



**East Pye Solar  
Environmental Statement  
Volume 3: Appendix 10.4 – Aerial Investigation  
Mapping Survey**

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P24-230



EAST PYE SOLAR FARM, NORFOLK  
Aerial Investigation and Mapping Project  
for Island Green Power UK Ltd

23/10/2024

# EAST PYE SOLAR FARM, NORFOLK

## Aerial Investigation and Mapping Project

for Island Green Power UK Ltd

October 2024

Ver 1.0

### PROJECT INFORMATION:

HA JOB NO.	P24-230
NGR	624373 294557
PARISH	Brooke, Great Moulton, Hempnall, Kirkstead, Long Stratton, Morningthorpe and Fritton, Pulham Market, Saxlingham Nethergate, Shelton and Hardwick, Shotesham, Tasburgh, Tivetshall, Wacton, Woodton
COUNCIL	South Norfolk District Council and Norfolk County Council

### PROJECT TEAM:

PROJECT MANAGER	
AUTHOR	
SITE VISIT	
GRAPHICS	
APPROVED BY	
VERSION COMMENTS	Issued



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## NON-TECHNICAL SUMMARY

*This report was commissioned by GHC Heritage on behalf of their client ('the Client'), Island Green Power UK Ltd, and presents the results of an aerial investigation and mapping (AIM) project to support a forthcoming planning application to construct a solar farm between the parishes of Brooke and Long Stratton in the county of Norfolk (centre point: NGR 624373 294557).*

*This report identifies, describes and assesses the importance of cropmarks, soilmarks, earthworks and standing structures identified on modern and historic aerial photographs and LiDAR imagery within the red line boundary of the proposed development, referred to as the Proposed Development Area (PDA).*

*In total, 56 new potential heritage assets have been identified and eight existing HER records have been augmented as a result of this AIM project.*

*The following archaeological, modern and geological features have been mapped:*

- *One possible Neolithic – Bronze Age settlement site, four probable or possible Neolithic – Bronze Age ring ditches and one possible Neolithic – Bronze Age extraction pit, all of Medium (Regional) importance;*
- *Five possible Iron Age or Romano-British dwellings or farmsteads and associated features of Medium (Regional) importance;*
- *Three Deserted or Shrunken Medieval or Post-Medieval Villages of Medium (Regional) importance;*
- *Five probable medieval or post-medieval sites of small-scale industry, four sites of mapped or possible medieval or post-medieval buildings, four medieval or post-medieval field systems and enclosures, one mapped post-medieval plantation and one possible medieval or post-medieval plantation, 178 mapped post-medieval field boundaries or ponds and 21 probable or possible unmapped medieval or post-medieval extraction pits or ponds and two probable unmapped medieval or post-medieval field boundaries of Low (Local) importance;*
- *Two WW2 military airfields of Medium (Regional) importance;*
- *Six modern buildings and agricultural or other features of negligible or Low (Local) importance;*
- *One probable geological feature; and*
- *Six features of unknown origin and unknown importance.*

# EAST PYE SOLAR FARM, NORFOLK

## AERIAL INVESTIGATION AND MAPPING PROJECT

### 1. Introduction

#### 1.1. Planning Background

- 1.1.1. This report was commissioned by GHC Heritage on behalf of their client ('the Client'), Island Green Power UK Ltd, and presents the results of an aerial investigation and mapping (AIM) project to support a forthcoming planning application to construct a solar farm between the parishes of Brooke and Long Stratton in the county of Norfolk (centre point: NGR 624373 294557) (Illus 1).
- 1.1.2. This report identifies, describes and assesses the importance of cropmarks, soilmarks, earthworks and standing structures identified on modern and historic aerial photographs and LiDAR imagery within the red line boundary of the proposed development, referred to as the Proposed Development Area (PDA). The aim of the project is to inform any possible future decisions regarding archaeological mitigation requirements for the forthcoming planning application which this report will support and to create a record of the identified features for inclusion in the Norfolk Historic Environment Record (HER).
- 1.1.3. This approach is consistent with the requirements of national and local planning policies on the historic environment in the planning process (see Part 2).

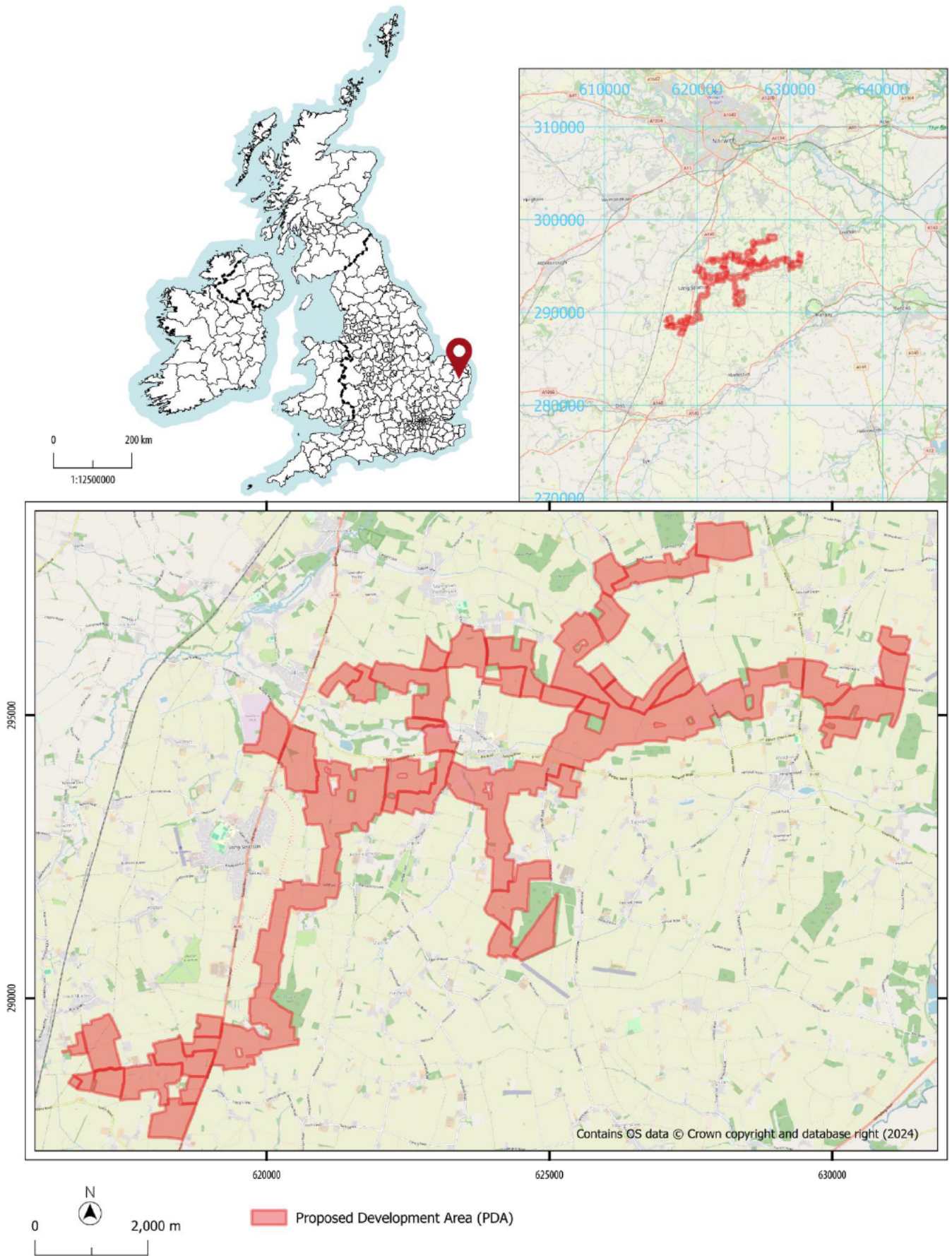
#### 1.2. Consultation

- 1.2.1. Norfolk Historic Environment Service issued the requirement for the AIM project to the Client's Heritage Consultant for the proposed development, GHC Heritage<sup>1</sup>:
- A site-specific Aerial Investigation Mapping survey carried out by a recognised specialist. The AIM survey will need to examine all existing physical and digital aerial images including Norfolk Air Photo Library collections (which can be accessed via our HER team), the Historic England Archive collection in Swindon and Environment Agency LiDAR data. Digital sources including Google Earth, Bing and Apple Maps (See section 5.1.2 of the Standards for Development-Led Archaeology in Norfolk. The Cambridge University Collection of Aerial Photography (CUCAP) is still closed for physical searches, some images are available online.*
- 1.2.2. Aerial investigation and mapping of Areas 70 - 72, 80, 82 and 196 of the PDA has already been undertaken as part of Historic England-funded AIM/NMP projects completed to date in the county<sup>2</sup>. It was confirmed with the Norfolk Historic Environment Service that only those areas not already surveyed were therefore required to be investigated and mapped for this AIM project (email received 8<sup>th</sup> August 2024).
- 1.2.3. Due to circumstances outside of Headland Archaeology's control, a distinct methodology was employed for aerial photographic rectification with the agreement of the Archaeological Advisor for Norfolk County Council. This is detailed further in the relevant section below.

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<sup>1</sup> Date of receipt unknown

<sup>2</sup> Massey and Albone 2007



Illus 1. Site Location and Proposed Development Area (PDA)

### 1.3. Site description

- 1.3.1. The PDA lies within the county of Norfolk and runs roughly south-west to north-east between the settlements of Great Moulton, Long Stratton and Tasburgh to the west and Seething and Brooke to the east. Its route crosses 14 parishes: Brooke, Great Moulton, Hempnall, Kirkstead, Long Stratton, Morningthorpe and Fritton, Pulham Market, Saxlingham Nethergate, Shelton and Hardwick, Shotesham, Tasburgh, Tivetshall, Wacton and Woodton. The approximate centre point of the PDA is NGR 624373 294557; its eastern extent lies at approximately NGR 631370 296315 and its western extent lies at approximately NGR 616400 289045 (Illus. 1).
- 1.3.2. The PDA is immediately surrounded by the settlements which give their names to the parishes the PDA crosses. Numerous other hamlets, villages and small towns interspersed with large areas of agricultural land and woodland surround the PDA on all sides. The PDA lies approximately 12 km to the south of the centre of Norwich.
- 1.3.3. The PDA has a total length of c. 16.8 km south-west to north-east, being c. 6.1 km wide at its widest point, and has a total area of approximately 32,164 ha. Most of the PDA lies at an elevation of between c. 34m AOD and c. 46m AOD; however, the ground elevation increases to around c. 56m AOD in the south-western part of the PDA (Areas 1, 2, 52 – 57, 83 – 143 and 248 - 252) It consists of 246 parcels of land, all in agricultural use and bounded by hedgerows or tree lines; no buildings are currently present within any of the land parcels of the PDA (Illus. 2 – 9).
- 1.3.4. These parcels of land which make up the PDA are referred throughout this report as 'Areas', following the convention applied in the geophysical survey of Areas 1 – 82 undertaken in April 2024<sup>3</sup>. The numbering of additional Areas assessed in this report have continued from number 83.
- 1.3.5. Six Areas – 85, 129, 134, 177, 178 and 217 – are void due to inaccuracies in numbering the Areas.

### 1.4. Geology and geomorphology

- 1.4.1. Two bedrock deposits are present within the PDA<sup>4</sup>. To the east, the settlements of Brooke, Saxlingham Newgate, Hempnall, Fritton, Shelton and Hardwick form the approximate northern and western boundaries of a large area of Norwich Crag Formation which continues out of the PDA to the east. A small, isolated area of Norwich Crag Formation is also recorded to the immediate south of or encroaching into Areas 1, 2 and 83. Norwich Crag Formation was laid down between 5.33 million years ago (mya) and 0.78 mya. It is described by the BGS as 'a widespread sheet of well sorted, fine- to medium-grained micaceous, glauconitic, locally shelly sands (Chillesford Sand Member in southeast Suffolk), with localized beds of laminated silty clays (Chillesford Clay and Easton Bavents Clay members) and rounded flint gravels (Westleton Beds). The formation is marine, with the clay members being estuarine and the Westleton Beds representing beach-face gravels.<sup>5</sup>'
- 1.4.2. To west of these settlements the underlying bedrock geology of the PDA is White Chalk Subgroup. This was laid down 100.5 and 66 mya. It is described by the BGS as 'Chalk with flints. With discrete marl seams, nodular chalk, sponge-rich and flint seams throughout. Typology of flints and incidence of marl seams is important for correlation.<sup>6</sup>'
- 1.4.3. Previous AIM projects carried out in Norfolk have suggested that Neolithic and Bronze Age sites tend to be concentrated on areas of Norwich Crag Formation, and that this preference for lighter and sandier bedrock types appears to have continued into the Iron Age and Romano-British periods. There is little evidence for a preference for settlement on certain geological bedrock types from the medieval period onwards<sup>7</sup>.
- 1.4.4. The prevailing superficial geological deposits recorded within the PDA by the BGS is Lowestoft Formation – Diamicton. This deposit was laid down between 0.48 and 0.423 mya during a cold (glacial) interval. It is described by the BGS as 'an extensive sheet of chalky till, together with outwash sands and gravels, silts and clays. The till is characterised by its chalk and flint content. The carbonate content of the till matrix is about 30%, and tills within the underlying Happisburgh Formation have less than 20%.<sup>8</sup>'

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<sup>3</sup> Magnitude Surveys 2024

<sup>4</sup> <https://mapapps2.bgs.ac.uk/geoindex/home.html> accessed 23.08.2024

<sup>5</sup> <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=NCG> accessed 23.08.2024

<sup>6</sup> <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=WHCK> accessed 23.08.2024

<sup>7</sup> Albone and Massey 2008, 28, 32, 38, 45, 54 and 56

<sup>8</sup> <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=LOFT> accessed 23.08.2024

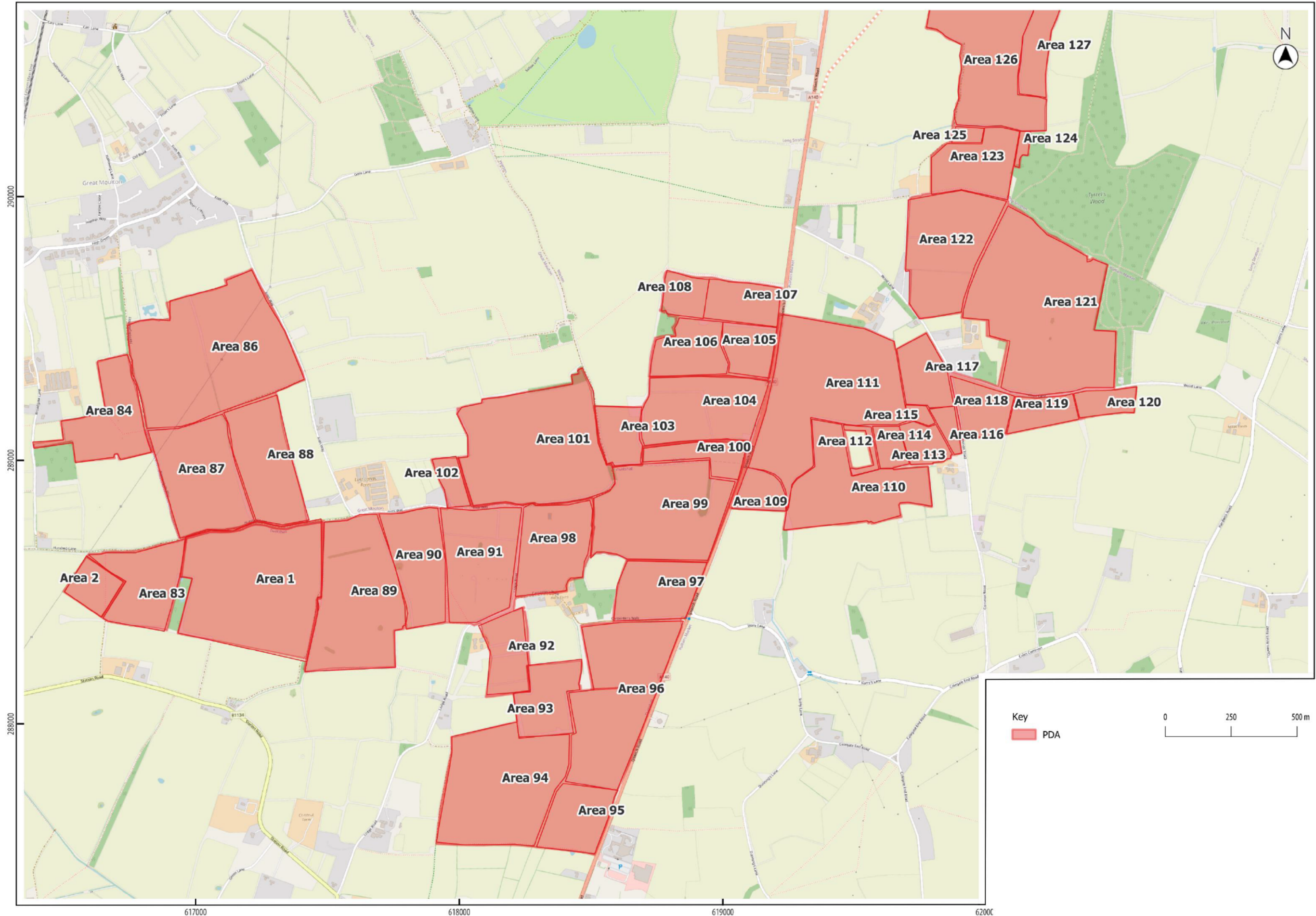
1.4.5. The BGS records small areas of distinct superficial geological deposits within and immediately surrounding the PDA. These are:

- In and around Woodton - Aldeby Sand and Gravel Member. This deposit was laid down between 0.48 and 0.423 mya during a cold (glacial) interval. It is described by the BGS as 'composed predominantly of sand and gravel that also contains lenses of reworked chalky till, discrete beds of clay and silt, reconstituted chalk and masses of sand transported and apparently derived from the Happisburgh Formation. The gravel fraction is composed predominantly of clasts of angular flint with some quartz and quartzite. In places beds of well-rounded flint and quartz gravel are present. The Member is thought to have formed during wastage of the Lowestoft ice from the adjacent higher ground.<sup>9</sup>.
- Between, in and around Tasburgh and Hempnall and Lundy Green and Shelton – Alluvium, Head, Leet Hill Sand and Gravel Member and Happisburgh Glacigenic Formation and Lowestoft Formation (Undifferentiated)<sup>10</sup>. The latter is contemporary with Aldeby Sand and Gravel Member, whilst the former three were laid down between 2.58 and present. Leet Hill Sand and Gravel Member derives from glaciofluvial outwash deposits, Alluvium derives from unconsolidated detrital material deposited by a river, stream or other body of running water and Head derives from hillwash or soil creep.

