



FIVE ESTUARIES OFFSHORE WIND FARM

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ONSHORE WRITTEN SCHEME OF
INVESTIGATION

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Five Estuaries OSWF Onshore Project Area Tendring, Essex

Outline Written Scheme of Investigation for Archaeological Investigation

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Five Estuaries OSWF Onshore Project Area Tendring, Essex

Outline Written Scheme of Investigation for Archaeological Investigation

1 INTRODUCTION

1.1 Project background

1.1.1 Wessex Archaeology has been commissioned by Five Estuaries Offshore Wind Farm Ltd (hereafter The Applicant), to prepare an outline written scheme of investigation (WSI) that sets out the in-principle measures which will be implemented for the proposed archaeological and geoarchaeological investigations to be completed prior to the construction of the onshore elements of Five Estuaries Project (VE) and mitigation measures to be undertaken during construction.

1.1.2 This is an outline document that, by reference to the assessments reported in the ES, sets out the key elements that will be secured in the post-consent WSI(s) which will be agreed in consultation with the relevant planning authority (via their historic environment advisors) prior to any development works commencing and following a successful Development Consent Order application.

1.1.3 VE has an onshore project area for both the Onshore Export Cable Corridor (and associated infrastructure) and the Onshore Substation (OnSS). The Onshore Export Cable Corridor (Onshore ECC) lies entirely within the district of Tendring, Essex and will make landfall between Holland Haven and Frinton on Sea and extend over approximately 22 km to the area for the proposed OnSS west of Little Bromley. The DCO application also includes the option to install cable ducts for the North Falls Offshore Wind Farm within the Onshore ECC. The Order Limits for the Onshore Project Area are shown on **Figure 1**.

1.1.4 This outline WSI has been prepared as part of the submission of the Development Consent Order application to be submitted to the Planning Inspectorate for examination and determination.

1.1.5 The detail of the works set out in this document will be formally agreed with the relevant planning authority (as part of the DCO requirements) in the form of one or more Written Schemes of Investigation.

1.2 Scope of document

1.2.1 This document covers two main elements. The first part sets out the aims of the post-consent archaeological investigations, and the methods and standards that will be employed. At present these works comprise archaeological trench evaluation, Palaeolithic test pit evaluation which are designed to inform the nature and extent of further archaeological mitigation. Purposive geoarchaeological boreholes may be required dependent upon the extent and distribution of the geotechnical works. In format and content, it conforms to current best practice, as well as to the guidance in *Management of Research Projects in the Historic Environment* (MoRPHE, Historic England 2015a) and the Chartered

Institute for Archaeologists' (ClfA) *Standard and guidance for archaeological field evaluation* (ClfA 2023a).

- 1.2.2 The archaeological trial trench and Palaeolithic test pit evaluation is required to sample the length of the onshore elements of the project to assess the potential for archaeological remains to be present, and to inform any further mitigation that may be required. A focussed pre-consent trial trenching campaign was undertaken in 2023 which evaluated the OnSS area, as there is less flexibility to microsite within the OnSS footprint. As part of these works Palaeolithic test pits were excavated at the ends of selected trenches to map, characterise the deposits and assess their potential for Palaeolithic remains and paleoenvironmental evidence reflective of past landscapes and environments.
- 1.2.3 Purposive geoarchaeological boreholes may be required (following the scope and distribution of ground investigations) to map and characterise the superficial geological deposits at the landfall zone, identifying archaeological and geoarchaeological potential. The geoarchaeological desk-based assessment will guide the strategy for Palaeolithic test pits and purposive boreholes.
- 1.2.4 The second part of this document consists of a further mitigation strategy. This is a high level approach outlining the approaches to achieving preservation by record where harm is unavoidable and the protocols to be followed with regard to further assessment, mitigation and monitoring during detailed design and construction. It is intended that any further mitigation works will have their own detailed WSIs which will specify their nature, location and scope.

2 CONSULTATION

- 2.1.1 During the development of the VE application, consultation has been undertaken on the archaeological aspects of the Environmental Impact Assessment (EIA), which included a commitment to present an outline WSI with the Development Consent Order application. Complete records of the consultation are presented within the relevant chapters of the Environmental Statements (ES). A draft of this document has been submitted to the historic environment advisor for the relevant planning authority and Historic England for comment prior to submission.

3 BASELINE ASSESSMENTS

3.1 Introduction

- 3.1.1 The archaeological and historical background was assessed in a prior desk-based assessment (Wessex Archaeology/Royal Haskoning 2023), which considered the recorded historic environment resource within a 500m study area of the draft Order Limits. A summary of the results is presented below, with relevant entry numbers from the Essex Historic Environment Record (EHER) and the National Heritage List for England (NHLE) included. Additional sources of information are referenced, as appropriate.

