GRANGE FARM

CB21

Grange Farm has all the ingredients to create a modern market town and set a new benchmark for sustainable development in the Greater Cambridge region. Most meaningful settlements evolve around major crossing points and this site sits at the intersection of the A11 and Babraham Road and the historic intersection of two Roman Roads. The location itself would seem perfectly suited as a satellite settlement for Cambridge, relieving pressure on eroding the special character of the city by overdevelopment but also on the Green Belt surrounding it. It is also located to the southeast of the city on the way to London and Stansted, the same side as the railway station, on the A11 to Newmarket and perhaps most importantly within a major cluster of monocultural employment parks all undergoing rapid expansion.

As pioneers of sustainable town building we are passionate about reviving the core purpose of villages, towns and cities to facilitate the exchange of goods, knowledge and social support while minimising the travel necessary for that exchange. Developing within easy walking and cycling distances of Granta Park and Babraham and the surrounding villages we see Grange Farm playing an important function in providing a wide range of physical spaces and amenities to serve those places and in turn make them more sustainable and vibrant. For the millennial population the quality of not just their homes but of their streets and neighbourhoods is key to whether they will chose to put down roots and feel like they belong. For Cambridge to thrive and keep its status on the world stage in academic excellence and innovation the quality of place is therefore paramount.

We believe we have the land, the land owner, the team and the track record to make something truly remarkable of which everyone we plan to involve going forwards will be proud.

THE GRANGE FARM PARTNERSHIP

GRANGE FARM

Grange Farm is a mould-breaking planning proposal close to Cambridge.

Its masterplanners propose an integrated market town that will:

Embody all the best practice in sustainability and combatting climate change that was showcased at COP26.

Provide the housing and social infrastructure that is needed to sustainably support the major science based employment infrastructure – Granta Park, Brabraham Science Campus, etc – that is being built in the area south/east of Cambridge.

Provide the critical economic and sustainability justification that is currently missing from the proposed south-eastern extension of the busway system: a strategic project that will be of enormous benefit to the whole city region.

OXFORD-CAMBRIDGE ARC

Be a key component of the emerging OxCam Arc – a strategic Government initiative to harness the economic potential of the sub-region in a highly sustainable way.

Pioneer a new approach to biodiversity enhancement based on enhancing the ecological richness of 200 acres of countryside through agroforestry.

"*all plans should promote a **sustainable pattern of development** that seeks to: meet the **development needs of their area; align growth and infrastructure;** improve the environment; mitigate **climate change**... and adapt to its effects*"

National Planning Policy Framework, 2021, para 11

"*The Oxford-Cambridge Arc is a **national economic priority area.** We believe it has the potential to be one of the most prosperous, innovative and sustainable economic areas **in the world,** and can make a major contribution to national economic recovery as we seek to build back better from the impact of COVID-19.*"

Creating a Vision for the Oxford-Cambridge Arc, H M Government, July 2021, para 1.1

"*We want Greater Cambridge to be a place where a **big decrease in our climate impacts** comes with a big **increase in the quality of everyday life** for all our communities. New development must minimise carbon emissions and **reliance on the private car; create thriving neighbourhoods with the variety of jobs** and homes we need; increase nature, wildlife and green spaces; and safeguard our unique heritage and landscapes.*

*Our Plan takes inspiration from what is unique about our area, and embraces the **bold new approaches** that will help us achieve this vision.*"

Greater Cambridge Local Plan - First Proposals, November 2021, 'Our Vision'

THE BACKGROUND

1. Cambridge is almost unique in the United Kingdom, as a place where the planning system needs to reconcile considerable potential for major economic growth with the imperative of combatting climate change and enhancing the natural environment. This is reflected in the key quotes on the previous page.

2. As is clear from the Government's recent consultation, the Oxford-Cambridge Arc is identified as a national economic priority area. This is unsurprising. It is already effectively the "silicon valley" of the United Kingdom, and Cambridge itself is at the epicentre of a host of world-class major science-based projects.

3. The extent of science-based research and manufacturing in the Cambridge area is illustrated on the next page.

4. It is clearly in the interests of the national economy that this exceptional cluster of activity is encouraged to thrive. There are many factors that need to be addressed, but a very important one is that there are attractive homes, and social and recreational infrastructure, located conveniently close to these major centres of employment. In an internationally competitive market, Cambridge needs to provide the most attractive possible living opportunities for the people who will staff the campuses and parks.

5. Because of the imperative of sustainability, it is very important that such living opportunities are located sustainably. This means being in physical proximity, to reduce the need for people to travel; and in a situation where as much as possible of any necessary travel can be by foot, cycle/scooter or public transport.

6. It also means that new residential areas must be located and planned to be resilient to climate change and to enhance the biodiversity of the natural environment as much as possible.

7 The emerging Greater Cambridge Local Plan is an important vehicle for achieving these objectives, and a first set of proposals has recently been published for consultation. This document is our response.

8. We acknowledge the hard work that has gone into the First Proposals, but it is our contention that the right balance has yet to be struck and, more specifically, that there exists a great opportunity at Grange Farm, Abington to create a new small town that is capable of meeting all of these objectives simultaneously.

9. This is a new proposal, which it is only possible to bring forward now land ownerships have been aligned. It is therefore not referenced at all in the Consultation material.

10. The purpose of this document is to explain the principal elements of the opportunity, and to open up a dialogue with the Councils and the community as the Local Plan evolves towards the next stages.


GODMANCHESTER
VISION PARK
CAMBRIDGE RESEARCH PARK
A14
HUNTINGDON RD
A14 FROM HUNTINGDON A1 NORTH
B1049
A10 FROM ELY
CAMBRIDGE RESEARCH PARK
ST JOHN'S INNOVATION CENTRE
A1309
CAMBRIDGE BUSINESS PARK
JCT 14
HISTON RD
MILTON RD
RIVER CAM
DITTON LANE
A14
B1102
TECHNO PARK
A428 FROM ST NEOTS & BEDFORD
A1303
MADINGLEY RD
NEWMARKET RD
A1303
WEST CAMBRIDGE
A1303
JESUS LA
A1134
CAMBRIDGE AIRPORT
A14 FROM NORWICH & BURY ST EDMUNDS
M11
CAPITAL PARK
PETERHOUSE TECHNOLOGY PARK
JCT 12
A603
A1134
RAILWAY STATION
BARTON RD
RIVER CAM
TRUMPINGTON RD
A1134
HILLS RD
A603
LONG RD
A1134
BABRAHAM SCIENCE CAMPUS
A11
M11
A1309
A1301
A1307
GRANGE FARM
JCT 11
HARSTON MILL
A10 FROM ROYSTON & LONDON
GRANTA PARK
ICONIX PARK
MELBOURN SCIENCE PARK
M11 FROM LONDON & STANSTED
CHESTERFORD RESEARCH PARK
A604 FROM HAVERHILL & COLCHESTER
A11
CAMBRIDGE BIOMEDICAL CAMPUS
WELCOME TRUST GENOME CAMPUS

WHY IS GRANGE FARM SUCH A GOOD OPPORTUNITY?

11. Before going into more technical detail, it is important to establish why Grange Farm is such a good opportunity for everyone. There are several reasons:

12. **First,** its **close proximity to several of the most exciting science campuses:** Granta Park and Babraham Science Campus are both within easy walking or cycling distance; the Wellcome Trust Genome Campus and Chesterford Research Park are within 5 miles. Such proximity has great benefits in terms of sustainability and carbon reduction. The advantage is the greater because all these facilities are planning to grow over the next few years, and there is little proposed housing within close proximity.

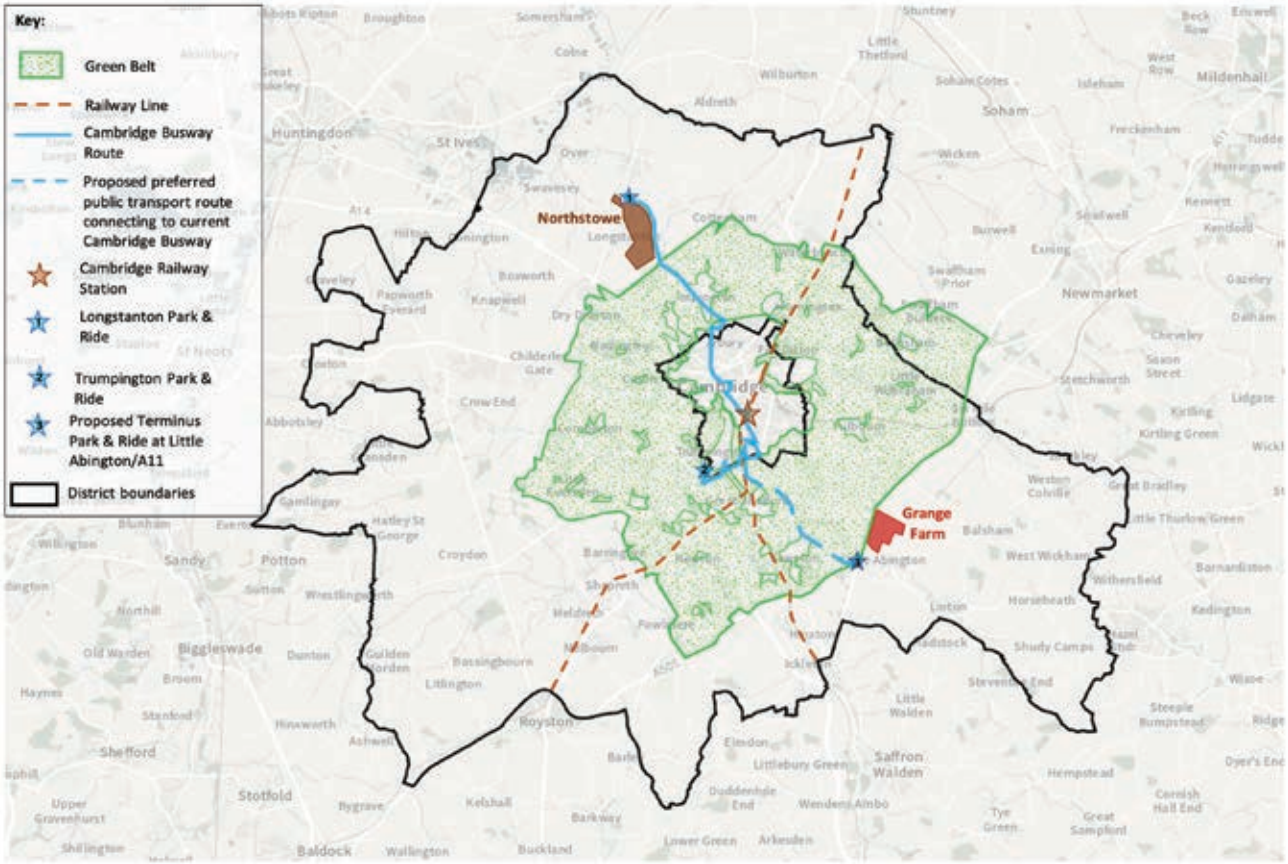
13. **Second,** it lies at the **head of the proposed dedicated busway extension** from the centre of Cambridge. The busway system already operates through the city centre and past the train station, before extending out to the economic "anchor" of Northstowe, an emerging new settlement to the north-west. Grange Farm offers the opportunity to create a similar economic anchor at this other end of the system – a high speed bus journey from Cambridge train station when everything is operational. The development of Grange Farm will significantly improve the economic and social case for building the busway, and thus make it more likely that the project will proceed at an early date, to the benefit of this whole sector of Greater Cambridge.

14. **Third,** because it is **outside the Green Belt** and is not affected by any other conservation designations. It therefore offers a relatively **"clean sheet"** opportunity to design and build a new community that exemplifies the best in current and future practice of design and sustainability.

Science Campus Map

15. Its situation is strikingly similar to the situation advocated by Ebenezer Howard and other early twentieth century pioneers of town planning. They saw the logic of allowing cities to grow via a series of self-contained satellite settlements, just beyond the Green Belt, each one substantially self contained, but linked to the mother city by high quality public transport. Their vision was on a larger scale, but the principles are very applicable here.

16. **Fourth,** the entire site is within single ownership. This is most unusual, but it means both that delivery and the proper phasing of infrastructure and housing can be assured; and that the owner can take a stewardship role, retaining ownership of key parts of the development, and thus maintaining quality control and ensuring good estate management in perpetuity.

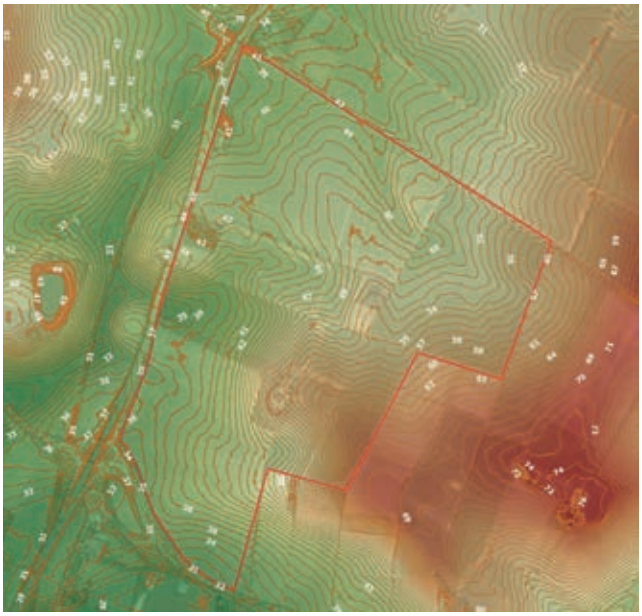


GRANGE FARM IN MORE DETAIL

17. The site extends to 184 hectares, and is located approximately 7 miles southeast of Cambridge city centre, just beyond the Green Belt. It is adjacent to the Fourwentways junction, where the A11 dual carriageway intersects with the A1307 radial route into Cambridge.

18. It is relatively featureless farmland – mostly Grade 3 and some Grade 2 arable land – comprising large fields divided by hedgerows. The general appearance of the land can be understood from the aerial photograph below.

19. It has gentle topography which rises away from the A11, and continues rising to the south-east, outside the site. This has the twin advantages of creating much more interesting placemaking and design opportunities than a flat site would present, and of keeping the whole site well out of the floodplain. The plan to the right shows the 1m contours; the plan on the next page shows how the site is well removed from land subject to flood risk.



20. A landscape appraisal prepared by The Landscape Agency is attached as Appendix 1. TLA identify several constraints: proximity to the two busy A roads, which generate a degree of noise; the Roman Road which defines the north-eastern boundary of the site, and which is well protected as a Scheduled Ancient Monument and Site of Special Scientific Interest; some far reaching views of the rural countryside; and mature trees, hedgerows and historic field patterns that it would be desirable to protect and preserve. However, they identify no constraints that cannot readily be addressed through intelligent masterplanning.

21. A desk-based archaeological assessment has been undertaken by the Cambridge Archaeological Unit. This is included as Appendix 2 to this document. As well as the Roman Road, it identifies a few prehistoric features of interest within the site, most of which have been substantially damaged over the years by ploughing. They conclude that there is nothing to inhibit development of the site, albeit the usual archaeological mitigation will be required.

22. The noise environment has been examined. Not surprisingly, there is noise intrusion along the two A roads, but this does not extend far into the site, and there is ample scope for installing bunds and/or barriers to create acceptable sound levels. The night-time sound levels are illustrated in the plan to the left.

Site location with night time sound levels based on DfT traffic data

Legend

Site boundary road noise LAeq, 8h

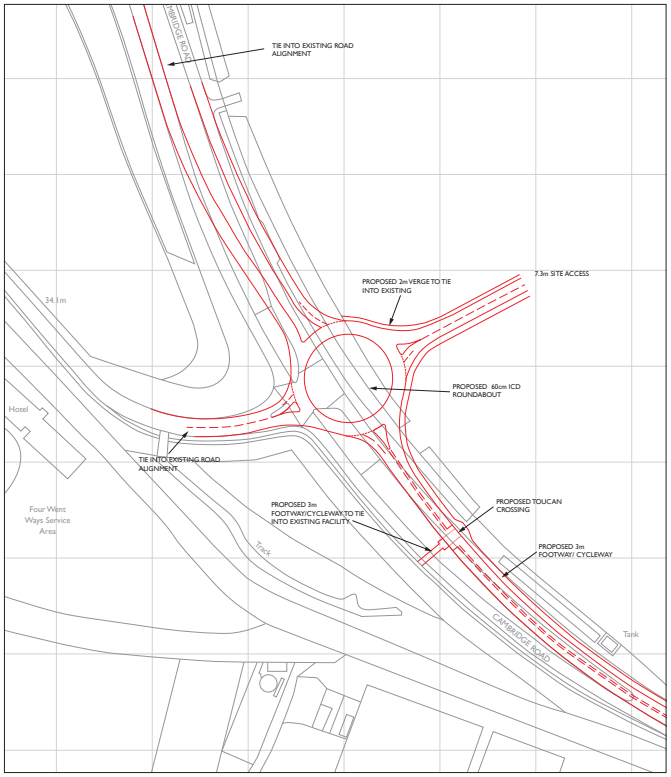
Noise Bands

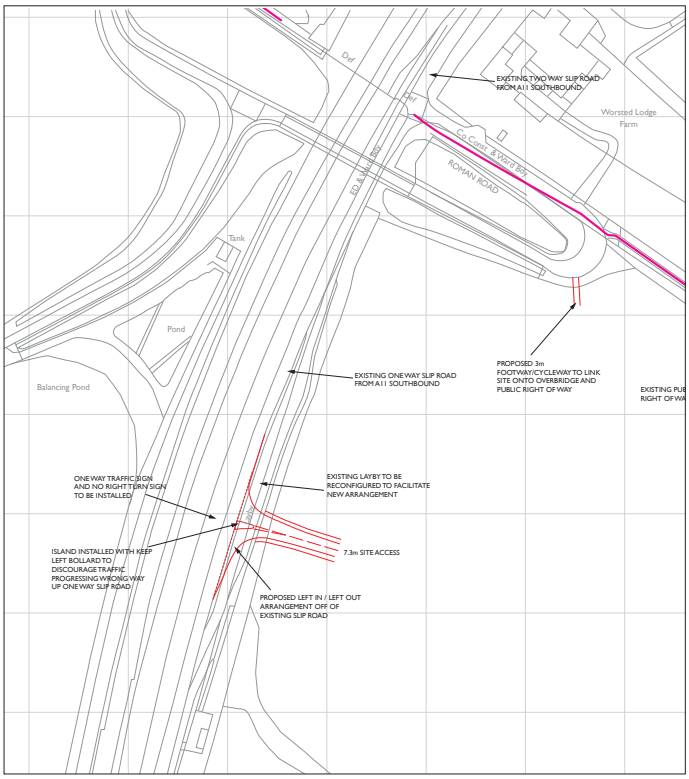
- 70+ dB(A)
- 65.0-69.9 dB(A)
- 60.0-64.9 dB(A)
- 55.0-59.9 dB(A)
- 50.0-54.9 dB(A)
- 00.0-49.9 dB(A)

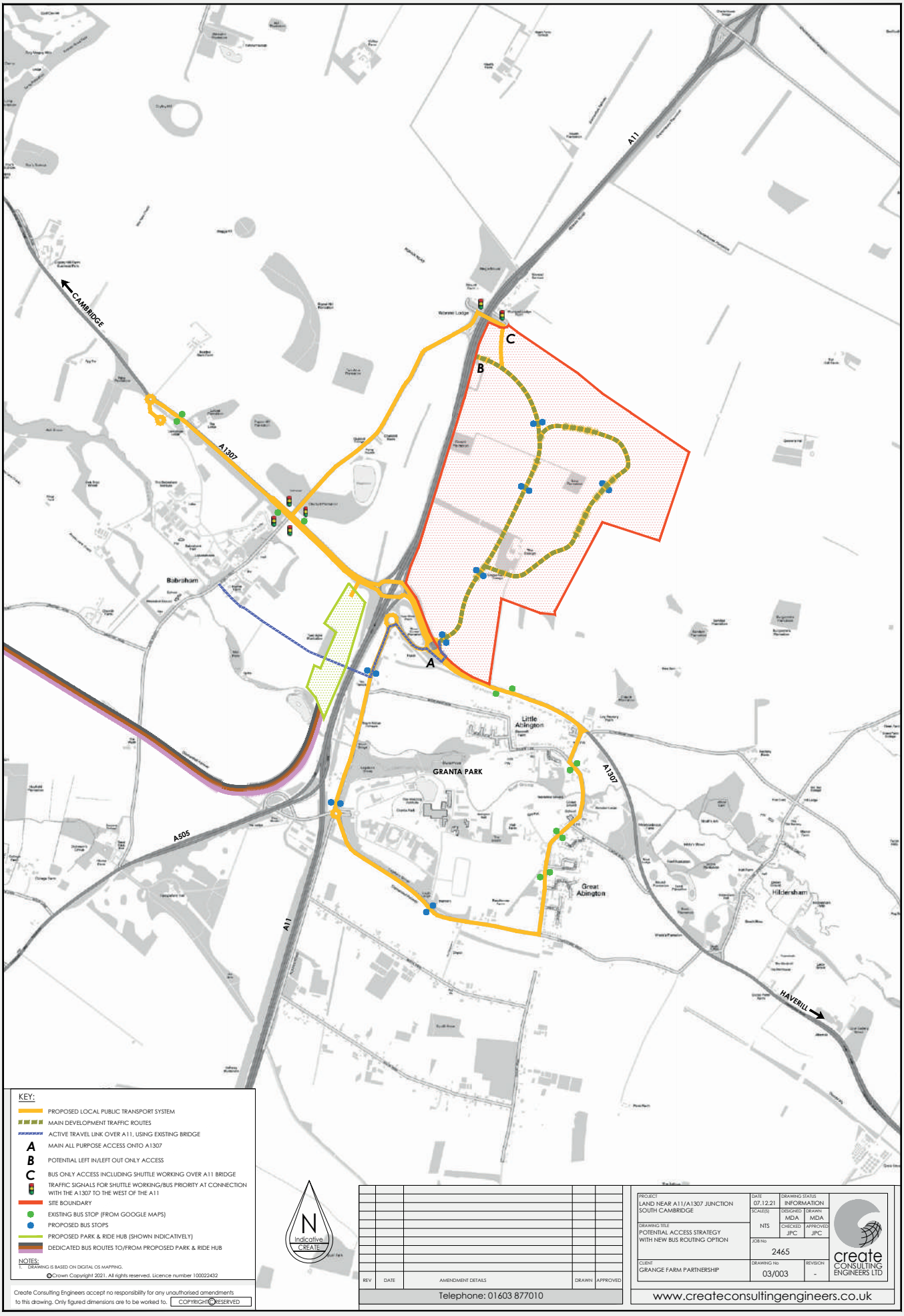
23. Providing road access would not be problematical. There is the potential to create a new roundabout on the A1307, on highway land, where the existing T-junction is. This is illustrated conceptually below. Direct access to the A11 would not be feasible, but this is of no consequence because there is an existing service road (presumably the former A11 road prior to the construction of the modern dual carriageway) running adjacent to the site from which safe access can be taken indirectly to the main road.

24. There is an excellent opportunity to upgrade the existing bridleway which follows the line of the old Roman Road immediately to the north-east of the site, and to turn it into a higher quality foot and cycle path, whilst enhancing the protection given to this heritage asset. The bridleway runs directly towards the city centre, intersecting with the main road/cycleway network close to Addenbrooke's Hospital.

25. An opportunity exists to develop an innovative local public transport system with high frequency and on-demand bus services, as well as a testbed for autonomous transit, active travel, micro-mobility and mobility hubs, all of which will future proof travel to, from and around the site in a sustainable way (see plan on the next page).






A11
CAMBRIDGE
A1307
Babraham
A
B
C
GRANTA PARK
Little Abington
Great Abington
Hildersham
A505
A11
A1307
HAVERILL
KEY:
PROPOSED LOCAL PUBLIC TRANSPORT SYSTEM
MAIN DEVELOPMENT TRAFFIC ROUTES
ACTIVE TRAVEL LINK OVER A11, USING EXISTING BRIDGE
A MAIN ALL PURPOSE ACCESS ONTO A1307
B POTENTIAL LEFT IN/LEFT OUT ONLY ACCESS
C BUS ONLY ACCESS INCLUDING SHUTTLE WORKING OVER A11 BRIDGE
TRAFFIC SIGNALS FOR SHUTTLE WORKING/BUS PRIORITY AT CONNECTION WITH THE A1307 TO THE WEST OF THE A11
SITE BOUNDARY
EXISTING BUS STOP (FROM GOOGLE MAPS)
PROPOSED BUS STOPS
PROPOSED PARK & RIDE HUB (SHOWN INDICATIVELY)
DEDICATED BUS ROUTES TO/FROM PROPOSED PARK & RIDE HUB
NOTES:
1. DRAWING IS BASED ON DIGITAL OS MAPPING.
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N
Indicative
CREATE
REV
DATE
AMENDMENT DETAILS
DRAWN
APPROVED
Telephone: 01603 877010
PROJECT
LAND NEAR A11/A1307 JUNCTION
SOUTH CAMBRIDGE
DRAWING TITLE
POTENTIAL ACCESS STRATEGY
WITH NEW BUS ROUTING OPTION
CLIENT
GRANGE FARM PARTNERSHIP
DATE
07.12.21
DRAWING STATUS
INFORMATION
SCALE(S)
NTS
DESIGNED
MDA
DRAWN
MDA
CHECKED
JPC
APPROVED
JPC
JOB No
2465
DRAWING No
03/003
REVISION
-
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ORIGINAL SHEET SIZE - A1 Portrait

WHAT IS THE DEVELOPMENT SCHEME?

26. The project is still very much work in progress. However, the clear intention is to create a new small market town of the highest possible quality and innovation.

27. Conceptual masterplanning is the responsibility of Ben Bolgar, Senior Director of The Prince's Foundation (albeit he is operating in this instance in his private capacity). An adviser to the Building Better, Building Beautiful commission, and author of numerous works including Upton in Northampton, Nansledan in Newquay, Sherford in the South Hams, Barton Quarter in Nottingham and Swansea Bay campus, he is an acknowledged pioneer of good quality placemaking and urban design.

28. His objective is to achieve several objectives simultaneously:

a) An exemplar of modern town planning practice, drawing heavily upon the experience of Poundbury, Nansledan, Upton, Sherford and other acclaimed major development schemes in which he (and in most cases the Prince's Foundation) has been involved; and equally rejecting the homogenous development schemes which are all too frequently delivered by the major housebuilders. This means full integration of private & affordable homes and workplaces; walkable neighbourhoods, where a good range of services are available within just a few minutes' walk of people's homes; pedestrian and cyclist priority, and measures to discourage the use of cars; a high level of communal facilities (meeting/co-working space, allotments, library of things); and high levels of integrated landscaping, play space and amenity space.

Nansledan, Cornwall, winner of RIBA South East award 2021 providing 4,000 new homes and 4,000 jobs.

b) The development of a new tradition in architecture that is respectful to local while adapting to align with new building practice and which is informed by local input and engagement. Ben is an exponent of "building beautifully", with close attention paid to scale, proportion, detailing, materials and colour while designing out unnecessary clutter such as road signs, utility boxes, bin stores etc. which so often degrade the environment.

The Natural House, at the Building Research Establishment's Innovation Park.

c) A pioneering approach to energy management. Already a feature of Ben's earlier work at the BRE, in the post- COP26 world this is particularly topical and vital. The intention is that Grange Farm should set new standards in efficient energy management, through an energy strategy being one of the building blocks of the scheme from the outset. SNRG have already been commissioned to devise a comprehensive plan for energy optimisation, and their initial prospectus is attached as Appendix 3.

d) A masterplan that is capable of being implemented efficiently and relatively swiftly, enabling the Grange Farm development to start to contribute to meeting the housing needs of the area at an early date. This is particularly important if the potential of the science-based locations is not to be thwarted. The promoters are investigating the possibility of some of the housing being tied via Section 106 agreement to jobs at say Granta and/or Babraham, so as to establish a very direct complementary link.

e) A scheme that will blend into its surroundings, both environmentally and in terms of human settlement and infrastructure. The objective is to enhance the facilities available to existing residents of the area, without significantly changing the environment with which they are familiar.

f) The new town will contain extensive green areas, and biodiversity enhancement will be a key objective. However, within a given area of land, there is a limit to how much biodiversity enhancement is consistent with the scale and density required to achieve the sustainability and other benefits which are sought. For this reason, the promoters of Grange Farm propose to link the new settlement with an ambitious programme of biodiversity enhancement on other land within their control nearby. This is explained in the next section.

g) The design of the new town will be shaped through an Enquiry by Design style process that brings together key stakeholders to collaborate on a vision for Grange Farm with every issue being drawn and discussed. This type of engagement is an important tool in developing sustainable communities; delivering masterplans based on enduring design principles, and developing the place-making skills of all participants in the workshop process.

29. It is early days, but a concept masterplan is already emerging from the drawing board, looking like this:

LANDSCAPE FRAMEWORK

Areas of public open space
Including parklets and community greens

Existing areas of woodland
To be retained, managed and enhanced

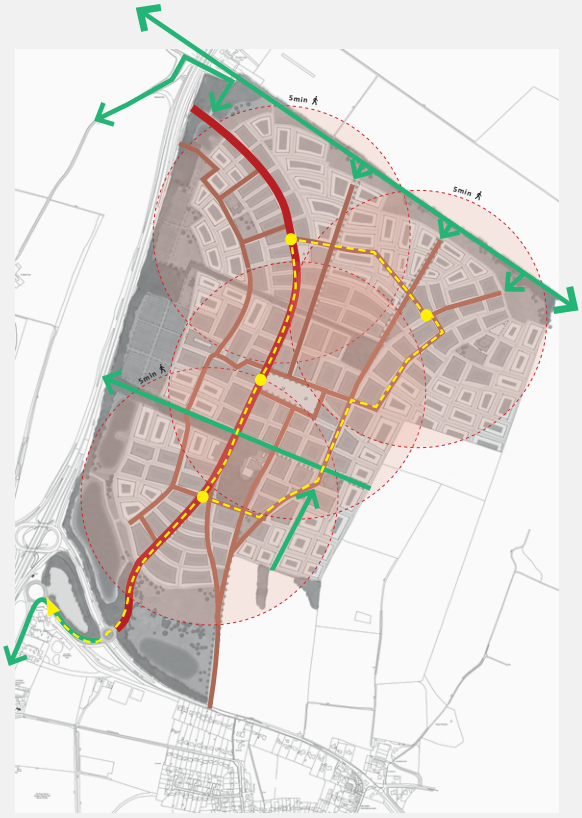
Playing fields and sports

New areas of woodland and tree planting

Gardens

Proposed water body

Avenues and key green streets



MOVEMENT

500m = approx. 5m walk

Main street

Secondary street

Active travel routes

Local public transport system

30. It will immediately be apparent that this is an intelligent plan which reflects the landscape, preserves existing hedgerows and trees, and includes generous areas of green space. It has a distinct urban form, which will give it character and legibility, and the relatively fine-grain block structure makes for permeability and the ability for people to get easily (and without cars) between their homes, workplaces, schools, shops, community facilities and leisure places. It incorporates the SNRG Smart Grid and Hub principles which are explained in Appendix 3.

31. The designers' mantra is to aim to provide a minimum of "one job, one parking space, one fruit tree, one bird box and one bee brick per house", though they are encouraged to do even better.

32. When fully developed, this market town is expected to accommodate approximately 4,000 to 5,000 homes and a variety of workspaces capable of accommodating a similar number of jobs.

Sherford won 'Large Residential Development of the Year' 2020, providing 5,500 new homes with Nick Tubbs as Strategic Developer and Ben Bolgar as Masterplanner.

THE BIODIVERSITY ENHANCEMENT STRATEGY

33. The Grange Farm Partnership is committed to biodiversity enhancement and the delivery of a minimum of 20% Biodiversity Net Gain (BNG) in line with the Cambridge Biodiversity Strategy. This will be informed with the benefit of detailed ecological surveys and the use of the latest DEFRA metric to calculate a series of biodiversity gains and a range of habitats both on and off site. Grange Farm BNG will be positively prepared on the basis of an evidence base that is effective and fully compliant with national policy as recently set out in the 2021 Environment Act and consistent with the 25- year Environment Plan and the NPPF.