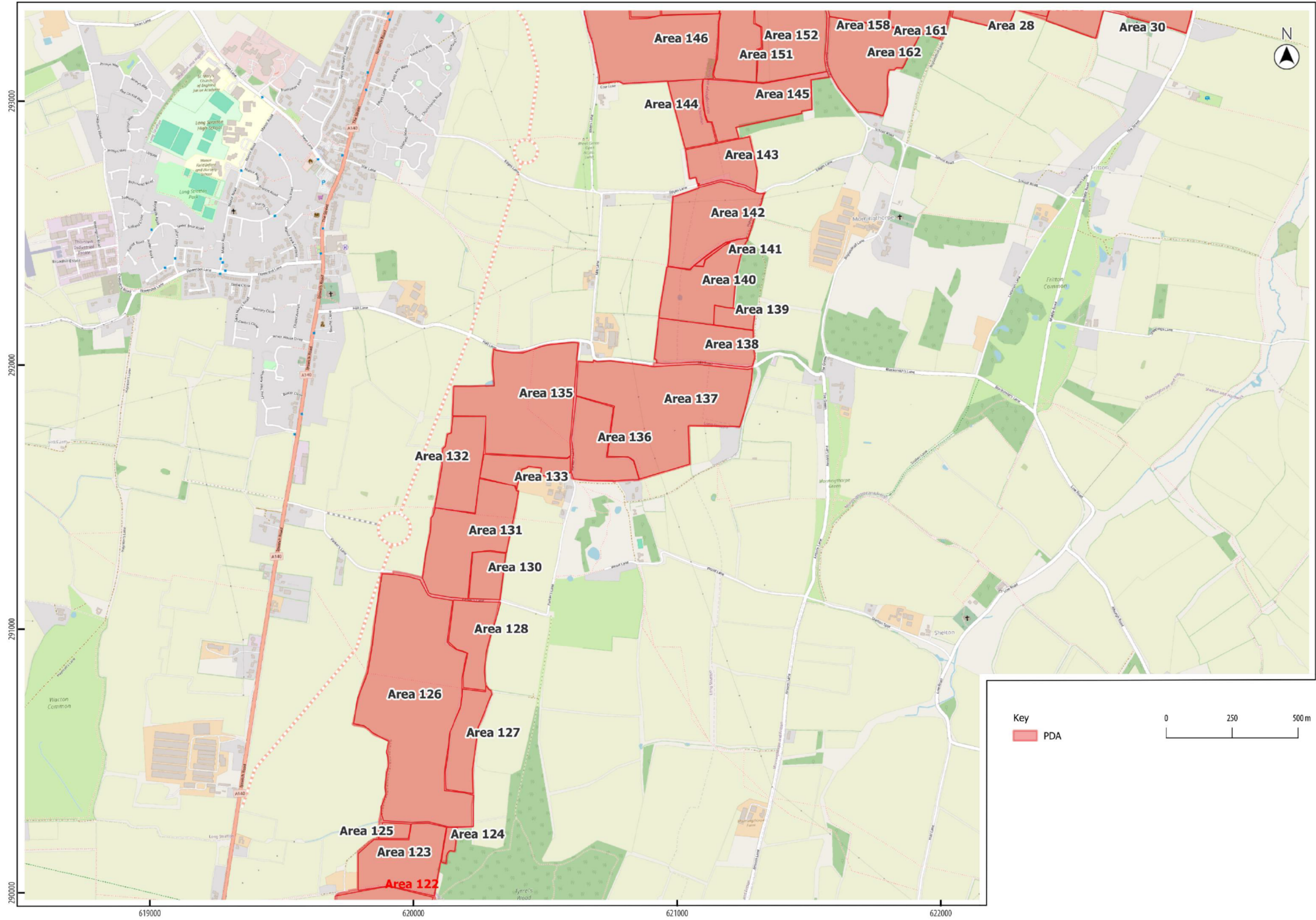
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<sup>9</sup> <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=ASAG> accessed 23.08.2024

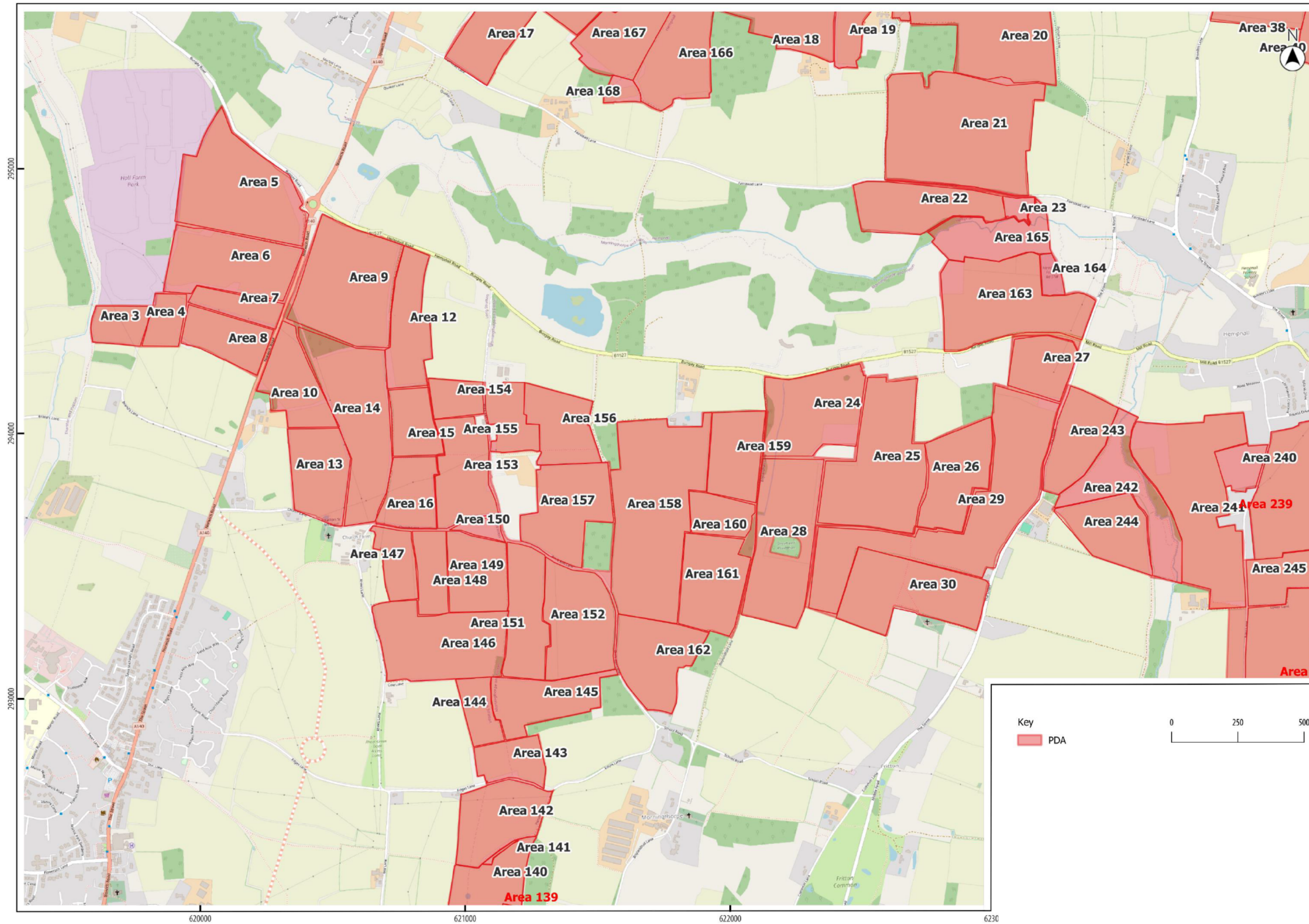
<sup>10</sup> <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=ALV>, <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=HEAD>, <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=LEHI>, and <https://webapps.bgs.ac.uk/lexicon/lexicon.cfm?pub=HPLO> accessed 23.08.2024



