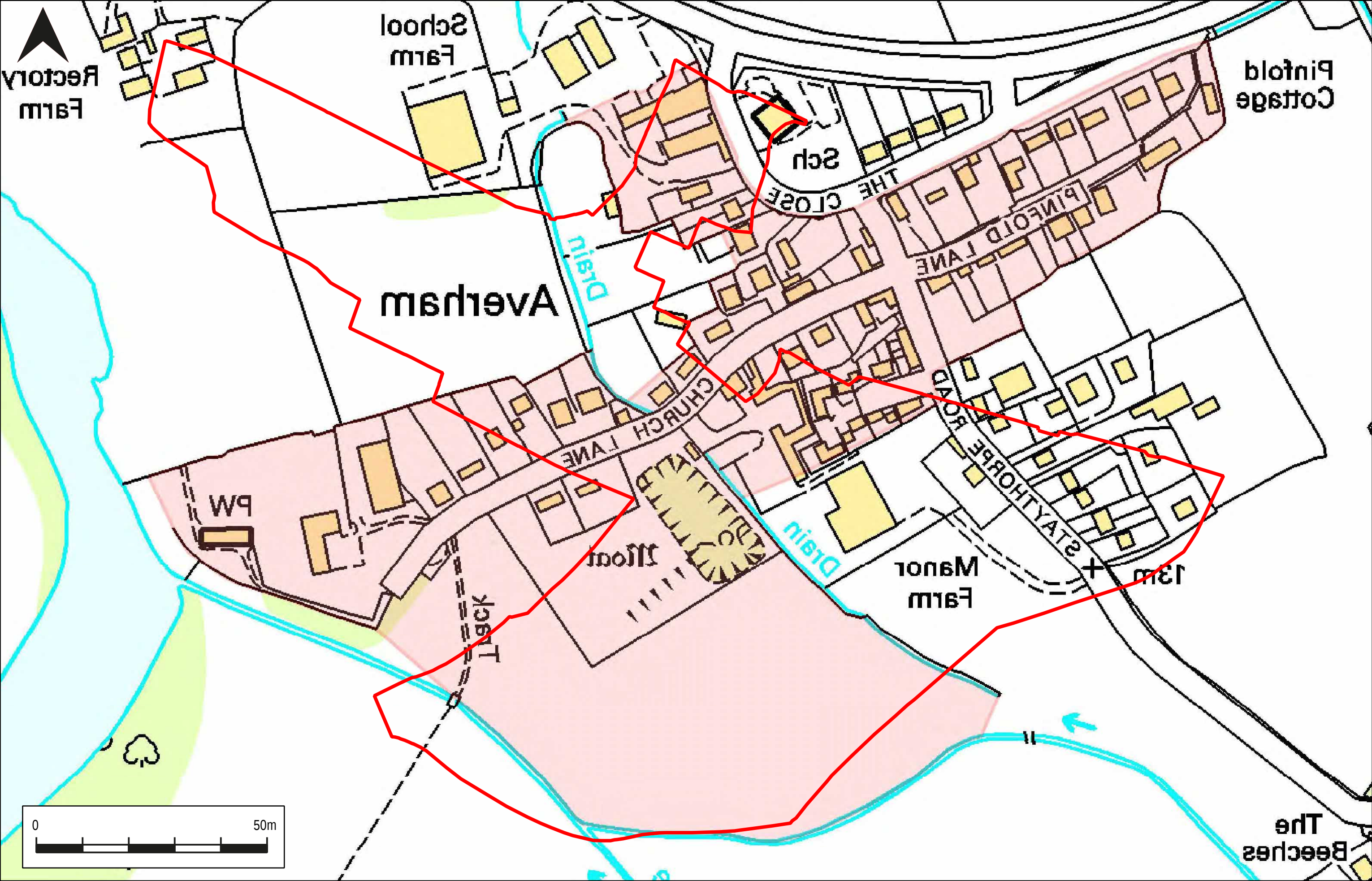


Figure 12. Soft screening concealing intervisibility between the proposed site and LBs - Kelham