34. The Cambridge Biodiversity Strategy 2021 – 2030 notes that comparison with other parts of the UK, Cambridgeshire has some of the lowest proportions of Priority Habitats and land designated for nature conservation and the second lowest proportion of woodland coverage.

Across Cambridgeshire, a large area is now characterised by arable farmland, such as Grange Farm, and there is relatively little accessible green infrastructure for people. Grange Farm would help to actively restore the quality of the natural environment in the area and create extensive areas of green infrastructure accessible to all. It would also help support a number of local initiatives including:

- **Natural Cambridgeshire Doubling Nature Vision** *(https://naturalcambridgeshire.org.uk/wp-content/uploads/2019/07/Doubling-Nature-LR.pdf)*
- **Cambridge Nature Network** *(https://www.cambridgeppf.org/cambridge-nature-network)*
- **South Cambridgeshire District Councils Doubling Nature Strategy** *(www.scambs.gov.uk/media/16668/digital-final-doubling-nature-strategy.pdf)*

35. Grange Farm will deliver:

- A quantified biodiversity impact accounting metric that is applied to the masterplan
- A series of land parcels would be identified to be put into long-term biodiversity management for the purposes of enhancing nature conservation at a significant scale. This will be informed by the strategic objectives for nature across the county and will deliver a minimum of 20% gain over and above the losses from the development.
- A series of priority habitats will be created including lowland meadows, wet woodland and lowland mixed deciduous woodland
- A detailed biodiversity management plan will be prepared to deliver the net gain benefits
- The implementation of a site-wide tree planting strategy to help mitigate the effects of climate change through carbon storage
- As well as planting trees, an area will be set aside to deliver agroforestry

"Grange Farm is committed to biodiversity enhancement and the delivery of a minimum of 20% Biodiversity Net Gain (BNG) in line with the Cambridge Biodiversity Strategy"

WHO IS BEHIND THE SCHEME?

36. Grange Farm is a joint venture between the current owners, and Grange Farm Partnership.

37. The Directors of Grange Farm Partnership, Nick Tubbs and Ben Bolgar, have considerable experience of, and enthusiasm for, high quality placemaking. Ben Bolgar's credentials have been outlined above. Nick Tubbs was the originator of the new settlement of Sherford, near Plymouth, which is now being built; and, more recently, of the much praised Barton Quarter in Nottingham as recently visited by the secretary of state and featured in the Sunday Times on 14th November 2021.

38. Since the Grange Farm opportunity was identified, only a few weeks ago, they have already appointed a team of leading professionals to undertake the initial analysis and design work. This team is outlined below:

39. The developer's intention is to take a stewardship approach to the scheme, retaining a long-term interest in key parts of it, and exercising ongoing management. Thus planning control will be supplemented with ownership-based control, making doubly sure that what is built will achieve the highest standards.

40. Their attention is to manage the development process very carefully, entrusting the responsibility for development to a small number of carefully-selected partners. This approach cuts out any middle party, thus ensuring that the maximum amount of value can be re-invested in the scheme and its infrastructure. It also means opportunities for small and medium sized enterprises, and self/custom builders, who struggle to find such opportunities in conventional "housebuilder" schemes.

Conceptual masterplanner:	Ben Bolgar
Planning consultants:	Roger Hepher, hgh Consulting and EIA
Transport:	Andy Cameron, Andrew Cameron Associates
Infrastructure:	Jonathan Cage, Create Consulting Engineers
Landscape & ecology:	Patrick James, The Landscape Agency
Development consultant:	Charlie Dugdale, Knight Frank
Energy:	Richard Scott, SNRG
Archaeology:	Rob Wiseman, Cambridge Archaeological Unit
Legal:	Iain Gilbey, Pinsent Masons Farrer & Co

"Their attention is to manage the development process very carefully, entrusting the responsibility for development to a small number of carefully-selected partners."

THE STEWARDSHIP MODEL

41. The Building Better Building Beautiful Commission concluded that the common factor amongst the best developments was long-term stewardship. The stewards of the best developments adopted a markedly different approach because they had a financial interest in the long-term success of that development, whether through land ownership, or through retention of developed commercial interests.

42. The approach at Grange Farm will be to assume a stewardship role in conjunction with the landowner and the community. Opportunities to retain long-term commercial interests will be favoured over short-term disposals, and income producing assets will be endowed to community trusts to ensure they have the appropriate financial stability. The stewardship model encourages reinvestment into the community and ensures land value is captured locally, as opposed to being distributed to shareholders. Poundbury has demonstrated this by contributing £100m GVA to the regional economy. Grange Farm should be double this figure.

43. The stewardship model is fundamentally different from the 'housebuilder model', where the emphasis is on selling everything other than the roads and open spaces (which will normally be adopted by the local authority) as soon as possible. Instead, the stewardship model will work with

housebuilding partners but rather than disposing of land outright and leaving housebuilders to their own volition, the model will form longer-term partnerships with SME builders thereby minimising the cost of land. Removing the pressure of a large up-front land cost is critical because it facilitates a longer-term view which, in turn, rewards decisions that favour the future community.

44. Throughout the project, the landowning Steward will adopt a role of 'patient participation' whereby it curates the development in accordance with an agreed set of principles – a project Charter that will bind all stakeholders. This Charter will establish the design and delivery standards, local governance structures, arrange community ownership of key infrastructure, and impose covenants to retain the quality and integrity of the estate whilst encouraging good neighbourliness.

45. Ben Bolgar and Charlie Dugdale pioneered the research and content for the BBBB Commission and are founders of the Stewardship initiative.

"The stewardship model encourages reinvestment into the community and ensures land value is captured locally, as opposed to being distributed to shareholders."

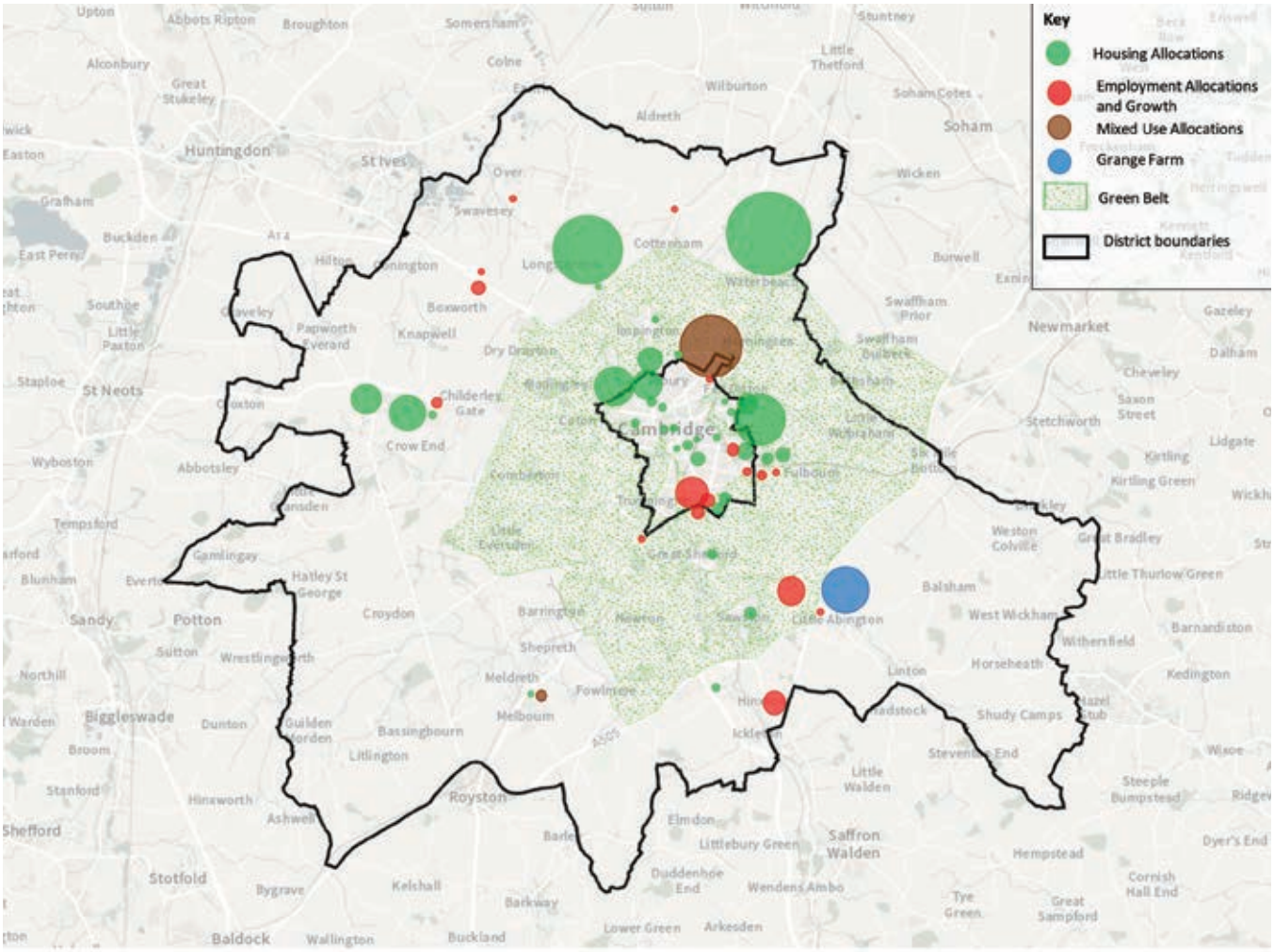
WHAT IS SOUGHT?

46. As noted above, Cambridge City Council and South Cambridgeshire Council face a challenge in preparing a Local Plan that both meets the admirably high standards of sustainability they have set, and also the needs of one of the UK's most dynamic local economies.

47. The Regulation 18 draft plan is based on identifying sites for 11,600 new homes. This is the least ambitious of the three options the Council has considered. The most ambitious would see this target increase to over 29,000.

48. Whichever option is eventually chosen, there is a need for a substantial amount of high quality housing to be provided in locations that will be suitable in every respect.

48. The currently tabled proposals represent a substantial mismatch between home locations and job locations. As is shown graphically in the map below, most of the proposed new housing is located in the northern part of the plan area, whereas much of the employment growth is in the southern part. The inherent unsustainability of this approach is plain to see. 4,000 to 5,000 homes at Grange Farm would help to correct this imbalance by putting quality homes very close to world class employment facilities.



49. The position is even less tenable when accessibility to good quality public transport and attractive cycle and pedestrian routes is factored in.

50. Moreover, much of the proposed major housing development is highly vulnerable to flooding by the middle of the century, as is clear from the map below, which shows in red areas expected to be below the annual flood level. Grange Farm is well away from this danger.

51. Grange Farm was not on the agenda when the Regulation 18 plan was prepared, so it could not realistically have been taken into account by the Councils. Now it is on the agenda, it is the hope of the developers that it will be taken as the seriously beneficial proposition that it is, and absorbed into the Regulation 19 Local Plan in due course. Grange Farm is also submitted in response to the Call for Sites exercise that is running parallel to the Local Plan consultation.

THE GRANGE FARM PARTNERSHIP

APPENDICES

Landscape

Archaeology

Energy

Water

Land at Grange Farm, Cambridgeshire

Landscape Appraisal

November 2021

TLA 1353-RP01

the landscape agency

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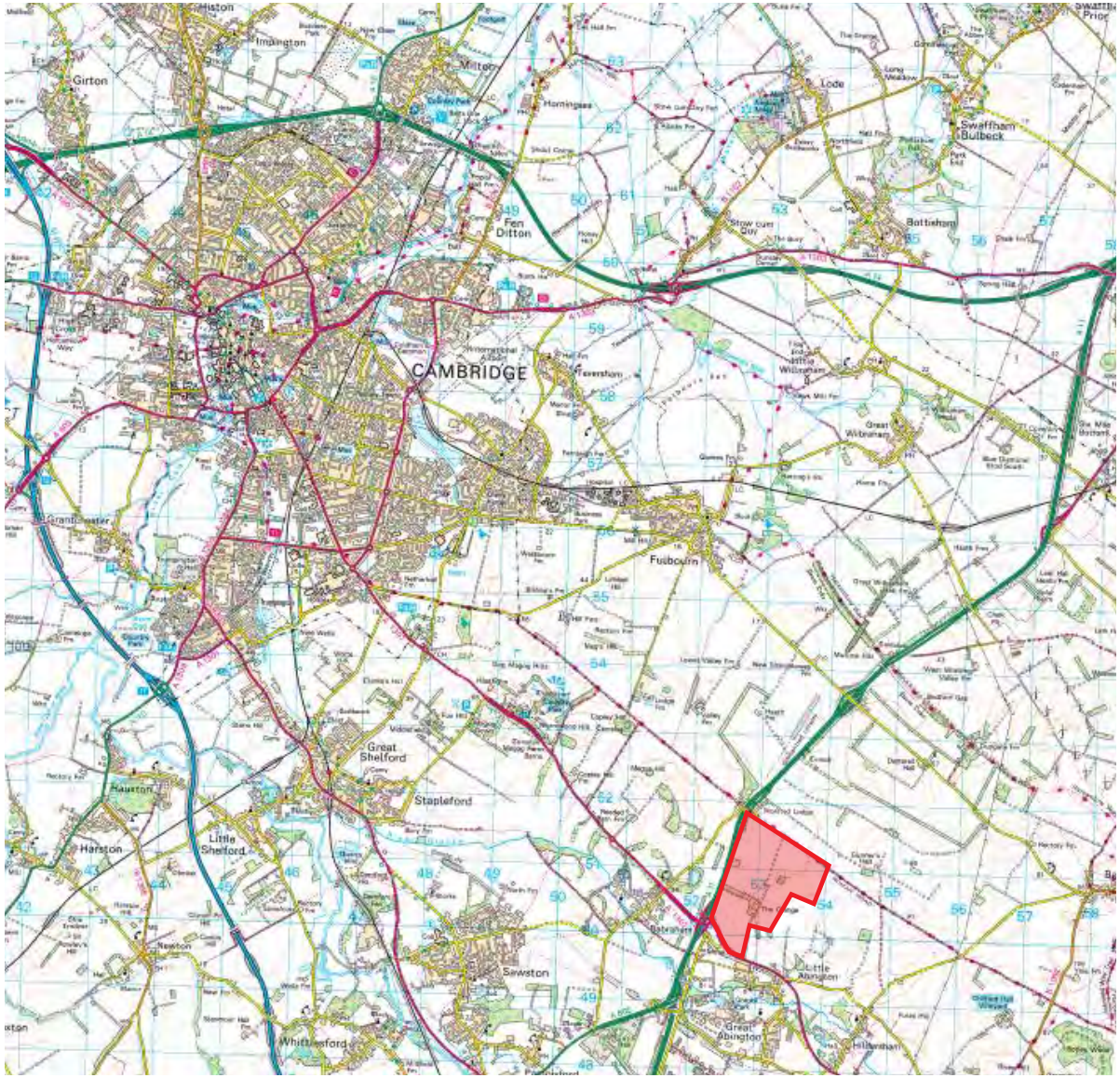
Introduction

1.1 INTRODUCTION

The Landscape Agency has been commissioned to undertake a Landscape Appraisal to support the promotion of land at Grange Farm, near the village of Little Abington to the south east of Cambridge.

The main aims of this report are to:

- Develop an understanding of the context, including landscape character and designations covering the site;
- Undertake an initial site appraisal of the landscape, documenting existing landscape features, access and boundaries, views and topography;
- Review the historic character of the site;
- Identify the constraints of the site and explore key opportunities for the proposed residential development.



▲ Wider Site Location (Ordnance Survey Map)

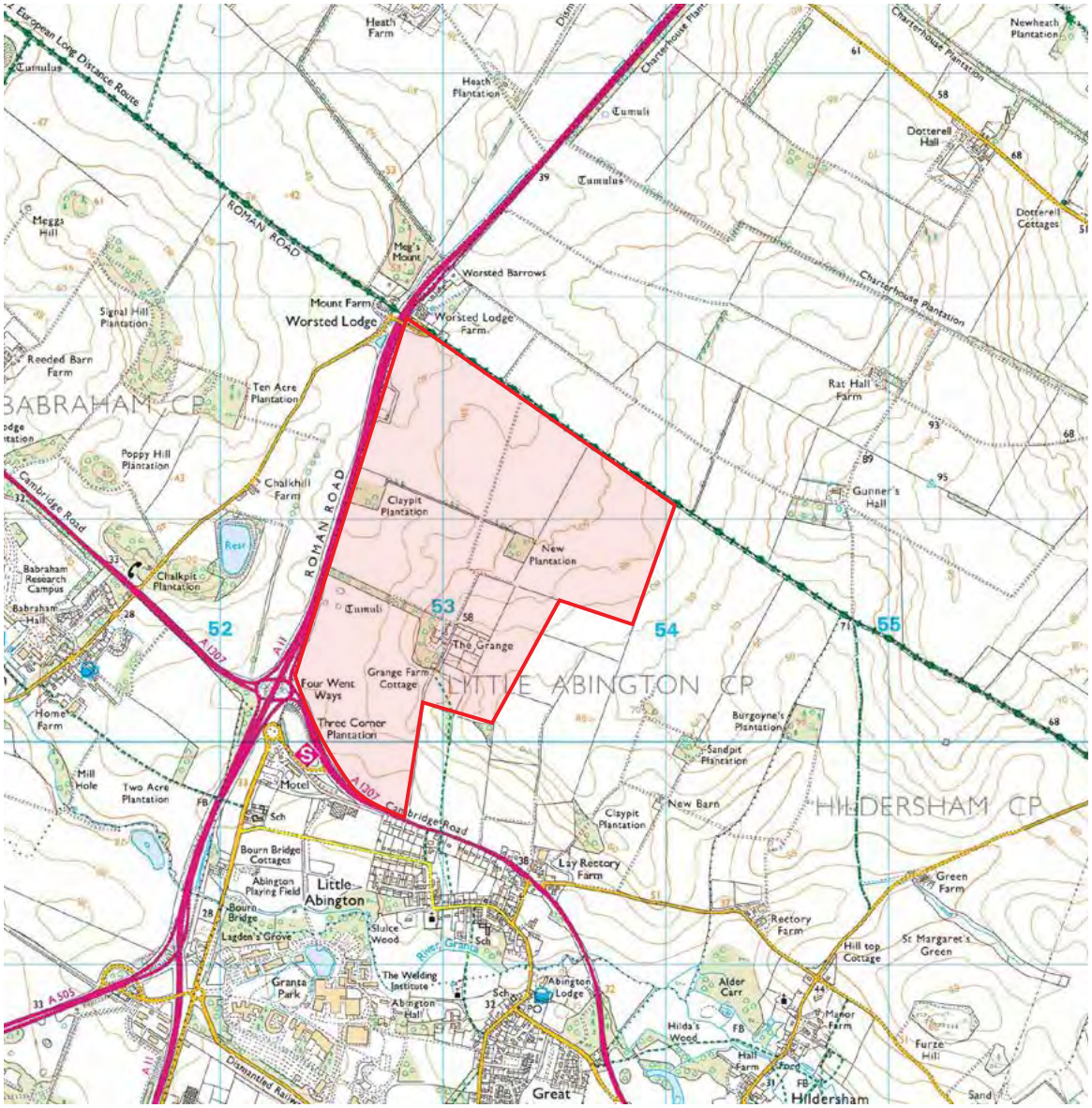

Wandlebury Country Park
N
PUBLIC RIGHT OF WAY
A11
Worsted Lodge
PUBLIC RIGHT OF WAY (ROMAN ROAD)
Gunner's Hall
A1307
Grange Farm
Babraham
Sawston Road
Sawston
High Street
A11
Little Abington
Granta Park
A505
Great Abington
▲ Site Location (Aerial Map)
Site Boundary
Public Right of Way

1.2 THE SITE

The site comprises approximately 184 hectares of farmland associated with Grange Farm located immediately to the east of the A11, approximately 7 miles to the south east of Cambridge. The site predominantly comprises agricultural fields dissected by hedgerows with three distinct areas of plantation woodland. Grange Farm, comprising of a farm house, cottage and outbuildings/ barns lies towards the south of the site.

The A11, Roman Road defines the sites western boundary, a major transport corridor connecting London to Norwich. Immediately to the north of the site is another Roman road, now providing a popular long distance public footpath, the 10 mile historic route is a designated Site of Special Scientific Interest and Scheduled Ancient Monument.

The closely linked villages of Little and Great Abington, known locally as the Abingtons, lie to the south of the site, with the River Granta separating little Abington to the north from Great Abington to the south. The villages offer a a range of community facilities and amenities including a primary school, village shops and services, village hall with cafe, public house and sports facilities including a football and cricket ground. Granta Park, a 120 acre science, technology and biopharmaceutical park, is also located to the south of the site. The park is home to over 30 leading technology businesses providing approximately 3700 jobs and includes on-site facilities such as restaurants, state of the art fitness centre and extensive landscaped grounds.



▲ Site Location (Ordnance Survey Map)

Site Boundary

2

Landscape Context

2.1 LANDSCAPE DESIGNATIONS

This section outlines the statutory designations that cover the site and its immediate context. It summarises designations, both at a national and local level. The Site does not lie within any statutory landscape designations such as National Park or Green Belt. The Site is not designated in terms of any local landscape designation. ***Designations within the surrounding area include:***

Cambridge Green Belt

The site does not fall within the Cambridge Green Belt, however the Green Belt is located immediately to the west of the site. Paragraph 134 of the NPPF defines the five purposes of the green belt:

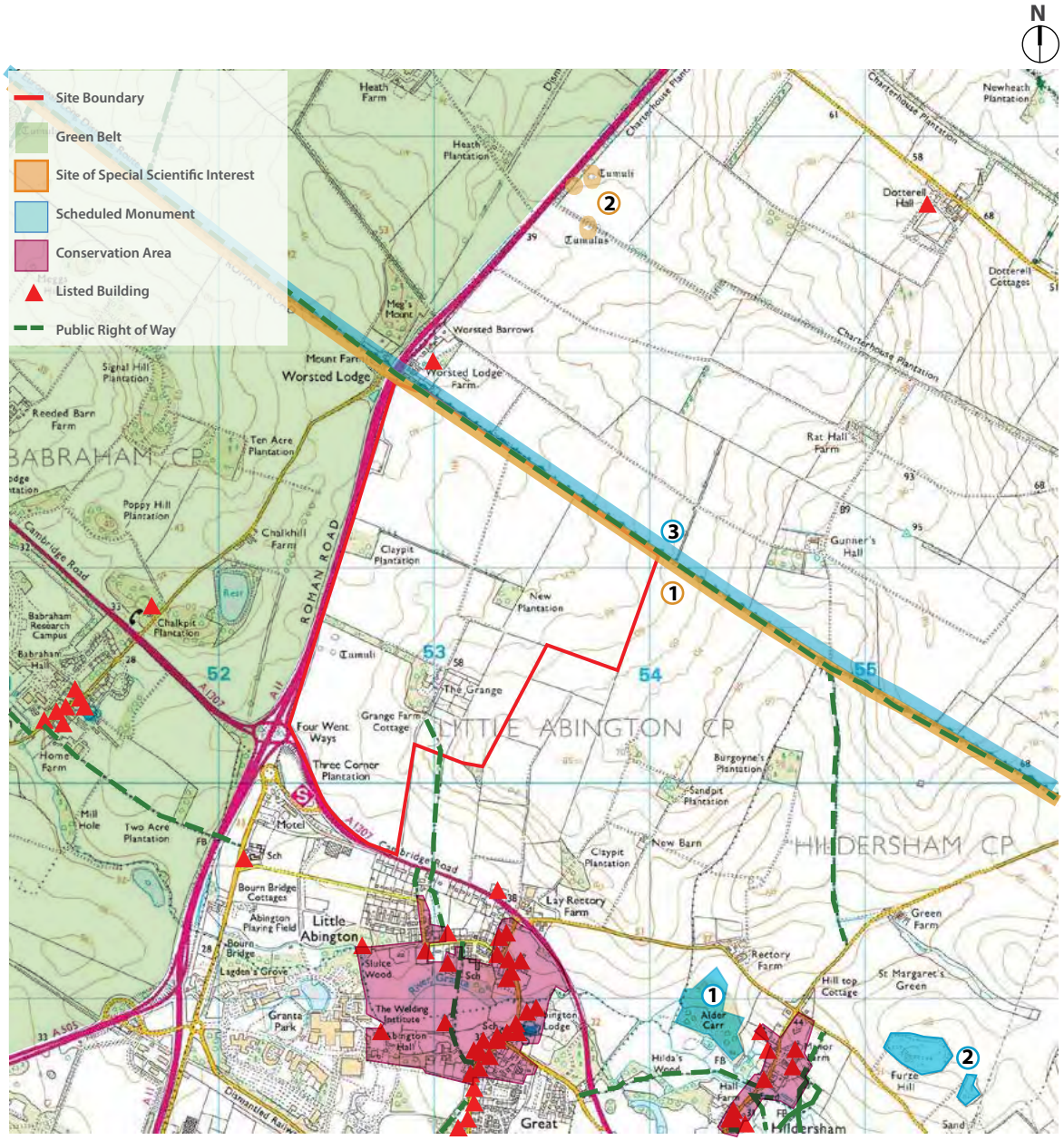
1. *To check the unrestricted sprawl of large built-up areas;*
2. *To prevent neighbouring towns from merging into one another;*
3. *To assist in safeguarding the countryside from encroachment;*
4. *To preserve the setting and special character of historic towns; and*
5. *To assist in urban regeneration, by encouraging the recycling of derelict and other urban land.*

Sites of Special Scientific Interest (SSSI)

1. **Alder Carr SSSI** lies approximately 1.6km to the south east of the site. The 6.7 hectare SSSI comprises a wet valley which has locally rare alder woodland on fen peat supporting a biodiverse ground flora providing valuable habitat to a host of invertebrates.

2. **Furze Hill SSSI** lies approximately 2.3km to the south east of the site. The 5.8 hectare SSSI is one of the few examples of a sandy habitat in the county, with steep banks of glacial deep sandy gravel supporting several rare plants. Both sites comprise private land with no public access.

3. **The Roman Road** lies along the sites northern boundary is a designated SSSI as well as a scheduled ancient monument. The route is colonised by valuable chalk grassland with a wide variety of wildflowers supporting an abundance of wildlife.



▲ Landscape Designations

Scheduled Ancient Monuments

1 **The Roman Road** defining the sites northern boundary is also a Scheduled Ancient Monument as well as a SSSI and popular Public Right of Way. The route is owned and managed by Cambridgeshire County Council.

2 **Bowl barrows** forming part of a dispersed round barrow cemetery dating back to the bronze age are located in Charterhouse Plantation woodland approximately 1.2km to the north of the site. Historic archeological earthworks such as these are typical landscape features of the locality and are found in large numbers across the wider area.

Conservation Areas

Great and Little Abington and Hildersham Conservation Areas are located to the south east of the site, designated to manage and protect the special architectural and historic interest.

Great and Little Abington Conservation Area is located approximately 0.3km from the site boundary and covers the historic core of the villages, including parts of Church Lane and the High street and the open space around the River Granta. The Conservation Area does not currently have a Conservation Area Appraisal. However, notable defining features of the Conservation Area include the numerous historic listed buildings with a wide variety of styles, scales and materials including the ornate flint rubble churches, distinctive timber framed, rendered, red brick and thatched buildings, flint walls and mature street trees.

Listed Buildings

There are numerous listed buildings within the nearby Conservation Areas of Great and Little Abington and Hildersham. The closest listed building to the site is Grade II listed Worsted Lodge Farmhouse (Listing number: 1127128) which lies along the northernmost corner of the site. The grand late eighteenth/ early nineteenth century farmhouse features buff gault bricks with plain tiled mansard roof. The farm is enclosed by a combination of dense woodland planting and high hedgerows which largely prevents views towards the site.

Views of the site from these buildings should be considered. However, the site is unlikely to contribute to an appreciation of the significance of any of these heritage assets.

Public Right of Way

The prominent Roman Road Public Right of Way/SSSI/Ancient monument runs along the sites northern boundary and forms part of a popular long distance circular route, the Fleam Dyke & Roman Road along with an extensive network of other public footpaths

A Public Right of Way also lies within the site boundary, providing a footpath from Cambridge Road in the south through to Grange Farm. Any proposals within the site consider access and users of this Public right of Way.

Views towards the potential development from the Public Rights of Way must be considered and will be explored later in this report.

2.2 LANDSCAPE CHARACTER

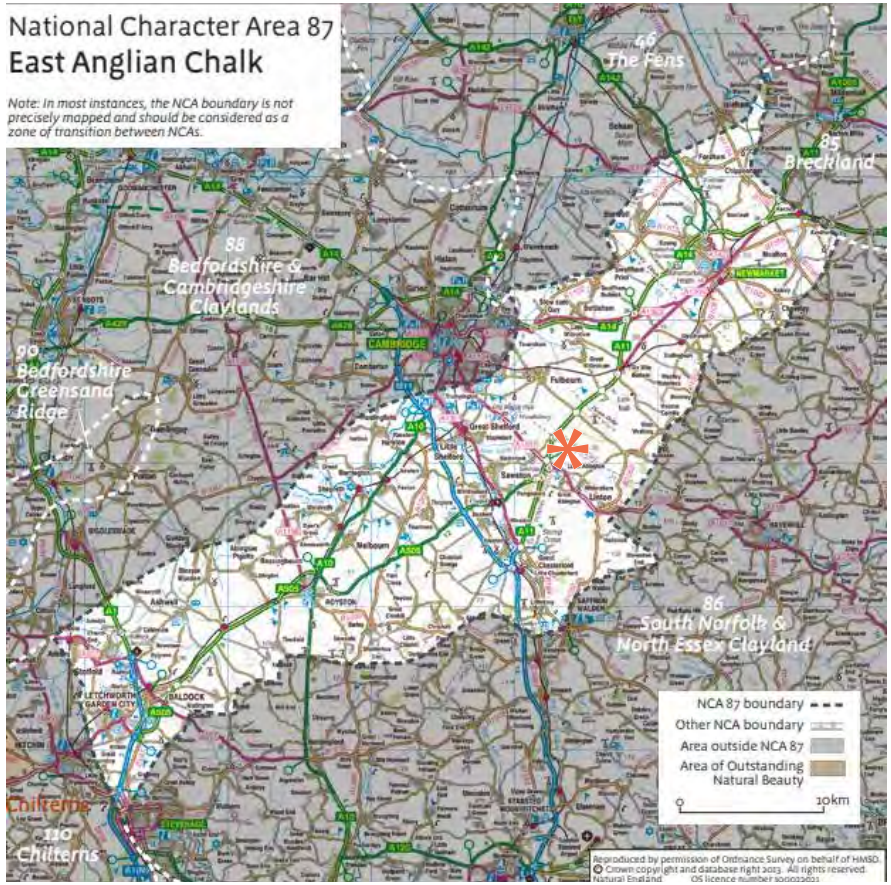
Landscape Character is assessed at different scales, from the national down to the county, district and site specific. Assessment of the landscape can help in:

- Understanding how and why landscapes are important;
- Promoting an appreciation of landscape issues;
- Successfully accommodating new development within the landscape; and
- Guiding and directing landscape change.