Illus 2. Location of Areas 1, 2 and 83-127

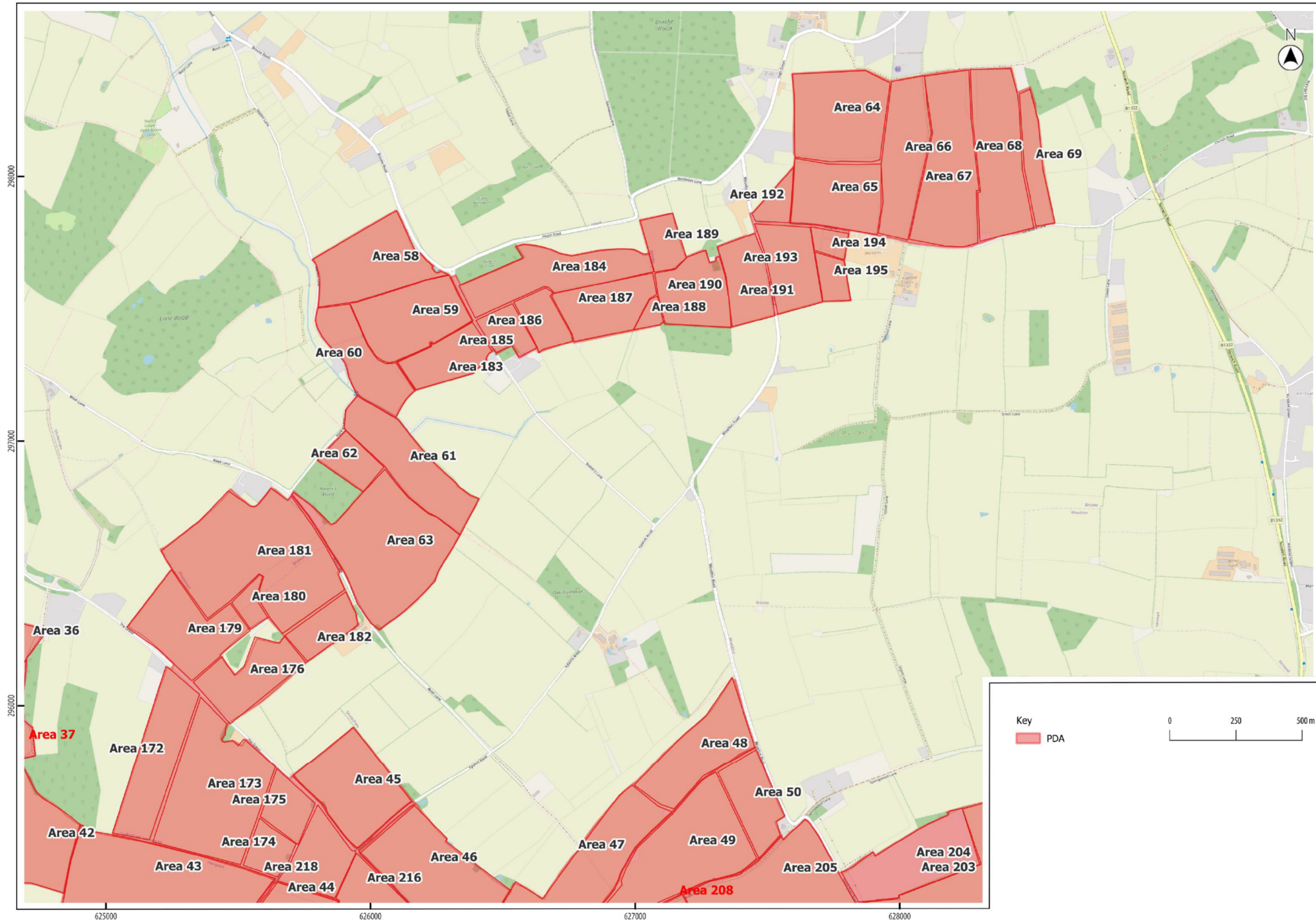


Illus 3. Location of Areas 123 - 145

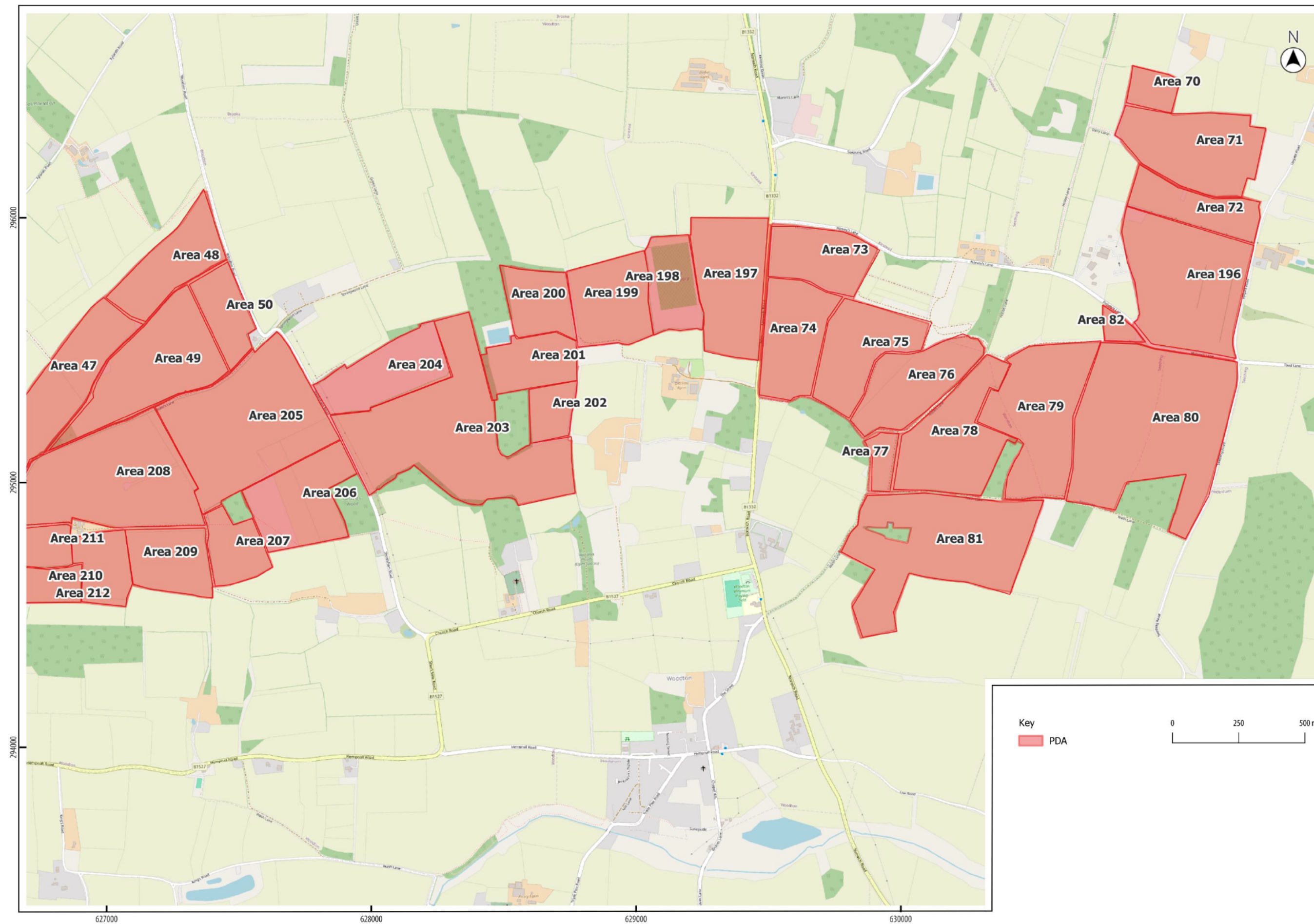


Illus 4. Location of Areas 3 – 16, 21 – 30, 146 – 162 and 240 - 245

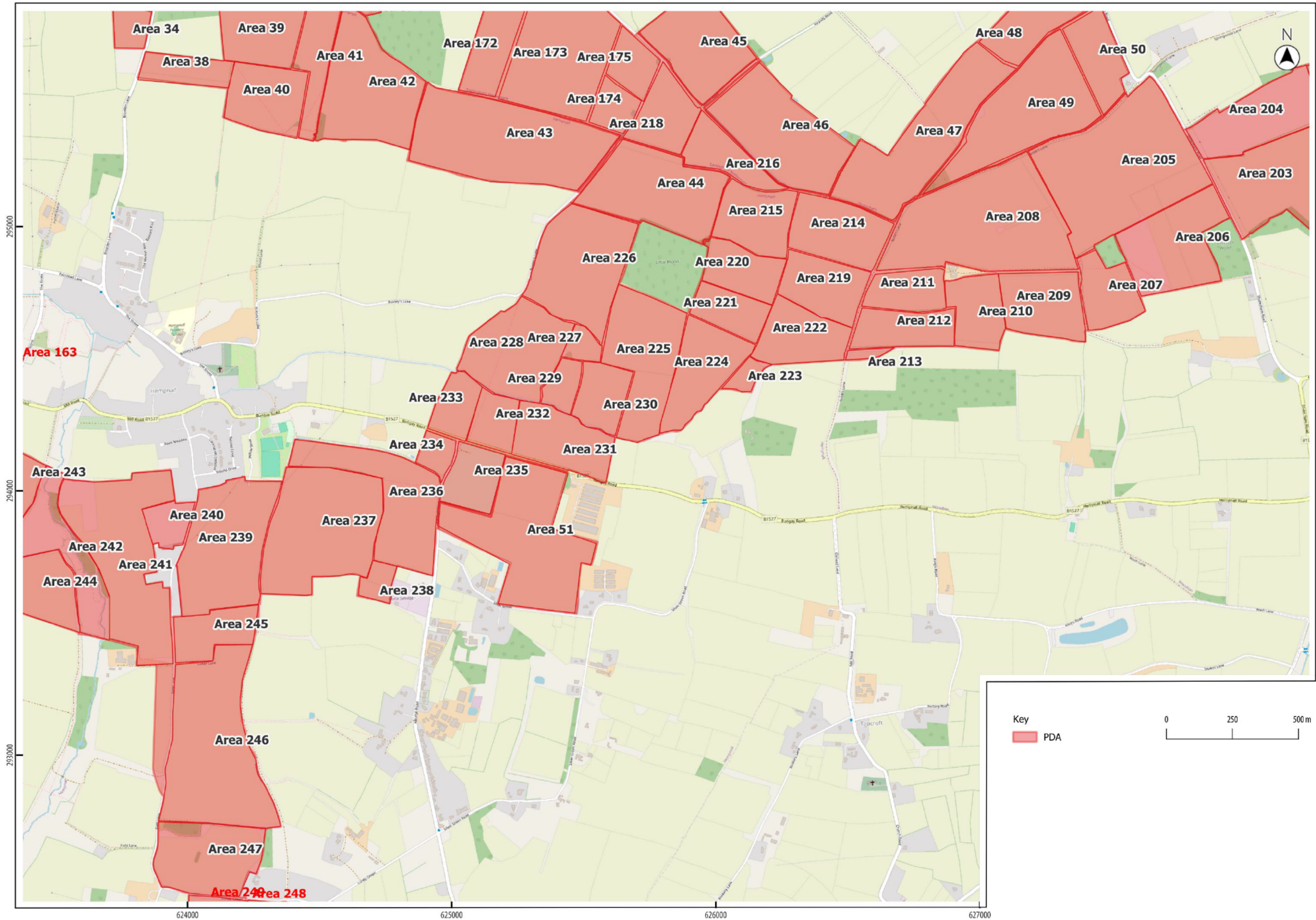




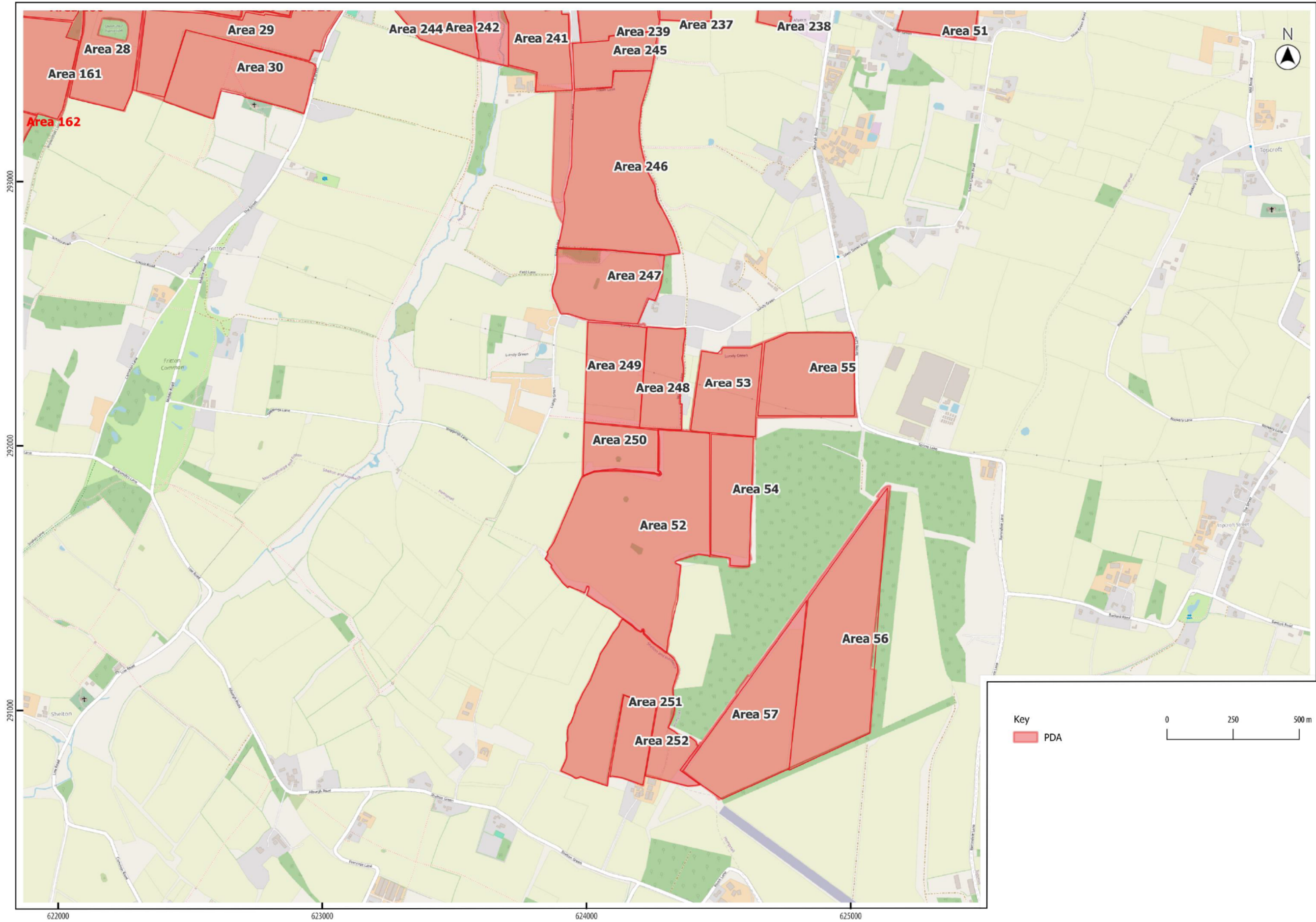
Illus 6. Location of Areas 45 – 50, 58 – 69 and 172 - 195



Illus 7. Location of Areas 47 – 50, 70 – 83, and 196 - 211



Illus 8. Location of Areas 39 – 51, 172 – 175 and 205 - 247



Illus 9. Location of Areas 52 – 57 and 246 - 252

## 2. Legislation, Policy and Guidance

### 2.1. Statutory protection

- 2.1.1. This report was commissioned as part of the planning process and is designed to help inform determination of a planning application with respect to the historic environment. Such work is undertaken within a framework of legislation, planning policy and guidance. Those relevant to the project are noted below.

### 2.2. Statutory protection

- 2.2.1. There is no statutory protection which is relevant to the aims or outcomes of this project.

### 2.3. National Planning Policy Framework

- 2.3.1. The National Planning Policy Framework (NPPF, 2023<sup>11</sup>) confirms that the historic environment, including archaeological remains, constitutes a material consideration in planning decisions, requiring applicants to describe the significance of heritage assets potentially affected by the development, including any contribution made by their setting.

- 2.3.2. Heritage and conservation forms one of the core planning principles of NPPF:

**(195)** “[Planning should conserve heritage assets] in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life for this and future generations.”

**(200)** “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.”

**(211)** Local planning authorities should require developers to record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact, and to make this evidence (and any archive generated) publicly accessible. However, the ability to record evidence of our past should not be a factor in deciding whether such loss should be permitted.

(footnote 73) [Copies of evidence should be deposited with the relevant historic environment record, and any archives with a local museum or other public depository.]

### 2.4. Local Planning Policy

- 2.4.1. The Greater Norwich Local Plan<sup>12</sup> was adopted in March 2024 and lays out the local planning authority’s approach to the historic environment in Policy 3: Environmental Protection and Enhancement. Further guidance is provided in the South Norfolk Local Plan: Development Management Policies Document (adopted October 2015)<sup>13</sup> under Policy DM 4.10 Heritage Assets.

- 2.4.2. The specifics of these policies as given in the documents are not of particular relevance to this project.

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<sup>11</sup> [https://assets.publishing.service.gov.uk/media/65a11af7e8f5ec000f1f8c46/NPPF\\_December\\_2023.pdf](https://assets.publishing.service.gov.uk/media/65a11af7e8f5ec000f1f8c46/NPPF_December_2023.pdf)

<sup>12</sup> <https://www.qnlp.org.uk/sites/qnlp/files/2024-03/Strategy%20-%20draft%20final%202.pdf>

<sup>13</sup> <https://www.southnorfolkandbroadland.gov.uk/downloads/file/245/development-management-policies-document>

## 2.5. Guidance

- 2.5.1. This AIM project has been carried out and reported on with reference to the ClfA's *Standard and Guidance for Historic Environment Desk-Based Assessment* (2014, revised 2017 and 2020<sup>14</sup>) and *Code of Conduct* (2014, revised 2020<sup>15</sup>), in addition to the following guidance documents issued by Historic England:
- Aerial Investigation & Mapping (formerly National Mapping Programme) Standards Technical Review (2019)<sup>16</sup>
  - Using Airborne Lidar in Archaeological Survey: The Light Fantastic (2018)<sup>17</sup>
- 2.5.2. Historic England's webpages on aerial investigation<sup>18</sup> have also been referred to.

## 2.6. Professional standards and acknowledgements

- 2.6.1. Headland Archaeology (UK) is a Registered Organisation with the Chartered Institute for Archaeologists (CIfA), an audited status which confirms that all work is carried out in accordance with the highest standards of the profession.
- 2.6.2. Headland Archaeology (UK), as part of the RSK Group, is recognised by the Institute of Historic Building Conservation (IHBC) under their 'Historic Environment Service Provider Recognition' scheme. This quality assurance standard acknowledges that RSK works to the conservation standards of the IHBC, the UK's lead body for built and historic environment practitioners and specialists.
- 2.6.3. Headland Archaeology (UK) operates a quality management system to help ensure all projects are managed in a professional and transparent manner, which enables it to qualify for ISO 9001 (Quality Management), ISO 45001 (health and safety management) and ISO 14001 (environmental management).
- 2.6.4. Ordnance Survey data is produced under © Crown copyright and database rights Licence AC0000811465.
- 2.6.5. LiDAR data is reproduced under the Open Government Licence.

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<sup>14</sup> [https://www.archaeologists.net/sites/default/files/CIfAS%26GDBA\\_4.pdf](https://www.archaeologists.net/sites/default/files/CIfAS%26GDBA_4.pdf)

<sup>15</sup> <https://www.archaeologists.net/sites/default/files/Code%20of%20conduct%20revOct2022.pdf>

<sup>16</sup>

[https://historicengland.org.uk/research/results/reports/7714/HistoricEnglandAerialInvestigationandMapping\(formerlyNationalMappingProgramme\)StandardsTechnicalReview](https://historicengland.org.uk/research/results/reports/7714/HistoricEnglandAerialInvestigationandMapping(formerlyNationalMappingProgramme)StandardsTechnicalReview)

<sup>17</sup> <https://historicengland.org.uk/images-books/publications/using-airborne-lidar-in-archaeological-survey/heaq179-using-airborne-lidar-in-archaeological-survey/>

<sup>18</sup> <https://historicengland.org.uk/research/methods/airborne-remote-sensing/aerial-investigation/> and <https://historicengland.org.uk/research/methods/airborne-remote-sensing/aerial-photographs/> accessed 23.08.2024

### 3. Aims and Objectives

- 3.1.1. The aim of this Aerial Investigation and Mapping (AIM) project is to inform determination of a planning application for a solar farm in relation to its likely impact on the historic environment. The assessment aims to enhance understanding of the past land use of the PDA and identify all cropmarks, soilmarks, earthworks and standing structures visible on all readily available aerial sources of the PDA which could be affected by the proposed development.
- 3.1.2. The purpose of this Aerial Investigation and Mapping (AIM) project is to improve the understanding of the historic environment resource within the PDA so as to inform any future assessment of the potential for heritage assets to survive within the PDA, their significance, and the likelihood of further evaluation, mitigation or management requirements as appropriate.
- 3.1.3. Historic England states that *'The standard products from air photo projects should be a digital archaeological map with archaeological descriptions and a report. Descriptions of sites should include interpretation of date, function and at least a basic record of the condition such as cropmark, earthwork, or levelled earthwork...A report should discuss the character, diversity, association and distribution of archaeological sites, visible on aerial photographs, within a project area...The report should also explicitly explain the methods used and sources consulted and any limitations in the data. Assessment and mapping also identifies why and where there may be gaps in the aerial photograph evidence.'*<sup>19</sup>.
- 3.1.4. The ClfA's Standard and Guidance for Historic Environment Desk-Based Assessment (2017<sup>20</sup>) further states that the importance of a heritage asset should be judged in terms of 'the nature, extent and quality of the known or potential archaeological, historic, architectural and artistic interest [of the asset]' at a local, regional, national or international context as appropriate.
- 3.1.5. The objectives are therefore to:
- Collate all available modern and historic aerial photographic and LiDAR data relevant to the PDA, identifying any gaps in evidence;
  - Describe the nature, extent and importance of identified cropmarks, soilmarks, earthworks and standing structures potentially affected by the development, identifying any uncertainties; and
  - Provide an assessment of the importance of the identified features.

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<sup>19</sup> <https://historicengland.org.uk/research/methods/airborne-remote-sensing/aerial-investigation/> and <https://historicengland.org.uk/research/methods/airborne-remote-sensing/aerial-photographs/> accessed 23.08.2024  
<sup>20</sup> [https://www.archaeologists.net/sites/default/files/ClfAS%26GDBA\\_4.pdf](https://www.archaeologists.net/sites/default/files/ClfAS%26GDBA_4.pdf)

## 4. Methodology

- 4.1.1. The methodology employed follows that given in the Historic England and Norfolk County Council guidance. However, due to circumstances outside of Headland Archaeology's control, a distinct methodology was employed for aerial photographic rectification with the agreement of the Archaeological Advisor for Norfolk County Council. This is detailed further in the relevant section below.