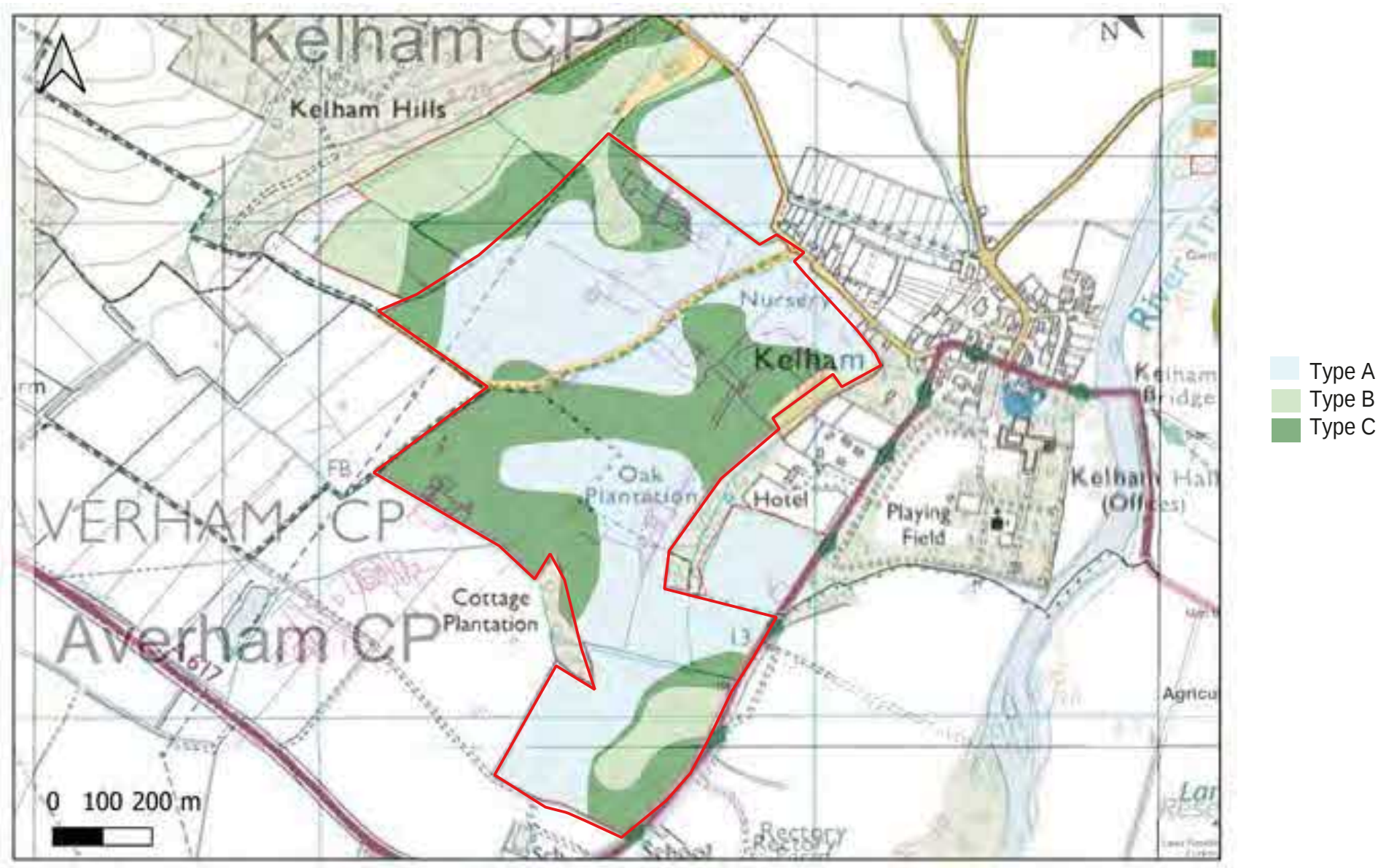
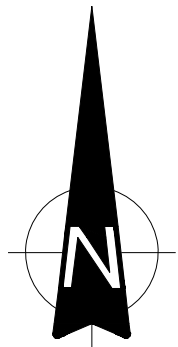


Figure 13. Soil classification within development area (see section 6 for interpretation).



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KEY

- SITE BOUNDARY
- ??? BOUNDARY
- GROUND CONTOURS WITH EXISTING BUND REMOVED
- EXISTING OVERHEAD CABLES
- EXISTING HEDGES
- EXISTING TREES
- PROPOSED PV PANELS
- PROPOSED 2.4m HIGH PALADIN FENCE
- PROPOSED 2.4m HIGH PALISADE FENCE
- PROPOSED 2.0m HIGH DEER FENCE
- PROPOSED 4m HIGH ACOUSTIC FENCE
- PROPOSED 2m HIGH CLOSE BOARDED TIMBER FENCE
- PROPOSED SCREENING BUND
- PROPOSED HEDGE/PLANTING AREAS
- PROPOSED TRANSFORMER
- PROPOSED SWITCHROOM
- PROPOSED SPARES CABIN
- INDICATIVE LOCATION OF CCTV POLE

REV	DESCRIPTION	DATE	BY
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CLIENT



4245 Park Approach, Thorpe Park, Leeds. LS15 8GB. 0113 264 9960

JOB TITLE
KELHAM SOLAR FARM AND BESS

DRAWING TITLE
SITE LAYOUT

DRAWN	DATE	APPROVED	DATE
S.T	22/8/2023	J.C	22/8/2023
SCALE	SHEET	DRAWING NUMBER	REVISION
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