> *"Put simply, landscape character is what makes an area unique. It is defined as "a distinct, recognisable and consistent pattern of elements, be it natural (soil, landform) and/or human (for example settlement and development) in the landscape that makes one landscape different from another."*
>
> (Natural England definition)

2.2.1 NATIONAL LANDSCAPE CHARACTER AREA EAST ANGLIAN CHALK

A National Character Area (NCA) is a natural subdivision of England based on a combination of landscape, biodiversity, geodiversity and economic activity. There are 159 NCAs and they follow natural, rather than administrative, boundaries. They were revised and published in September 2014 by Natural England, the UK government's advisors on the natural environment. The site lies within **NCA 87: East Anglian Chalk**



▲ NCA 87: East Anglian Chalk boundary map

Site Location

KEY LANDSCAPE CHARACTERISTICS

NCA 87: EAST ANGLIAN CHALK

- The ***chalk bedrock*** shapes the landscape and has given the NCA its nutrient-poor and shallow soils.
- Distinctive ***chalk rivers***, the River Rhee and River Granta, flow in gentle river valleys
- The ***chalk aquifer*** is abstracted for water to supply Cambridge and its surroundings and also supports flows of ***springs*** and ***chalk streams***; features associated with a history of modification include watercress beds, culverts and habitat enhancements.
- The ***rolling downland***, mostly in ***arable production***, has ***sparse tree cover*** but ***distinctive beech belts*** along long, straight roads. Certain high points have small ***beech copses*** or 'hangers', which are prominent and characteristic features in the open landscape. In the east there are ***pine belts***.
- Remnant ***chalk grassland***, including road verges, supports ***chalkland flora*** and vestigial populations of invertebrates.
- The NCA is traversed by the ***Icknield Way***, an ancient route that is now a public right of way. Roads and lanes strike across the downs perpendicularly and follow historical tracks that originally brought livestock to their summer grazing. Today ***major roads*** and ***railways*** are prominent landscape characteristics of the NCA
- A rich mosaic of ***archaeological features*** include Neolithic long barrows and bronze-age cumuli lining the route of the prehistoric Icknield Way; iron-age hill forts, impressive Roman burial ***monuments*** and cemeteries; ***Roman roads*** and dykes; ***ridge-and-furrow*** cultivation remains and large numbers of later moated enclosures.
- Brick and 'clunch' (***building chalk***) under ***thatched roofs*** were the traditional building materials, with some earlier survival of timber frame. Isolated farmhouses built of grey or yellowish brick have a bleached appearance.
- Settlement is focused in small towns and in villages. There are a number of expanding ***commuter villages*** located generally within valleys. Letchworth Garden City is a nationally significant designed garden city

OPPORTUNITIES

The National Character Area profiles identify opportunities and guidelines to inform sensitive development across the NCA.

Key opportunities of NCA 36 & NCA 38 applicable to the site include:

OPPORTUNITIES

- Conserve the settlement character and create ***sustainable urban drainage systems*** and ***green infrastructure*** within new developments to provide ***recreation opportunities***, increase soil and water quality and enhance ***landscape character***.
- Include ***green infrastructure*** within new development and provide ***accessible greenspace*** and potentially creating new ***biodiverse grasslands***.
- Promoting the use of white and yellow ***brick*** and ***thatch*** in the north and west and red brick and ***flint***s in the east as ***traditional building materials***.
- Ensure that development is appropriate to the setting and incorporates suitable measures, such as ***tree planting*** and ***green buffers***.

2.2.2 LOCAL LANDSCAPE CHARACTER AREA

The Greater Cambridge Landscape Character Assessment was published on behalf of South Cambridgeshire District Council and Cambridge City Council in May 2020. The document, produced by Chris Blandford Associates provides an up-to-date and consistent Landscape Character Assessment of the whole Greater Cambridge area. The Landscape Character Assessment is an important tool used by the Councils to:

- *Develop an appropriate spatial strategy in the new Greater Cambridge Local Plan*
- *Develop suitable Local Plan policies to protect and enhance the area's sensitive, valued and vulnerable landscapes*
- *Develop design, place-making, sustainable development and climate change policies in the Local Plan*
- *Inform decision-making on planning applications*

The site is on the boundary between Character Areas:
8A: Pampisford Lowland Chalklands and **9D: Granta River Valley.**

The Landscape Character Area Assessment provides detailed descriptions of each Landscape Character Areas with recommended guidelines for managing landscape change. Information applicable to the application site include:

8A: PAMPISFORD LOWLAND CHALKLANDS

KEY LANDSCAPE CHARACTERISTICS

- Mature ***hedgerows***, small ***blocks of woodland*** and ***shelterbelts*** combine with occasional lines ***roadside trees*** to create a visually ***enclosed,*** intimate character.
- Scattered ***designed historic parkland*** features, including some ***modern developments*** of large science and technology research parks, in proximity to the River Cam and River Granta.
- Settlement pattern of ***scattered small villages*** on elevated ground at the edges of the River Valleys.
- Generally strong ***rural character***, locally ***interrupted by major roads*** cutting across the landscape.
- A ***long history of human habitation*** is indicated by the A11 which follows the route of a ***Roman road***, Brent Ditch, a linear Anglo Saxon earthwork, and the distinctive conical mounds of the Bartlow Hills which are well preserved Roman Barrows.

LANDSCAPE MANAGEMENT GUIDELINES

- Protect the sites and features of archaeological and historic interest
- Conserve and enhance existing hedgerows and consider opportunities for re-planting and restoration of hedgerows where these have been lost/become fragmented
- Manage planting of new trees and woodland in order to conserve open views of the undulating chalkland and emphasise landforms whilst improving biodiversity
- Manage existing woodland and plant new woodlands to maintain the wooded character

9D: GRANTA RIVER VALLEY LANDSCAPE CHARACTER AREA

KEY LANDSCAPE CHARACTERISTICS

- Designed ***parkland landscapes***, including modern development at Granta Park.
- Sense of ***separation*** between villages on elevated land in the neighbouring Lowland Farmlands.
- Time depth associated with ***historic routes*** into Cambridge
- Landcover comprises ***small pastoral fields***, ***paddocks*** and ***meadows*** enclosed by ***woodland***, ***shelterbelts*** of ***trees*** and ***robust hedgerows***. They are organised in an ***irregular*** pattern, with a combination of straight and sinuous boundaries.
- Views are ***generally short,*** visually ***enclosed,*** and occasionally framed by individual trees the relatively ***well treed A11*** crosses the LCA.

LANDSCAPE MANAGEMENT GUIDELINES

- Conserve and enhance the tranquillity and rural qualities of the river landscape.
- Conserve and enhance existing hedgerows.
- Consider opportunities for re-planting hedgerows and woodland where these have been lost/become fragmented.
- Protect sites and features of historic and cultural value.
- Identify, conserve and consider opportunities for restoring wetland habitats such as wet woodland, grazing marsh, grasslands and lowland meadows.

GUIDANCE FOR INTEGRATING DEVELOPMENT INTO THE LANDSCAPE

The Landscape Character Assessment also provides detailed guidance for Integrating Development into the Landscape for each landscape character type. Guidance relating to the site includes:

INTEGRATING DEVELOPMENT INTO THE LANDSCAPE

- Maintain the ***distinctive settlement pattern*** of the area and its local context.
- Avoid backland and cul-de-sac developments where possible.
- Ensure new developments are ***integrated*** with sufficient space for ***garden*** and ***street tree planting*** where applicable.
- Enhance village gateways and, where appropriate, consider provision of appropriate planting on village approaches, and ***retain hedges*** along roads.
- Take opportunities to create new ***village greens*** and/or ***wildlife areas*** within new developments.
- Ensure new developments ***integrate/connect with existing Public Rights of Way*** within development layout .
- Ensure new developments ***reflect the form***, ***scale*** and ***proportions*** of the existing ***vernacular building***s and pick up on ***traditional local building styles***, ***height***, ***materials***, ***colours*** and ***textures***.
- Enclose boundaries facing the street in village cores by low, or high, ***flint walls*** with ***brick detailing***, simple ***decorative railings***, ***picket fencing*** or ***hedging***.
- Enclose boundaries facing the street on village peripheries with ***hedge*** and ***tree planting***.
- Avoid the use of standardised and intrusive urban materials, street furniture, lighting and signage as part of traffic calming measures wherever appropriate.

3

Site Appraisal

3.1 EXISTING LANDSCAPE FEATURES

The site comprises agricultural fields surrounding grange farm immediately to the east of the A11. Defining features of the site are as follows:

Grange Farm

- Grange Farm reflects a typical farmstead of the area. It includes the main farmhouse with workers cottage and a collection of barns and agricultural buildings.

Access

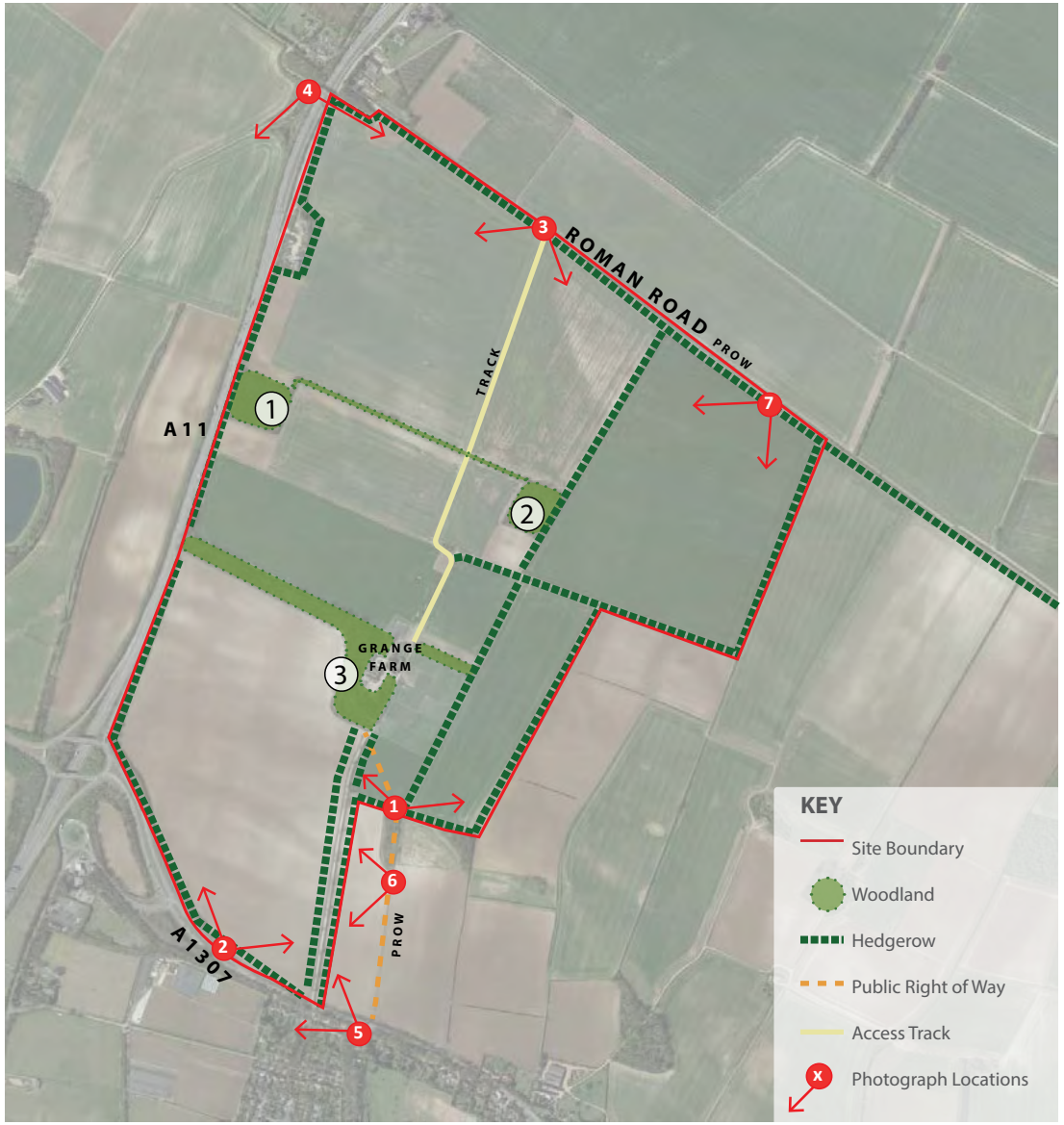
- The historic roman roads, the A11 immediately to the west of the site and the Roman Road PRoW immediately to the north, are defining features.
- A tree and hedge lined access track connects Grange Farm to the A1307. A private farm track continues through Grange Farm and links to the Roman Road PRoW to the north of the site.

Vegetation

- There are three distinct areas of historic plantation woodland within the site. These areas comprise Claypit Plantation (1), New Plantation (2) and woodland to Grange Farm (3).

Boundaries

- Field boundaries comprise mature native hedgerows.
- Within the site there is a network of hedgerows that define individual field boundaries connecting to areas of woodland.
- The hedgerow boundary to the Roman Road is especially well managed. With high dense growth of mixed species providing valuable shelter and food source for local wildlife.



▲ Existing Landscape Features

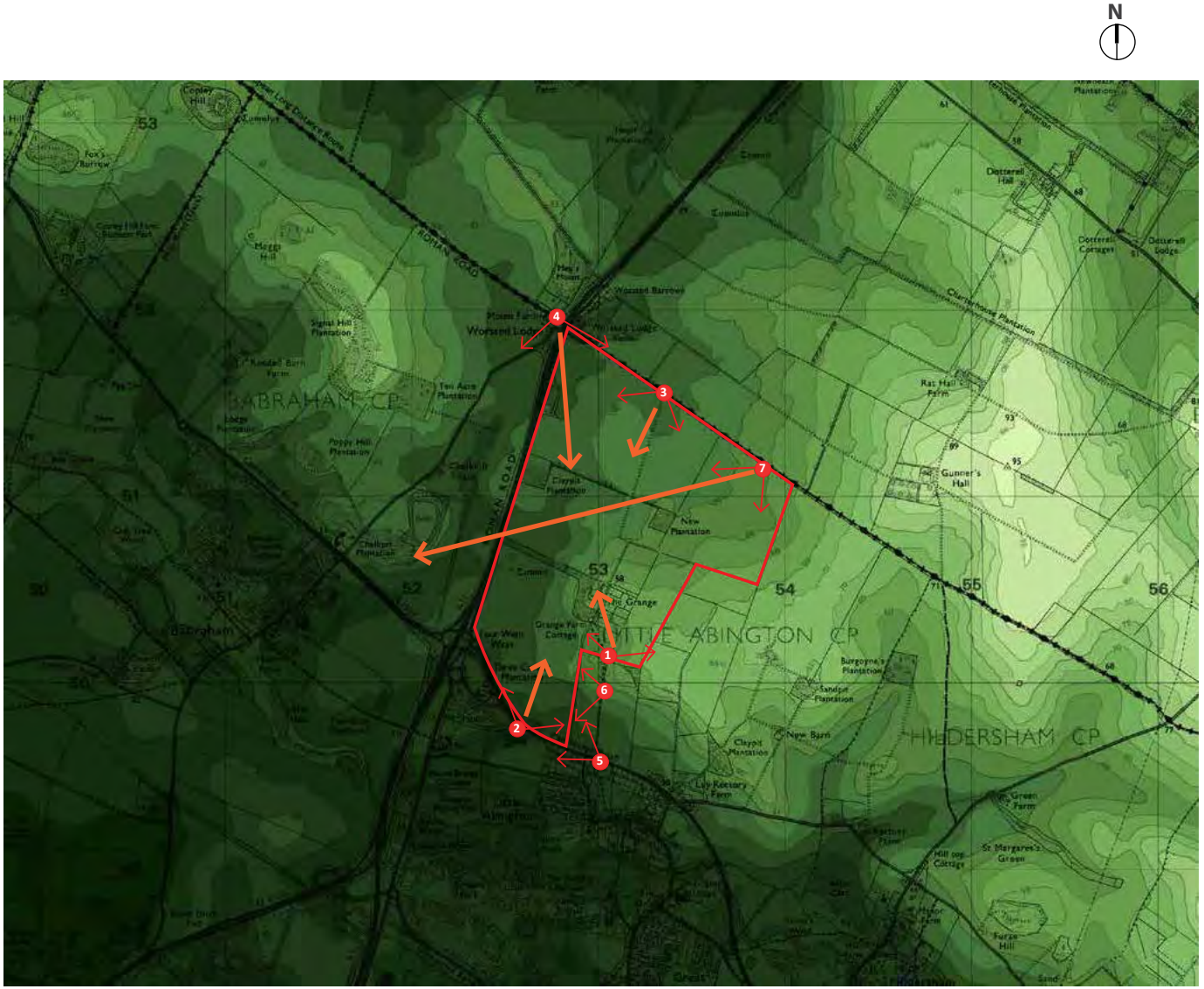
3.2 TOPOGRAPHY & VIEWS

Topography

- The site rises from west to east from a low point of approximately +35m to the south west corner of the site along Cambridge Road to a high point of approximately +65m on the eastern boundary.

Views

- In general the views into the site are limited by the gently sloping topography and mature hedgerows and trees. Native screen planting to the A11 and A1307 has established well and provides as successfully barrier to views from these roads.
- The main views into the site are from the south along a section of the A1307 and adjacent footpath, where the hedgerow is not as established and gappy.
- The Roman Road Public Right of Way to the north is enclosed on both sides by mature hedgerow over 2m in height that prevents clear views both south, into the site and north. Glimpse views into the site are obtained at occasional openings within the hedgerow for example field access.
- The A11 overpass also provide an elevated view across the northwest corner of the site.



▲ Topography and Views

Site Boundary

1 The Grange

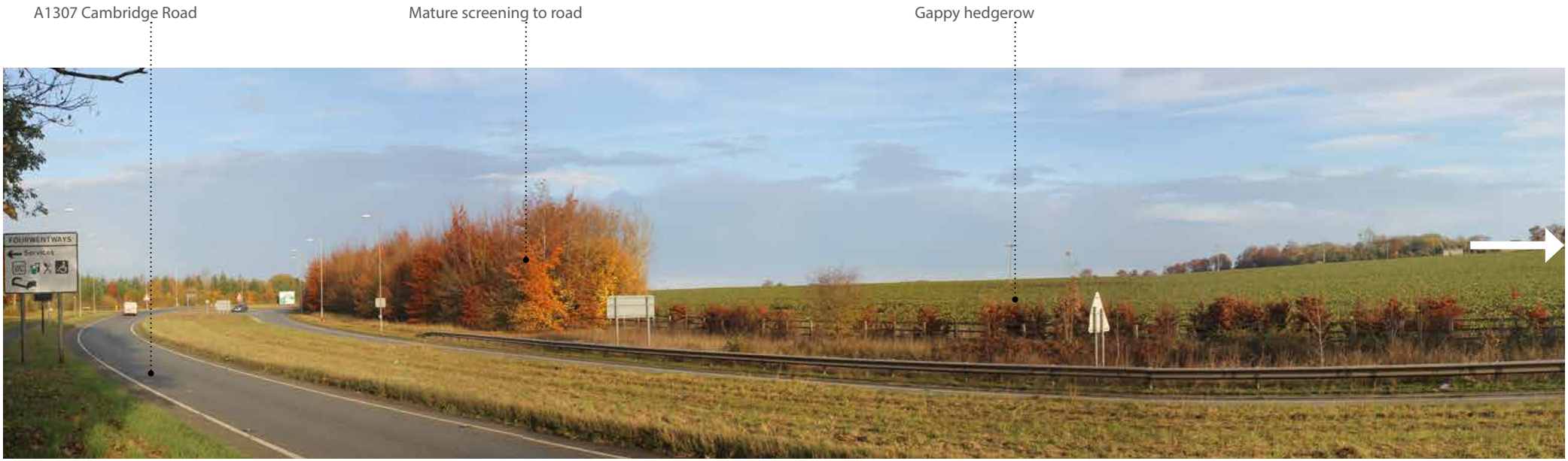
2 New Plantation

3 Claypit Plantation

4 Babraham Research Campus

▲ Photograph 1 - Looking north from PRoW towards Grange Farm

▲ Photograph 1 continued - looking north across farmland

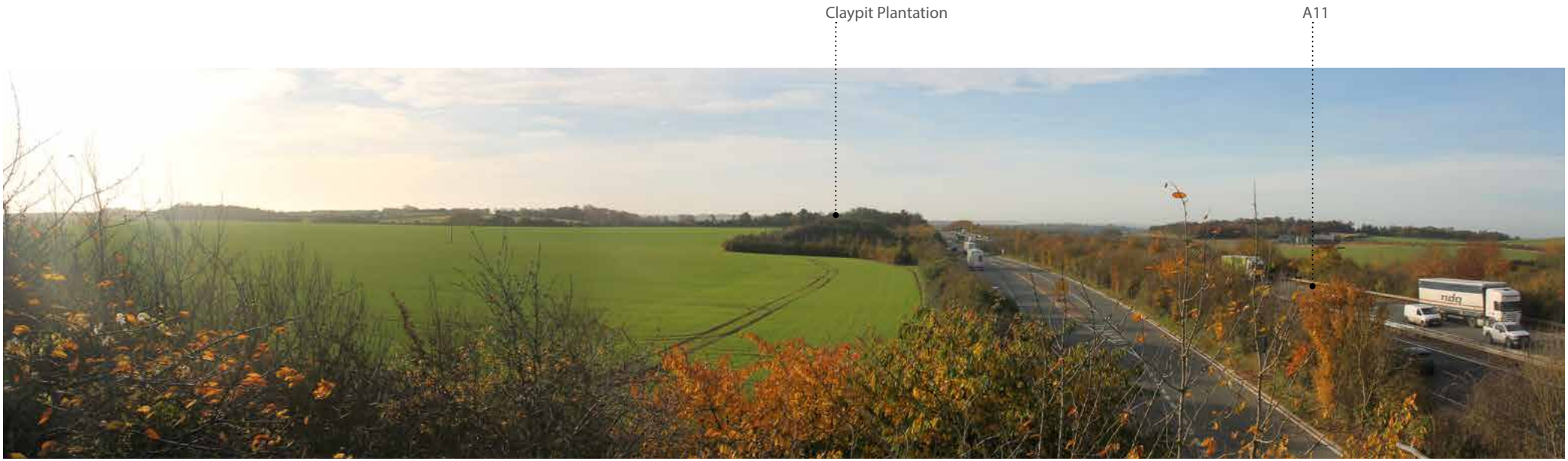


▲ Photograph 2 - Looking north from footpath adjacent to A1307

▲ Photograph 2 continued - looking north

▲ Photograph 3 - Looking south towards the site from Roman Road PRoW and opening in hedgerow for field access

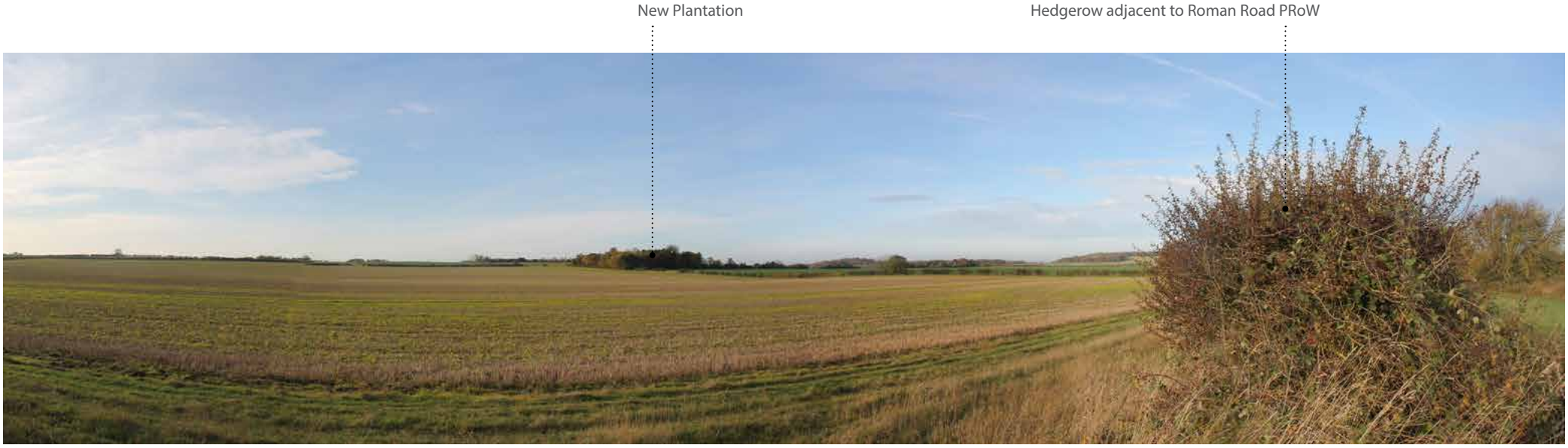
▲ Photograph 3 continued - looking north across farmland



▲ Photograph 4 - Looking southeast towards the site from A11 overpass

▲ Photograph 5 - looking west along A1307

▲ Photograph 6 - Looking west from PRoW towards southern end of the site and access to Grange Farm



▲ Photograph 7 - Looking southwest towards the site from Roman Road PRoW and opening in hedgerow for field access

3.3 HISTORIC LANDSCAPE DEVELOPMENT

A brief historic appraisal has been undertaken to help inform an understanding of the site. Comparing the 1885 O/S Map with an existing site aerial it is clear that the site itself is largely unchanged since the late 19th Century.

The landscape is characterised by late enclosures, most of which were created from common fields, with irregular field boundary enclosures suggesting this was a gradual, piecemeal process. The division of land remains largely unchanged, with the historic hedged field boundaries still present within the existing site.

The 1885 map also clearly shows the three areas of existing plantation woodland. The Map illustrates a further small plantation within the south eastern corner of the site, named 'Three Corner Plantation'. This area of woodland has been lost with the widening of the junction between the A11 and the A1307. Within the 1885, both the A11 and A1307 are shown as relatively narrow roads, both routes have expanded considerably into the major transport routes present today.

▲ OS 25-inch Map, 1885

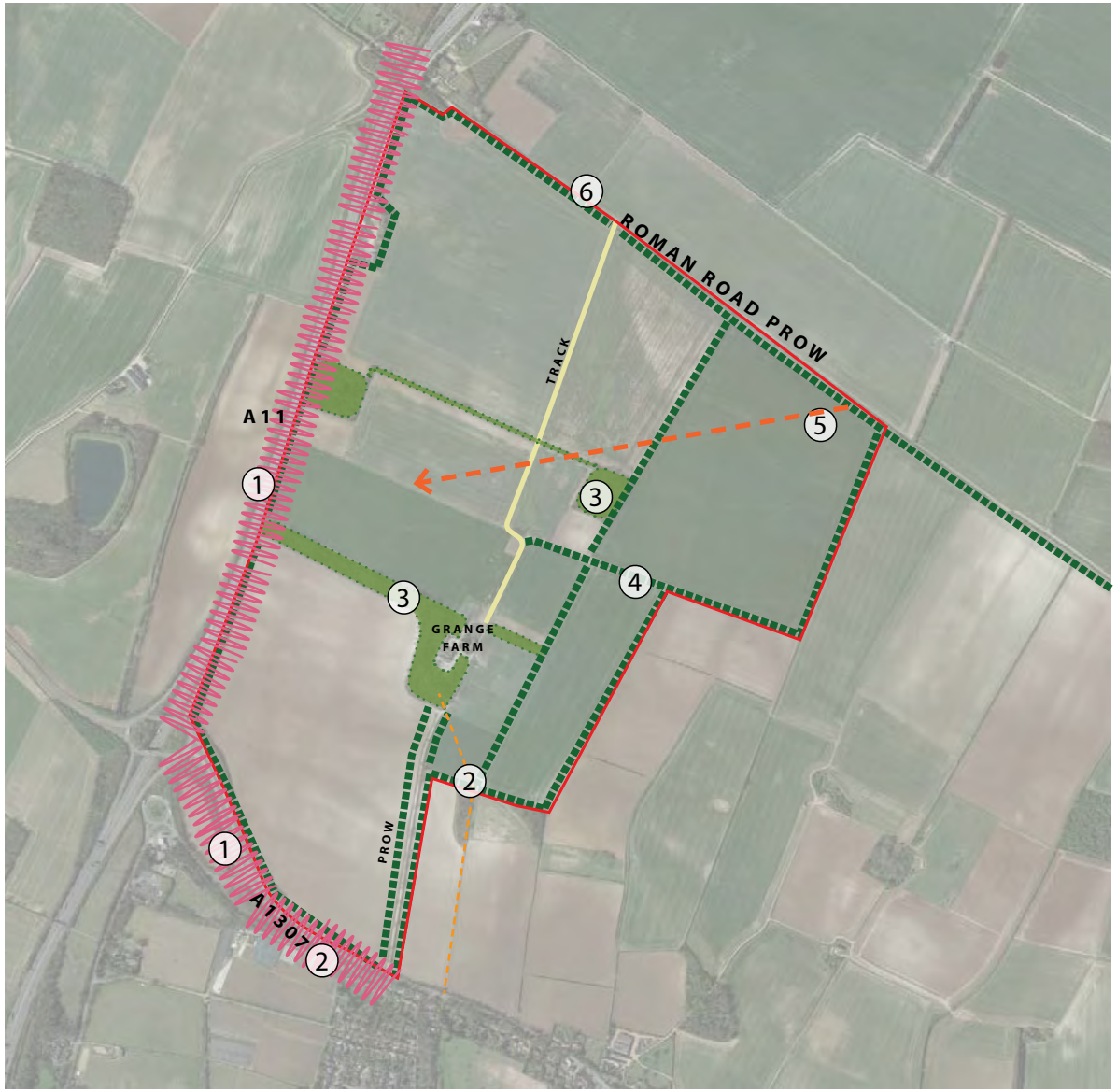
▲ Existing site aerial

4

Constraints & Opportunities

4.1 SUMMARY OF CONSTRAINTS

1. The A11 and A1307 form physical constraints to the west and south of the site and should also be considered in terms of noise and sound pollution. Appropriate mitigation should be included to ensure new dwellings are not negatively impacted by these roads.
2. Views from the existing Public Rights of Way should be considered.
3. The existing mature trees with and on the edge site should be retained and incorporated into areas of green infrastructure. Adequate root protection areas must be ensured and trees protected during construction works.
4. Hedgerows within and to the edges of the site should be retained wherever possible, preserving the historic field pattern. Maintain adequate root protection areas and protection during construction works.
5. Where possible, development proposals should retain far reaching views out to the rural landscape to the west.
6. The Roman Road is a key feature of the local landscape. This should be protected and conserved as a Public Right of Way, Site of Special Scientific Interest and Scheduled Monument.