### 4.2. Baseline Data

#### Study Area

- 4.2.1. The Study Area for this assessment comprises the planning application red line boundary of the proposed development, referred to in this report as the Proposed Development Area or 'PDA'.
- 4.2.2. Cropmarks, soilmarks, earthworks and standing structures falling outside of the PDA were not mapped even if visible, except where they encroached into the PDA.

#### Data sources

- 4.2.3. The assessment has been based on a study of all readily available documentary sources, following the Historic England guidance<sup>21</sup>. The following sources of information were referred to:
- Aerial photographs held in the Historic England Archive, Swindon;
  - Aerial photographs held by the Norfolk Air Photo Service;
  - Digitised aerial photographs available to view on the CUCAP website<sup>22</sup>;
  - Satellite imagery available from Google Earth Pro and Bing Maps;
  - Environment Agency Lidar data<sup>23</sup>;
  - Archaeological records and aerial photographs held by the Norfolk HER [received 31<sup>st</sup> August 2024, NHER ref. 24\_08\_31]
  - Geological data available online from the British Geological Survey<sup>24</sup>;
  - Results of a geophysical survey of Areas 1 – 82 of the PDA carried out in 2024<sup>25</sup>;
  - Historic mapping available to view on the National Library of Scotland and Norfolk Historic Maps websites; and
  - Readily available published sources and unpublished archaeological reports.

References are given for only those aerial photographs reproduced in the report.

#### Lidar

- 4.2.4. Light Detection and Ranging (LiDAR) is an airborne mapping technique, which uses a laser to measure the distance between the aircraft and the ground. Up to 500,000 measurements per second are made of the ground, allowing highly detailed terrain models to be generated in which it is possible to identify shallow or otherwise imperceptible topographic features.
- 4.2.5. A Composite Digital Terrain Model (DTM) has been produced by removing objects from the Digital Surface Model (DSM) which is available at 1m resolution for the PDA. Composite data breaks down by spatial resolution i.e. 2m, 1m, 50cm and 25cm and is made up from a combination of the full EA dataset which has been merged

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<sup>21</sup>

[https://historicengland.org.uk/research/results/reports/7714/HistoricEnglandAerialInvestigationandMapping\(formerlyNationalMappingProgramme\)StandardsTechnicalReview](https://historicengland.org.uk/research/results/reports/7714/HistoricEnglandAerialInvestigationandMapping(formerlyNationalMappingProgramme)StandardsTechnicalReview)

<sup>22</sup> <https://www.cambridgeairphotos.com/> accessed 10.09.2024

<sup>23</sup> <https://environment.data.gov.uk/>

<sup>24</sup> <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

<sup>25</sup> Magnitude Surveys 2024

and re-sampled to give the best possible coverage. This means that a 1m resolution tile may contain decimated 50cm data as well as native captured 1m data. It is not possible using only the composite to know which part of a given tile was surveyed at which resolution.

- 4.2.6. Analysis was undertaken by a professional archaeologist using QGIS imaging and geo-referencing/mapping software.

## Historic maps

- 4.2.7. The inclosure, tithe and historic Ordnance Survey (OS) mapping sequence corresponding with the PDA was consulted to confirm whether any identified cropmarks, soilmarks, earthworks or standing structures could relate to buildings, ponds, field boundaries, extraction pits/quarries, plantations or any other features recorded on mapping. Earlier county-wide maps produced by Faden (1797) and Bryant (1826) were also consulted.

## Limitations of baseline data

- 4.2.8. Information held by public data sources is generally considered to be reliable; however, the following general points are noted:
- The interpretation of archaeological sites identified solely from aerial imagery or LIDAR without confirmation from archaeological excavation or supporting evidence, such as findspots, may be revised in the light of further investigation;
  - The exact form of archaeological sites as shown on aerial imagery or LIDAR may be revised in the light of further investigation; HER records can be limited because opportunities for research, fieldwork and discovery depend on the situation of commercial development and occasional research projects, rather than the result of a more structured research framework. A lack of data within the HER records does not necessarily equal an absence of archaeology;
  - Tithe mapping was not available for Areas 100 and 104 – 108;
  - Inclosure mapping was available for Areas 17, 84, 86 – 88, 101, 102, 167, 169 and 170 only.

## 4.3. *Recording of cropmarks, soilmarks, earthworks and standing structures*

### Scope

- 4.3.1. All plough-levelled and upstanding features of known, probable and possible archaeological origin and of Neolithic to modern date were recorded. Post-medieval field boundaries and ponds which are adequately depicted by readily accessible historical maps were usually ignored.
- 4.3.2. As is the standard for AIM projects, mapping of features was undertaken at a scale of 1:2,500. Any detail not clearly visible at this scale, such as internal features of enclosures, was not mapped.

### *Plough-Levelled Features*

- 4.3.3. All cropmarks and soilmarks representing likely or possible archaeological remains not shown on historic mapping were recorded.

### *Earthworks*

- 4.3.4. All visible earthwork sites were mapped whether or not they were still extant on the latest aerial photographs or lidar data.

### *Buildings and Structures*

- 4.3.5. Standing buildings shown on the consulted sources which are no longer extant were recorded where no other adequate record existed.

### *Industrial Archaeology and Areas of Extraction*

- 4.3.6. Cropmarks, soilmarks, earthworks and standing structures relating to known, probable or possible industrial activity, such as brickmaking and resource extraction, were mapped.

### *Twentieth-Century Military Archaeology*

- 4.3.7. Only World War Two (WW2) sites were identified within the PDA. These were recorded at the level of detail visible at 1:2,500 scale.

### *Coastal and Inter-Tidal Archaeology*

- 4.3.8. The project area did not include any coastal or inter-tidal areas.

### *Post-Medieval Field Boundaries and Ponds*

- 4.3.9. Identified linear and circular or subcircular features which could be securely associated with field boundaries and ponds shown on historic mapping were not mapped. The exception to this was when known field boundaries overlay features of earlier date; in this case, the field boundaries were drawn and labelled so as to clearly differentiate between them and the cropmarks, soilmarks or earthworks which were related to the earlier feature(s).
- 4.3.10. All linear and small circular and subcircular features which could not be identified on historic mapping but which are believed most likely to relate to pre-19<sup>th</sup> century field boundaries or ponds were mapped, as this interpretation has not yet been proven.

### *Ridge and Furrow and Water Meadows*

- 4.3.11. No remains of ridge and furrow or water meadows were identified during this project.

### *Drainage Features*

- 4.3.12. Drainage features were not recorded as part of the project unless it was believed that they could be mistaken for archaeological features, such as field boundaries or military remains.

### *Parks and Gardens*

- 4.3.13. Although no earthworks and levelled landscape features associated with known historic parks and gardens were present within the PDA, features which relate to or could relate to areas of plantation were recorded.

### *Transport*

- 4.3.14. No industrial transport features which are not also identifiable on historic mapping were present within the PDA. However, where cropmarks of possible unmapped trackways were visible, these were recorded.

### *Geological and Geomorphological Features*

- 4.3.15. Geological features were not mapped unless there was a possibility that they could instead be archaeological in origin.

## **Digital Transcription**

### Rectification of images

- 4.3.16. Guidance issued by Historic England and Norfolk County Council<sup>26</sup> states that, due to pixel image and height distortions often present in aerial photographs, and particularly oblique photographs<sup>27</sup>, historic aerial photographs must be rectified in order to produce accurate mapping of features. This should be done using

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<sup>26</sup> Historic England 2019; Norfolk County Council 2018

<sup>27</sup> cf. Wilson 2000, 225 - 232

digital OS mapping or existing georectified images (such as Google Earth Pro) as a control source and a DTM (such as LiDAR) to account for height distortions. Ideally six or seven control points should be used, and it will be only the part of the photograph within those control points which is accurately rectified. The recommended software for doing this is Aerial or AirPhoto.

- 4.3.17. It was confirmed during this project that neither software was suitable for use. The first, Aerial, is not publicly available. AirPhoto is now obsolete as it does not run on systems post-dating Windows 7. An alternative method for rectifying the necessary photographs using the Georeferencer tool of QGIS was therefore agreed with the Historic Environment Senior Officer (Specialist Advice) (email dated 14<sup>th</sup> October 2024).
- 4.3.18. The Georeferencer tool is described on the online QGIS manual thus:  
*[Georeferencer is] a tool for generating world files for layers. It allows you to reference rasters or vectors to geographic or projected coordinate systems by creating a new GeoTiff or by adding a world file to the existing image. The basic approach to georeferencing a layer is to locate points on it for which you can accurately determine coordinates... The usual procedure for georeferencing an image involves selecting multiple points on the raster, specifying their coordinates, and choosing a relevant transformation type. Based on the input parameters and data, the Georeferencer will compute the world file parameters. The more coordinates you provide, the better the result will be<sup>28</sup>.*
- 4.3.19. There are a variety of transformation types available when using Georeferencer. The Projective transformation type is suitable for rectification:  
*The Projective algorithm generalizes Polynomial 1 in a different way, allowing transformations representing a central projection between 2 non-parallel planes, the image and the map canvas. Straight lines stay straight, but parallelism is not preserved and scale across the image varies consistently with the change in perspective. This transformation type is most useful for georeferencing angled photographs (rather than flat scans) of good quality maps, or oblique aerial images. A minimum of 4 GCPs is required<sup>29</sup>.*
- 4.3.20. Aerial photographs rectified with the Projective transformation algorithm of the QGIS Georeferencer tool were compared against the data from both georectified Google Earth Pro images and LiDAR DTM data at 1m resolution to ensure their accuracy.
- 4.3.21. Due to the rural nature of the PDA, standing buildings which could be used as control points were rare. Therefore, control points were by necessity placed at the edges of roads or over field boundaries and vegetation. It is acknowledged that this method of locating control points is by no means ideal; vegetation heights and widths change with the seasons and according to human interference, and shadows can distort the ability of the viewer to accurately decipher the exact location of a road boundary or the extent of hedgerows and tree canopies. To minimise inaccuracy as much as possible, control points were always placed at the assumed centre point of any field boundary or vegetation and at the assumed edge of any road.

## Mapping of features

- 4.3.22. All images showing each identified feature were viewed and the clearest and/or most detailed image selected as that from which features was mapped. All features were drawn as closed polygon shapefiles. These shapefiles have been coloured green to follow the precedent set by existing AIM projects produced by Norfolk County Council.
- 4.3.23. A hand-held stereoscope was used when viewing aerial photographs held in the Historic England Archive, but no features presenting as cropmarks were noted which were not also shown, more clearly, on LiDAR imagery. The elevation data contained within the LiDAR imagery was therefore utilised to confirm the form of earthworks where these survived.

## Interpretation of features

- 4.3.24. The mapped AIM data was compared with the results of the geophysical survey of the PDA, the Norfolk HER, historic mapping and field names, as available and relevant, to aid in their interpretation.
- 4.3.25. Identified cropmarks, soilmarks, earthworks and standing structures identified within the Proposed Development Area are shown in Illus 88 - 93, with detailed descriptions compiled in a gazetteer reproduced in Appendix 1.

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<sup>28</sup> [https://docs.qgis.org/3.34/en/docs/user\\_manual/working\\_with\\_raster/georeferencer.html](https://docs.qgis.org/3.34/en/docs/user_manual/working_with_raster/georeferencer.html) accessed 15.09.2024

<sup>29</sup> Ibid.

- 4.3.26. No cropmarks, soilmarks, earthworks or standing structures associated with designated heritage assets have been identified, and therefore designated heritage assets within or surrounding the PDA are not discussed in this report.
- 4.3.27. Non-designated heritage assets are referenced by HER Preferred Reference. Any newly discovered potential assets are assigned a number prefixed HA for Headland Archaeology. A single asset number can refer to a group of related features, which may be recorded separately in the HER and other data sources.

## **Database Records**

- 4.3.28. An attribute table for the mapped features has been produced which contains the following data:
- Headland Archaeology ID no. (HA 1, HA 2, etc)
  - Location (eight-figure NGR recording the approximate centre point of each feature)
  - Monument type, qualified with 'probable', 'possible' or 'potential' as appropriate.
  - Summary description of features (as appropriate)
  - Period
  - Form (cropmark, soilmark, earthwork or structure).
  - Primary Source(s) (aerial photograph or LiDAR dataset)
  - Associated HER records
  - Additional information (as appropriate)
  - Compiler details (initials and date)
- 4.3.29. The attribute table is fully compliant with the Forum on Information Standards in Heritage (FISH) thesaurus terms and follows the HE/MIDAS Heritage (the UK Historic Environment Data Standard) and Association of Local Government Archaeological Officer (ALGAO) guidelines (available online at <https://archaeologydataservice.ac.uk/ifp/>).
- 4.3.30. None of the georectified aerial photographs have been retained, as per the usual AIM procedure.

## **4.4. *Assessment of Importance***

- 4.4.1. Although not usually a component of AIM projects, the likely importance of the features identified is assessed in order to inform any possible future decisions regarding archaeological investigation or mitigation requirements for the forthcoming planning application which this report will support.
- 4.4.2. The importance of a heritage asset is the overall value assigned to it reflecting its statutory designation or, in the case of non-designated assets, the professional judgement of the assessor (

- 4.4.3. Table 1). Historic England guidance also refers to an asset's 'level of significance' (GPA2<sup>30</sup>, paragraph 10), which in this usage has the same meaning as importance.
- 4.4.4. Any feature which does not merit consideration in planning decisions due to its significance may be said to have negligible importance. It is the role of the professional judgements made by the assessor to identify any historic remains within the PDA that are considered to be of negligible importance, to justify no further works.
- 4.4.5. The importance of heritage assets that may be affected by the proposed development is identified in the results section of this report and summarised in the gazetteer in Appendix 1.

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<sup>30</sup> <https://historicengland.org.uk/images-books/publications/gpa2-managing-significance-in-decision-taking/gpa2/>

Table 1. Criteria for Assessing the Importance of Heritage Assets

Importance of the asset	Criteria
Very High (International)	World Heritage Sites and other assets of equal international importance, that contribute to international research objectives
High (National)	Grade I and II* Registered Parks and Gardens, Scheduled Monuments, Protected Wreck Sites, Registered Battlefields, Grade I and II* Listed Buildings, and undesignated heritage assets of equivalent importance that contribute to national research objectives. Also Conservation Areas, Grade II Registered Parks and Gardens and Grade II Listed Buildings which have particular characteristics that merit a high level of importance.
Medium (National or Regional)	Conservation Areas, Grade II Registered Parks and Gardens, Grade II Listed Buildings except where their particular characteristics merit a higher level of importance, heritage assets on local lists and undesignated assets that contribute to Regional research objectives
Low (Local)	Locally listed heritage assets, except where their particular characteristics merit a higher level of importance, undesignated heritage assets of Local importance, including assets that may already be partially damaged
Negligible	Identified historic remains of no importance in planning considerations, or heritage assets and findspots that have already been removed or destroyed (e.g. through excavation)
Unknown / Uncertain	Heritage assets for which a level of importance cannot be defined on current information

## 5. Results

### 5.1. Overview

- 5.1.1. The full list of identified cropmarks, soilmarks, earthworks and standing structures is presented in the gazetteer located in Appendix 1, and the location of each is shown in the relevant illustrations below and on Illus. 88 - 93 in Appendix 2.
- 5.1.2. In total, 56 new potential heritage assets have been identified and eight existing HER records have been augmented as a result of this AIM project.
- 5.1.3. The following archaeological, modern and geological features have been mapped:
- One possible Neolithic – Bronze Age settlement site;
  - Four probable or possible Neolithic – Bronze Age ring ditches;
  - One possible Neolithic – Bronze Age extraction pit;
  - Five possible Iron Age or Romano-British dwellings or farmsteads and associated features;
  - Three Deserted or Shrunken Medieval or Post-Medieval Villages;
  - Five probable medieval or post-medieval sites of small-scale industry;
  - Four sites of mapped or possible medieval or post-medieval buildings;
  - Four medieval or post-medieval field systems and enclosures;
  - One mapped post-medieval plantation and one possible medieval or post-medieval plantation;
  - One hundred and seventy-eight mapped post-medieval field boundaries or ponds;
  - Twenty-one probable or possible unmapped medieval or post-medieval extraction pits or ponds and two probable unmapped medieval or post-medieval field boundaries;
  - Two WW2 military airfields;
  - Six modern buildings and agricultural or other features;
  - One probable geological feature;
  - Six features of unknown origin.
- 5.1.4. No cropmarks, soilmarks, earthworks or standing structures were identified within Areas 1 – 4, 10, 11, 15, 50, 77, 78, 91, 92, 95, 102 – 105, 112 – 115, 139, 141, 149, 150, 156, 161, 164, 174, 175, 185, 186, 192, 194, 196, 198, 200, 202, 207, 213, 214, 218, 219, 223, 227, 229 and 242.
- 5.1.5. No cropmarks, soilmarks or earthworks relating to ridge and furrow agriculture were identified; this is in keeping with the regional picture, as this asset type is not common within Norfolk<sup>31</sup>.