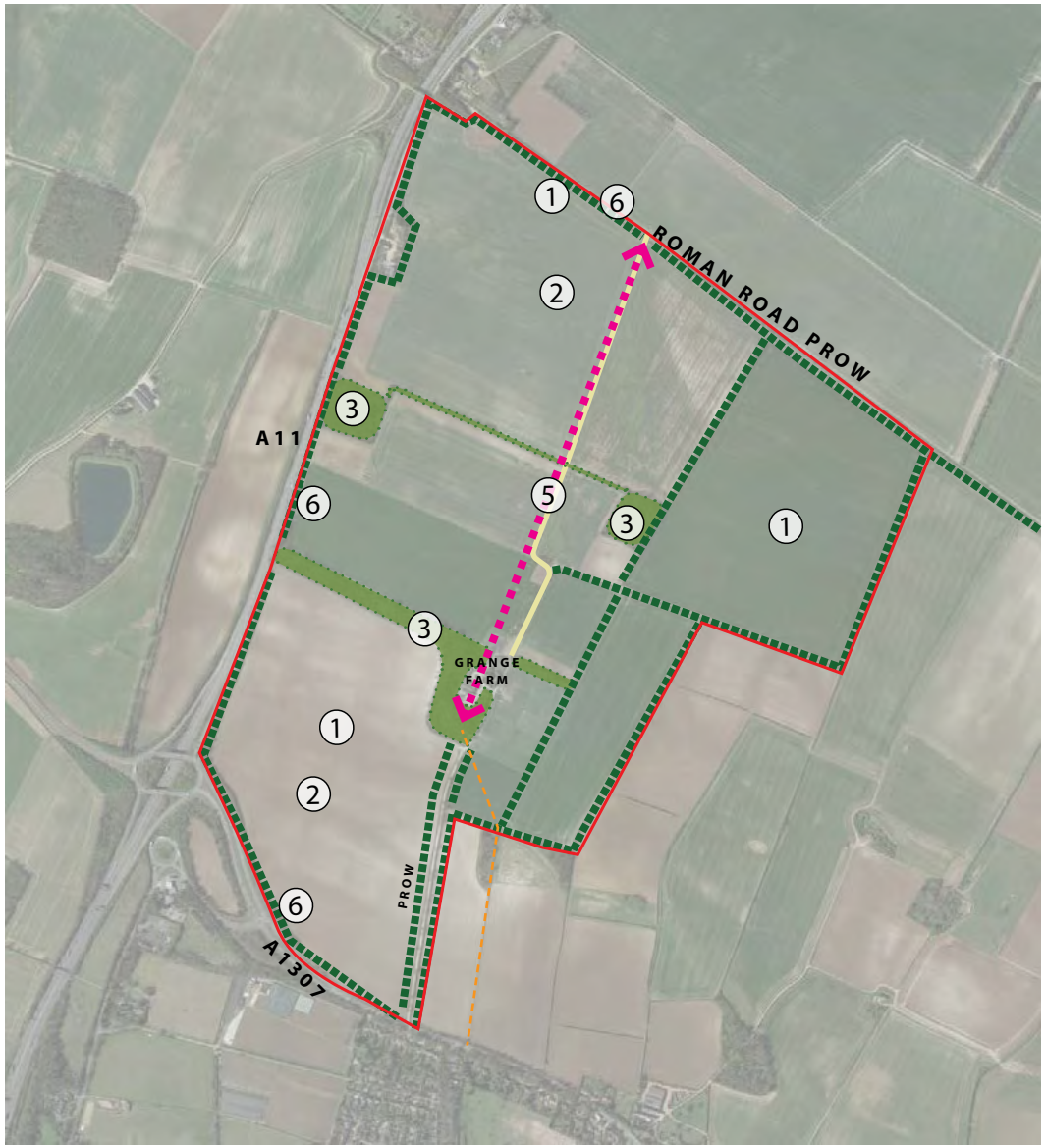


KEY

- Site Boundary
- Hedgerow
- Public Right of Way

4.2 SUMMARY OF OPPORTUNITIES

1. Enhance the landscape and ecological value of the site introducing a range of new native vegetation including trees, hedgerow creation and woodland buffer planting. Opportunities for extensive new tree planting advocating native, local species including Oak and Sycamore. Strengthen green corridors and the SSSI along the Roman Road.
2. Provide large areas of attractive, publicly accessible green space. Green space to include open areas for informal recreation, specimen tree planting, areas of wildflower meadow and bulb planting and potential community features such as a communal garden. Generous areas of open space will help integrate development with the wider rural setting to the west.
3. Retain existing woodland copses and hedgerows. The existing woodland should be celebrated within public open space, with opportunities to incorporate woodland walks and woodland play.
4. Opportunity to provide a range of high quality, energy efficient and sustainably sited homes.
5. Explore opportunities to create footpath links to the south and north to compliment the existing Public Right of Way network.
6. Strengthen the sites boundaries with individual and tree belt planting. To include native hedgerow trees. Along with providing additional screening to the site this will also establish valuable wildlife corridors with the wider landscape and establish a strong edge to the settlement.
7. Opportunity to incorporate sustainable urban drainage features including a potential attenuation body
8. Maintain a broad visual connection to the wider landscape and retain the sense of openness. Properties should be orientated to enjoy rural views to the wider landscape where possible.
9. Draw on the character of the surrounding landscape and reference local building materials.



▲ Summary Opportunities








The Roman Road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APPENDICES

Landscape

Archaeology

Energy

Water

Land at Grange Farm, Little Abington, Cambridgeshire

A Desk-Based Assessment

Author: Rob Wiseman
Graphics: Ellie Winter

CAMBRIDGE ARCHAEOLOGICAL UNIT

UNIVERSITY OF CAMBRIDGE

GRANGE FARM: LITTLE ABINGTON, CAMBRIDGESHIRE

Desk Based Assessment

commissioned by Devonport Property Consulting Limited

Author: **Rob Wiseman**
Illustrations: **Ellie Winter**

Report No. 1486

Approved by **Ricky Patten**

CAMBRIDGE ARCHAEOLOGICAL UNIT

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1. INTRODUCTION

1.1.1 The Cambridge Archaeological Unit (CAU) has been commissioned by the Devonport Property Consulting Limited to prepare an archaeological desk-based assessment for land being promoted for development through the Greater Cambridge Local Plan. The Proposed Development Area (PDA) covers approximately 186 hectares and lies north of the village of Little Abington.

1.1.2 The purpose of this desk-based assessment is to assess:

- the archaeological potential of the PDA
- the likely impact of previous land use on the survival of any archaeological remains
- the potential for impacts of development on the surviving archaeological resource within the PDA
- the potential impact of development on heritage assets nearby
- potential line of mitigation of affected heritage assets.

1.1.3 For the purposes of this report, archaeological and historical records were consulted for a search area extending one kilometre from the PDA's boundaries. The sources consulted are outlined in Section 5, and a detailed list of individual assets in Appendix 2.

2. SUMMARY OF DOVELOPMENT PROPOSALS

2.1.1 The client is proposing a mixed-use/mixed-income development. It would provide high quality housing and employment space locally within the PDA, as well as links to nearby employment centres such as Granta Park, the Babraham Research Campus and the Wellcome Genome Campus.

3. LOCATION, TOPOGRAPHY AND GEOLOGY

3.1.1 The PDA lies approximately northwest of the villages of Little Abington and Great Abington (Figure 1). Its western boundary follows the A11, and the southern boundary the Cambridge Road (A1307). The northern edge is defined by the Roman road between Haverhill and Cambridge, Worstead Street. The eastern edge is marked by hedges along the field boundaries.

3.1.2 Administratively, the PDA lies within the South Cambridgeshire District Council (Little Abingdon parish).

3.1.3 The PDA currently comprises arable farmland. It is divided into large fields bounded by hedgerows, with several small areas of plantation and woodland. At the centre are nineteenth and twentieth century farm buildings.

3.1.4 Topographically, the PDA lies in the low rolling chalklands of southern Cambridgeshire (Figure 2). The highest point is on the eastern boundary at c.60m, with a minor ridge extended into the centre of the PDA where the farm buildings of Grange Farm stand. To the north and northeast of the farmhouse, the land slopes very gently forming a tableland. To the west and especially the south, the land falls away, dropping into the River Cam valley. There is a pronounced ridge at the edge of the valley southeast of the PDA. The river itself flows between the villages of Great and Little Abington, c.450m south of the PDA's southern boundary.

3.1.5 The bedrock beneath the PDA comprises white chalk of the New Pit Chalk Formation. Overlying this, by the A11 in the north-western part of the PDA, is a small area of diamicton and later glacial sands and gravels of the Lowest Formation (British Geological Survey: Geology of Britain website, accessed 10 November 2021).

3.1.6 The soils are derived primarily from the underlaying chalk, and consequently are well drained and lime rich. In the southern field in particular, they are noticeably shallow. The UK Soils observatory records most of the soils on the site as “freely draining lime-rich loamy soils” grading to “shallow lime-rich soils over chalk or limestone” in the northern part of the PDA. Along the ridge to the southeast of the PDA, are “lime-rich loamy and clayey soils with impeded drainage” (Soils Observatory website, accessed 10 November 2021).

4. PAST AND CURRENT LAND USE

4.1.1 Almost all of the land within the PDA is currently used for agriculture, and has been so for a considerable period of time. Aerial photographs and lidar show plough headland and furlong boundaries over much of the PDA. The layout of fields on the Inclosure Award map of 1807 (Figure 12) has changed little in the past two centuries (Figures 13 and 14).

4.1.2 Historic maps and aerial photographs show areas of gravel and clay extraction in the western part of the PDA in the fields beyond – notably in the area of the 19th century Claypit Plantation at TL526511 beside the A11, dug to exploit the diamicton in that part of the PDA.

5. SOURCES CONSULTED

5.1 Topography

5.1.1 The topography of the site and wider search area was derived from lidar data produced by the Environment Agency (Environment Agency 2019). A relief map with contours of the site is shown in Figure 2. A high-relief hillshade plot shows the presence of former plough headlands across the PDA (Figure 15).

5.2 Cambridgeshire Historic Environment Record

5.2.1 The Cambridgeshire Historic Environment Record (CHER) supplied the data of known heritage assets and archaeological events within the PDA and surrounding search area. All of the heritage assets within the Study Area are listed in Appendix 2.

5.2.2 The location of aerial photographic surveys and archaeological works recorded in the CHER is shown in Figures 3 and 4 (apart from the National Mapping Programme, which covers the entire area shown in the figures). Scheduled monuments, listed buildings and historic hedgerows are show in Figure 5. Individual HER entries organized by archaeological periods are shown in Figures 6–11.

5.3 Historic mapping and records

5.3.1 Historic maps and records were sourced from the Cambridge University Library and the Ordnance Survey. Figures 12 – 14 show extracts from key historic maps covering the survey area. As noted above, there is strikingly little change in the field layout within the PDA in the two hundred years since the earliest map was drawn.

5.4 Aerial photographs

5.4.1 The CHER provided scans from aerial photograph surveys in its collection. A separate scan of photographs in Google Earth (1945, 2000, 2002, 2003, 2007, 2008, 2012, 2015, 2018, and 2020) highlighted a number additional features, including ploughed out barrows, plough headlands, trackways, and potential hollows in the chalk bedrock. These are described below (Section 8).

5.5 Site visit

5.5.1 A site walkover was carried out on 9 November 2021. Photographs of the fields and farm buildings were taken, along with the Roman road along the northern boundary (Figures 17–31). No evidence for buried archaeology was identified at sites already identified from aerial photographs.

5. ARCHAEOLOGICAL BASELINE

5.6 Archaeological excavations and surveys

5.6.1 A total of 29 archaeological events within the search area are recorded in the Cambridgeshire Historic Environment Record. The location of all archaeological investigations is shown in Figures 3 and 4. A list of the events is in Appendix 3. Work has included assessments of aerial photographs, geophysical survey (including part of the southern field of the PDA), archaeological evaluations and excavations, and monitoring of groundworks.

5.7 Scheduled Monuments

5.7.1 The northern boundary of the PDA abuts the Roman road of Worstead Street (or Wool Street) running between Haverhill and Cambridge, interpreted as part of the Via Devana (SM 1003263). The line of the road is well-defined for around 16 kilometres from near Horseheath and Streetly End in Suffolk to the Gog Magog Hills in Cambridgeshire. Along the boundary of the PDA, the road is flanked by tall banked hedges. The site is also listed as a Site of Special Scientific Interest (SSSI).

5.7.2 There have been three archaeological investigations on the road:

- Fox dug two slots across it in the Gog Magog Hills in 1921 (Fox 1923: 21–27)
- in 1959 when a gas pipeline was dug along it (Dewhurst 1964);
- four slots were dug in 1991 during widening of the A11 at Worsted Lodge (Malin et al. 1997).

5.7.3 The A11 excavations confirmed that the road was Roman in date, with an agger 3–5m wide surviving up to 0.6m high, flanked by ditches 14m apart. The road comprised a gravel surface on a rammed chalk foundation. The 1959 excavation found coal under the agger, suggesting a post-first century AD date. Molluscs were recovered from two layers of buried soil beneath the road at Worsted Lodge (Malim *et al.* 1997: 82–83). The earlier soil layer contained a mixture of snail species: some characteristic of open landscape and others of woodland, suggest a grass landscape spotted with scrub. The later, upper layer contained exclusively species from an open, treeless landscape, indicating either intensive grazing or cultivation in the area around Worsted Lodge.

5.7.4 Malim *et al.* (1997) noted the incongruity of the road as part of the Roman transport system, as its northern end does not extended to Roman Cambridge (it terminates halfway between the Iron Age hillforts at Wandlebury and War Ditches), and the southern end peters out before reaching the Roman town at Wixoe. The road runs parallel to the Fleam Dyke 2.8 kilometres to the northeast – and indeed, all of the four great Cambridgshire Dykes are parallel, as are many of the smaller field boundaries and some of the parish boundaries in this part of the county. As the Bran Ditch has recently been shown to have Early Iron Age precursors (Ladd and Mortimer 2017), it is possible that Worsted Road also follows an older Iron Age routeway.

5.8 Listed buildings

5.8.1 There are four Grade II* listed buildings in the search area and 26 Grade II listed buildings. They are listed in Table 1, and plotted in Figure 5.

5.8.2 The bulk of these buildings lie on High Street and Church Lane, Little Abington, and are between 500 and 1000m metres from the PDA. The exceptions are:

- Worsted Lodge, by the A11 just outside the on the PDA's northwest corner: a brick farmhouse built in the late 18th or 19th century
- The Temple, a 19th century brick lodge, now part of the Cambridge International School at Bourn Bridge Road (by the A11)
- three buildings on the Babraham High Street
- the 18th century Icehouse north of Babraham
- the 18th century Abington Hall, now part of the Granta Park research campus.

5.8.3 As is typical of Cambridgeshire, the oldest structures in the search areas are the two parish churches, both of which date from the twelfth century (1161650, 1309328). Most of the remainder are timber framed structures; some with thatching still intact. Just a few are constructed flint rubble or Gault brick.

Table 1: Listed buildings in the search area.

Reference	*Name*	*Grade*	*Date*
1127657	Abington Pottery (Little Abington)	II*	Late 15th/early 16th C., altered 18th/19th C.
1127722	Abington Hall and British Welding Research Association (Great Abington)	II*	1711, altered 18th C.
1161650	Parish Church of St Mary (Great Abington)	II*	Earliest parts c.1200
1309328	Parish Church of St Mary the Virgin (Little Abington)	II*	Earliest parts 11th C.
1127128	Worsted Lodge Farmhouse	II	Late 18th/early 19th C.
1127654	Walls and Plaques to Former Sluice on River Granta West of Parish Church of St Mary	II	1721
1127655	The Old Vicarage (33 Church Lane, Little Abington)	II	Early 18th C, remodeled late 18th C
1127656	4 Church Lane, Little Abington	II	Early 19th C.
1127658	The White House (46 High Street, Little Abington)	II	Late 15th/early 16th C., altered 19th C.
1127659	5 High Street, Little Abington	II	Late 17th/early 18th C.

Reference	*Name*	*Grade*	*Date*
1127718	Long Thatch (72 & 74 High Street, Great Abington)	II	Late 17th C.
1127720	Hall Farmhouse (86 High Street, Great Abington)	II	Early 16th C, altered late 17th and 20th C.
1127748	Brick Row (25-31 High Street, Babraham)	II	?18th C, altered 19th C
1163116	1 Church Lane, Little Abington	II	Early 19th C.
1163158	Jeramiahs Cottage (24 High Street, Little Abington)	II	16th or early 17th C., altered late 18th/early 19th C.
1163185	Damson Cottage (38 High Street, Little Abington)	II	18th C.
1309280	48 & 50 High Street, Little Abington	II	Late 17th C.
1309285	The Old House (7 High Street, Little Abington)	II	16th C, altered late 18th and 19th C.
1309297	Churchview (36 Church Lane, Little Abington)	II	15th/16th C, rebuilt late 17th.
1331110	The Icehouse (Babraham)	II	Mid/late 18th C
1331113	The George Public House (Babraham)	II	17th C, extended and altered 19th C
1331135	Coach House to North of Abington Lodge (High Street, Great Abington)	II	18th C.
1331149	Temple Cafe and Restaurant (Newmarket Road, Little Abington)	II	Early 19th C
1331186	8 Cambridge Road, Little Abington	II	17th C, renovated 20th C.
1331187	Princes Cottage (22 High Street, Little Abington)	II	Early 19th C
1331188	28, 30 & 32 High Street, Little Abington	II	17th C.

5.8.4 The historic buildings in Little Abington would be screened from the PDA by a combination of distance, topography and the intervening modern village. Likewise, the three listed buildings in Babraham would be screened by the position of hills, and are cut off from the PDA by the A11 and the busy Cambridge Road. The two buildings nearest the PDA – Worsted Lodge (50m) and The Temple (150m) – both have open fields to the east, and are also both very close to the A11 and its lay-bys.

6. CARTOGRAPHIC AND TOPONOMIC EVIDENCE

6.1 Place name evidence

6.1.1 The villages of Little and Great Abington derive their names from the Anglo-Saxon personal name **Abba*, with the element *-ing* signifying 'family of' or 'people associated with' Abba, and *-ton* indicating an enclosed settlement. Babraham is likewise Anglo-Saxon in origin, again based on a personal name **Beaduburh*, and the element *-ham* indicating a settlement or homestead. (Institute for Name Studies website).

6.1.2 Worsted Lodge takes its name from the adjoining Roman road, known in the 13th century as 'Woles Street' or 'Wolves Street'. An 1821 map records it as 'Woolstreet' or 'Worsted Street'.

7. HISTORIC HEDGEROWS

7.1.1 The Hedgerow Regulations 1997 defines hedgerows as historically significant if they have existed for at least thirty years, and meet one of the following criteria:

- The hedgerow marks the boundary (or part of a boundary) of at least one historic parish or township which existed before 1850
- The hedgerow incorporated or is associated with an archaeological feature in the list of Scheduled Monuments
- The hedgerow marks the boundary of a pre-1600 estate or manor recorded at the relevant date in a Sites and Monuments Record or in a document held at that date at a Record Office
- The hedgerow is integral to a part of a field system pre-dating the Inclosure Acts.

7.1.2 There are two hedgerows within the PDA which meet these criteria, shown in Figure 5.

- First are the parallel hedges running along each side of the Roman road and scheduled monument, Worsted Street (Figure 17). These form the northern boundary of the PDA and also lie on the parish boundary (shown in the Inclosure Award map dated 1803; Figure 12)
- Second are hedges running down part of the western edge of the PDA, along the A11, where it marks the parish boundary (also shown on the Inclosure map).

7.1.3 Several other parish boundaries within the search area are also marked by hedgerows, but they are outside the PDA and would not be impacted by development.

7.1.4 The hedgerows on the eastern boundary of the PDA correspond with field boundaries shown on the Inclosure Award map, but their straightness and lack of alignment with plough headlands suggests a nineteenth century origin, rather than a pre-existing field boundary.

8. ARCHAEOLOGY BY PERIOD

8.1.1 The following section summarizes entries in the Cambridgeshire Historic Environment Record, organised by period. The full list of entries in in Appendix 2.

8.2 Palaeolithic, Mesolithic and Neolithic

Figure 6

8.2.1 A Palaeolithic hand axe (CHER 11317B) was found by the River Cam during fieldwalking c.900m southwest of the PDA, ahead of excavation of a borrow pit. The location is in an area of River Terrace Gravels and was presumably deposited by glacial meltwater.

8.2.2 Late Mesolithic/early Neolithic activity was found in the same borrow pit in the form of three tranchet axes and a small number of blades/bladelets (CHER 11317). More late Mesolithic/early Neolithic flints were found 250m upstream where the A11 crosses the river (CB 14748) and at Granta Park (CB15306).

8.2.3 In situ Neolithic activity was found at the borrow pit (CHER 11317), where artefacts were recovered from soils trapped within periglacial solution hollows in the chalk. Similar finds have been made downstream at the Babraham Research Campus (Collins 2011, 2014, Wright forthcoming)

8.2.4 Neolithic axes have been found at just two points well away from the river, in the northern part of the search area (CHER 06238 and 06239) – 450m and 850m northwest of the PDA.

8.2.5 At the Cambridge International School, 350m southwest of the PDA, geophysical survey and trial trenching identified a probable Neolithic henge measuring c.65m in diameter (CHER 09356a). A nearby feature which had been interpreted as a long barrow from aerial photographs was found in excavation to be a natural solution hollow.

8.2.6 Aerial photographs and lidar suggest a number of potential chalk hollows within the PDA – notably at TL 53280 50230, TL 53050 51480 and TL 52940 51480. Excavations on chalkland sites elsewhere in Cambridge have found these features sometimes contain substantial assemblages of Mesolithic/Neolithic material. They include both riverside settings (such as the borrow pit or Babraham Research Campus excavations noted above) and also similar dryland chalk sites (e.g. Melbourn, Ladd 2019).

8.3 Bronze Age

Figure 7

8.3.1 There is widespread evidence of Early Bronze Age activity across the landscape in the form of barrows – all of which have been ploughed out leaving only ring ditches visible as cropmarks.

8.3.2 Within the PDA, there is a group of four large ring ditches centred at TL 52550 50600 (CHER 06281), and a single small ring ditch, partly covered by a plough headland, at TL 53160 51040 (CHER 09275).

8.3.3 Around 300m northwest of the PDA is a cluster of at least five barrows (CHER 09263). In the field to the rear of Worsted Lodge is a single ring ditch, 50m north of the Roman road. Further to the north on a low hill is another (CHER 06250). Further east is a third single ring ditch, c.400m from the PDA boundary (CHER 0987).

8.3.4 Just over 250m southwest of the PDA, at the Four Wentways site, aerial photographs identified up to five ring ditches, and subsequent trial trenches confirmed at least two (MCB11167). Both barrow ditches contained pottery and significant quantities of worked flint. Environmental remains taken from the ditch fills showed that the barrows stood in open grassland, suggesting the landscape was pasture used for grazing during the Early Bronze Age (OAU 1994). Nearby, an assessment of aerial photographs identified a possible segmented ditch (CHER 09363) and a linear ditch (CHER 09356c), although subsequent excavation failed to retrieve any dating evidence.

8.3.5 In the fields to the southeast, 200 and 500 metres from the PDA's southern boundary, are two more isolated ring ditches (CHER 09363, MCB15782). A third barrow nearby survived as an earthwork until the late 1970s when it was destroyed by new housing (CHER 06172).

8.3.6 Excavations of barrow sites elsewhere in Cambridgeshire sometimes find activity associated with barrows – usually pits, but sometimes field systems. While aerial photographs and the

magnetometry survey in the PDA southern field provide no evidence for a field system, other activity should be expected in the immediate vicinity of the barrows.

8.3.7 An unusual late EBA/early MBA circular monument was excavated in the borrow pit by the River Cam, west of the A11 (CHER 11317A, Pollard 2002). It comprised a shallow circular ditch around a large central post setting. A number of posts were set into the ditch, and pits surrounded the monument. A cremation filled a recut of the central pit and a second cremation was excavated outside the ring ditch. C14 dates suggested it was constructed in the mid-second millennium. Most of the material recovered dated from the Middle and Late Bronze Ages. The monument has no close parallels locally. Around the monument, a lithic scatter, pits and other cut features indicate Bronze Age activity – including potential settlement activity.

8.4 Iron Age and Roman

Figure 8

8.4.1 Definitive evidence for settlement in the Cam Valley first appears in the Middle Iron, in an excavation at Abington Hall (now part of Granta Park), 750m south of the PDA's southern boundary (CB15306). The excavation uncovered 60 pits, interpreted as grain storage pits. They had been deliberately filled with animal bone, pottery and hearth fragments, indicating a settlement in the immediate environs (although outside the excavated area). The area had been abandoned when rising groundwater made the riverside location unsuitable for underground grain storage.

8.4.2 Evidence for a ditched field systems dating to the Late Iron Age/Early Roman period were found at the River Cam borrow pit (CHER 11317C), and field systems have also been excavated Babraham Research Campus (MCB19539), where they were associated with a high-status Roman settlement west of the search area.

8.4.3 As noted above (Section 5.7), a Roman road, Worstead Street (CHER 07970), runs southeast to northwest through the search area, forming the northern boundary of the PDA. Excavations on the road in 1959, located by the PDA, found coal stratified beneath the road surface (CHER 06249).

8.4.4 There is a large cropmark complex on the hill now occupied by Gunner's Hall Farm, 250–750m northeast of the PDA. They include large rectangular enclosures (CHER 09276), complex smaller enclosures or paddocks (09274, 09285), and a dense area possibly indicating buildings (CHER 09284). Their morphology and position immediately adjacent to – and in one case crossing – the Roman road suggests a later Iron Age or Roman settlement, although no Roman material has been reported from the site.

8.4.5 To the south, 300 and 1000 metres southeast of the PDA, there are two further smaller ditched enclosures visible as cropmarks (CHER 09358, 09361). The curvilinear form of the nearer suggests a late prehistoric date, while Middle Roman pottery was reportedly found in the same field as the other site (CHER 09361).

8.4.6 To the north of the PDA, 700m from the northern boundary, is the cropmark of a large square double-ditched enclosure measuring c.85m on each side (CHER 09286). Its form suggests a Roman date, but there are no other cropmark enclosures nearby or finds reported from the field.

8.5 Medieval

Figure 9

8.5.1 Abington is mentioned in the Domesday Book of 1086 (although no distinction was made between Great and Little Abington). The entry lists 34 households, making it somewhat above average size. The bulk of the land was divided between two Norman landholders, Aubrey de Vere and Count Alan of Brittany: King William also had two minor holdings worth one shilling each. Resources listed in the Domesday inventory include ploughland, meadow, woodland for pigs, and two mills. (Open Domesday website)

8.5.2 There are two medieval churches within the search area, both dating to the twelfth century: both named for St Mary: CHER 06215 in Little Abington and CB14842 in Great Abington, along with the associated churchyard (MCB26677).

8.5.3 In the meadows immediately south of St Mary's church in Little Abington is an area of earthworks by the river, attributed to the medieval period (CHER 06194).

8.5.4 Immediately to the southeast of the churchyard in Great Abington is a moated site and trackway (MCB17695) visible as cropmarks and as geophysical anomalies. The medieval village is presumed to have been in around the same location (CHER 08154), roughly 900m from the PDA's southern boundary.

8.5.5 The medieval manor house is presumed to have stood on the site of the current Abington Hall, west of Great Abington and around 850m south of the PDA.

8.5.6 All the land to the north of Cambridge Road (including the PDA) as well as to the west of Little Abington show wide areas of flattened ridge and furrow ploughing (MCB30892, MCB 30895). Furlong boundaries and plough headlands (MCB30889, MCB30890) remain upstanding and clearly visible in lidar (Figure 15). these ploughlands may date to the medieval period, and would certainly have been in use in the post-medieval period. To the north of the PDA is another area of partially upstanding ridge and furrow (CHER 10118).

8.5.7 Through the upstanding ridge and furrow to the north of the PDA are two undated hollow-ways, visible in both lidar and aerial photographs. One leads north 2.5 kilometres to Mutlow Hill on the Fleam dyke, where a number of other ancient trackways converge. The second (CHER 09078) runs northwest for two kilometres These routeways are undated, although their visibility on lidar suggests a medieval or post-medieval date.

8.6 Post-medieval and modern

Figure 10

8.6.1 Around a kilometre to the south of the PDA is the Grade II* listed Abington Hall (CHER 06056), south of Great Abington. Construction of the first parts of the house commenced in 1712, with much expansion in the late 18th century to create a three storey house of nine bays. After WWII, the building was converted into flats and offices. Abington Hall is surrounded by extensive parkland (CHER 12284), now part of Granta Park. This was first established in 1791, and expanded and landscaped by Henry Repton around 1803. It included orchards, kitchen gardens, a walled garden tree-lined avenues, and ornamental canal. Associated with the Hall is the Lodge (MCB22365) on Bourn Bridge Road, c.500m south of the PDA.

8.6.2 At the edge of the search area west of the PDA are the grounds of Babraham Hall (MCB17505). The grounds were initially emparked in the 16th century, and were expanded in the 19th century. Associated with the Hall is Babraham Lodge (MCB31301) and an 18th/19th icehouse (MCB7739) to the north of the Cambridge Road.

8.6.3 As noted above, most areas of ridge and furrow and plough headlands visible in the PDA, which have been assigned to the medieval period continued in use into the post-medieval period (MCB30889, MCB30890, MCB30892, MCB 30895, CHER 10118). Along the River Cam are areas of water meadows (MCB30906).

8.6.4 The CHER records a potential gallows site where the Roman road crosses the parish boundary by Worsted Lodge, immediately northwest of the PDA. However, the report of numerous burials is based solely on dowsing, and no human remains were found during widening of the A11.

8.6.5 The common fields of Little Abington were inclosed by Act of Parliament in 1807. This resulted in the establishment of farm houses in the new fields. At the centre of the PDA is the 19th century Grange Farm (MCB 26692), which also has a brick barn associated with it (Figures 24 and 25). Smaller farm dwellings, which appear to have been built in the first part of the twentieth century, are also present to the south (Figure 26).

8.6.6 Other farm buildings in the wider search area that also appear to have been established around the same time are:

- Worsted Lodge farm, immediately north of the PDA, which an associated malthouse (MCB31297)
- Gunner's Hall Farm (MCB31296) to the northeast of the PDA
- Hill Cottages west of the PDA (MCB26691)
- the New Barn east of the PDA (MCB22368)
- Lay Rectory Farm (MCB22360) on Cambridge Road, southeast of the PDA
- Bancroft's Farm (MCB22362) and Lower Grange Farm (MCB22361) south of the PDA in Little Abington.

8.6.7 The villages of Great and Little Abington, along with Babraham, grew in size during the eighteenth and first half of the nineteenth centuries, and several village buildings date to this period, including the Babraham blacksmith's workshop (MCB31299), the Great Abington School (MCB21405), and the Former Mission Room and United Reformed Church buildings in Little Abington (MCB31295).

8.6.8 Several engineering works took place within the search area during the nineteenth century. The most notable was the Newmarket and Chesterford railway: one of the early failures of the 19th century railways boom (Brown 1931). The railway was opened in 1848, to enable travel to the Newmarket Races, but was bankrupt within 18 months and finally closed in 1851. Parts of the rail line were taken up and re-used to construct the track from Chesterford to Cambridge. Within the search area, the railway line ran north–south, slightly to the west of the modern A11. The railbed is still visible as a railed bank in the fields (see Figure 15). Associated with the railway was the Bourn railway bridge (MCB29003). Built around the same time was the nearby Bourn Bridge (MCB22366).

8.6.9 As noted above, there are several post-medieval and modern quarry pits in and around the PDA, used to extract clay, gravel and chalk (MCB22364, MCB22367, MCB26850, MCB30889, MCB30896, MCB30897, MCB30898, MCB30899, MCB30904, MCB31294,

MCB31298, MCB31302). Most are now covered with plantations or small areas of woodland.

8.6.10 The only 20th century features recorded in the CHER is the potential site of a WWII searchlight battery (MCB27080) 850m northwest of the PDA.

8.7 Undated features

Figure 11

8.7.1 There are a handful of undated features.

8.7.2 As noted above (8.5.7) there are two hollow ways north of the PDA, visible in both aerial photographs and lidar (CHER 09078), crossing an area of ridge and furrow. While their presence and an earthwork suggests a medieval or post-medieval date, they may follow a much older routeway. They converge just to the north of the PDA, and it is likely that the route continued south through the PDA – most likely following one of the medieval furlong boundaries.

8.7.3 Cropmarks show an undated ditch – probably a field boundary or enclosure – 250m the north of the PDA (CHER 09287). On the northern edge of the search area is another cropmark of a ditch (CHER 06313), with a linear field system nearby (CHER 06312).

8.7.4 Geophysical survey within the southern field of the PDA identified two parallel anomalies interpreted as a trackway (MCB30577). To the southwest of the PDA, the same geophysical survey identified two parallel curvilinear anomalies and two parallel linear anomalies (MCB30578).

8.7.5 A linear ditch close to the barrows at Four Wentways (CHER 9356c) could not be dated in excavation, but the difference in ditch fills from the barrows suggests a later date. It runs parallel with the A604 road, which might suggest a modern origin. The site has now been lost to construction.

8.7.6 An excavation at the Cambridge County Scout Camp 600m southeast of the PDA identified an undated ditch.

8.7.7 Finally, just under a kilometre southwest of the PDA, beside the River Cam, are cropmarks of two substantial rectangular ditched enclosures, measuring c. 80 × 40m.

9. SUMMARY OF ARCHAEOLOGICAL ACTIVITY AND SURVIVAL

9.1.1 Almost all archaeological evidence within the search zone is concentrated around the River Cam and adjoining river terraces. There are three main exceptions:

- the Roman road along the northern boundary of the site
- the Early Bronze Age barrow fields and isolated barrows scattered across the landscape – potentially with other contemporary activity around them such as pits and flint scatters
- the medieval or post-medieval plough headlands which run the length of the PDA from north to south (although the associated ridge and furrow has been ploughed out).

9.1.2 Taken together, this the evidence suggests the land within the PDA was used primarily for grazing throughout later prehistory possibly into the early medieval period. After then, the land was given over to arable cultivation.

9.1.3 The only evidence for settlement in PDA or uplands immediately around it before the 19th century is the large Iron Age/Roman cropmark complex at Gunner's Hall farm, and smaller late prehistoric/Roman enclosures southeast of the PDA. As cropmark evidence is excellent, there are unlikely to be further settlements elsewhere within the PDA.