### 5.2. Neolithic – Bronze Age features

#### Settlement sites

- 5.2.1. Cropmarks of two probable small rectilinear enclosures containing possible internal features and one larger curvilinear enclosure intersecting with a north-east to south-west linear of c. 131m length and c. 3m width, HA 18, is visible in Area 55 on Google Earth Pro images only (Illus. 10 and 11). The southernmost of the two rectilinear enclosures has internal c. 41.5m x 22.5 m and is bounded by ditches of c. 2.0-3m width. It has an amorphous internal feature (which may in fact be several conglomerated features) measuring c. 22m x 16m. The northernmost of the two rectilinear features is sub oval in shape, with its northern half presenting as one large dark area measuring c. 80m x 23.5m. Its southern half, which measures c. 81.5m x 12.5m, appears to be subdivided into three distinct areas bordered by ditches measuring around 2.5m in width. The internal

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<sup>31</sup> Massey and Albone 2007, 21 and Albone and Massey 2008, 61

dimensions of the circular enclosure are approximately 51.5m x 50.5m and it has bordering ditches of c. 2.5m – 3m width. HA 18 covers a total area of c.156m x 113m and no possible entrances or internal features were identified. The feature is interpreted as a series of enclosures, a trackway and associated features. The cropmarks of HA 18 may correspond to a rectilinear enclosure and associated linears recorded during the geophysical survey of the PDA as probable archaeology<sup>32</sup>.

5.2.2. The HER records that Neolithic and Neolithic/Early Bronze Age polished flint handaxes have been found within the Area (HER MNF68782). Recent synthesis of known archaeology in Norfolk has demonstrated that Neolithic and Bronze Age settlement types are more varied than previously thought and can include rectilinear features as well as well roundhouses and pit alignments; they can also be enclosed as well as unenclosed<sup>33</sup>. Therefore, despite the form of HA 18 being traditionally dated to the Iron Age or Romano-British era, the recovery of Neolithic and Bronze Age finds from the field suggests that HA 18 could be Neolithic or Bronze in date<sup>34</sup>.



Illus 10. Unannotated Google Earth Pro aerial photograph taken in September 2006 showing feature HA 18 in its south-eastern corner

<sup>32</sup> Magnitude Surveys 2024

<sup>33</sup> Albone and Massey 2008, 27; Cooper 2024; Brudenell 2024

<sup>34</sup> Albone and Massey 2008, 36 and 37



Illus 11. Feature HA 18 as mapped by this AIM project overlain onto 1:2500 OS mapping

## Circular features

### Ring ditches

- 5.2.3. Areas 52, 74, 111, and 228 contain probable or possible ring ditches (HA 5, HA22, HA27 and HA50a respectively). HA 5, HA 22 and HA 27 were present as cropmarks or soilmarks only, with any associated earthworks likely levelled during ploughing. HA 50a and HA 55 are visible on LiDAR imagery and the elevation data demonstrates that earthworks associated with these features are present.
- 5.2.4. Two oblique aerial photographs of Area 12 taken on 2<sup>nd</sup> July 1996 and held by the Norfolk Air Photo Service only (ref. TM2094/5 and 6) show a clear circular ring ditch, HA 5 (Illus. 12 and 13). HA 5 is slightly subcircular and has an internal north-south diameter of c. 27m and an internal east-west diameter of c. 25m. Its ditches are c. 2.5m to 3m in width. This feature aligns with a ring ditch identified by geophysical survey of the PDA and is likely to partially reflect HER entry MNF40593 (cropmarks of ring ditch and possible Romano-British field system), in whose footprint HA 5 lies.
- 5.2.5. A second circular feature measuring c.33m x 38m, HA 22, is present in Area 74 (Illus. 14 and 15). This is visible on aerial photographs held by the Historic England Archive and Norfolk Air Photo Service as well as Google Earth Pro (best seen on ref. TM2995/86, taken on 24<sup>th</sup> April 1965 and held by the Norfolk Air Photo Service). This feature was identified during the geophysical survey of the PDA as an undetermined feature of weak

response. On the aerial photographs, this feature is visible as a light-coloured circle within a darker coloured field. However, the geophysical survey records the feature as a clear ring ditch, suggesting that the cropmark visible on aerial photographs represents the internal area of the ring ditch and not the ditch itself. There is no current HER entry relating to this feature.

- 5.2.6. Faint cropmarks of a possible irregular subcircular ring ditch, HA 27, are visible on Google Earth Pro images only in the south-eastern corner of Area 111 (Illus. 16 and 17). It is possible that this feature extends into Area 117, although this could not be determined from available aerial photographs. The feature has an internal north-south diameter of c.50.5m and an internal east – west diameter of c. 38m, with ditches of c. 7m – 14m width. The Norfolk HER records Neolithic, Romano-British and medieval finds within this Area (HER MNF58190), which may be associated with this feature. The Long Stratton tithe apportionment records the tithe plot in which HA 27 lies, Tithe Plot 107, as New Broke. The element 'Broke' is most likely to derive from Old English *brōc* 'stream' (although no stream is recorded as being in vicinity of Area 111 on the tithe or historic OS maps) or *brocc* 'badger'. However, it is possible, given the existence of HA 27, that it derives from Old English *brocen-bæc*, in the sense of 'broken or divided mound'<sup>35</sup>. There is no current HER entry relating to this feature.
- 5.2.7. A circular feature in the approximate centre of Area 228, HA 50a, can be identified on all consulted sources, most clearly on LiDAR imagery (Illus. 18 and 19). The feature is slightly subcircular and has an internal north-south diameter of c. 27m and an internal east-west diameter of c. 25m. Its ditches are c. 2.5m to 3m in width. It presents as a dark-coloured area on a lighter coloured field in aerial photographs and as larger very slight upstanding earthworks surrounding a slight depression on LiDAR imagery. Although the feature does not appear as a ring ditch on the consulted sources, the centre point of HER entry MNF56912, the cropmark of a possible ring ditch, is located within the footprint of HA 50a as mapped from aerial photographs. Therefore, HA 50a most likely reflects that the internal area of the ring ditch and not the ditch itself.
- 5.2.8. A synthesis of known barrow sites in Norfolk dating 1986 posited that ring ditches are often representative of flattened barrow sites. This synthesis and more recent fieldwork confirm that many ring ditches date to the Early Bronze Age. Known Bronze Age barrows within Norfolk have diameters of between 5m and over 65m, with most being between 10m – 40m<sup>36</sup>. However, the East of England Archaeological Research Framework highlights that ring ditches containing burials of Neolithic date and of similar proportions to known Early Bronze Age barrows are increasingly recorded, and that Neolithic mortuary practice was more varied than merely oval or long barrows<sup>37</sup>.
- 5.2.9. Single ring ditches HA 5 and HA 22 and HA 27 and circular feature HA 50a have diameters than fall within the recorded ranges of Neolithic – Early Bronze Age barrows in Norfolk and therefore are most likely to reflect this asset type; it may be more likely that HA 27 is of Neolithic date given its nearby HER entry.

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<sup>35</sup> Cavill 2018, 44, 48 - 49 and 476

<sup>36</sup> Lawson 1986, 3; Massey and Albone 2007, 14; Albone and Massey 2008, 33 and 34; Cooper 2024; cf. Powell and Tremlett 2023, 20 - 31

<sup>37</sup> Last, J., Outram, Z and Bye-Jensen, P. 2024



Illus 12. Feature HA 5 as shown on oblique aerial photographs held by the Norfolk Air Photo Service (ref. TM2094/5 and 6 dated 2<sup>nd</sup> July 1996)



Illus 13. Feature HA 5 as mapped by this AIM project overlain onto 1:2500 OS mapping



Illus 14. Feature HA 22 as shown on aerial photographs held by the Norfolk Air Photo Service (TM2995/86, taken 24<sup>th</sup> April 1965)



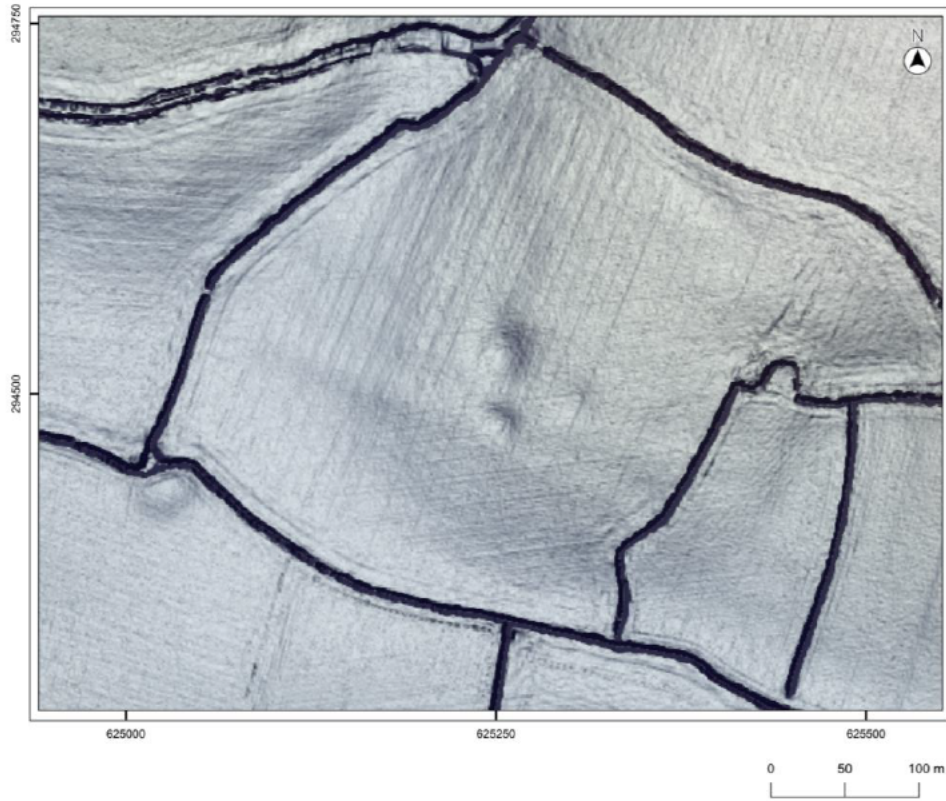
Illus 15. Feature HA 22 as mapped by this AIM project overlain onto georectified Google Earth Pro aerial imagery



Illus 16. Unannotated Google Earth Pro aerial photograph taken in May 2011 showing HA 27 in its approximate centre



Illus 17. Feature HA 27 as mapped by this AIM project overlain onto georectified Google Earth Pro aerial imagery



Illus 18. Unannotated LiDAR DTM imagery at 1m resolution with hillshade and colour ramp showing HA 50a and HA 51



Illus 19. Feature HA 50a and HA 51 as mapped by this AIM project overlain onto Google Earth Pro imagery

## Extraction sites

- 5.2.10. A large circular depression of a maximum depth of c. 1.6m measuring c.72m x 65m, HA 55, is visible on all sources in the north-east corner of Area 243 (Illus. 20 and 21). The depth of this feature as recorded on LiDAR imagery, approximately 1.6m, strongly suggests that it reflects a past extraction pit. Although it may be medieval or post-medieval in date, the HER records the site of a possible Late Neolithic/Bronze Age flint working site and multi-period finds within the field (HER MNF29412). It is therefore posited that HA 55 is an extraction site relating to the possible prehistoric flint working site.



*Illus 20. Unannotated LiDAR DTM imagery at 1m resolution with hillshade and colour ramp showing features HA 53 - 56*



Illus 21. Features HA 53 – 56 as mapped by this AIM project overlain onto Google Earth Pro imagery

### 5.3. Iron Age and Romano-British

#### Settlement sites

- 5.3.1. The following identified possible settlement sites were seen as cropmarks or soilmarks on aerial photographs only, with no associated earthworks recorded, suggesting that these have been levelled through ploughing.
- 5.3.2. The possible settlement sites below are characterised by circular or rectilinear enclosures and associated features possible representing trackways and pits. Although these have been assigned a likely Iron Age or Romano-British date<sup>38</sup>, it is highlighted that other recent AIM projects within or close to the fenland of Norfolk have stressed that 'fragmentary rectilinear enclosures, fields and trackways of the sort proven to be Neolithic [or Bronze Age] ... would more usually be interpreted as being of Iron Age to Romano-British date on aerial

<sup>38</sup> Cf. Albone and Massey 2008, 45

photographic evidence alone.<sup>39</sup>. It is therefore quite possible that the cropmarks and soilmarks discussed below pre-date the Iron Age.

- 5.3.3. Cropmarks or soilmarks of a rectilinear enclosure and three small oval features, HA 15, were identified on aerial photographs held in the Historic England Archive and Norfolk Air Photo Service in Areas 52 and 54 (ref. OS/73359/190 dated 3<sup>rd</sup> July 1973; Illus. 22 and 23). The enclosure covers an area of c. 138m x 78m, with an internal area of c.123m x c.71m and ditches of between c.6m and c.10m in width. A possible entrance of c.25m width is present in the north-west corner of the enclosure, although this break in enclosure ditch may instead be related to truncation from the modern road which runs north to south through the enclosure. No internal features were identified. The oval features range in size from c.9m - 12m x 10m - 12m. Although no anomalies were identified on the geophysical survey of the Areas, the HER records that prehistoric - post-medieval artefacts have been recovered from these fields (HER MNF24356). Due to the rectilinear form of HA 15<sup>40</sup>, the feature is interpreted as a possible truncated Iron Age or Romano-British enclosure and associated ovoid pits.
- 5.3.4. Aerial photographs held by the Historic England Archive and the Norfolk Air Photo Service show cropmarks or soilmarks of feature HA 25a in Area 109 (ref. TM1988/73-118/34 dated 13<sup>th</sup> May 1973; Illus. 24 - 26). HA25a consists of two open-sided ring ditches of c.40m – 48m internal width with ditches of between c4m and 6.5m in width, three short interconnected rectilinear features of between c. 40m and 69m in length and c.4m – 4.5m in width, and three small circular features of no greater than 20m diameter. HA 25a is overlain by later, mapped post-medieval field boundaries, HA 25b. HA 25a covers a total area of c.218m x 159m and is not recorded on the HER. No possible entrances or internal features were identified. The form of the features is suggestive of enclosures and associated features such as pits<sup>41</sup>. HA 25a is located c. 70m to the east of The Pye Romano-British road (HER MNF7947) and c.56m to the south of findspots of Romano-British artefacts (HER MNF58190). HA 25a is thought most likely to be late Iron Age or Romano-British in date.
- 5.3.5. In Area 123, oblique aerial photographs held by the Historic England Archive and the Norfolk Air Photo Service (ref. TM1990/ATE/6 dated 21<sup>st</sup> July 1983; Illus. 27 - 29) show circular cropmarks and associated pit-like features (HA 28a) which are overlain by post-medieval field boundaries or ponds shown on historic mapping (HA 28b). HA 28a consists of one large cropmark, presenting as darker coloured areas in a lighter coloured field on aerial photographs, formed of two intersecting circular features measuring approximately 98.5m x 43.5m and a second subcircular ring ditch cropmark with an internal diameter of approximately 44m x 20m and ditches of c. 4m – 5m width. The northernmost circular feature of the two interconnection circular features may have internal subdivisions. The latter ring ditch appears to contain two amorphous internal features measuring c. 14m x c. 12m and c. 12m x c. 12m and is flanked to its east by two small interconnected pits measuring c. 15.5m x c.11.5m and two short linear features measuring c. 8m and c. 29m by c. 4m. A final amorphous feature which may be related to HA 28a extends towards the east and measures c. 50m x c. 28.5m. No possible entrances or internal features were identified. The form of HA 28a is suggestive of possible Iron Age enclosures and associated features such as pits<sup>42</sup>. HA 28a is not recorded on the HER.
- 5.3.6. Cropmarks of a north-west to south-east orientated rectilinear enclosure with an internal of diameter of c. 107m x 82m and ditches between approximately 3m and 4m in width, HA 33, was identified in Area 158 from aerial photographs held by Norfolk Air Photo Service only (ref. TM2293/73-359/212 dated 9<sup>th</sup> July 1973; Illus. 30 and 31). No possible entrances or internal features were identified. The orientation of HA 33 is at odds with the surrounding post-medieval field system and its morphology is similar to Iron Age and Romano-British sites elsewhere in Norfolk<sup>43</sup>. It is therefore believed most likely to be Iron Age or Romano-British in date. HA 33 is likely mirrored by HER entry MNF10177, an undated cropmark, although the mapped footprint of MNF10177 extends c.48m further to the east than HA 33.
- 5.3.7. Aerial photograph TM2295/93-358/76, dated 6<sup>th</sup> July 1993 and held by the Norfolk Aerial Photo Service, shows the soilmarks of a possible ring ditch set within a roughly square enclosure, HA 40, in Area 167 (Illus. 32 and 33). The internal dimensions of the enclosure are c. 145m x c. 125 and its ditches are between c. 6m and c.13m wide. Its orientation is consistent with the surrounding post-medieval field boundaries. Although the location of its western and eastern sides of the enclosure are in line with mapped post-medieval field boundaries, its northern and south sides are not, and therefore the post-medieval field boundaries may have been positioned so as to respect HA 40. The circular ring ditch feature set within the enclosure has an internal diameter of c. 46.5m and ditches of between c.14m and c. 22m width. A short linear feature measuring c. 25m by c. 7m

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<sup>39</sup> Albone and Massey 2008, 27

<sup>40</sup> cf. Evans 2024; Powell and Tremlett 2023, 32 – 34 and 37 - 40

<sup>41</sup> Evans 2024

<sup>42</sup> Ibid.