9.2 Survival

9.2.1 As almost all the PDA has been agricultural land for the past millennium, no archaeological features are likely to be preserved in the ploughsoil. The dearth of stray finds reported to the Cambridgeshire HER also suggests that artefacts are unlikely to be common from any age, and any artefacts scatters are likely to have been dispersed through plough action.

9.2.2 Most of the soil comprises think rendzinas, so plough action is likely to have destroyed all but deep archaeological features. The exception are any features which may have lain under plough heads—such as the isolated ring ditch in the northern part of the PDA (CHER09275).

10. IMPACT OF DEVELOPMENT OF HERITAGE ASSETS

10.1.1 The following assessment of impact takes into account two factors:

- the relative importance of each heritage asset
- the likely effect of development upon each asset or changes to their setting.

10.2 Importance

10.2.1 The following criteria have been used to rank the potential importance of archaeology within the PDA:

Importance	*Description of feature*
National	Scheduled ancient monuments; Grade I listed buildings.
Regional	Sites listed in the HER or identified from other sources that comprise important examples in the context of the East Anglian area; Grade II* listed buildings.
District	Sites listed in the HER or identified from other sources that comprise important examples in the context of the South Cambridgeshire area; Grade II listed buildings.
Local	Sites listed in the HER or identified from other sources that comprise important examples in the context of the site and its immediate surroundings; locally listed buildings, hedgerows of defined archaeological or historic importance.

10.2.2 The importance of identified surviving heritage assets within or immediately adjacent to the PDA in each period is rated as follows:

Importance	*Description of feature*
National	(1) The Roman road, Worstead Street, along the northern boundary of the PDA. The alignment is well-preserved and is a scheduled monument.
Regional	(2) no features within the PDA; within the search area are four Grade II* listed buildings: the two parish churches, Abington Hall, and the Abington Pottery building
District	(3) within the PDA are ring ditches of ploughed out barrows. In particular, the group of four (CHER 06281) are particular large, so have higher-than-usual potential for preserving environmental remains which might provide information on past land use and land cover. (4) potential for hollows in the chalk, possibly preserving earlier prehistoric material (5) the 26 Grade II listed buildings in the wider search area (most of which are in the villages: only Worsted Lodge is within the immediate environs on the PDA).
Local	(6) The historic hedgerows along the northern and western boundaries of the site, which would meet the criteria for historic hedgerows.

10.3 Severity of effects

10.3.1 Effects may be either beneficial, harmful or neutral. The following criteria have been used to rank the degree of effects on assets. The table of harmful effects is more specific than the

three broad categories in the National Planning Policy Framework (substantial harm, less than substantial harm and no harm). The NPPF categories are included for reference, but are not used to assess the significance of the effects below

Beneficial effects

Degree of effect	*Description of effect*
Very substantial	Very substantial restoration or enhancement of the site or feature, or positive alteration of its setting which very substantially enhances understanding or enjoyment of the site or feature.
Substantial	Substantial restoration or enhancement of the site or feature, or positive alteration of its setting which substantially enhances understanding or enjoyment of the site or feature.
Moderate	Moderate restoration or enhancement of the site or feature, or positive alteration of its setting which enhances understanding or enjoyment of the site or feature.
Minor	Minor restoration or enhancement of the site or feature, or positive alteration of its setting which slightly enhances understanding or enjoyment of the site or feature.
Negligible	Material changes to the site, feature or setting but which result in no enhanced understanding or enjoyment of the site or feature.
Nil	No changes made to the site or feature, or no alteration of its setting.

Harmful effects

Degree of effect	*NPPF degree of harm*	*Description of effect*
Very substantial	Substantial harm	Site or feature entirely or largely removed / destroyed (over 75%), or undergoes a fundamental alteration to its setting which very substantially reduces or totally destroys understanding or enjoyment of the site or feature.
Substantial	Substantial harm	Site or feature substantially removed / destroyed (50–75%) or undergoes a considerable alteration to its setting which substantially reduces understanding or enjoyment of the site or feature.
Moderate	Less than substantial harm	Site or feature partially removed (15–50%) or undergoes alteration to its setting which changes understanding or enjoyment of the site or feature.
Minor	Less than substantial harm	Site or feature suffering some disturbance / removal (<15%) or with a discernible alteration to its setting which changes understanding or enjoyment of the site or feature.
Negligible	Less than substantial harm	Site or feature will suffer no disturbance or removal, and any changes in the setting are limited to a narrow visual arc (<10°) and are generally in keeping with the existing character of the site or feature, and has only minor impact on the understanding or enjoyment of the site or feature.
Nil	No harm	Site or feature suffering no disturbance, or no alteration to setting.

10.4 Significance

7.1 The significance of beneficial and harmful effects on heritage assets is assessed using a combination of the asset's importance and the degree of the effect. Neutral effects are all rated as 'not significant'

	National	*Regional*	*District*	*Local*
Very substantial	High	High	High	High
Substantial	High	High	Medium	Medium
Moderate	High	Medium	Low	Low
Slight	Medium	Low	Low	None
Negligible	Low	None	None	None
Nil	None	None	None	None

10.5 Effects

10.5.1 As proposals for the PDA are necessarily broad at this time, effects on archaeology and heritage have been treated at a high level only. They can be divided into:

- effects of construction on buried archaeology and heritage assets
- effects caused while the proposed development is in use
- effects on the setting of heritage assets

10.5.2 This section assesses the effects and significance of typical construction activity on the identified assets without any mitigation. The following section outlines measures which might be employed to mitigate these effects.

Impacts caused by construction

10.5.3 There are no listed buildings within the PDA, and therefore no effects on heritage assets will be caused through demolition.

10.5.4 The only upstanding heritage assets within the PDA which might be impacted by construction are the historic hedgerows. Although rated as only 'local' importance, if large parts of them were lost, the effect could potentially be 'substantial' or 'very substantial', resulting in a 'medium' or 'highly' significant harmful effect.

10.5.5 In principle, the main effects of constructing new residential developments on buried archaeology result from:

- ground levelling or lowering
- ground reinstatement
- installation of building foundations
- installation of services
- landscaping, including tree planting
- vehicle movements
- provision of contractors' compounds.

10.5.6 The only confirmed below-ground heritage assets identified within the PDA are the ring ditches of ploughed out barrows. There is also potential for hollows in the chalk in the northern part of the PDA which might preserve evidence for earlier prehistoric activity. Both are rated as of 'district' importance. Construction activity has potential to completely remove these features, resulting in 'substantial' harm, and a rating of 'medium' or 'highly' significantly harmful effect.

Impacts caused by use

10.5.7 The main potential impact of the proposed development once in use would be additional footfall and cycling on the Roman road. This has potential to cause erosion of the protecting grass and topsoil, and if unchecked, damage to the road and any associated archaeology.

10.5.8 The road is a scheduled monument, and therefore of 'national' importance. Even moderate loss through erosion of the current grass and topsoil could result in a' highly significant' harmful impact on the monument.

Impacts on setting

10.5.9 In principle, the creation of a large residential development on what are currently arable fields has the potential to change the setting of heritage assets. Assets potentially affected in and around the PDA are:

- the listed buildings in the wider search area
- the Roman road

10.5.10 The bulk of the listed buildings lie in the villages of Great and Little Abington and Babraham. All are well screen from the PDA by the existing villages, and so would suffer no change to their settings. The Grade II* listed Abington hall is embedded in Granta Park, so would likewise suffer no substantial change in its setting

10.5.11 The only listed buildings in the immediate vicinity are (a) the malthouse at Worsted Lodge just north of the PDA and (b) The Lodge to the southwest on Borne Bridge Road. Both are Grade II listed, and so rated of 'local' importance only. Worstead Lodge would see up to 25% of the land in its immediate environment given over to residential development (areas to the southeast of the farm buildings). This would be classed as a 'moderate' effect and the significance would therefore be rated as only 'low'. The Lodge is at some distance from the PDA, and separated from it by fields and the Cambridge Road. The impact on its setting would therefore be rated as, at most, 'minor' and consequently on no significance.

10.5.12 The Roman road is a scheduled monument and therefore of 'national' importance. It runs immediately adjacent to the PDA and currently passes through open farmland. Using the PDA for residential development potentially alters up to 50% of the land around the monument (depending on the proximity of housing and infrastructure). The result would potentially be a 'moderate' or 'substantial' harmful effect on the setting. The outcome would be a 'highly' significant harmful effect on the setting in the absence of any mitigation.

11. MITIGATION

11.1.1 National and local policy on mitigating effects of construction on archaeology favours preservation in situ. Where preservation of archaeology is not practicable, an appropriate level of recording and interpretation would need to be undertaken before damage to archaeological remains occurs.

11.1.2 For upstanding heritage assets, in addition to mitigating harmful effects, there is the potential for works that enhance and further protect monuments.

11.1.3 Based on the assessment above, there appears to be nothing within the PDA which would prevent development of the site. However, the Cambridgeshire Historic Environment Team (as advisors to the Local Planning Authority, South Cambridgeshire District Council), and

Historic England (which has responsibility for scheduled monuments) are likely to recommend a program of mitigation works.

11.1.4 The following discussion mitigation is intended to be suggestive only, to inform initial stages of design, and does not constitute formal recommendations. It is based on typical practice in Cambridgeshire. Any mitigation works would need to be agreed with CHET and Historic England, and undertaken in concert with the owners of affected assets.

11.2 Potential for preservation and heritage enhancement

11.2.1 The chief upstanding heritage asset potentially impacted by development is the Roman road. As noted above, the chief risks are erosion caused by substantially increased foot traffic and cycle use, along with loss of its rural setting. Both can potentially be mitigated. Mitigation works would need to take into account not only the sensitivity of site as a scheduled monument, but also the road's status as a Site of Special Scientific Interest.

11.2.2 Protection from erosion could be managed through sympathetic surfacing. With additional information boards or signage, it would also be possible to enhance appreciation and enjoyment of the site as a historic monument, as well as contribute to placemaking within the new development. Use of the route for walking, running and cycling could also encourage new residents to engage with nearby natural and heritage sites along the route e.g. Wandlebury Country Park and Nature Reserve, Copley Hill, and the ancient woodlands of Balsham Wood and Borley Wood.

11.2.3 The nature of the road potentially provides opportunities to manage changes to its setting. From the monument itself, the high dense hedges on either side constrain the main lines of sight to the line of the road itself by (Figure 17); there are only occasional breaks in the hedges along the boundary with the PDA. The impact of the proposed development on the road's setting – particularly for people travelling along the road – might be mitigated by planting a buffer zone between the road and developed areas with a mixture of chalk grassland species and pockets of woodland. (Expanded areas of sympathetically planted grassland also have potential to enhance the site's ecological status as an SSSI.)

11.2.4 Preservation and enhancement works would need to be implemented in concert with the owners of the road surface (Cambridgeshire County Council), and the banks and hedges (the adjoining landowners). Historic England has control of decisions regarding the site as a scheduled monument, and Natural England over decisions about management of the natural assets.

11.3 Mitigating effects of construction on buried archaeology

11.3.1 Within the PDA, the main archaeological assets at risk are the four large barrow ring ditches (CHER 06281) and the isolated ring ditch (CHER 09275). There is also potential for chalk hollows in the northern field which may preserve evidence of prehistoric activity and environments.

11.3.2 The ring ditches could be preserved in situ, with an ongoing programme of maintenance However, as there is no visible sign of the monuments on the ground, preservation would require additional information explaining their significance in order to enhance public understand or appreciation of both sites – a key goal of the National Planning Policy framework (paras. 198, 205). Arguably, the large number of ring ditches present in the Cambridgeshire chalk landscape means the loss of these two sites with suitable

archaeological mitigation would be outweighed by bringing the land into use for housing development (National Planning Policy Framework 2019, paras. 201d, 202).

11.3.3 The potential for archaeology in chalk hollows would need to be assessed through intrusive investigations.

11.3.4 Mitigating the potential damage to or loss of buried archaeology caused by construction can be divided into two phases:

- evaluation to narrow down the extent, nature, and significance of heritage assets, identifying sites of significance.
- excavation of sites identified in evaluation. National planning policy requires developers to "record and advance understanding of the significance of any heritage assets to be lost … in a manner proportionate to their importance and the impact, and make this evidence (and any archive generated) publicly accessible" (National Planning Policy Framework 2019, para. 199).

11.3.5 All archaeological fieldwork needs to be conducted in accordance with a Written Scheme of Investigation. This needs to be prepared in consultation with, and approved by, the Cambridgeshire Historic Environment Team, as advisors to the local planning authority, and potentially Historic England, depending on proximity of interventions to the scheduled monument.

11.4 Evaluation

11.4.1 There are a number of potential evaluation methods which might be used to narrow down the extent, nature, and significance of heritage assets within the PDA. The following is based on typical archaeological practice in Cambridgeshire.

Aerial photographs

11.4.2 As noted above, several assessments of aerial photographs covering the PDA and most of the search area has previously been undertaken. As the chalk landscape is well suited to identification of archaeological features, existing assessments are likely to have identified all sites of potential within the PDA. A further assessment is therefore unlikely to add to existing understandings of archaeology within the PDA.

Fieldwalking

11.4.3 This assessment has shown the bulk of past activity within the search area has been focussed on the river valley, with the PDA itself used primarily for grazing, arable farming, and a handful of Bronze Age funeral monuments. Surface scatters of artefacts are therefore unlikely outside sites already identified from aerial photographs. Fieldwalking is therefore unlikely to add to existing understandings of archaeology within the PDA.

Geophysical survey

11.4.4 Geophysical survey using fluxgate magnetometers have previously been carried out in southern parts of the PDA (ECB6222) and produced good results. The magnetic response should be good on the geology across the PDA, and geophysical survey would therefore be an effective, non-intrusive method for site identification within the PDA. Its use needs to be offset against the quality of existing information from aerial photographs, and the apparent paucity of sites within the PDA.

Trial trenching

11.4.5 Trial trenching targeting features and anomalies identified from aerial photographs and geophysical survey is normal practice to assess the nature of sites identified. This will involve excavating a sample of the PDA (typically 3–5%), to assess ground conditions, preservation conditions, extent and density of archaeological features, and their likely significance.

11.5 Excavation

11.5.1 The use of open area excavation to mitigate construction activities would depend on the results of the evaluation, and be determined by the Cambridgeshire Historic Environment Team, as advisors to the local planning authority.

12. CONCLUSION

12.1.1 This desk-based assessment identifies a number of heritage assets and potential archaeological activity within the PDA's boundary: primarily the group of four ploughed out barrow ring ditches on the western edge of the site, and a second isolated ring ditch in the centre. There is also potential for chalk hollows in the northern part of the PDA which may preserve evidence of prehistoric activity and environments.

12.1.2 In addition, there are a number of heritage assets in the wider search area which may be impacted by development. The principle one is the Roman road, Worstead Street, along the northern edge of the PDA.

12.1.3 The high quality of aerial photographic evidence, and the apparent concentration of historic activity in the river corridor rather than the PDA, provides a high level of confidence in this assessment.

12.1.4 Based on this assessment, there appears to be nothing within the PDA which would prevent development of the site. The Cambridgeshire Historic Environment Team and Historic England are, however, likely to recommend a program of mitigation works.

12.1.5 Mitigation would typically involve:

- evaluation to narrow down the extent, nature, and significance of heritage assets, identifying sites of significance—the most effective methods for the PBA being geophysical survey and trial trenching
- targeted excavation of significant archaeological features likely to be impacted by construction and landscaping works.

12.1.6 There is potential to preserve and enhance the Roman road and its landscape setting. Protection of the monument through sympathetic surfacing would also encourage public engagement with both the historic significance of the monument and also the wider landscape assessable from it.

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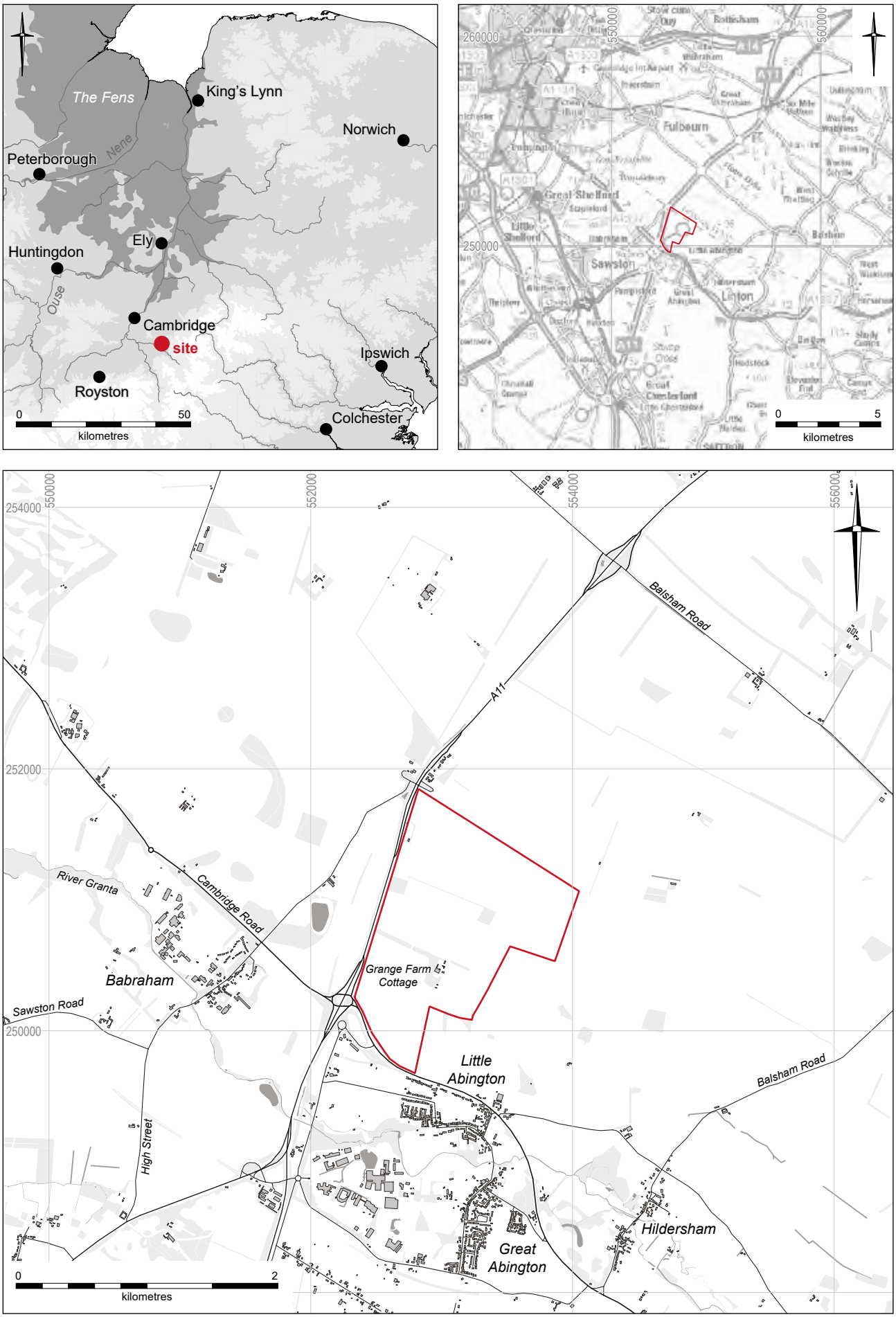


Figure 1. Site location

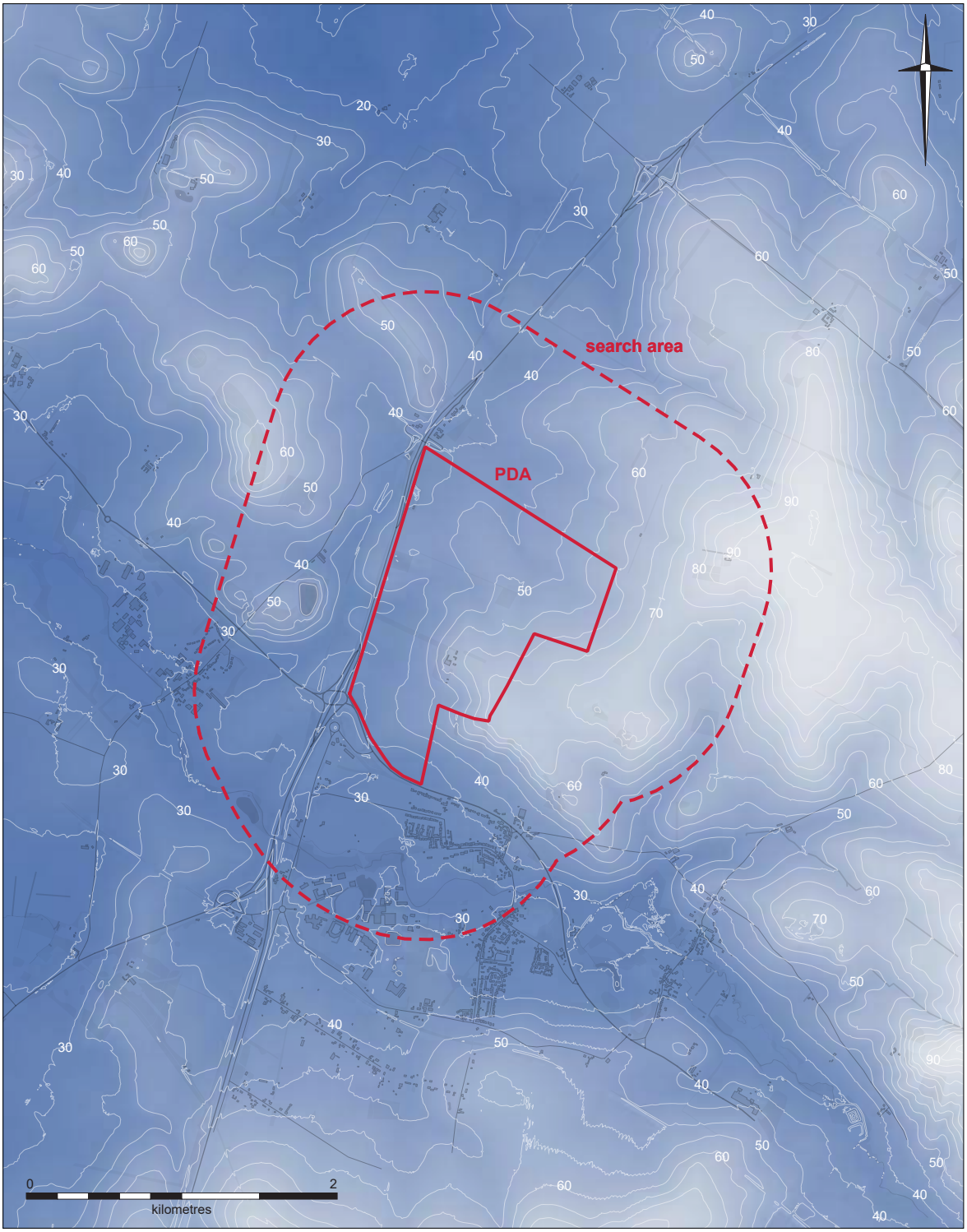


Figure 2. Topography and 5m contour map of the search area.
Source: Environment Agency lidar data. © Crown Copyright 2021, Open Government License 3.0

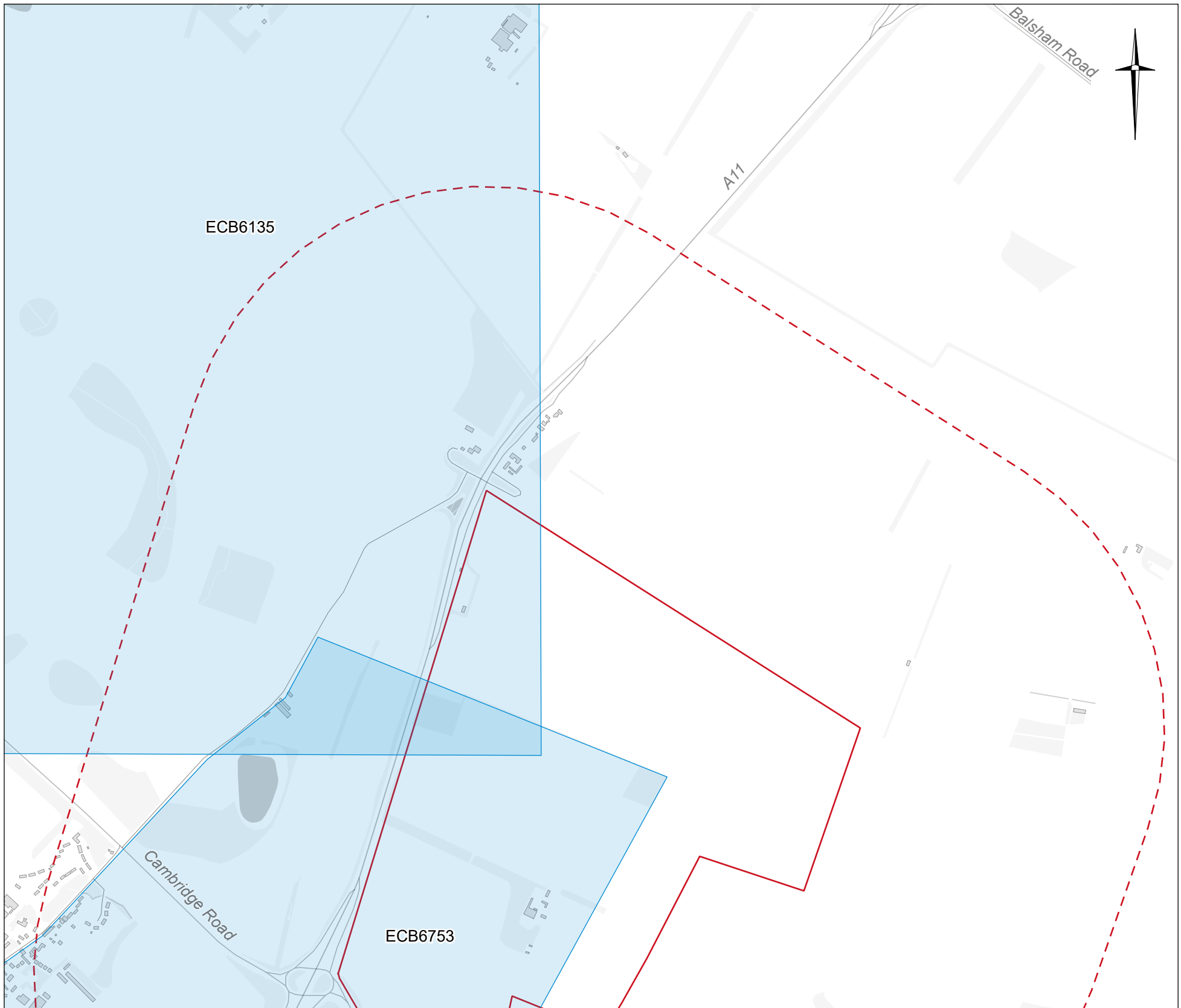


Figure 3. Location of aerial survey within the search area.
Source: Cambridgeshire Historic Environment Record

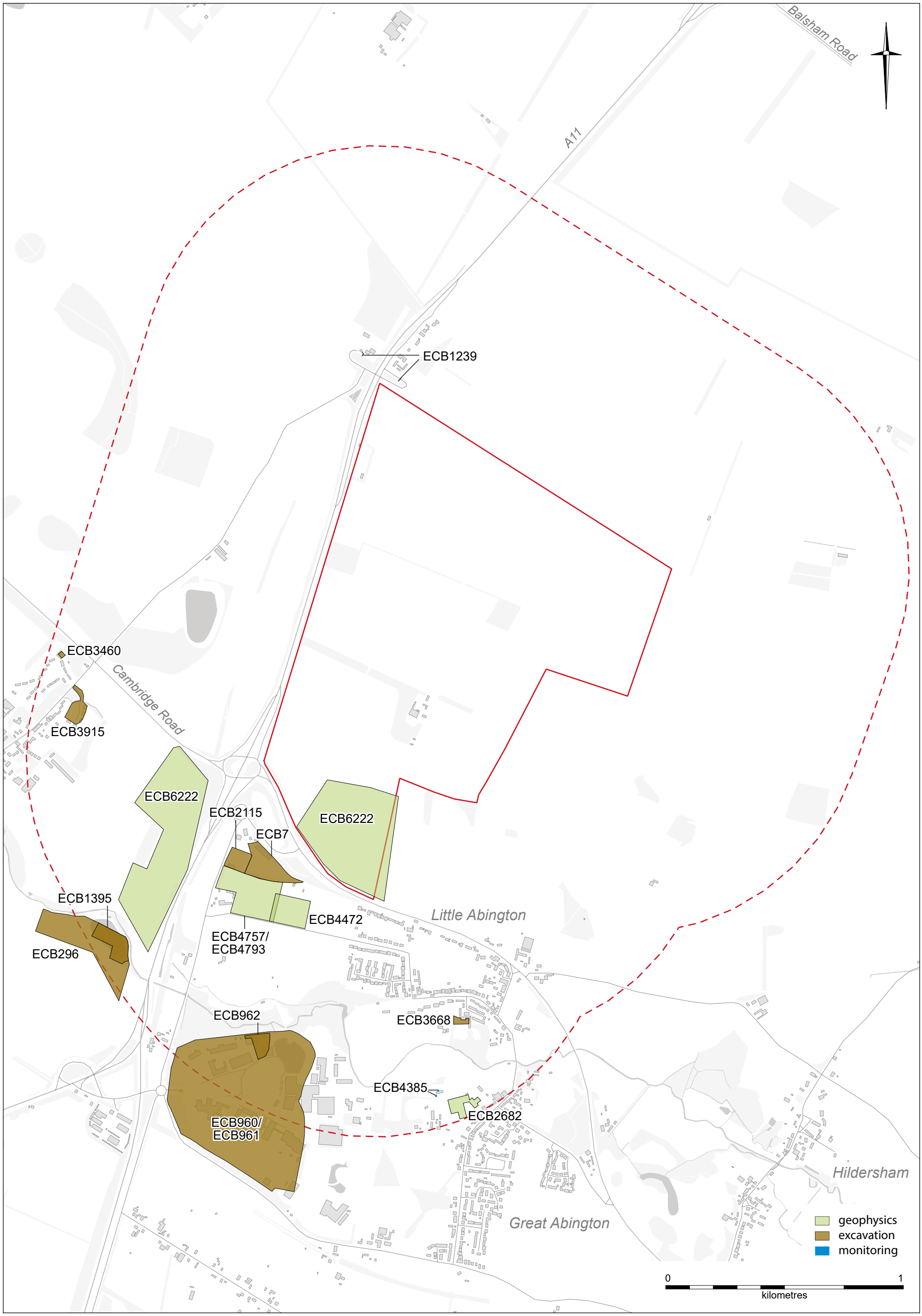


Figure 4. Location of archaeological works within the search area.
Source: Cambridgeshire Historic Environment Record