<sup>43</sup> Powell and Tremlett 2023, 40 – 41, compare especially with Figure 22

stretches south-west from its south-west corner and may reflect an entranceway. The circular ring ditch has an irregularly triangular internal feature measuring c. 36.5m x c. 29m. Due to the morphology of HA 40's enclosure and its correspondence with post-medieval field boundaries<sup>44</sup>, it is thought that HA 40 may be Iron Age or Romano-British in date. HA 40 is not recorded by the HER.

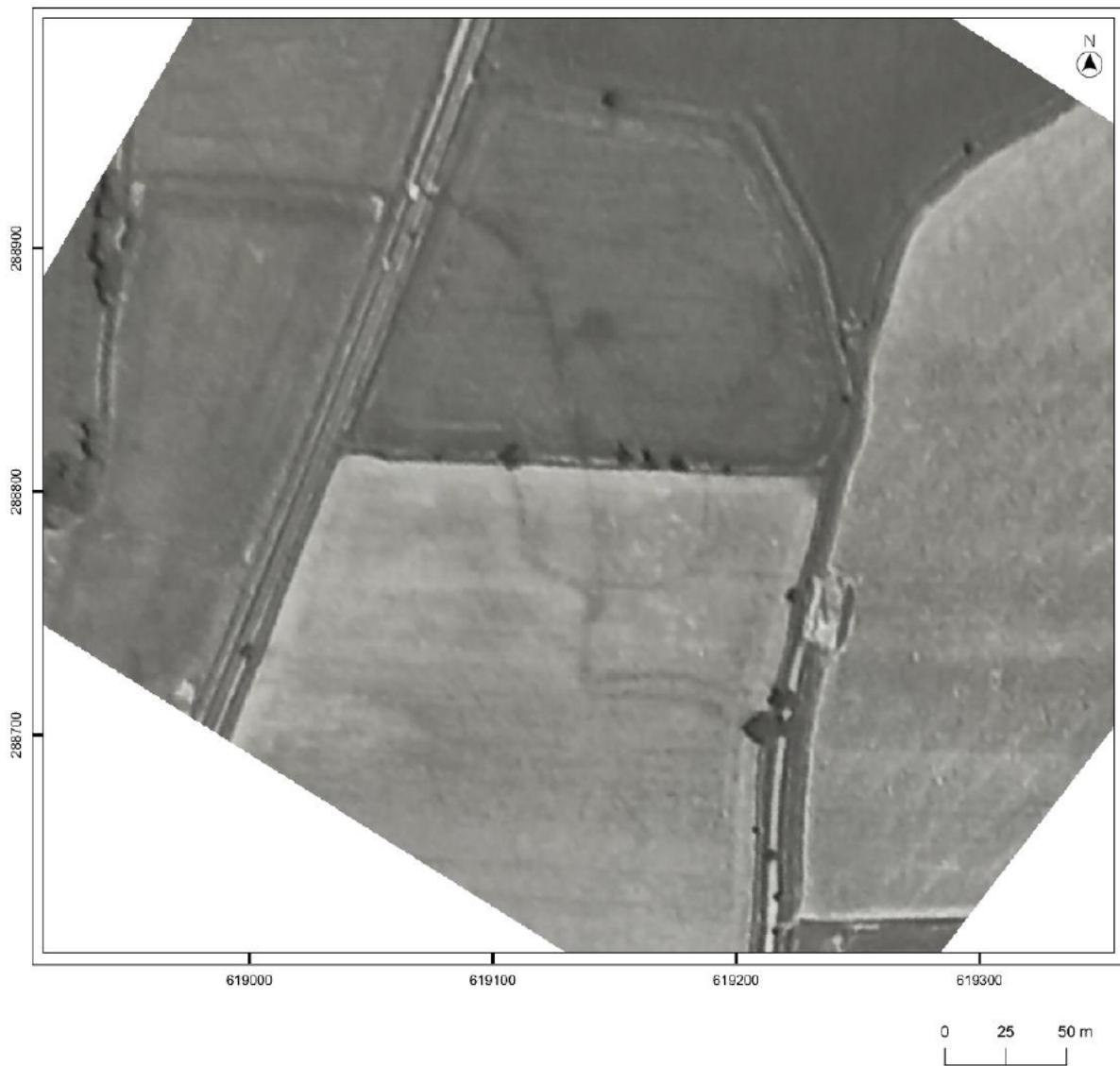


*Illus 22. Feature HA 15 as shown on aerial photographs held in the Historic England Archive and by the Norfolk Air Photo Service (ref. OS/73359/190)*

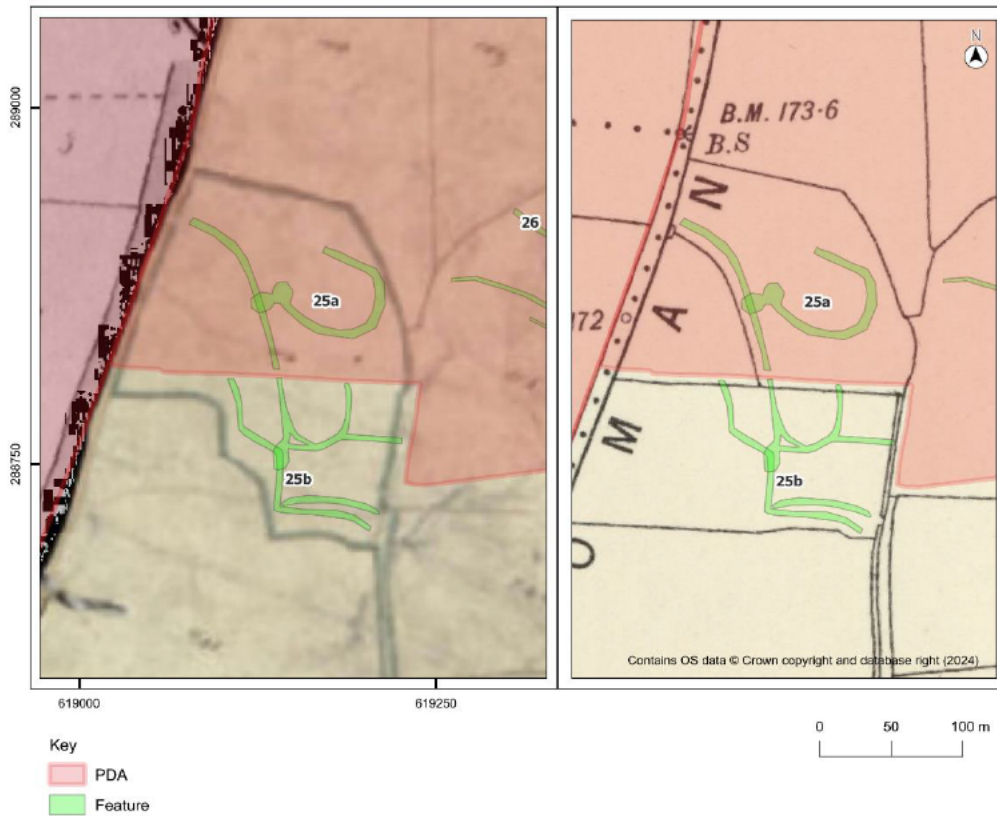
<sup>44</sup> There is evidence throughout Norfolk that medieval and post-medieval field systems can have their antecedents in the Iron Age (when agricultural field systems had been firmly established in England) or even Bronze Age (when agricultural field systems began to be created) (Albone and Massey 2008, 32 and 40).



*Illus 23. Feature HA 15 as mapped by this AIM project overlain onto 1:2500 OS mapping*



*Illus 24. Features HA 25a and 25b as shown on aerial photographs held in the Historic England Archive and by the Norfolk Air Photo Service (ref. TM1988/73-118/84)*



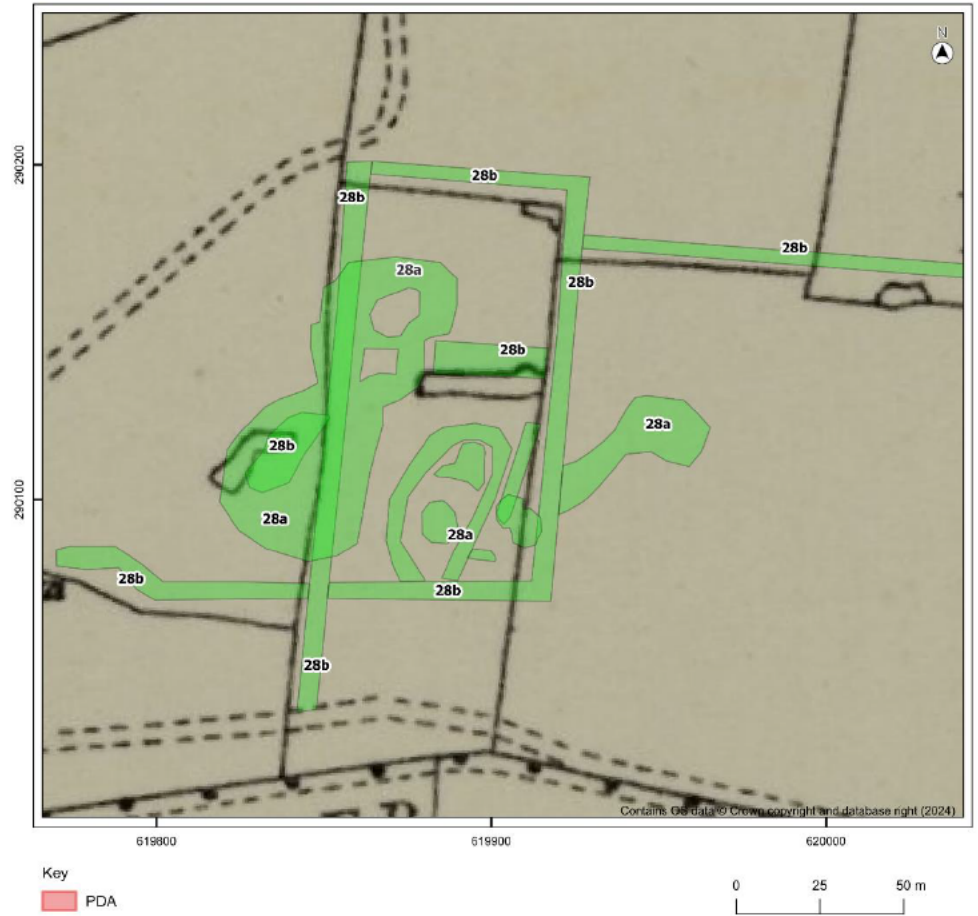
Illus 25. Features HA 25a and 25b as mapped by this AIM project overlain onto tithes (left of frame) and 2<sup>nd</sup> edition OS (right of frame) mapping



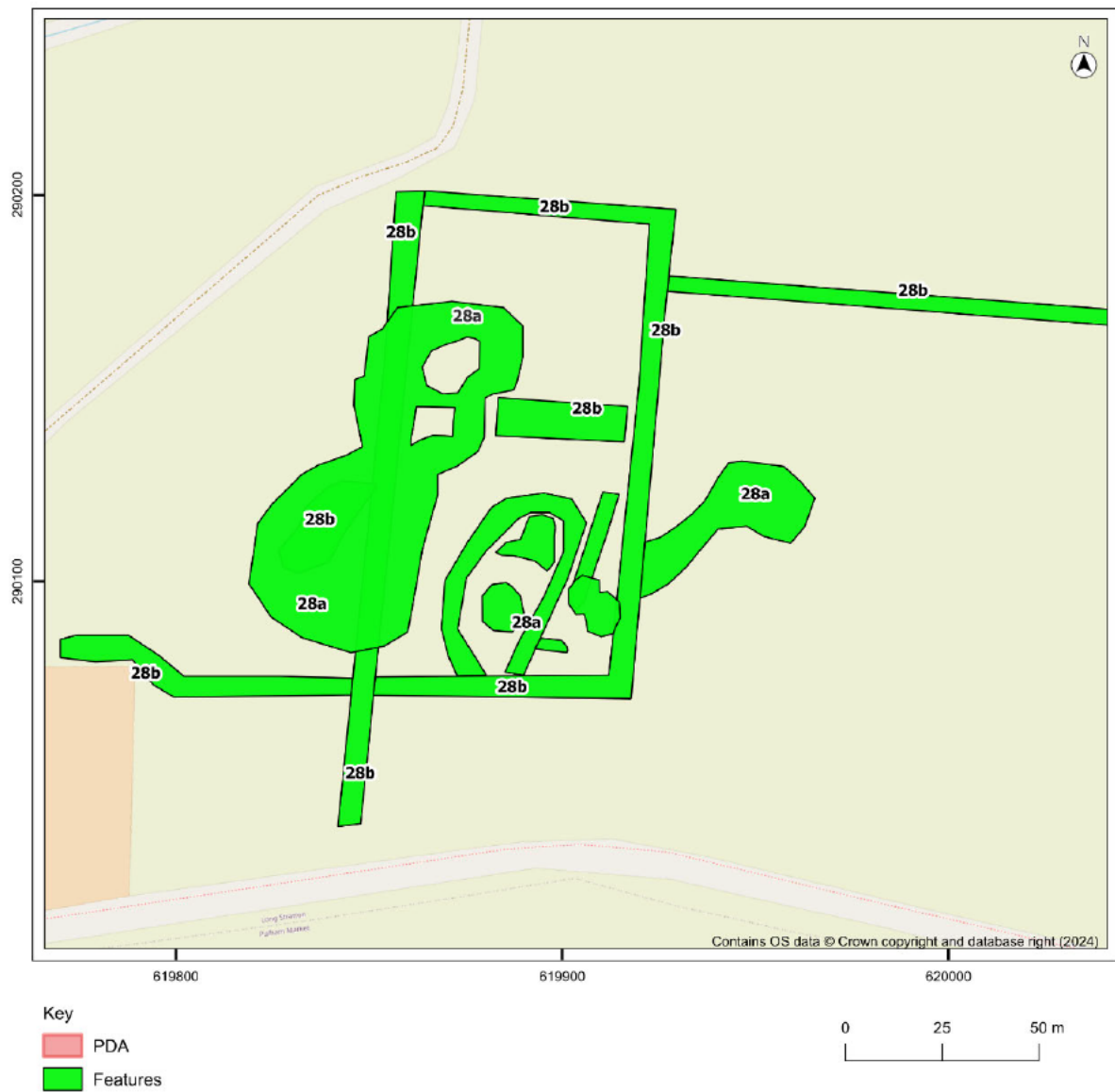
Illus 26. Features HA 25a and 25b as mapped by this AIM project overlain onto 1:2500 OS mapping