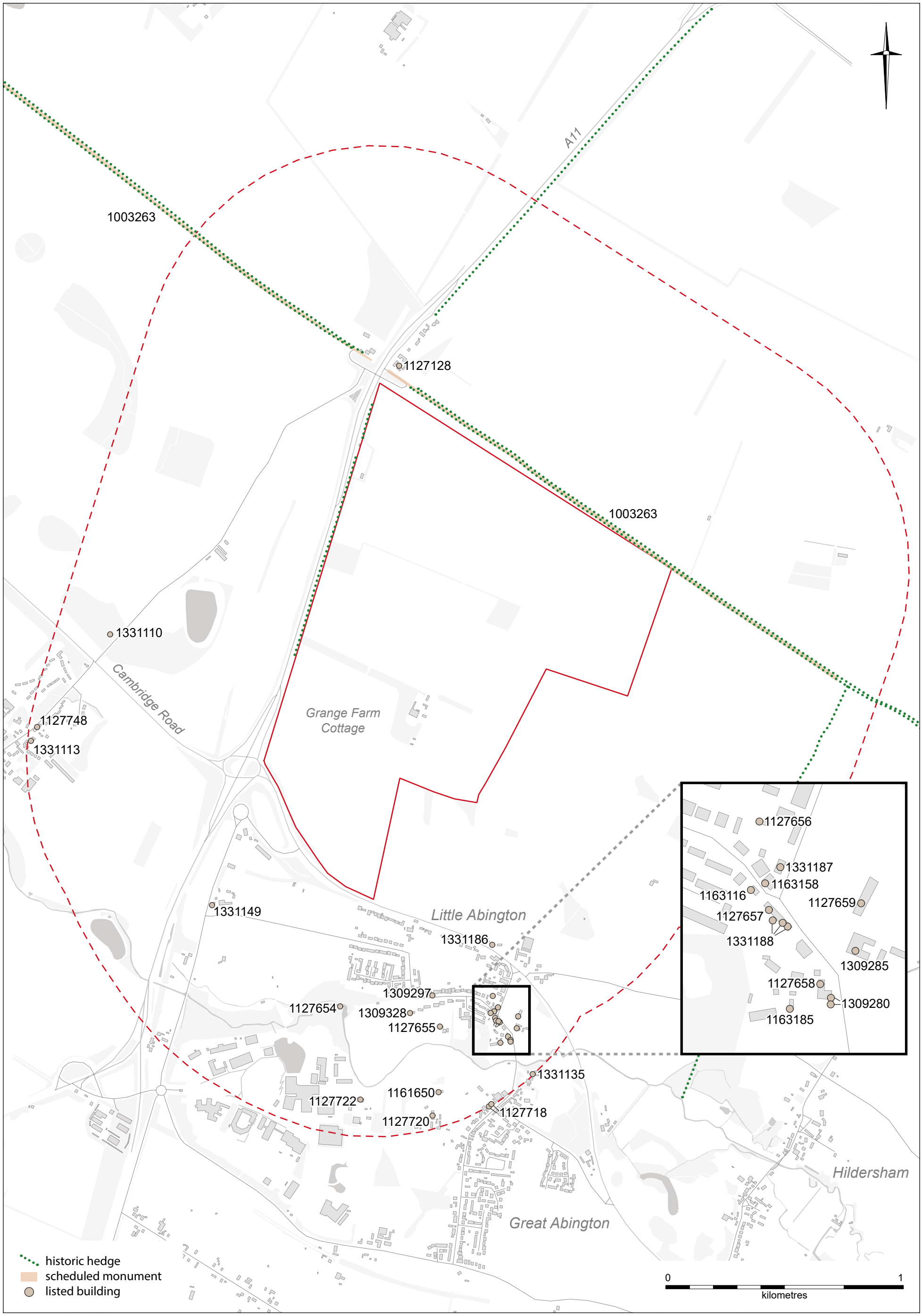


Figure 5. Location of listed buildings, scheduled monuments and historic hedges within the search area.
Source: Cambridgeshire Historic Environment Record

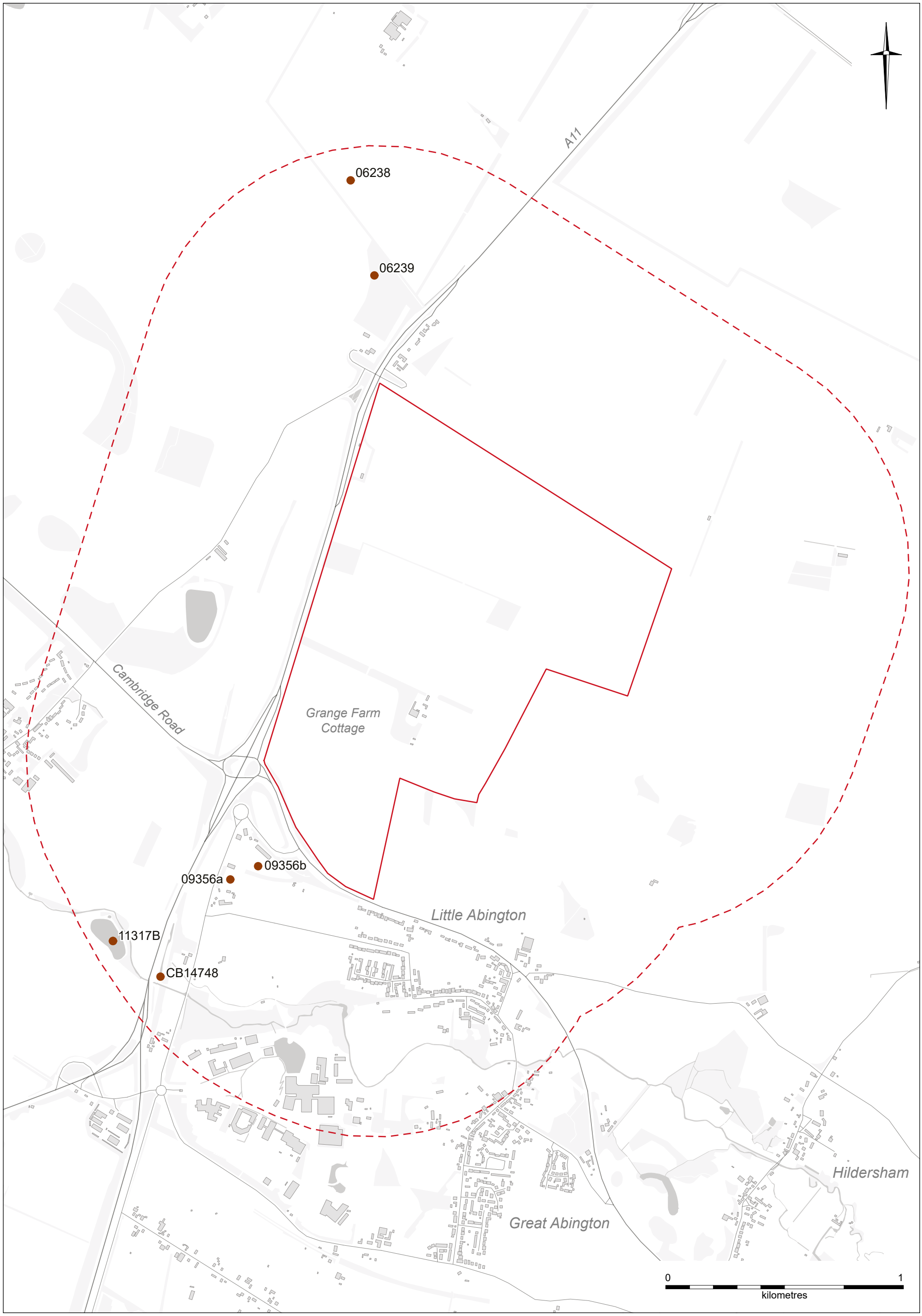


Figure 6. Palaeolithic, Mesolithic and Neolithic findspots and monuments.
Source: Cambridgeshire Historic Environment Record

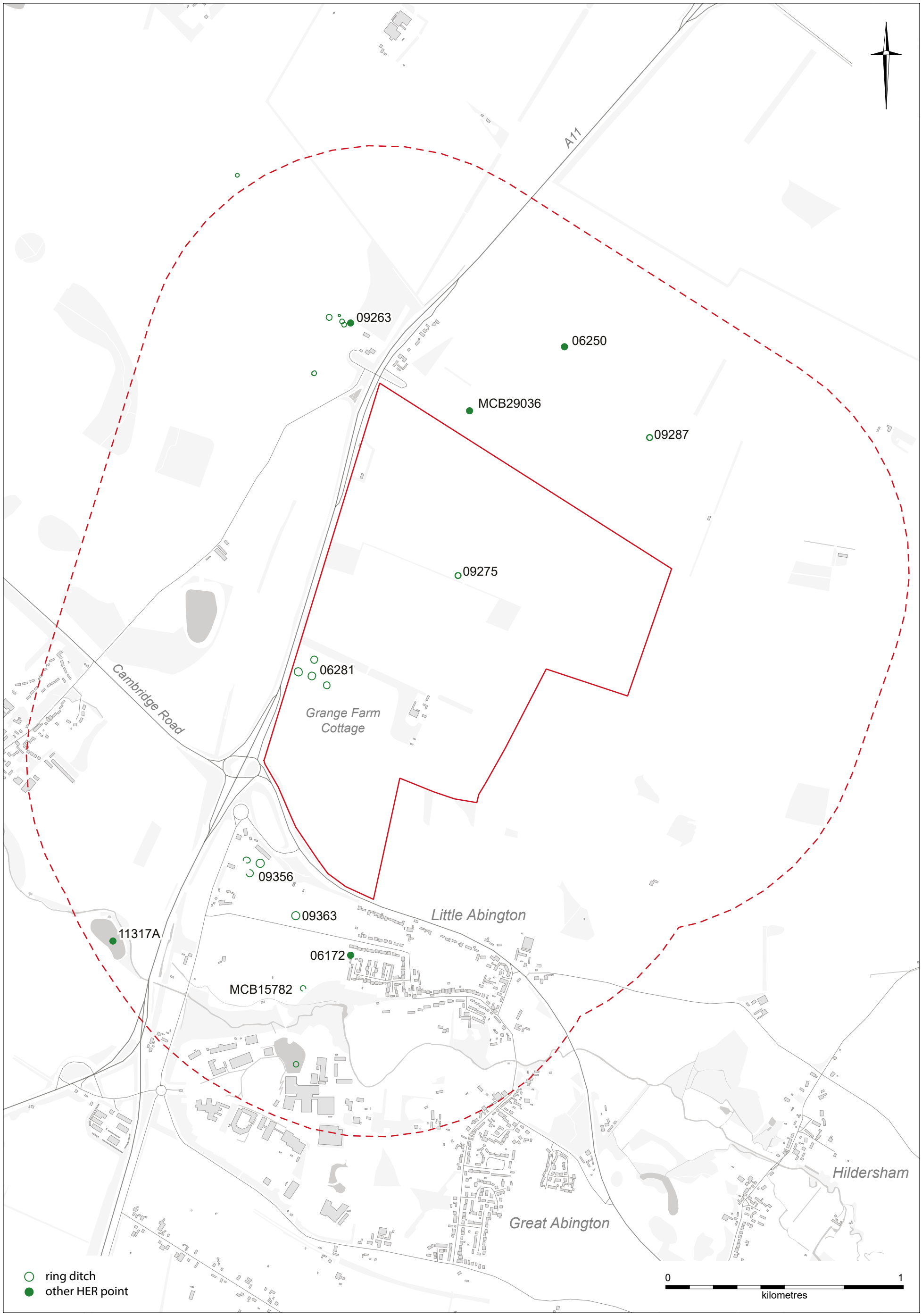


Figure 7. Bronze Age findspots and monuments.
Source: Cambridgeshire Historic Environment Record

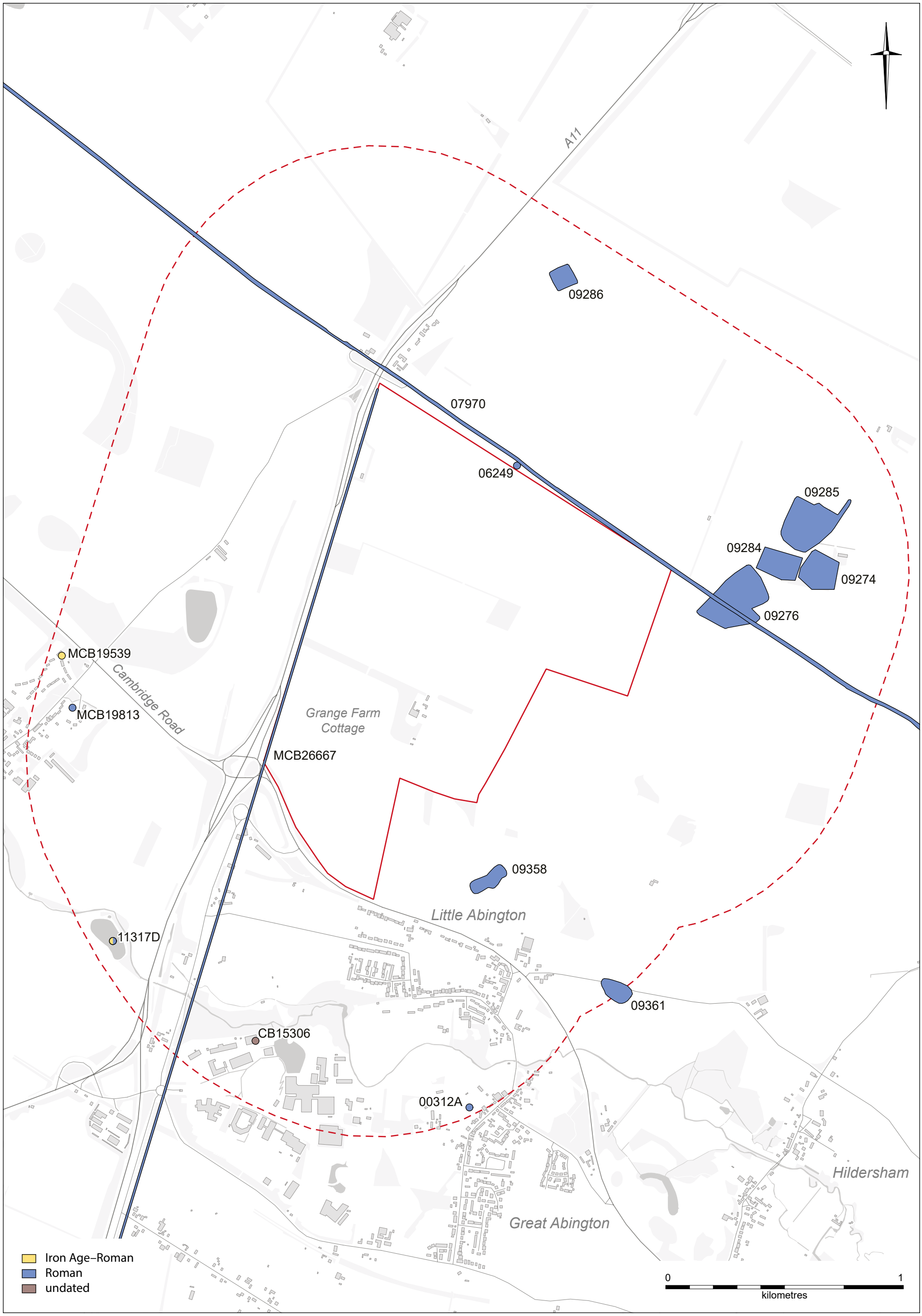


Figure 8. Later prehistoric and Roman findspots and sites, including undated but potentially Roman cropmarks.
Source: Cambridgeshire Historic Environment Record

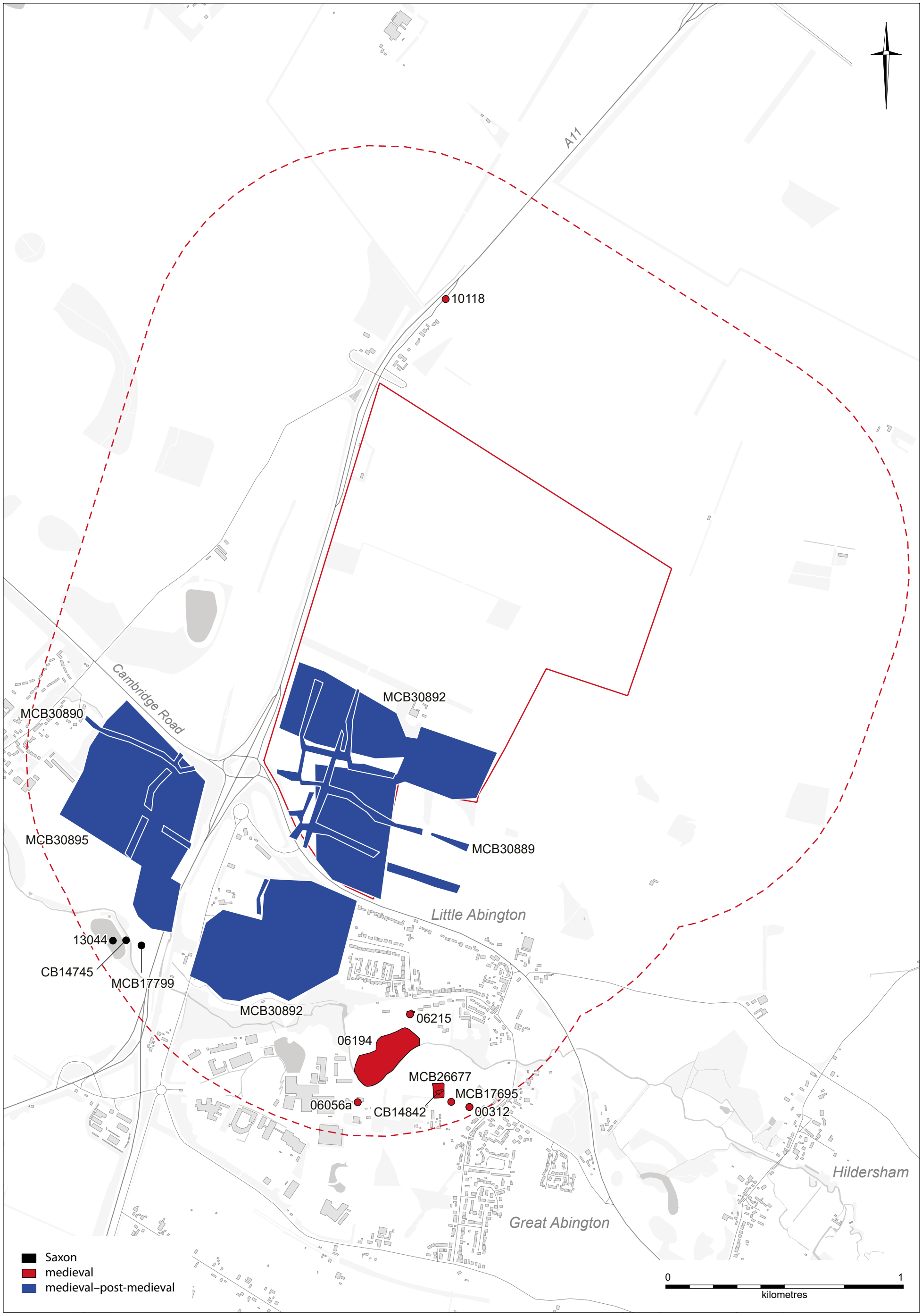


Figure 9. Anglo-Saxon and medieval findspots and sites.
Source: Cambridgeshire Historic Environment Record

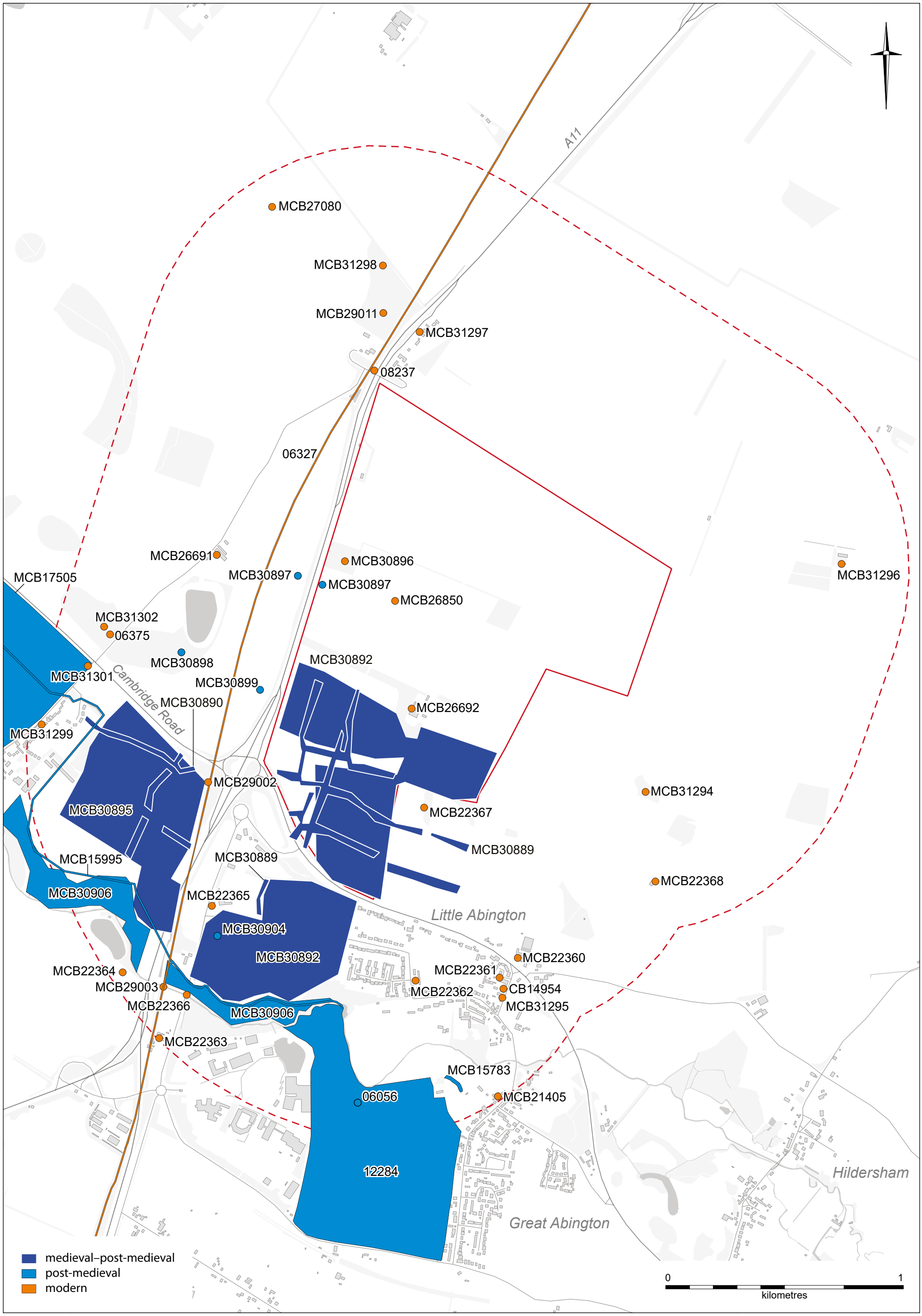


Figure 10. Post-medieval and modern findspots and sites.
Source: Cambridgeshire Historic Environment Record

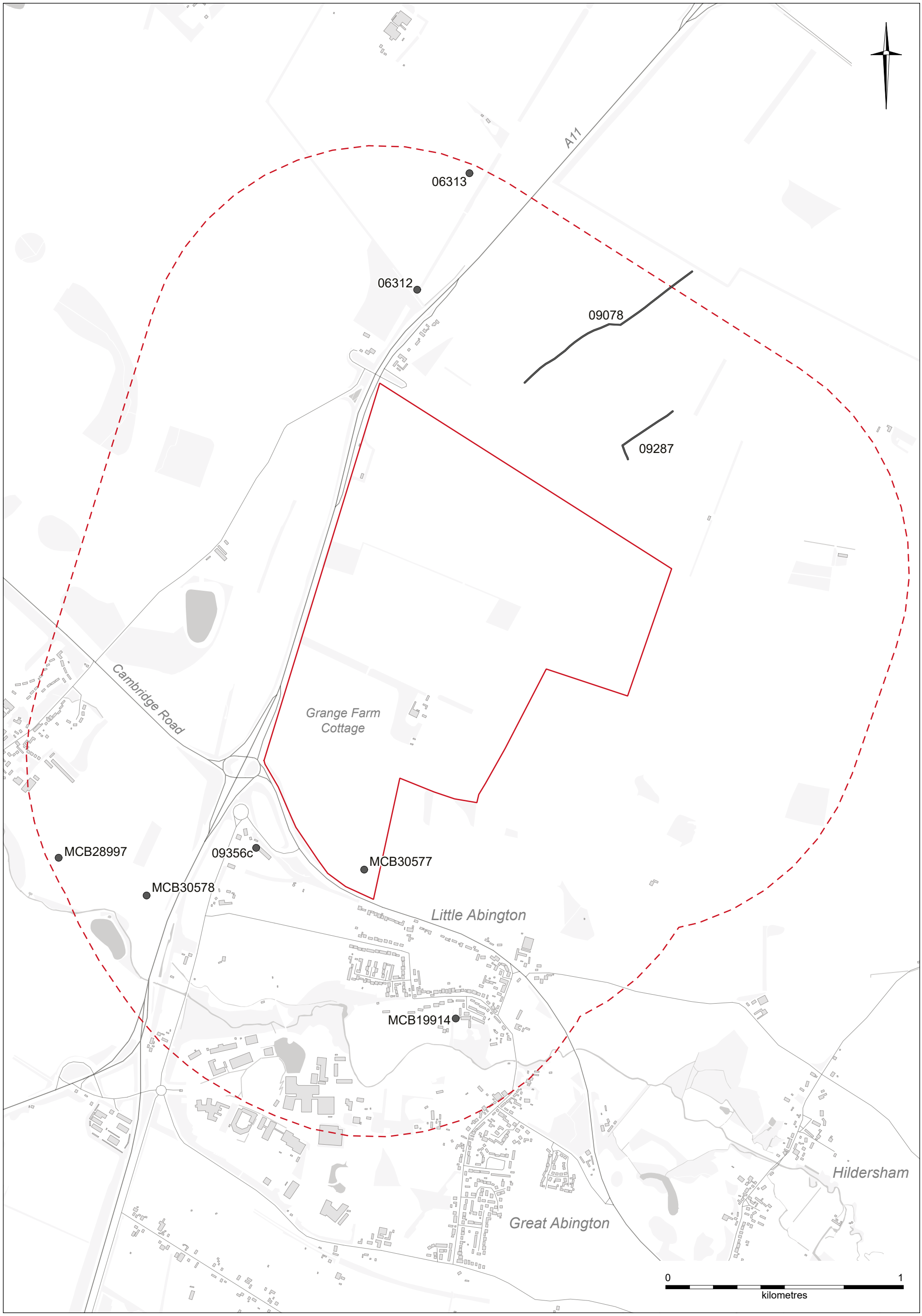


Figure 11. Undated findspots and sites.
Source: Cambridgeshire Historic Environment Record

Figure 12. Plan of the parish of Little Abington in the county of Cambridge as allotted 1803 (Maps.Ms.Plans.27)

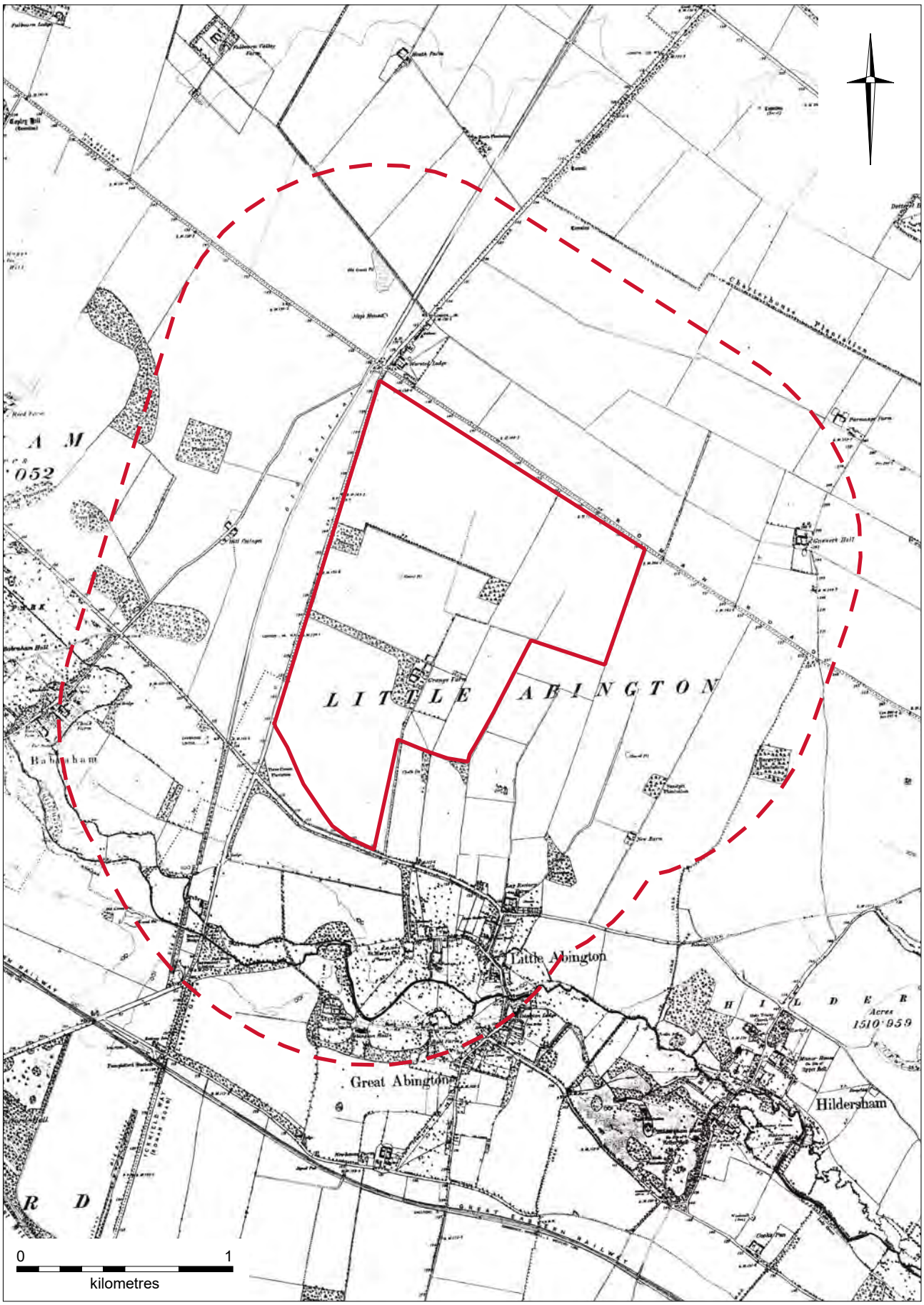


Figure 13. Cambridgeshire County Series 1:10,560 1886 (1st edn).

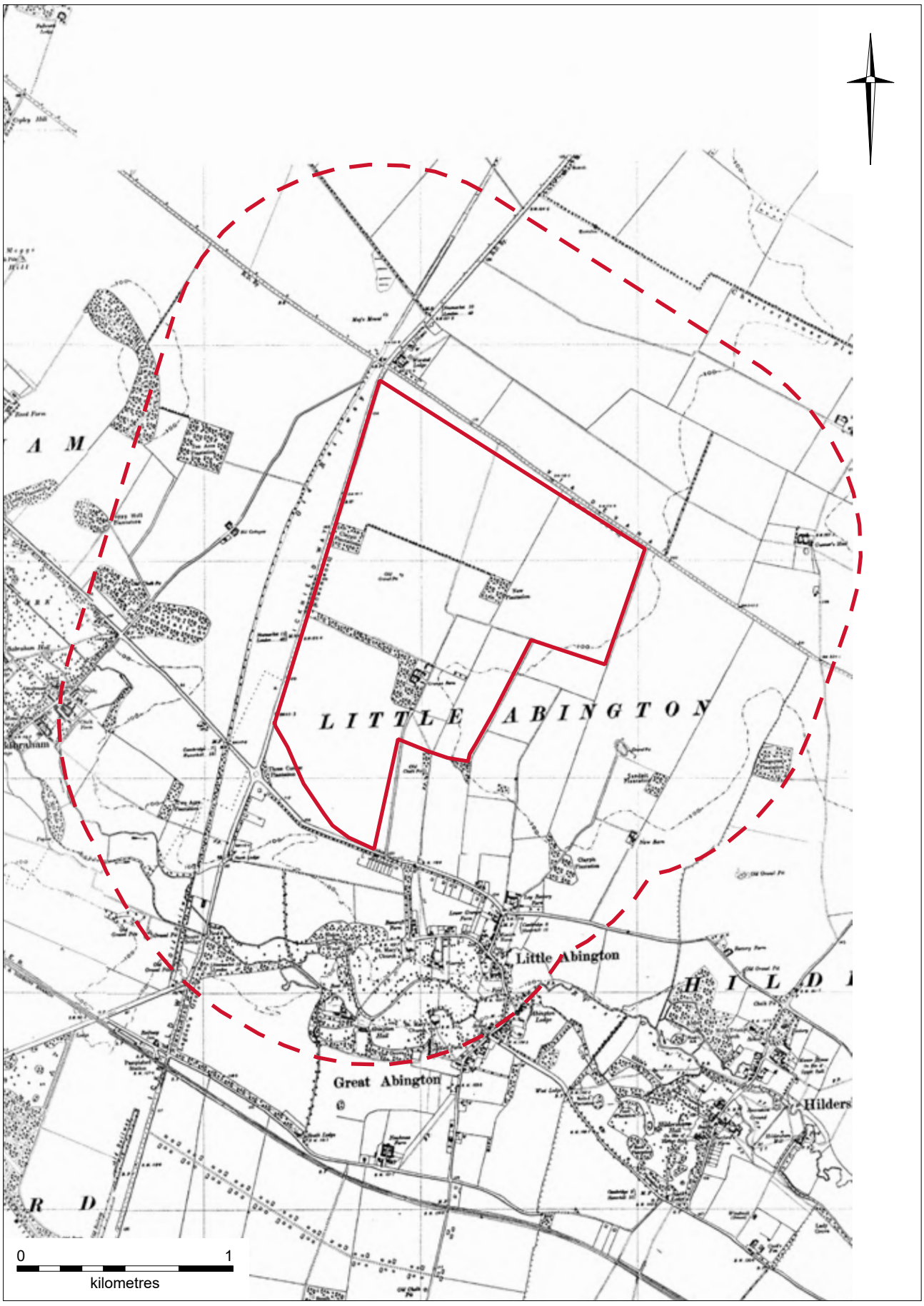


Figure 14. Cambridgeshire County Series 1:1:10,560 1938 (3rd revision).