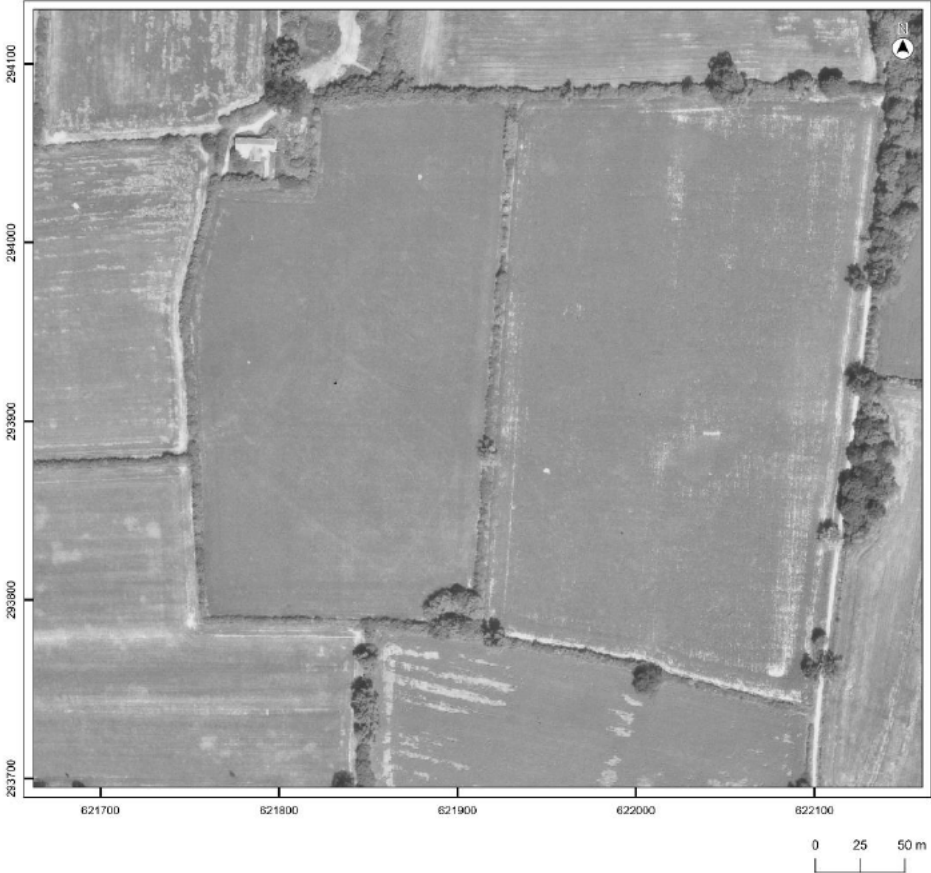
Illus 27. Features HA 28a and 28b as shown on aerial photographs held in the Historic England Archive and by the Norfolk Air Photo Service (ref. TM1990/ATE/6)



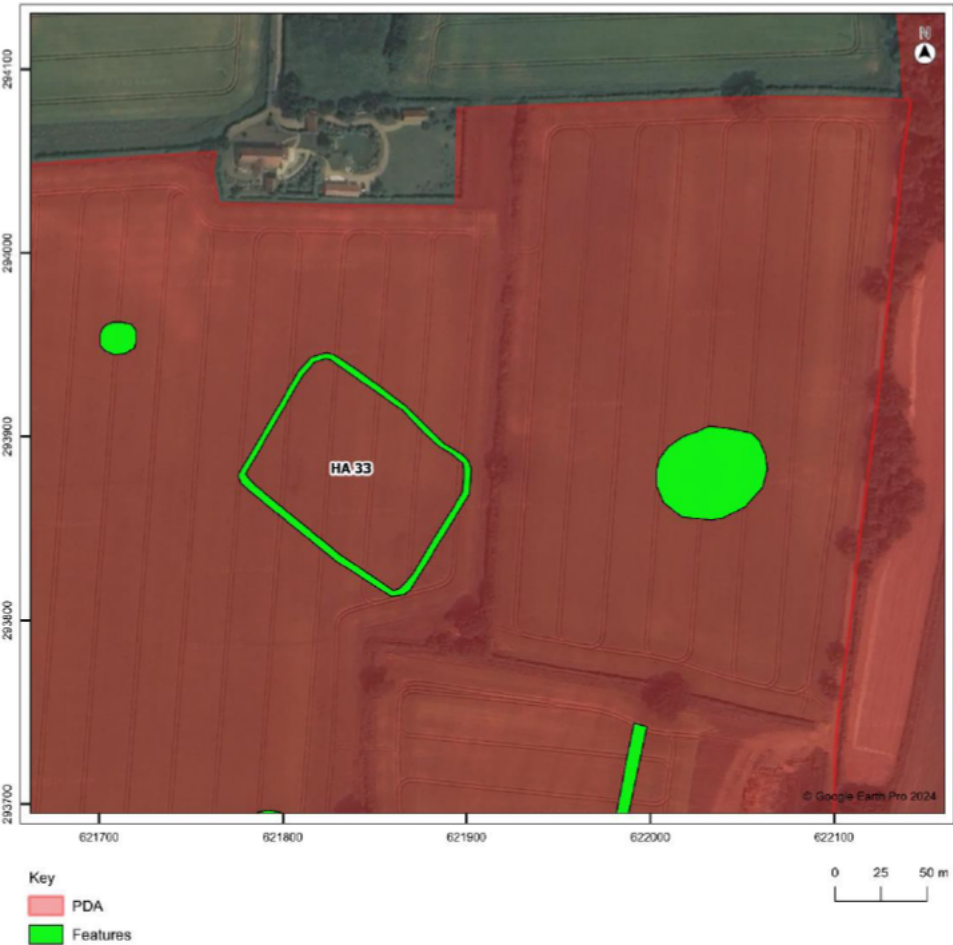
Illus 28. Features HA 28a and 28b overlain onto 2<sup>nd</sup> edition 1:10560 OS mapping



Illus 29. Features HA 28a and 28b as mapped by this AIM project overlain onto 1:2500 OS mapping



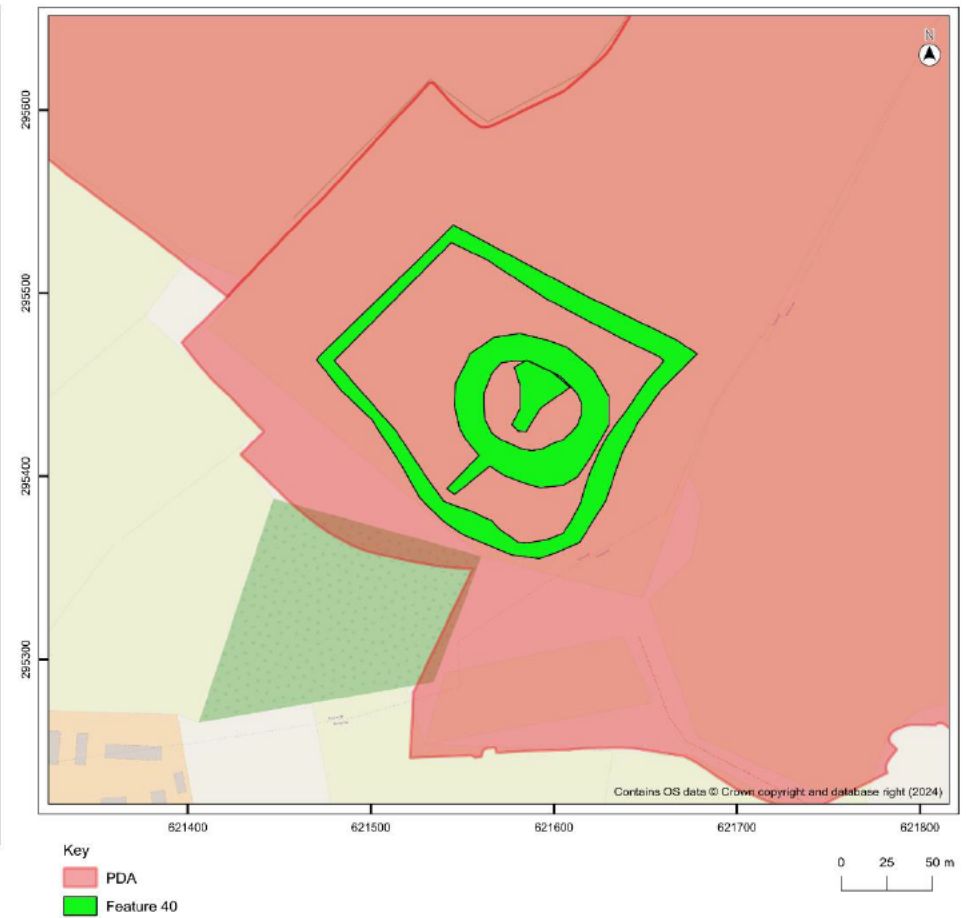
Illus 30. Feature HA 33 as shown on aerial photographs held by the Norfolk Air Photo Service (ref. TM2293/73-359/212)



Illus 31. Feature HA 33 as mapped by this AIM project overlain onto Google Earth Pro imagery (other features unlabelled apart for clarity)



Illus 32. Feature HA 40 as shown on aerial photographs held by the Norfolk Air Photo Service (ref. TM2295/93-358/76)



Illus 33. Feature HA 40 as mapped by this AIM project overlain onto 1:2500 OS mapping

## 5.4. *Medieval and Post-Medieval*

### **Deserted or Shrunken Medieval and/or Post-Medieval Villages**

- 5.4.1. One Deserted Medieval Village (HA 46) has been identified as cropmarks only with no earthworks surviving and the cropmarks and slight earthworks of two Shrunken Medieval – Post-Medieval Villages (HA 30a and 58) have been identified.
- 5.4.2. Deserted Medieval Village HA 46 is located within Area 203 and can be seen as cropmarks and soilmarks on all aerial photographic sources, although it does not appear on LiDAR imagery (Illus. 34 - 36). It consists of a series of small rectilinear enclosures, circular features and curvilinear features covering an area of approximately c.430 x 280m. Late Saxon to post-medieval finds have been made through this area and are recorded on the HER (HER MNF10156) and HA 46 is located c.185m to the north of post-medieval Woodton Hall (HER MNF10200) and to the immediate west of possible site of medieval Woodton Hall (HER MNF74763). Moreover, the tithe apportionment for Woodton records that Tithe Plot 326, in which the south-eastern half of HA 46 lies, was known as The Gibbett, referring to a place where an executed body was displayed, and Tithe Plot 325, in the south-easternmost corner of Area 206 and c.50m from HA 46, was known as Pound Close. These field names as well as the surrounding HER entries strongly suggest that HA 46 reflects the medieval village associated with the medieval Woodton Hall.
- 5.4.3. A series of rectilinear enclosures and circular features measuring with a total of area of c.260m x 182m, HA 30a, are visible within Area 147 on LiDAR imagery and Google Earth Pro aerial photographs only (Illus. 37 - 39). LiDAR data demonstrates that surviving earthworks are slightly raised above the surrounding ground level and that HA 30a extends outside of the PDA to the east and possibly also to the south. It is likely that HA 30b, a mapped post-medieval field boundary, represents a late survival of an element of HA 46 as it runs in parallel with a linear element of HA 30a. First and second edition OS mapping record the site of St. Peter's Church in Area 147, and the HER records the site of earthworks of medieval to post medieval enclosures throughout the Area (HER MNF33332). HA 46 is therefore interpreted as a Deserted or Shrunken Medieval - Post-Medieval Village, possibly an earlier iteration of Stratton St. Michael, centred around the site of St. Peter's Church.
- 5.4.4. LiDAR imagery and Google Earth Pro and Bing Maps aerial photographs demonstrate that archaeological remains relating to now-deserted parts of Lundy Green, presenting as cropmarks and earthworks consisting of slight depressions, are likely to survive in situ in Area 247 (HA 58) (Illus. 40 - 42). HA 58 consists of four circular and amorphous features with a total area of c.215m x 200m, three of which align with at least three now-lost buildings and gardens on the Hempnall tithe map; the final element of HA 46 may reflect a pond associated with these buildings. Moreover, the HER records the recovery of medieval and post-medieval pottery within this field (HER MNF21990). HA 58 is therefore interpreted as the Shrunken Medieval - Post-Medieval Village of Lundy Green.

### **Moated sites**

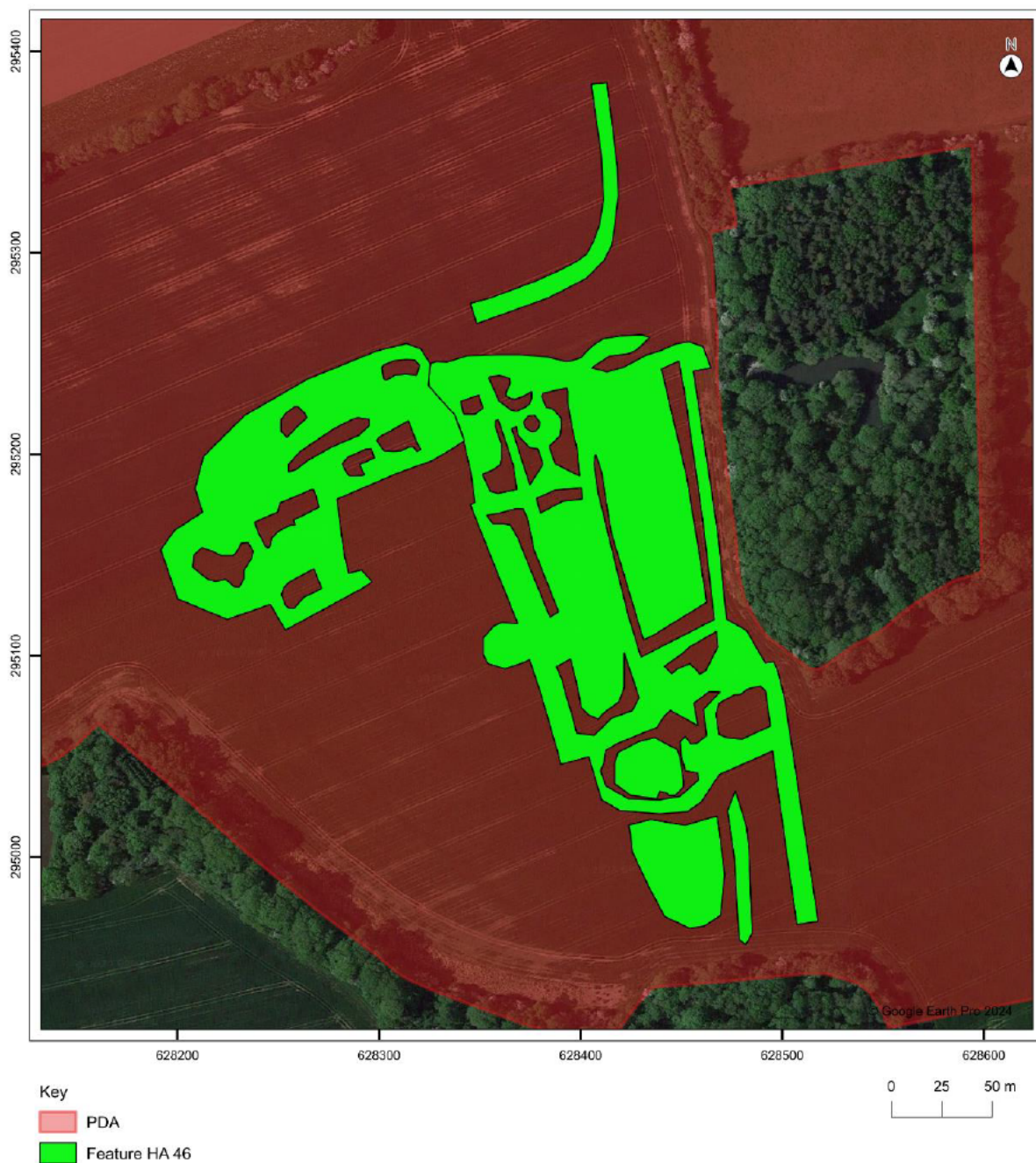
- 5.4.5. A partial double-ditched enclosure, HA 62, is shown on oblique aerial photographs held by the Historic England Archive in Area 206 (ref. TM2794/4/15, dated 21<sup>st</sup> February 1989; Illus. 43 - 44). The feature consists of the southern side and the south-western corner of a double-ditched square or rectangular enclosure of c. 100m length with ditches measuring c. 3m – 3.5m wide and at least one possible internal circular feature measuring c. 15m x c. 13m. Aerial photograph TM2794/3 strongly suggests that the western side of the enclosure underlies the historic and modern plantation marked on 1<sup>st</sup> and 2<sup>nd</sup> edition OS maps as 'Ash Bed'. Later post-medieval field boundaries mirror the curve of the enclosure at its south-western corner. The northern and eastern sides of the enclosure are not visible on aerial photographs and it is possible that they have been disturbed or overlain by post-medieval field boundaries or destroyed through ploughing. HA 62 accords with HER entry MNF29782, soilmarks of a possible medieval moat.