Figure 15. Lidar image of the PDA, in high relief, showing the plough headlands across the site and nearby fields. The hollow way (CHER 06250) in the fields to the north of the Roman road, Worstead Street, are also visible

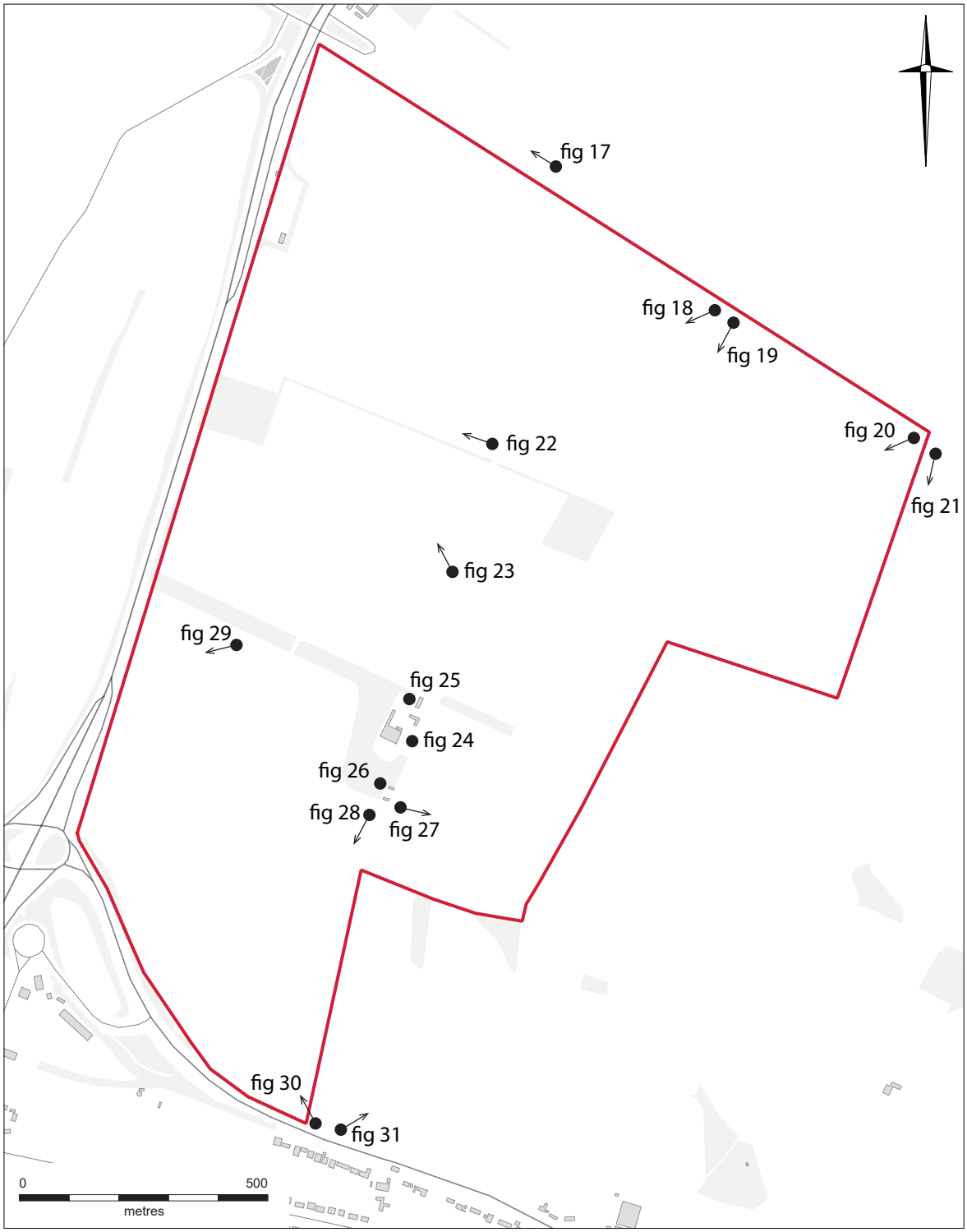


Figure 16. Photo locations

Figure 17. The Roman road, Worstead Street, on the northern boundary of the PDA, along with the flanking historic hedgerows. Looking north-west toward Worsted Lodge Farm

Figure 18. The north-eastern field, looking south-west

Figure 19. The N–S aligned hedgerow dividing the fields in the northern part of the PDA

Figure 20. Panoramic view of the hedgerow on the north-eastern boundary of the PDA

Figure 21. Panoramic view of the northern fields viewed from the north-east

Figure 22. Location of the single ring ditch (CHER 09275), visible as a cropmark in aerial photographs. There is no upstanding feature visible on the ground

Figure 23. View of north-western fields in the PDA

Figure 24. The 19th century main farmhouse at the centre of the PDA, with the barn to the rear

Figure 25. The brick barn to the rear of the main farmhouse

Figure 26. The small early 20th century farmhouse

Figure 27. The eastern field of the PDA, viewed from the small farm house, looking east

Figure 28. The southern field of the PDA, viewed from the small farmhouse, looking south. The main buildings of Granta Park are visible in the distance at the centre of the picture

Figure 29. The location of the four large barrow ring ditches in the southern field, viewed from the east. There is no sign of upstanding barrows on the ground

Figure 30. The southern field and entrance to Grange Farm from Cambridge Road, looking north-west

Figure 31. The land east of the southern field of the PDA

14. APPENDIX 1: PLANNING POLICY

14.1 Ancient Monuments and Archaeological Areas Act 1979

14.1.1 The Ancient Monuments and Archaeological Areas Act (1979) allows an archaeological site or historic building of national of importance to be designated as a Scheduled Monument, and registered with the Department of Culture, Media and Sport (DCMS). Any development that could affect a Scheduled Monument or its setting requires Scheduled Monument Consent. Advice on Scheduled Monument Consent is provided to DCMS by Historic England, which also provides advice on the management of Scheduled Monuments.

14.2 National Planning Policy

14.2.1 The National Planning Policy Framework (February 2019) sets out the Government's planning policies on the historic environment.

> *189. In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes, or has the potential to include, heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation.*
>
> *190. Local planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this into account when considering the impact of a proposal on a heritage asset, to avoid or minimise any conflict between the heritage asset's conservation and any aspect of the proposal.*

14.3 Local Planning Policy

14.3.1 The South Cambridgeshire Local Plan includes the following policy on heritage, including archaeology:

> *Policy NH/14: Heritage Assets*
>
> *1. Development proposals will be supported when:*
>
> *a. They sustain and enhance the special character and distinctiveness of the district's historic environment including its villages and countryside and its building traditions and details;*
> *b. They create new high quality environments with a strong sense of place by responding to local heritage character including in innovatory ways.*
>
> *2. Development proposals will be supported when they sustain and enhance the significance of heritage assets, including their settings, as appropriate to their significance and in accordance with the National Planning Policy Framework, particularly:*
>
> *c. Designated heritage assets, i.e. listed buildings, conservation areas, scheduled monuments, registered parks and gardens; d. Non-designated heritage assets*

including those identified in conservation area appraisals, through the development process and through further supplementary planning documents;
e. The wider historic landscape of South Cambridgeshire including landscape and settlement patterns;
f. Designed and other landscapes including historic parks and gardens, churchyards, village greens and public parks;
g. Historic places;
h. Archaeological remains of all periods from the earliest human habitation to modern times.

6.43 A core planning principle of the NPPF (2012) is to conserve heritage assets in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations. 6.44 Heritage assets are buildings, monuments, sites, places, areas or landscapes which are significant because of their historic interest. They are irreplaceable but can be vulnerable to neglect or unsympathetic change.

6.45 The district's character is largely shaped by its heritage, including that of its much loved historic villages and countryside. Villages stand out in the landscape, with a variety of forms which respond to their locations such as at the edge of Fens or on hilltops or valley sides. Agricultural and food processing buildings are characteristic, and the varied geology is reflected in traditional materials such as brick, tile, clunch and clay batt. 6.46 Challenges facing the historic environment include preserving the district's special rural character and scale of building, the degree of change generated by prosperity, the impact of intensive agriculture on historic landscapes and archaeology, the need to find new uses for traditional farm, food-processing and industrial buildings, and securing the future of unoccupied buildings such as historic garden pavilions. Understanding, conserving and enhancing the historic environment will be an essential part of master planning the growth planned within the district helping to create a sense of place.

6.47 The distinctive character and quality of life given by the historic environment of the area has been key to its economic success. Many important Hi-Tech and Bio-Tech organisations and businesses are based in large historic houses and their parkland settings. Strategic management plans are an important tool for achieving successful growth. Historic farm and industrial buildings can provide a range of size and type of premises for smaller businesses. Retaining historic pubs in use is important for village life as well as conservation.

6.48 Heritage is an essential component of plans from a village or neighbourhood level to that of the district. A full understanding of the historic environment, including traditional materials as used in vernacular buildings, is needed to inform plans, identify opportunities for conservation and enhancement, and to be able to reinforce local identity and create a sense of place.

6.49 The conservation of heritage assets does not prevent all change but requires it to be managed in a way which does not compromise heritage significance and exploits opportunities for enhancement. Section 12 of the NPPF (2012) provides guidance regarding the consideration of development proposals on heritage assets. In summary the more important the asset, the greater the weight should be applied to its conservation. Where development would lead to the substantial harm or total loss of significance of a designated asset, the local planning authority should refuse consent unless demonstrated it is necessary to achieve substantial public benefit that outweigh the harm or loss. Proposals leading to less than substantial harm to the significance should also be weighed against public benefits of the proposal. For proposals affecting non-designated assets a balanced judgement will be made, having regard to the scale of any harm or loss and the significance of the heritage asset.

6.50 Non-designated heritage assets of archaeological interest which are of equal significance to scheduled monuments will be considered in the same way as designated heritage assets.

6.51 Finding viable uses which sustain rather than compromise the significance of historic buildings is fundamental to conservation (though not possible for all buildings). The need to secure the future of buildings may require a flexible approach to other policies or enabling development, Section 106 agreements and other planning contributions. Buildings at risk will be monitored and action taken to secure their repair and encourage sustaining uses. The Council is committed to ensuring the future viable uses of assets within the district.

6.52 Decisions on development proposals must be based on a good understanding of how the proposals will affect heritage. Applicants must describe the significance of any heritage assets, including any contribution from their setting. The level of detail must reflect the importance of the asset and clearly identify the potential impact of the proposal.

6.53 Where development is proposed for a site which includes or has the potential to include heritage assets with archaeological interest, developers must submit an appropriate desk-based assessment and, where necessary, a field evaluation.

6.54 Prospective developers should contact the County Council's Historic Environment Team for information to establish whether there is known or potential archaeological interest and the need for investigation and evaluation at an early stage.

6.55 Different levels of information are available on different types of heritage asset and parts of the district. For some development proposals, more research will be required. It will always be important to investigate sites and their context on the ground.

6.56 The Cambridgeshire Historic Environment Record, maintained by the County Council, provides information on heritage assets, including non-designated and designated heritage assets with archaeological interest. Other information on heritage assets and local heritage character is available on national websites, from the County Council's Historic Environment Team, and in District Council Conservation Area Appraisals and SPDs. The Council's web site and officers will give advice on sources of information. 6.57 Where development resulting in the loss of a heritage asset is permitted, the developer will be required to record and advance the understanding of the heritage asset to be lost. The results of assessments and investigations which are required and collected as part of development management are of public interest and will be made accessible, normally through the Cambridgeshire Historic Environment Record.

6.58 The Council encourages people to be involved with and enjoy local heritage and, where appropriate, developers will be required to support public understanding and engagement, and interpretation.

15. APPENDIX 2: HERITAGE ASSETS

Monument ID	*Name*	*phase*
312	Medieval earthworks, Great Abington	Medieval
00312A	Roman and later pottery, Great Abington	Roman
6056	Abington Hall	Post-medieval
06056a	Abington Hall	Medieval
6172	Round barrow and ring ditches, Little Abington	Bronze Age
6194	Medieval earthworks, Little Abington	Medieval
6215	Saint Mary's Church, Little Abington	Medieval
6215	Saint Mary's Church, Little Abington	Medieval
6238	Stone axe find, Fulbourn	Neolithic
6239	Neolithic axe, Fulbourn	Neolithic
6249	Roman finds, Balsham	Roman
6250	Bronze Age barrow, Balsham	Bronze Age
6281	Round barrows, Little Abington	Bronze Age
6312	Linear ditch system, Fulbourn	Undated
6313	Undated ditch, Fulbourn	Undated
6327	Chesterford-Newmarket railway	Modern
6375	Icehouse in Chalkpit Plantation, Babraham	Modern
7970	Worsted Street (Via Devana) Roman road	Roman
8154	Shrunken village, Great Abington	Medieval
8237	Possible gallows site, Worstead Lodge	Modern
9078	Linear feature, Balsham	Undated
9263	Ring ditches and linear feature, Fulbourn	Bronze Age
9274	Enclosures, Balsham	Roman
9275	Ring ditch, Little Abington	Bronze Age
9276	Enclosures, Balsham/Little Abington	Roman
9284	Enclosures and possible building, Balsham	Roman
9285	Enclosures with ring-ditch, Balsham	Roman
9286	Square double-ditched enclosure, Balsham	Roman
9287	Linear features and ring ditch, Balsham	Undated
9287	Linear features and ring ditch, Balsham	Bronze Age
9356	Ring ditches, Little Abington	Bronze Age
9358	Enclosures, Little Abington	Roman
9361	Enclosure, Little Abington	Roman
9363	Ring ditch, Little Abington	Bronze Age
10118	Rdge and furrow, Balsham	Medieval
11317	Mesolithic - Neolithic activity, Bourn Bridge	Mesolithic-Neolithic
11317A	Bronze Age ditched monument, Bourn Bridge	Bronze Age
11317B	Palaeolithic hand axe, Bourn Bridge	Palaeolithic
11317C	Late Iron Age/Romano-British field system, Bourn Bridge	Iron Age-Roman
11317D	Roman settlement and droveway, Bourn Bridge	Roman
12284	Great Park, Abington Hall, Great Abington	Post-medieval
09356a	Large prehistoric ring ditch or henge, Four Wentways, Little Abington	Neolithic
09356b	Prehistoric ditch, Little Abington	Prehistoric

Monument ID	*Name*	*phase*
09356c	Linear ditch, Little Abington	Undated
13044	Saxon settlement, Bourn Bridge	Anglo-Saxon
CB14745	Saxon finds, Bourn Bridge	Anglo-Saxon
CB14748	Mesolithic-Neolithic flints, Bourn Bridge	Mesolithic-Neolithic
CB14842	Saint Mary the Virgin's Church, Great Abington	Medieval
CB14954	Little Abington United Reformed Church, 14 High Street	Modern
CB15306	Iron Age and Post-Medieval features, The Welding Institute	Iron Age-Post-medieval
MCB15782	Ring ditch cropmark, Little Abington	Bronze Age
MCB15783	Former watercourse, Little Abington	Post-medieval
MCB15995	Babraham water meadows	Post-medieval
MCB17505	Babraham Hall Park and gardens	Post-medieval
MCB17695	Moated site and trackway, Great Abington	Medieval
MCB17799	Saxon finds, Bourn Bridge	Anglo-Saxon
MCB19539	Possible Iron-Age/ Roman field system, Babraham Research Campus	Iron Age-Roman
MCB19813	Roman field boundaries at Blacksmith's Close, Babraham	Roman
MCB19914	Undated ditch at Cambridge County Scout Camp Site	Undated
MCB21405	School, Great Abington	Modern
MCB22360	Lay Rectory Farm, Little Abington	Modern
MCB22361	Lower Grange Farm, Little Abington	Modern
MCB22362	Bancroft's Farm, Little Abington	Modern
MCB22363	Old gravel pit, Pampisford	Modern
MCB22364	Old gravel pit, Pampisford	Modern
MCB22365	Lodge, Little Abington	Modern
MCB22366	Bourn Bridge, Little Abington and Pampisford	Modern
MCB22367	Chalk Pit, Little Abington	Modern
MCB22368	New Barn, Little Abington	Modern
MCB26667	Roman Road, Braughing to Worsted Lodge	Roman
MCB26677	St Mary's Churchyard, Great Abington	Medieval
MCB26691	Hill Cottages, Babraham	Modern
MCB26692	Grange Farm, Little Abington	Modern
MCB26850	Site of former gravel pit, Great Abington	Modern
MCB27080	Possible World War II features, Fulbourn	Modern
MCB28997	Undated enclosure, Babraham	Undated
MCB29002	Abington Road Bridge	Modern
MCB29003	Bourn railway bridge	Modern
MCB29011	Meg's Mount tree ring, Fulbourn	Modern
MCB29036	Ring ditch east of Worsted Lodge Farm	Bronze Age
MCB30577	Undated trackway, north of Cambridge Road, Great Abington	Undated
MCB30578	Curvilinear and linear anomalies, Top Acre Plantation, Great Abington	Undated
MCB30889	Furlong boundaries in the parish of Little Abington	Medieval/ Post-medieval
MCB30889	Furlong boundaries in the parish of Little Abington	Medieval/ Post-medieval

Monument ID	*Name*	*phase*
MCB30889	Furlong boundaries in the parish of Little Abington	Medieval/ Post-medieval
MCB30889	Furlong boundaries in the parish of Little Abington	Medieval/ Post-medieval
MCB30890	Furlong boundaries in the parish of Babraham	Medieval/ Post-medieval
MCB30890	Furlong boundaries in the parish of Babraham	Medieval/ Post-medieval
MCB30890	Furlong boundaries in the parish of Babraham	Medieval/ Post-medieval
MCB30890	Furlong boundaries in the parish of Babraham	Medieval/ Post-medieval
MCB30892	Former ridge and furrow in the parish of Little Abington	Medieval/ Post-medieval
MCB30892	Former ridge and furrow in the parish of Little Abington	Medieval/ Post-medieval
MCB30895	Former Ridge and furrow in the parish of Babraham	Medieval/ Post-medieval
MCB30896	Site of former clay pit, Great Abington	Modern
MCB30897	Site of former extractive pits, Abington	Post-medieval
MCB30897	Site of former extractive pits, Abington	Post-medieval
MCB30898	Site of former extractive pit, Babraham	Post-medieval
MCB30899	Site of former extractive pit, Babraham	Post-medieval
MCB30904	Site of former extractive pits, Abington	Post-medieval
MCB30906	Former water meadows, Babraham and Little Abington	Post-medieval
MCB30906	Former water meadows, Babraham and Little Abington	Post-medieval
MCB31294	Site of gravel pit, Little Abington	Modern
MCB31295	Former Mission Room, Little Abington	Modern
MCB31296	Gunners Hall, Little Abington	Modern
MCB31297	Malthouse, Little Abington	Modern
MCB31298	Site of gravel pit, Little Abington	Modern
MCB31299	Blacksmiths workshop, Babraham	Modern
MCB31301	Babraham Lodge, Babraham	Modern
MCB31302	Site of chalk pit, Babraham	Modern

16. APPENDIX 3: ARCHAEOLOGICAL INVESTIGATIONS

Event ID	*Year*	*Name*
ECB7	1994	Evaluation at Four Wentways, Little Abington, 1994
ECB296	1993	Fieldwalking and evaluation at Bourn Bridge, Pampisford, 1993
ECB960	1997	Evaluation at Abington Park, 1997
ECB961	1997	Further evaluation at Abington Park, 1997
ECB962	1998	Excavation at Granta Park, Great Abington, 1998
ECB1239	1991	Excavations at Worsted Street, Mount Farm, Fulbourn, 1991
ECB1239	1991	Excavations at Worsted Street, Mount Farm, Fulbourn, 1991
ECB1239	1991	Excavations at Worsted Street, Mount Farm, Fulbourn, 1991
ECB1239	1991	Excavations at Worsted Street, Mount Farm, Fulbourn, 1991
ECB1395	1994	Excavations at Bourn Bridge, Pampisford, 1994
ECB1478	2004	AP assessment, Rickett Field site, 2004
ECB1543	1994	AP assessment, Four Wentways, Little Abington, 1994
ECB2115	2005	Evaluation at Comfort Cafe, Four Went Ways, Little Abington, 2005
ECB2682	2006	Geophysical survey, SE of St Mary's church, Great Abington, 2006
ECB3460	2010	Monitoring and excavation at Babraham Research campus Nursery building, 2010
ECB3668	2011	Evaluation at the Scout Camp site, Little Abington
ECB3915	2013	Evaluation at Blacksmith's Close, Babraham 2013
ECB4385	2016	Monitoring at St Mary's Church, Great Abington, 2014-2016
ECB4385	2016	Monitoring at St Mary's Church, Great Abington, 2014-2016
ECB4472	2012	Geophysical Survey of land at Little Abington, Cambridgeshire 2012
ECB4757	2016	Evaluation at the Cambridge International School, Bourn Bridge Road, Little Abingdon in 2016
ECB4793	2016	Geophysical survey at Cambridge International School, Little Abington in 2016
ECB6030	1993	Aerial photographic assessment at Bourn Bridge, 1993
ECB6038	2004	Aerial photographic assessment, Great Abington in 2004
ECB6038	2004	Aerial photographic assessment, Great Abington in 2004
ECB6135	2008	Aerial photographic survey south of Cambridge in 2008
ECB6222	2020	Geophysical survey to the north and west of Great Abington in 2020
ECB6222	2020	Geophysical survey to the north and west of Great Abington in 2020
ECB6753	2019	Aerial photographic assessment, Abington in 2019

APPENDICES

Landscape

Archaeology

Energy

Water

SNRG

EMPOWERED BY CENTRICA

SNRG SMARTGRIDS AND HUBS

AT GRANGE FARM, CAMBRIDGE, CB21 6BW

The Grange Farm Partnership

SNRG SmartGrid & Hubs at Grange Farm
Energy, mobility & amenities at the heart of the community

SNRG centrica

SNRG will work with The Grange Farm Partnership to create an energy solution that is relevant for current times

- The transition to all-electric homes (2025) and Mobility (2030) will contribute to reducing carbon emissions & attaining net zero. However, this is complex and costly.
- SNRG, empowered by Centrica, simplifies these transitions, saving money for residents & developers whilst reducing carbon emissions.
- As an innovative solutions provider for energy & mobility, SNRG's future-proofed solution comprises:

SNRG SmartGrid
Infrastructure using renewables & optimised storage

SNRG eMobility Hub
Where energy, mobility & community amenities are integrated

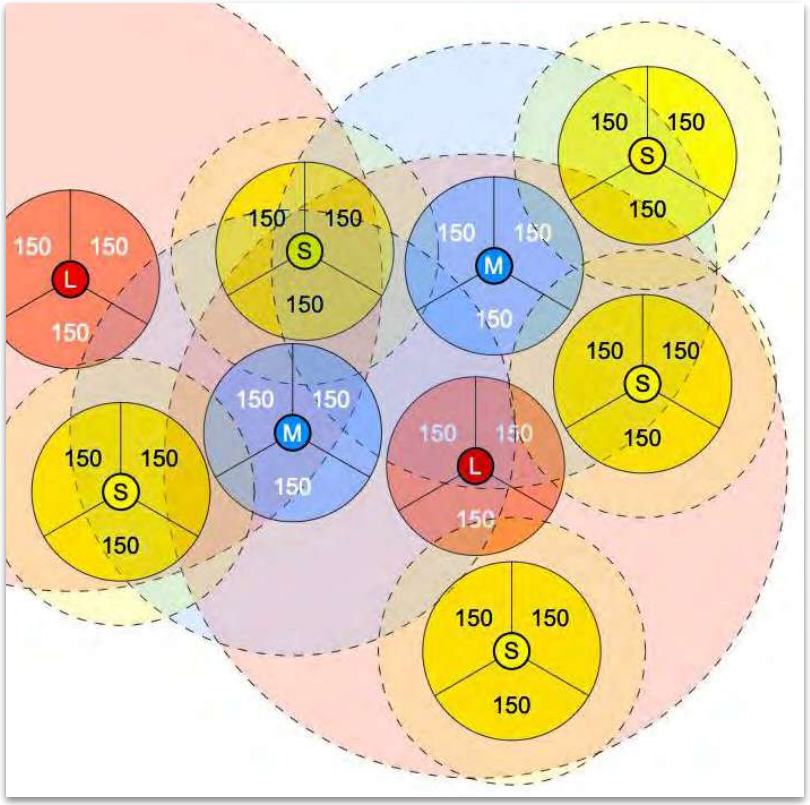
SNRG Connect
Digital Experience for people to access integrated services

SNRG Community Hub
Zero Carbon Modern Methods of Construction (MMC)

Overview

- Through the SmartGrid, Mobility & Community hubs strategies, SNRG will enable and enhance the Neighbourhood Centres at Grange Farm
- Sustainable access to nursery, primary and secondary schools will be enabled by SNRG Hubs and in turn the schools use of them will help to promote their sustainable transport and community cohesion
- Each hub will have landscape and play areas closely associated with a cafe and other community uses
- Grange Farm 'xxxx ManCo' will be supported by the SNRG Connect optimisation platform and Community App
- SNRG designs, funds, builds and operates Hubs. This model can be delivered through a JV with The Grange Farm Partnership and also allows the community to have a stake in the operation
- A network of hubs, each with a SmartGrid serving 450 homes, but with different levels of mobility & community amenity, subject to the optimisation of mobility analysis & stakeholder engagement. Analysis is continuous, enabling modular hubs to adapt to behaviour trends throughout the masterplan build-out

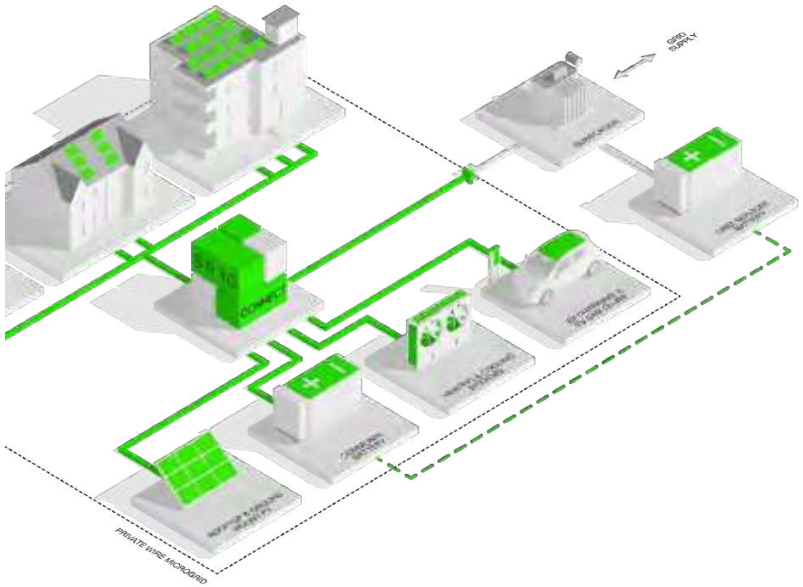
- Supports 20 minute community principles
- Use of footpaths & cycle lanes is promoted and facilitated by each Hub as part of its sustainable transport purpose



SNRG SmartGrid
Infrastructure using renewables & optimised storage

SNRG centrica

- Smart private microgrid supplies homes & businesses
- Solar PV & battery storage reduces peak demand
- Reduces energy costs & enables high EV use
- Controlled via platform & app for customer care
- Front loaded strategic infrastructure reduces cost
- Fully funded solution



SmartGrid Benefits for Public Sector

- Sustainable Net zero new homes
- Minimal impact on grid
- Uses local renewable energy
- No public sector cost & help mitigate fuel poverty

Benefits for Master Developer

- All electric low carbon energy solution
- Reduction in grid connection costs
- Uses local renewable energy
- Design, build, fund and operate solution

Benefits for [Plot Developer?]

- One-stop-shop for energy and tech supply & integration
- Solar PV rebate
- Future Homes Standard compliant
- 60% reduction in GHG emissions & net zero energy supply

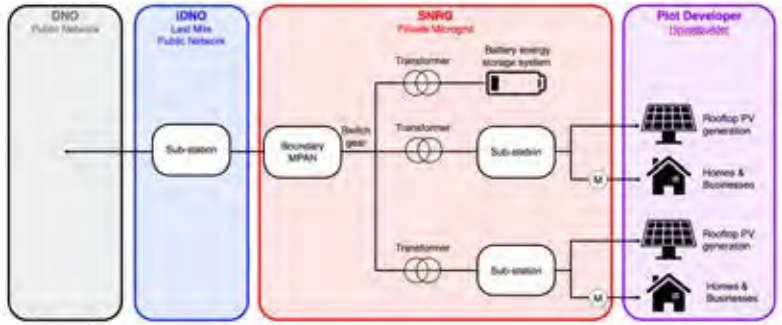
Benefits for Residents

- 20% min saving on energy bills (50% for social tenants)
- Fully integrated solution (heating, hot water, EV, energy)
- No upfront cost
- Serviced by simple app - Single point of contact for all

Affordable Housing

- A SNRG SmartGrid supports the affordability of housing by minimising running costs and enhances any Affordable Housing Providers drive to Net Zero by maximising environmental sustainability

Network Configuration Diagram



Communal Battery

0.5 MW / 1.5MWh containerised battery c.10mx2.5m footprint

SNRG eMobility Hubs at Grange Farm

Where energy, mobility & community amenity are integrated

SNRG centrica

SNRG Community Hubs at Grange Farm

Optimised Amenity for Community Cohesion

- Building on the SmartGrid solution, eMobility services including EV charging and EV Car Club, Docked eBikes / eScooters and Docked eCargo bikes can be provided
- All of these aspects are contained within a single storey building, which is either self contained, or built into the ground floor of an apartment building
- Depending on the location within a development site and the level of service required, SNRG Hubs can be provided at a variety of scales; from small hubs, containing only essential items such as EV charging and e-bikes, to larger hubs, containing additional services, such as cafe, co-working and last-mile delivery facilities

A SNRG mobility strategy will achieve the following:

- Enable seamless future mobility
- Reduce on-site vehicle ownership
- Increase active transport daily trips
- Reduce on-site GHG emissions
- Future-proofed to support sustainable transport choices
- Supports optimisation of road layouts

SNRG e-Mobility and Community

- Reduces GHG emissions
- Supports the transition from car dependency and to shared use
- Using technology to improve journey efficiency and management
- Unifies mobility services and community facilities to reinforce community cohesion
- Supports an approach based upon phased place creation over phased construction, ensuring liveability from the outset
- Its sustainability is founded on flexibility to embrace residents' changing needs throughout their lives

Changes to working arrangements will increase the need for placemaking & community

Through the delivery of a SNRG hub we can provide the following community benefits at Grange Farm:

- SNRG funded hub facilities can help meet S106 requirements
- Services harmonise provision across the masterplan
- We will create jobs for local people (to operate our Hubs)
- Services fit for a post-COVID world
- All site services are bookable through a single mobile app
- Create shared and social spaces that support The Grange Farm Partnership approach of xxxxxx

Community Amenities can include the following:

- Cafe, Co-working, Community flexible space
- Library of Things, Last Mile Delivery, Storage Pods
- Landscaped play-space

SNRG Connect at Grange Farm

Digital Experience for people to access integrated services

SNRG centrica

Platform and Community App Overview

- Resident access to all energy, mobility and community services through a single simple mobile app
- The application is underpinned by our advanced software platform (SNRG Connect) that optimises the SmartGrid and coordinates our mobility and community services.