*Illus 34. Feature HA 46 as shown on aerial photographs held by the Norfolk Air Photo Service (ref. OS/72035/4)*



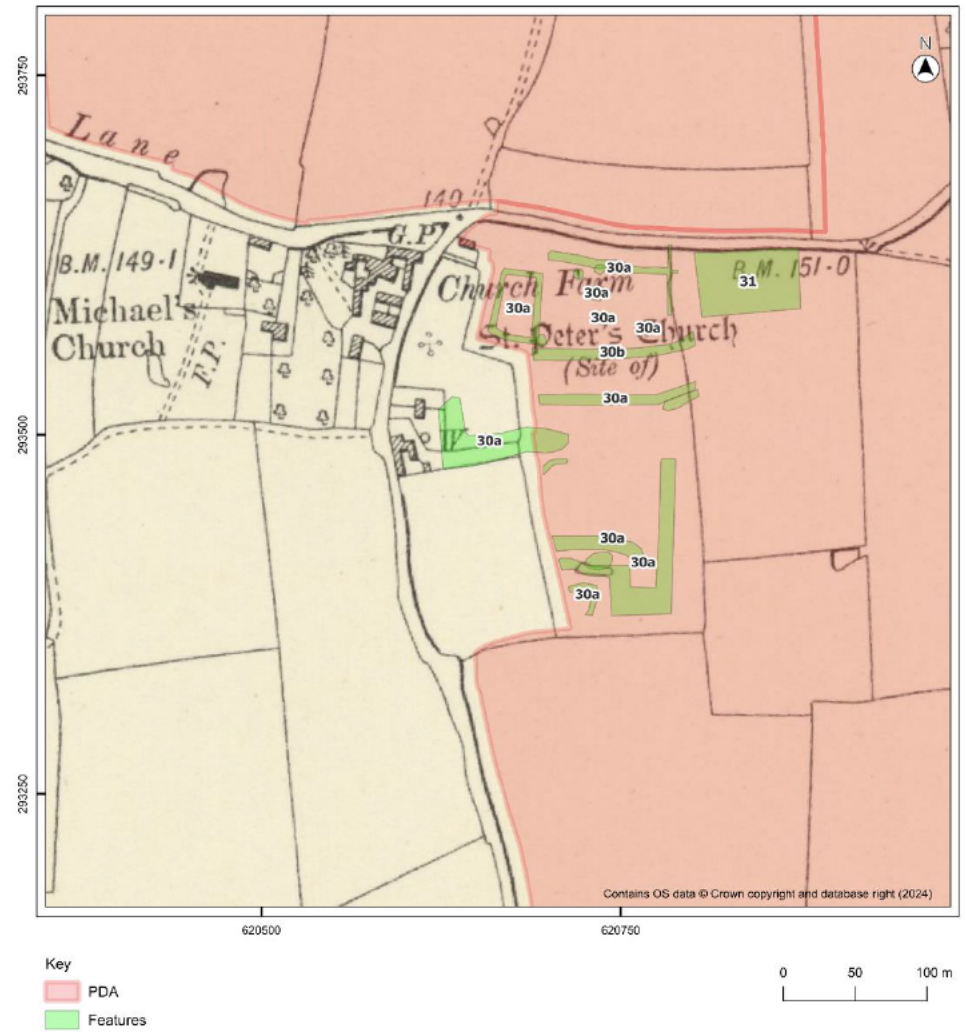
*Illus 35. Feature HA 46 as shown on aerial photographs held by the Norfolk Air Photo Service (ref. OS/73359/259)*



*Illus 36. Feature HA 46 as mapped by this AIM project overlain onto Google Earth Pro imagery*



Illus 37. Unannotated LiDAR DTM imagery at 1m resolution with hillshade and colour ramp showing HA 30a



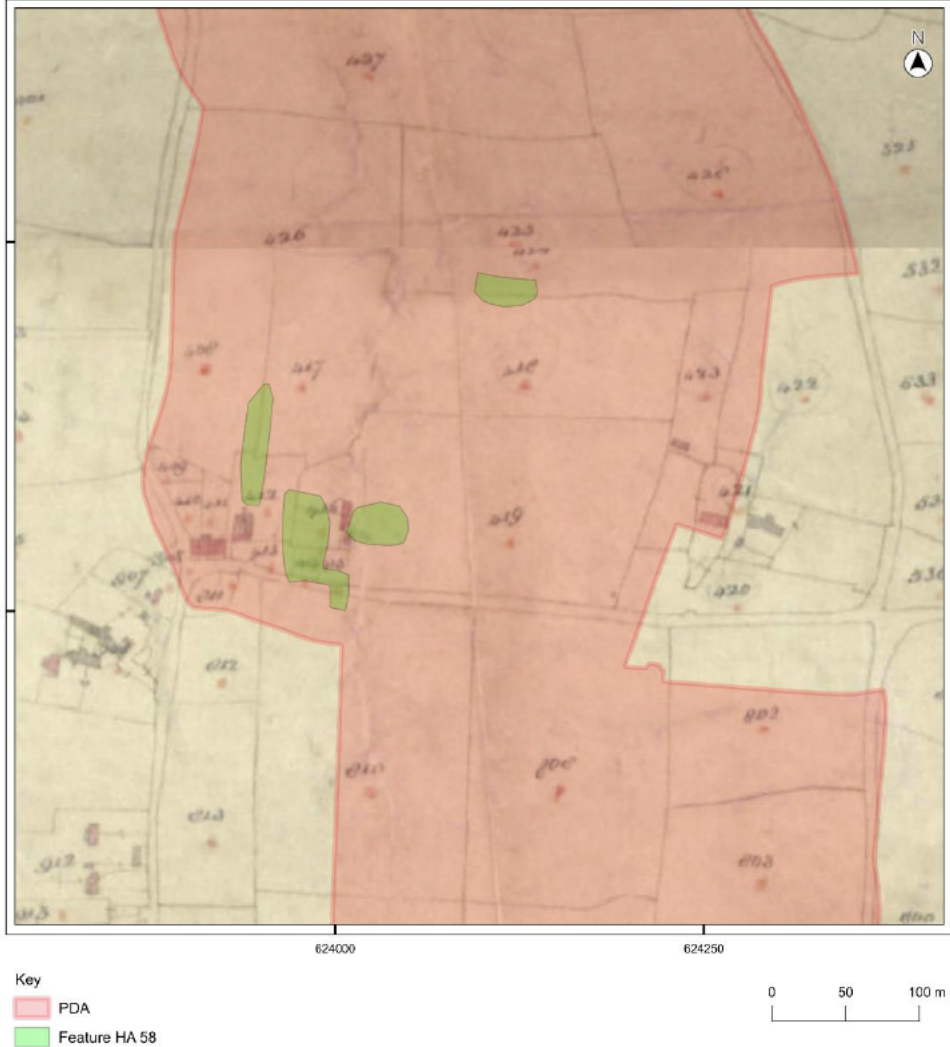
Illus 38. Feature HA 30a as mapped by this AIM project overlain onto 2<sup>nd</sup> edition 1:10560 OS mapping



Illus 39. Feature HA 30a as mapped by this AIM project overlain onto Google Earth Pro imagery



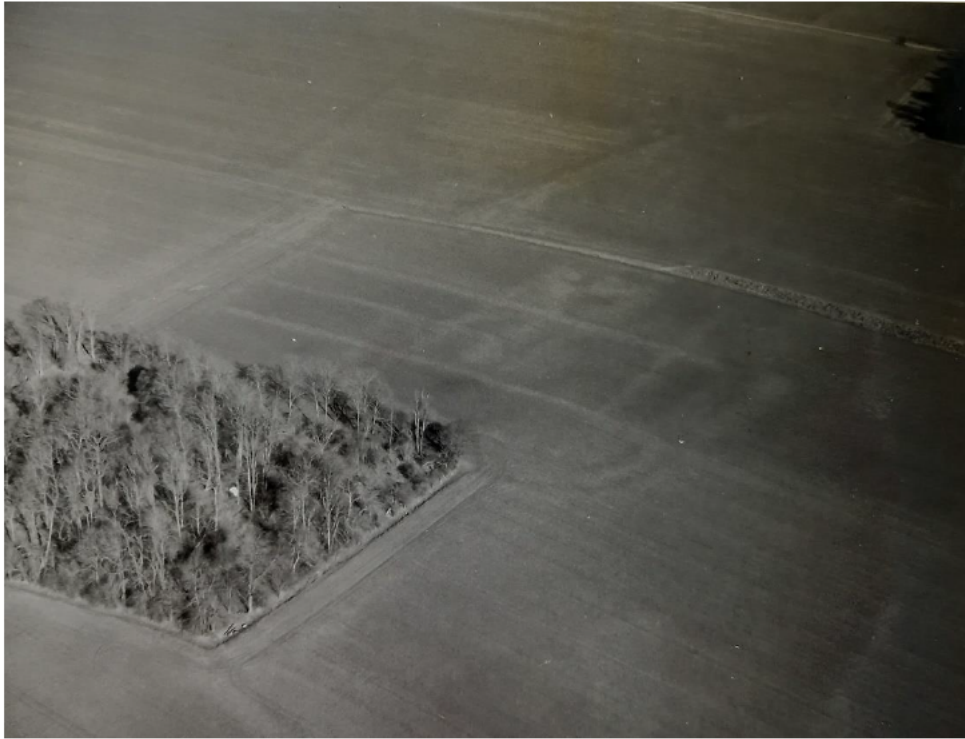
Illus 40. Unannotated LiDAR DTM imagery at 1m resolution with hillshade and colour ramp showing HA 58



Illus 41. Feature HA 58 as mapped by this AIM project overlain onto the Hempnall tithe map



Illus 42. Feature HA 58 as mapped by this AIM project overlain onto 1:2500 OS mapping



Illus 43. Feature HA 62 as shown on aerial photographs held in the Historic England Archives (ref. TM2794/4/15)



Illus 44. Feature HA 62 as mapped by this AIM project overlain onto Google Earth Pro imagery

## Sites of medieval or post-medieval buildings

- 5.4.6. Cropmarks and/or earthworks pertaining to one unmapped and three mapped medieval or post-medieval buildings have been identified.
- 5.4.7. The earthworks and cropmarks of an ovoid feature, HA 43, is visible on all sources apart from Bing Maps in the north-east corner of Area 197 (Illus. 45 and 46). HA 43 measures c.83m x 50m in area and LiDAR imagery shows that surviving earthworks take the form of a depression of 1m depth. HA 43 lies hard up to the west of Norwich Road (B1332), which is not recorded as the line of a Romano-British or turnpike road on the HER. Within Area 197, medieval coins have been found (HER MNF66485) and the tithe apportionment for Woodton records the Tithe Plot 309, in which HA 43 lies, as Pale Close. 'Pale' field names often relate to medieval deer park boundaries<sup>45</sup>. This field name, in combination with the HER entry and the location of HA 43 at the side of a road, may indicate that HA 43 pertains to the site of a medieval building which may have been related to a nearby deer park (for example, a keeper's lodge).
- 5.4.8. Within Area 79, cropmarks and earthworks record at least six elements of the central complex of Berry Farm and immediately associated field boundaries as shown on historic mapping, HA 23 (Illus. 47 - 49). According to LIDAR elevation data, the surviving earthworks take the form of a cutting in the naturally rising ground elevation to the eastern side of the feature. The total area of cropmarks and earthworks related to the farm buildings measures c.63m x 53m. The remains of Berry Farm were identified as agricultural anomalies by the geophysical survey of the PDA. HA 23 is not currently recorded on the HER.
- 5.4.9. A small rectangular dark-coloured cropmark within a lighter-coloured field corresponding to small building and enclosure on historic mapping, HA 24, is visible on aerial photographs held by the Norfolk Air Photo Service and Google Earth Pro in Area 88 (Illus. 50 - 52). The total area of the cropmark is c.95m x 88m. HA 24 is not currently recorded on the HER.
- 5.4.10. Earthworks and cropmarks corresponding with site of building shown on 1st - 2nd edition OS maps, HA 48, are present in Area 225 (ref. TM2295/93-358/58 dated 6th July 1993; Illus. 53 - 55). The cropmarks, identifiable on Historic England Archive aerial photographs only, measures approximately 55m x 35m. The feature is not currently recorded on the HER.

## Small-scale industry

- 5.4.11. The site of a mapped post-medieval quarry pit in Area 9, HA 4, is visible on all consulted sources and was also identified during the geophysical survey of the PDA (Illus. 82 and 83). HA 4 is located at the northern edge of the Area and has a footprint of approximately 185m x 40m. LiDAR data demonstrates that HA 4's earthworks take the form of a depression in the western side of the feature and a mound on the eastern side of the feature, likely representing the latest iteration of the extraction pit and its associated soil heap. HA 4 is not recorded on the HER.
- 5.4.12. The earthworks and cropmarks of a large subcircular feature in the north-west corner of Area 240, HA 53, can be seen on all consulted sources (Illus. 20 and 21). HA 53 has a total footprint of c. 84m x 45m and LiDAR data records surviving earthworks of around 2.5m depth. The tithe apportionment for Hempnall names Tithe Plot 376, in which HA 53 lies, as Gravel Pit Close, and the HER records the recovery of multi-period finds from that Area (HER MNF22241). HA 53 therefore almost certainly represents a medieval or post-medieval gravel pit, albeit one not drawn on historic mapping. HA 53 is not recorded on the HER.
- 5.4.13. The earthworks and cropmarks of a smaller subcircular feature, HA 54a, are visible in the south of Area 241 on all consulted sources (Illus. 20 and 21). The footprint of HA 54a measures c. 62m x 43m and LiDAR data records its surviving earthworks as a depression of around 0.5m depth. The tithe apportionment for Hempnall records Tithe Plot 388, in which HA 54a lies, as Saw Pit Close, whilst Tithe Plot 390, c. 95m to the south of HA 54a, is named as Clay Pit Close. In addition, the HER records the recovery of multi-period finds from that Area (HER MNF19363). HA 54a is therefore thought most likely to relate to remains of a medieval or post-medieval saw pit but may also relate to the nearby named clay pit. HA 53 is not recorded on the HER.
- 5.4.14. Within Area 244, two circular features and on irregular linear feature, HA 56, can be seen on all consulted sources (Illus. 20 and 21). The circular features measure c. 60m x 48m and c. 42m x 36m respectively whilst the irregular linear feature measures c. 155m x 78m. LiDAR data records HA56's surviving earthworks as slight depressions, with the westernmost circular feature being the deepest. The tithe apportionment for Fritton

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<sup>45</sup> Cavill 2018, 316

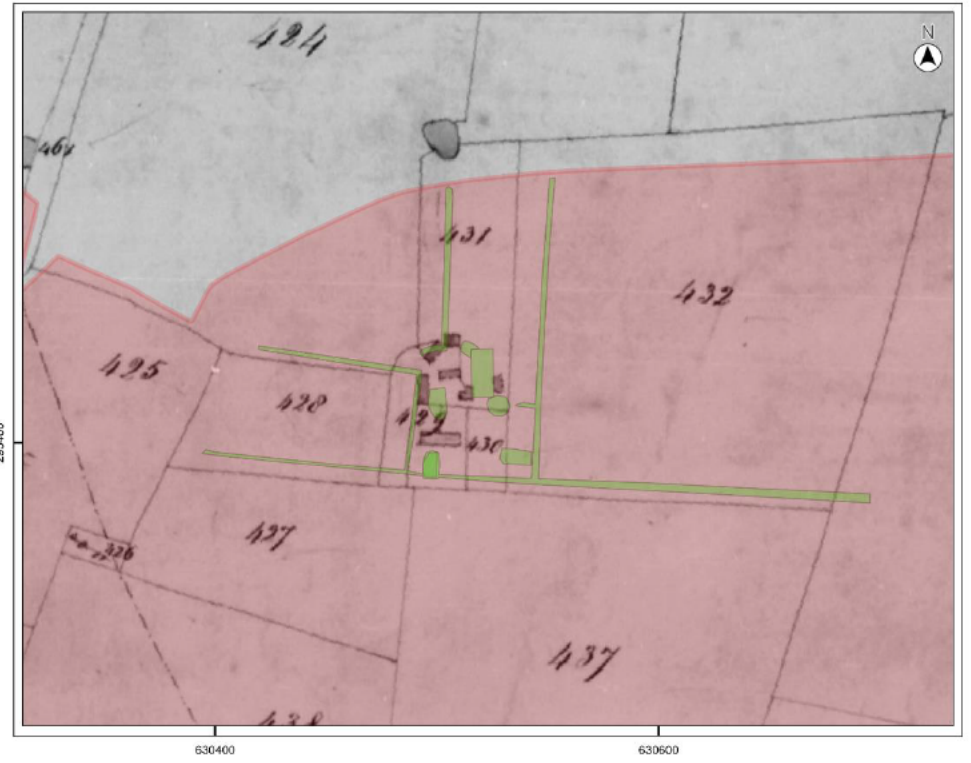
records Tithe Plot 44, in which the westernmost circular feature of HA 56 lies, as Brick Kiln Close, whilst Tithe Plot 61, in which the irregular linear element of HA 56 lies, is named as Clay Pit Close. It is therefore thought most likely that HA 56 relates to the site of an unmapped medieval or post-medieval brick works. HA 56 is not currently recorded on the HER.



*Illus 45. Unannotated LiDAR DTM imagery at 1m resolution with hillshade and colour ramp showing HA 43*



*Illus 46. Feature HA 43 as mapped by this AIM project overlain onto Google Earth Pro imagery*



Key

- PDA
- Feature 23

Illus 47. Feature HA 23 as shown on Google Earth Pro imagery dating to September 2006

Illus 48. Feature HA 23 as mapped by this AIM project overlain onto the 1841 Woodton tithe map