Essential

- Secure personal account
- Energy billing & payment
- GDPR compliance
- SmartGrid optimisation

Optional

- Bookable EV charging (public)
- Car club (resident & business)
- Bookable e-bike and e-scooter (public)
- Community concierge
- Last mile delivery
- On demand storage space
- Bookable co-working space
- Bookable community space

- Unlocks an integrated Net Zero approach
- Engages residents from day one in understanding and benefiting from Net Zero
- Provides a “day one” community engagement tool to support Sustainable Travel Plans
- Supports liveability and community from the outset
- A ready made platform for The Grange Farm Partnership and ongoing community led initiates

SNRG centrica

SNRG Cares about People & Community

MAKING PLACE

Strong connection between people and shared places

Collaborate to shape our public realm to maximize shared value

e-MOBILITY

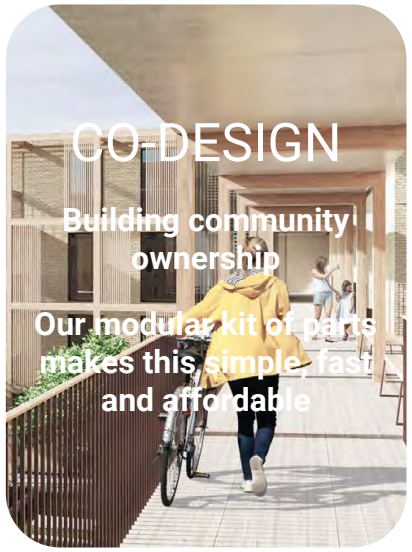
Reduces emissions

Supporting the transition to reduced car dependency and shared use

Using technology to improve journey efficiency and management

SHARED AMENITIES

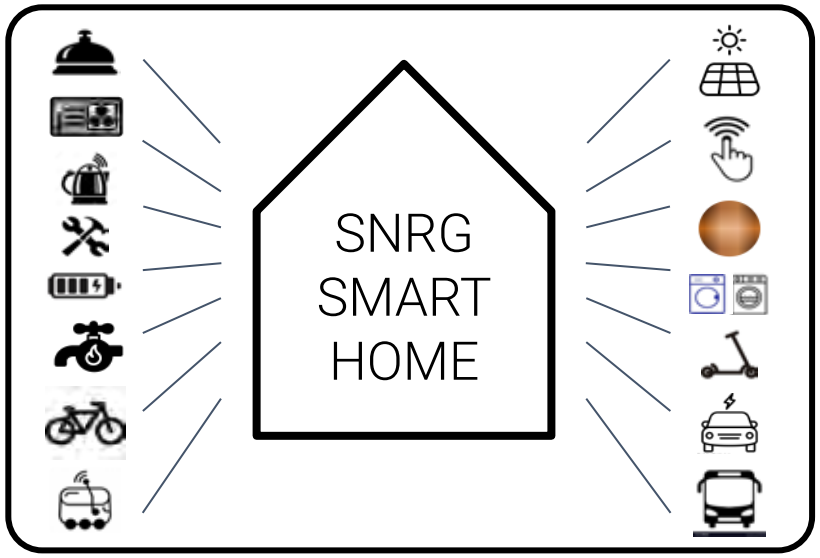
Coffee shop, Shared kitchen & Co-working
eMobility as a Service
Last Mile Delivery
Bike & Scooter storage
Laundry & Multi-purpose space
Library of Things & Maker space



CO-DESIGN

Building community ownership

Our modular kit of parts makes this simple, fast and affordable



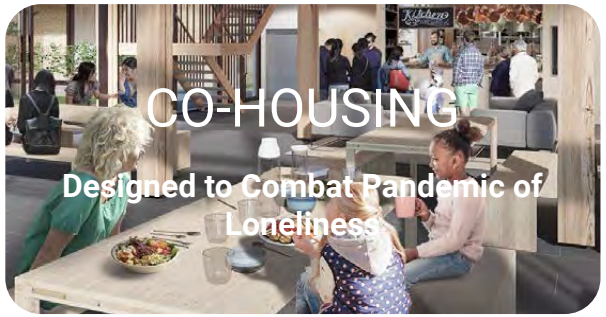
HUMAN GROUPS

Richard Dunbar shows how groups >150 become unstable

We design & build communities to this principle - enabling Human Connection

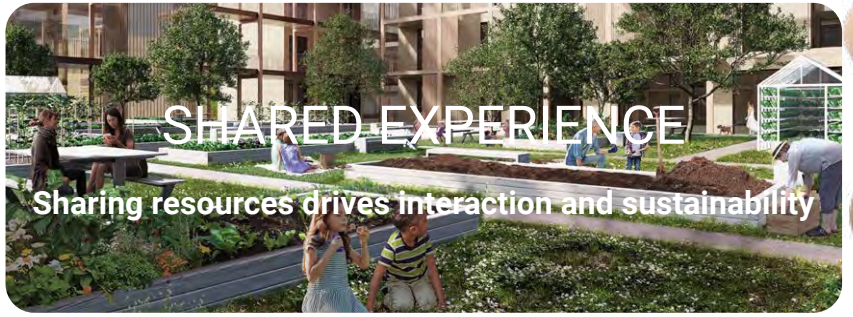
CONNECT

Our tech platform makes life simple & affordable & operationally efficient



CO-HOUSING

Designed to Combat Pandemic of Loneliness



SHARED EXPERIENCE

Sharing resources drives interaction and sustainability

SNRG SmartGrid Overview

Energy Solution for Grange Farm

The SNRG Smart Grid Connect analyses and predicts local intermittent variables such as weather, power generation, grid carbon intensity and load, then uses a shared battery along with AI optimisation that:

Reduces:

- Capital electrical equipment deployment requirements (often with a corresponding embodied CO2 reduction)
- CO2 emissions
- Peak electricity demand
- Commodity purchase requirements (i.e. kWh of electricity)
- Non commodity charges (i.e. grid costs)

or increases:

- Resilience
- Asset availability
- Flexibility market income (Payments from the grid to keep it stable)

depending upon what is required from the system on a minute by minute, or half hourly resolution.

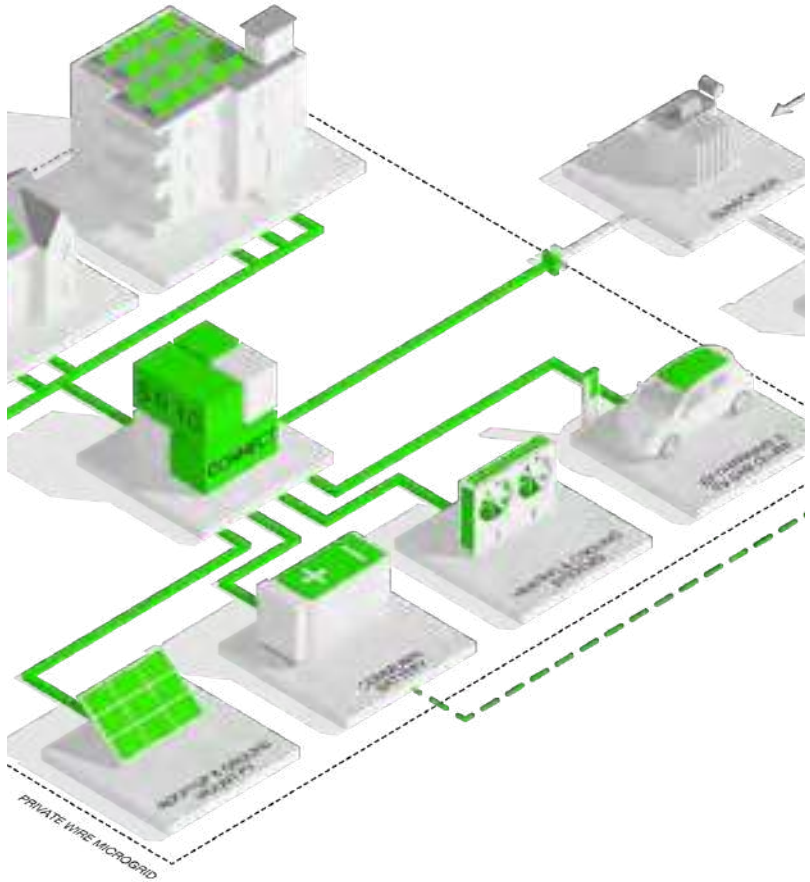
SNRG's proposed solution for Grange Farm is based on a single intelligent private wire microgrid (SNRG SmartGrid)

It combines a private wire, battery storage and smart controls to:

- maximise the use of local renewable energy generation
- minimise infrastructure cost
- maximise greenhouse gas emissions savings
- reduce energy costs for all-electric homes and businesses.

All renewable energy generation and loads (homes and businesses) will be connected to the SmartGrid behind a single bulk supply meter, which connects the SmartGrid to the public network.

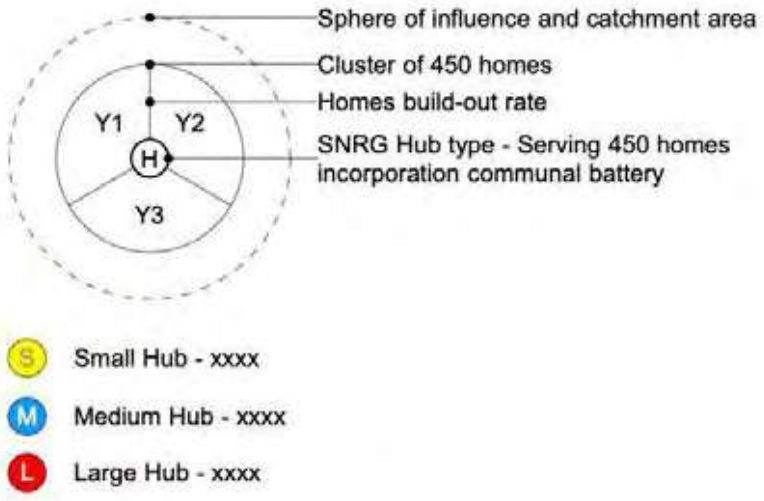
SNRG will design, fund, install and operate the solution, working closely with The Grange Farm Partnership and its appointed partners to ensure seamless delivery.

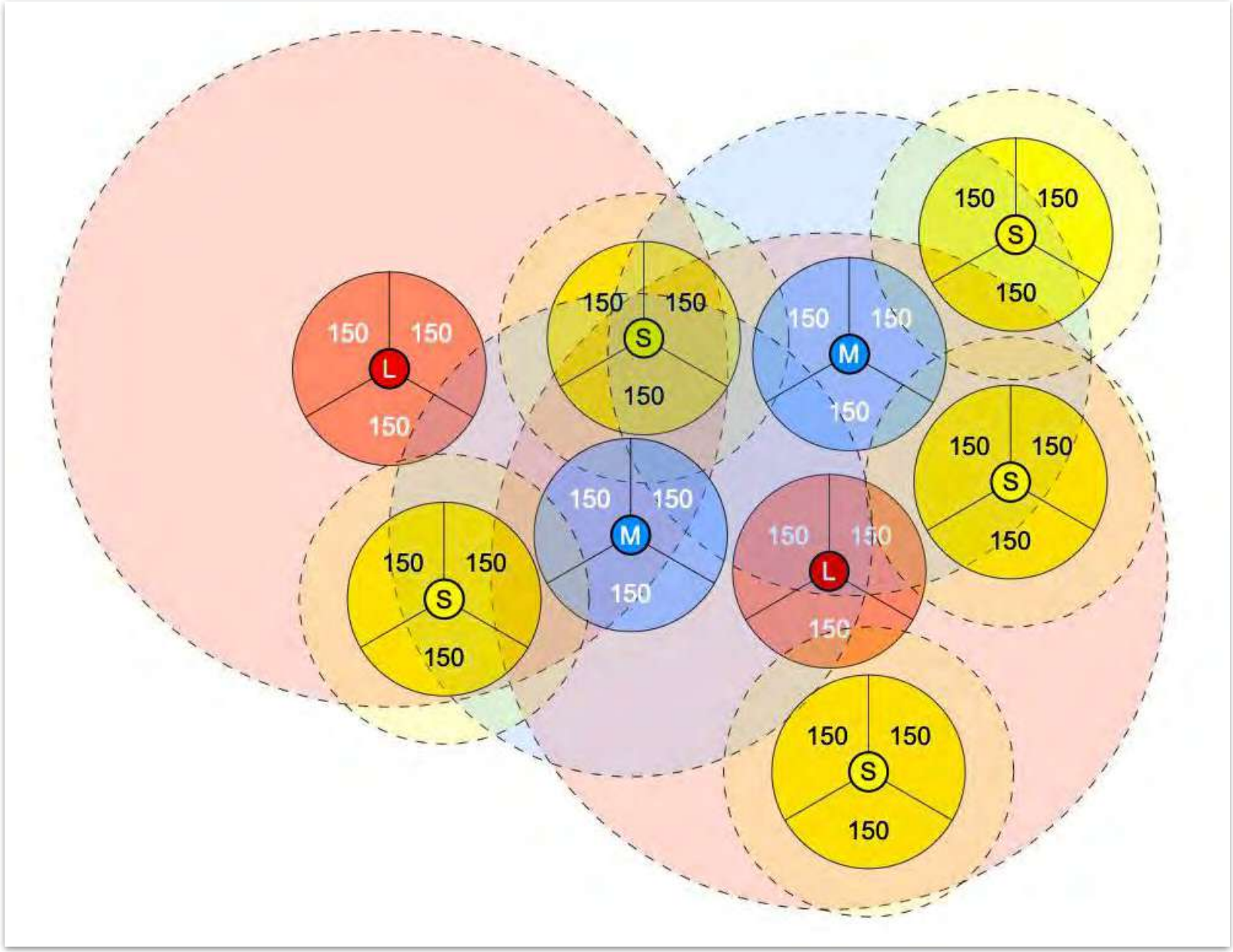


Phasing / build-out rate

Metrics these aligned to ideal clusters for a SmartGrid:

- The ideal number of homes per SmartGrid is 450.
- With a build-out rate of say 150/year, 3 years would equate to a SmartGrid of 450.
- This would then be aligned to clusters of homes in line with a 10 minute living radius.
- This would determine the ideal locations for communal batteries and these can be co-located with mobility (and sometimes) community Hubs (SNRG Hubs). We can also do this as a discreet diagram as well as in overlay. RS/NC (1 week)

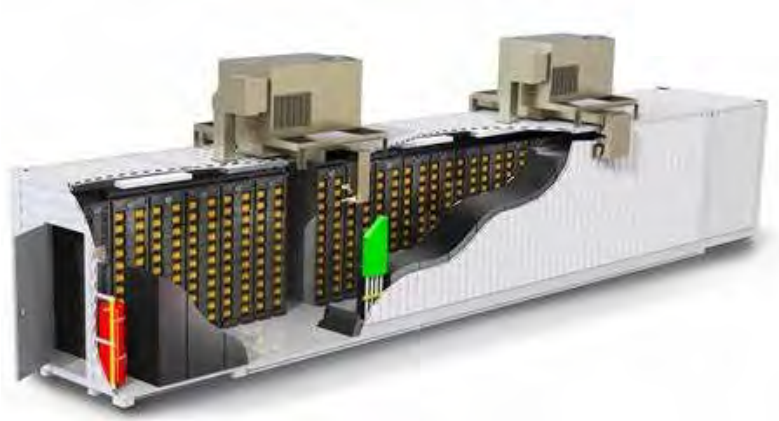




Roof-mounted and Ground-mounted PV.

Parameters for optimised PV provision

Direction of solar panels	Output	Tilt of solar panels	Observations
South	Best for total output	10 degrees	Poor winter performance
West	Best for evening output	30-40 Degrees	Best for output (UK)
East	Best for morning output	Above 40 degrees	Better winter performance (still low output)
North	Avoid if possible		



Orientation
Xxxx

Roof type and **Pitch**
Xxxx

Protected views
Xxxx

SNRG recognises that the cost of connecting large new developments to the electricity grid can be significant

Our SmartGrids can help to reduce this cost by minimising the peak load of the development

We can also assist through the optional **deployment of a grid scale battery and ground-mount solar PV system.** The approach offers the following benefits:

1. Assets that will provide a use for the new grid capacity from day one
2. A contribution to the cost of providing the grid capacity needed to service the wider scheme (reducing both the cost and the risk for the site promoter)
3. Strategic assets in place early that can be reorientated towards the smart grid as the build out programme proceeds, driving greater value to residents
4. An opportunity for co-investment (landower or local council)
5. Charging for site vehicles

DIAGRAM SHOWING SOLAR STRATEGY ON MASTERPLAN, ALIGNED TO PHASING

Off Site Manufacture

Off-site Manufacture has a number of benefits such as programme, waste, cost and quality:

- building's elements can be constructed more quickly in controlled conditions - if necessary 24/7
- Speed of the programme leads to earlier project completion and revenue generation
- process is not governed by external factors such as adverse weather, challenging site logistics, industry skills shortage
- factory process support specialisation of staff leading to a better quality of product
- opportunity to target zero on site defects
- Waste can be reduced by as much as 50% compared traditional building sites with all the attendant financial and environmental benefits.
- We are able to deliver more of the project value into the enduring physical asset, by eliminating waste throughout the manufacturing, on site and administrative processes.
- We can competitively achieve a higher quality, higher performance product which requires less maintenance than the traditional alternative.
- 87% of respondents in a 2019 JLL European investor survey believe that MMC will increase as a proportion of overall asset delivery. Over 50% also believe that MMC will help with scheme viability and rent enhancement.

A standardised approach generates a logic for a generic core unit, but interchangeable facades enable final unit elevations to suit differing contexts and site needs.

Our design philosophy focuses on simplification, only building what we need while selecting natural materials that have low embodied carbon wherever possible.

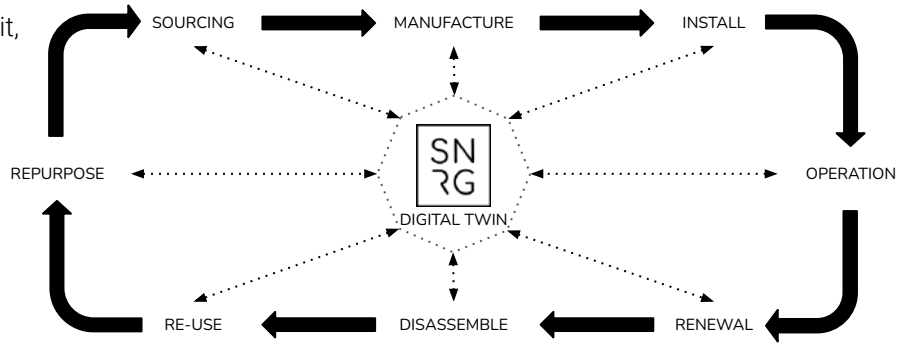
We seek to achieve the following benefits with our all-timber, modular, off site manufacture:

- Zero carbon in build
- _40% reduction in build time
- 10% reduction in TOTEX
- 80% reduction in energy usage
- Net zero carbon in use
- _70% less defects

Our modular solution is manufactured off-site from kit of parts of standardised sub-components, arranged in different ways to accommodate individual sites.

Lifecycle adaptability is also designed-in while also considering end-of-life re-use & recycling. We design out obsolescence whilst ensuring a product which is efficient and effective.

A '**Field Factory'** on or near the site, as a temporary structure for the assembly of sub-components, would help promote local jobs, whilst gaining the benefit of factory built homes.



APPENDICES

Landscape

Archaeology

Energy

Water

GRANGE FARM | LIVING WITH WATER

create

RevA - December 2021

EXECUTIVE SUMMARY

Living with Water

Historically it was of strategic importance for development to be located close to water. This has not changed and water remains a very important resource in the modern world.

Improved Quality and Biodiversity

Grange Farm provides multiple opportunities to improve water quality both within the Site and the wider catchment.

Improving Access

Within the development boardwalks will be included along with pedestrian bridges and cycle routes along the side of the water features, creating attractive focal points for the residents and wildlife. Flood relief channels in the form of Swales will be incorporated into the development ensuring that any exceedance flows are directed to the main pond network, ensuring that key access routes are maintained during significant flood events and that no flood flows leave the site. Where public access is encouraged, safety will always be at the forefront of the designers' mind, appropriate landscaping and bank gradients will ensure that safe access can still be provided.

Working with Water

Water is being integrated within the development to provide great amenity value, and to enhance accessibility opportunities and biodiversity. The new wetland areas being created within the site will not only provide attractive locations for people to meet or exercise, but they will also be put to work as an integral element of an overall water management system. With each of the ponds providing a storage facility for water which will be utilised by the site wide grey water system.

Water as a Resource

Grange Farm will use the latest most efficient water appliances throughout the development, in the homes, commercial areas and public facilities such as schools., A site integrated grey water recycling system is to be introduced using rainwater harvesting, with the potential for onsite treatment. The aim is to achieve water neutrality.

A target of 80 litres per person per day is being set for potable water usage.

The feasibility of a new Waste Water Works will also be investigated which will meet all the requirements of the Environment Agency and facilitate the recycling of water on the development.

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LIVING
WITH WATER

LIVING WITH WATER

Rivers provide ecosystem services which have attracted humans for millennia. Historically it was of strategic importance to locate development adjacent to waterbodies. Rivers and streams are an important resource not only for supplying drinking water, but as a source of energy, a major transport network facilitating trade, for industry and for sanitation.

But why, in the digital age, when traditional forms of transport and energy generation are no longer considered appropriate should we look to locate development adjacent to water bodies?

Not only do lakes and ponds bring delight to residents but water remains a very important resource in the modern world. We still need a supply for drinking, food production and sanitation. We also need to manage rainfall as part of the ever-changing climate. We need lakes and ponds to help treat, store and transport water whilst maintaining the natural aquatic life native to our waterways. Lakes and ponds provide a wide range of benefits to society and living in harmony with them allows for successful and sustainable development.

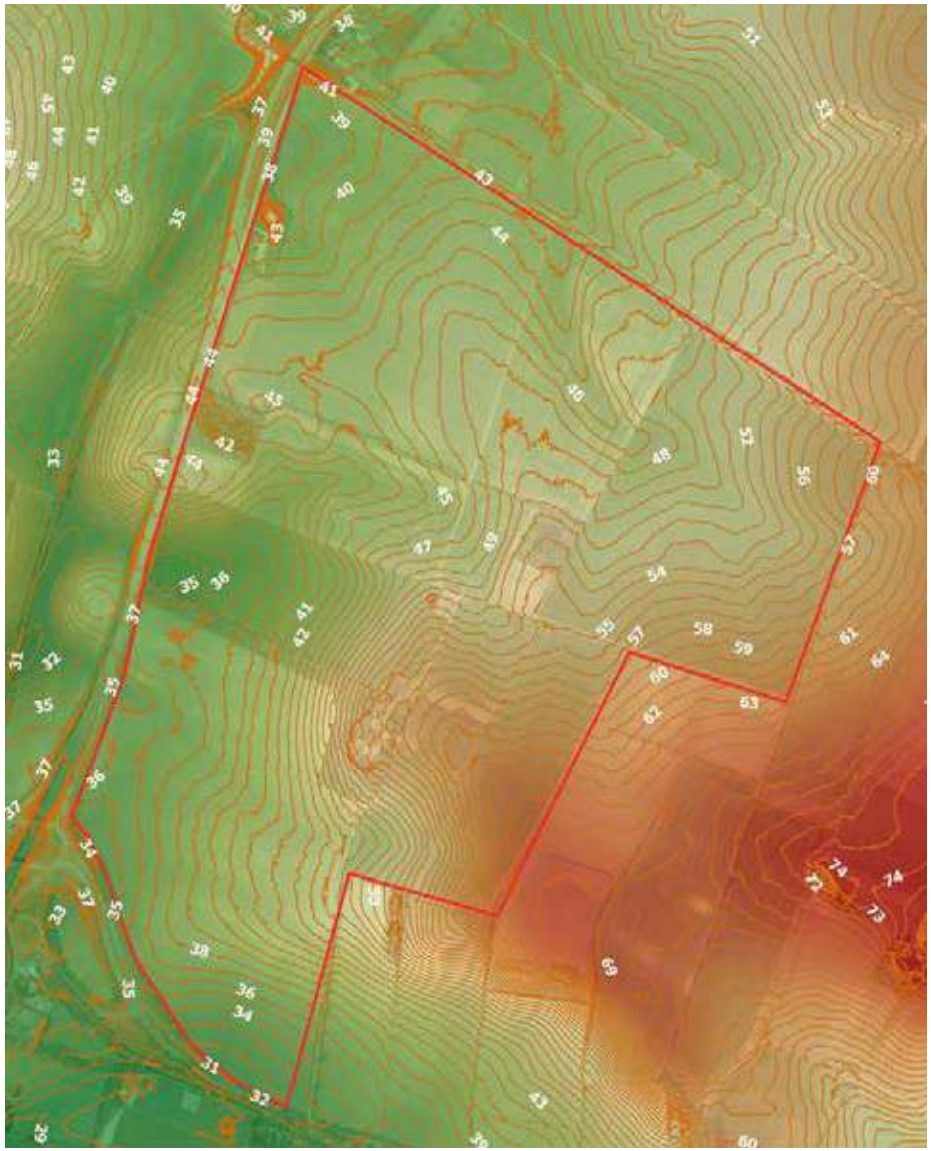
TAKING THE HIGH GROUND

The development is located strategically to ensure that the benefits of living near water can be maximised without introducing any adverse risks to either the new development or pre-existing development within the catchment.

The development will provide a community which is sustainable, resilient and adaptable to changing needs and the dynamic climate challenges of the future.

A combined integrated catchment model will be developed encompassing the Site and surrounding area to demonstrate that the development will in fact improve the management of the catchment, notably managing surface water flow rates and restricting these to less than the existing greenfield runoff. The changes we will make will ensure that the scheme will not cause any external flooding and the balance between aquifer recharge and the efficient re-use of water balanced.

All development parcels are located within Flood Zone 1, land designated as being at the lowest risk of flooding in which all development uses are permitted by the Environment Agency, and outside of the 1 in 100 year fluvial flood event with an allowance of up to 105% for climate change therefore providing long term resilience to climate change.



HELPING OUR NEIGHBOURS

Substantial thought has been put into designing the development to work with the water environment and this consideration does not stop at the development boundary. Grange Farm provides an opportunity to actively manage water both through and within the catchment.

The current unmanaged natural catchment generally allows all water to soak quickly into the underlying chalk aquifer. Whilst this is extremely helpful for recharge it often leads to crops having to be heavily irrigated during dry periods. The introduction of a managed catchment along with the new water features, allows a certain proportion of the water during winter periods and periods of heavy rainfall to be retained, whilst also allowing through a range of SUDS features for an element of aquifer recharge. The water captured on site will be used on to keep down the potable water demand, reducing the impact on surrounding supply resources.

The size of the development enables a unique chance to introduce natural flood management within the scheme which will enable water to be stored on site thus improving flood resilience downstream. We will work in partnership with the Environment Agency to appropriately manage the catchment and to provide ecological benefits for the area.

IMPROVED QUALITY / BIODIVERSITY

The nearest watercourse in the proximity of the development area is the River Granta which is located to the south of the site. There are no other watercourses within the overall site area.

Natural Run-off from agricultural land (fertilisers, herbicides and pesticides) can have a significant impact on the nutrient levels within groundwater and any perched underlying aquifers. These pollutants will no longer enter the ground post development and an exemplary SuDS treatment train for all surface water discharges will be implemented.

The addition of the new water features along the south west corner of the site, will provide an excellent opportunity to improve the overall biodiversity of the site, providing new wetland habitats. The water features will be designed with aeration systems in pace, to ensure oxygen levels will be maintained to ensure a sustainable habitat for fish and other aquatic life, especially in dry summer periods..

IMPROVING ACCESS

Within the development boardwalks will be included along with pedestrian bridges and cycle routes along the side of the water features, creating attractive focal points for the residents and wildlife. Flood relief channels in the form of Swales will be incorporated into the development ensuring that any exceedance flows are directed to the main pond network, ensuring that key access routes are maintained during significant flood events and that no flood flows leave the site.

Where public access is encouraged, safety will always be at the forefront of the designers' mind, appropriate landscaping and bank gradients will ensure that safe access can still be provided, whilst allowing residents of all ages and abilities to enjoy the benefit of the water features.

Ares of the pond network will be designed to be not accessible by the public with planting restricting access to the pond. The development will also enhance river corridors within the landscape, introducing features such as boardwalks and pedestrian bridges, in various areas to enable safe and useable access to areas previously with limited accessibility.


PLAYING
WITH WATER

PLAYING WITH PUDDLES

The scale of the development combined with the numerous surface water outfall opportunities at the Site provides the opportunity to create a wide scale multitiered approach to sustainable drainage (SuDS) which work holistically with the catchments natural drainage patterns. SuDS will be integrated across the scheme to control both the quantity and rate of surface water discharge from the development. Through the use of appropriate controls the time of discharge can be regulated, allowing the managed system to operate more efficiently and effectively to prevent flooding than the existing unmanaged catchment.

SuDS, including a series of large water features which will also act as attenuation basins, will reduce the flood risk to the area but will provide ecological and amenity value.









ACCESSIBILITY

River corridors within the landscape will be enhanced, introducing features such as boardwalks and pedestrian bridges, in various areas to enable safe and useable access to areas previously with limited accessibility.

As a part of the development a series of walkways will interconnect with the water features on site. The active travel corridors provides an internal framework that seeks to connect Grange Farm to the existing settlements and local assets through a robust network of footpaths, cycle and bridleways.

ENJOY THE WATER

Water related leisure uses will be introduced within the wetland area, providing fishing platforms, dipping areas and where possible, canoeing and paddle boarding.

Other areas will remain free from public access and will retain many of the existing naturalised wetland features with reeds, ponds and meandering channels providing attractive wildlife areas which will be managed and maintained by the Heritage Trust.


WORKING
WITH WATER

TURN OFF THE TAP!
REDUCE

Water is a vital resource however it is coming under increasing pressure from both continuing development and climatic changes. Making new homes water efficient is important for people, nature and the economy.

Water efficiency measures will be incorporated into all new homes to achieve an aspirational indoor water use lower than 80 litres/person/day. These include the use of dual flush WCs, flow restrictors & aerators, low volume baths and low water consuming appliances with the aim of raising standards in these new homes.

Other measures, including smart metering and the use of well-designed tariffs, will ensure the development will strives towards water neutrality and will significantly reduce potable water demand.

EVERY DROP COUNTS!
RE-USE

Alongside reducing water usage, where possible, water will be re-used to further improve water efficiency. The scale of the development allows for the incorporation of all new infrastructure across the scheme allowing for the introduction of some innovative technology including grey water recycling and a twin pipe system which will provide both potable and recycled water to each of the buildings.

The use of greywater recycling systems helps reduce the stress of new developments on water supply networks. The system would allow grey water to be collected and, after treatment, used for purposes such as toilet flushing and garden watering, where the high drinking water quality is not required.

A feasibility exercise will be undertaken to see if a Waste Water Treatment Works plant could be located on the site. The works will be designed to treat water to exceptionally high standards, allowing it be used as a part of the grey water system.

Any new works would be operated either by Anglian Water or in contract with a specialist inset contractor, who would not only manage and operate the plan, but would also be responsible for the operation of the recycling system and the associated billing."

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