3.2 National Mapping Programme and Aerial Photographs

- 3.2.1 A key part of the data gathering for the desk-based assessment was the review of the existing information collected by the National Mapping Programme with regard to potential archaeological remains identified from aerial photographs. This was a large scale project undertaken across many counties in the UK in the 1990s. This information was provided by the Historic Environment Record. This was then supplemented and verified by independent review of aerial photographs undertaken to Aerial Photo Services in 2021 and 2022. The

examined the aerial photographs and digitised potential archaeological features, any discrepancies between the location of the features from the NMP when compared to the APS work was noted in the accompanying report.

- 3.2.2 Both surveys identified a number of archaeological features within and adjacent to the Onshore ECC and OnSS. A concentration of features were identified at Little Bromley in the form of a number of ring ditches, possible henge, enclosures and possible settlement areas. Other features along the route included the occasional ring ditch and a large number of linear features some of which are likely to relate to post-medieval to modern land management features.

3.3 Previous investigations related to the proposed development

Geophysical Survey (2022/2023)

- 3.3.1 The geophysical survey was undertaken to inform the route selection process (along with other factors) and as such the actual area surveyed covers land parcels which now lie outside of the Order Limits (Figure 3A and 3B). The geophysical survey has identified possible and probable archaeological features along the route including linear features relating to field boundaries (some of which can be identified on historic mapping), enclosures, ring ditches, possible bank and ditch, an enclosure possibly relating to settlement activity, another enclosure possibly relating to industrial activity and the potential route of a roman road.

- 3.3.2 The results of the geophysical survey were tested at the OnSS and the results of the trial trenching were found to correspond well to the results of the geophysical survey (Wessex Archaeology 2023a). Discrepancies between the NMP data and the geophysical survey data in terms of the positioning of the features have been shown to derive from errors in the NMP mapping.

Archaeological and Geoarchaeological Monitoring of Geotechnical Investigations (2022/2023)

- 3.3.3 Geotechnical Investigations were undertaken in 2022 and 2023. In 2022, three boreholes at the landfall zone were monitored. This monitored three boreholes and their hand excavated starter pits and identified a sequence of superficial deposits including Kesgrave sands and gravels and Holocene alluvium including peat. The alluvial sequence represents sediment accumulated under the influence of rising post-glacial sea levels and deposited within an estuarine environment. The peat deposits within the Holocene alluvial sequence are considered to be of high geoarchaeological potential (Wessex Archaeology 2022).

- 3.3.4 A further seven boreholes and their hand excavated starter pits were monitored in 2023. No archaeology was identified in the starter pits or the boreholes. Kesgrave sands and gravels were encountered in four of the boreholes at depths between 1.2 and 2.00m bgl, directly overlying the London Clay bedrock. The sands and gravels are likely to be equivalent to the Cooks Green Gravel and have the potential to contain Lower Palaeolithic archaeology and organic and other fossiliferous sediments of significant geoarchaeological potential. Brickearth was found in five of the boreholes and dependent upon its age it has the potential to contain lower or middle palaeolithic archaeology and fossiliferous sediments of significant geoarchaeological potential (Wessex Archaeology 2023b).

Archaeological/Palaeolithic Evaluation- OnSS Area (2023)

- 3.3.5 The Archaeological and Palaeolithic evaluation was undertaken at the OnSS in 2023 in two phases. This comprised the archaeological excavation and recording of a total of 124 trial trenches across the area for the OnSS. This predominantly revealed linear features thought

to relate to land management and/or field division. The majority of these were undated however some were dated to the post-medieval to modern period. Within the Phase 1 evaluation, towards the northern part of the OnSS area, a small number of datable features were found including a later prehistoric ditch and discrete features dating to the medieval period. The route of a Roman Road is thought to traverse the northern section of the Site and whilst the roadside ditches were identified during the aerial photograph survey and the geophysical survey, the ditches were found, but could not be dated during the evaluation. There was no evidence of any metalled surface between the two parallel ditches. Similarly, a single possible cremation burial was also revealed during the Phase 1 evaluation but could not be dated (Wessex Archaeology 2023c and 2023d).

4 POST-CONSENT ASSESSMENT STRATEGY

4.1 Introduction

4.1.1 Prior to the commencement of any development, further assessment will be required to inform the detailed design stage of the development and inform the nature and extent of further mitigation. The post-consent assessment will comprise;

- Completion of the remaining 14.5ha of geophysical survey;
- Archaeological and Geoarchaeological Watching Brief on geotechnical works;
- Archaeological Trial Trench and Palaeolithic Test Pit Evaluation; and
- Purposive Geoarchaeological Borehole Survey (although the requirement for and scope of this will be reviewed based upon the nature, scope and distribution of the watching brief on the ground investigation works).

4.2 General aims

4.2.1 The general aims (or purpose) of the evaluation, in compliance with the ClfA *Standard and guidance for archaeological field evaluation* (ClfA 2023a), are to:

- provide information about the archaeological and geoarchaeological potential of the site;
- to inform either the scope and nature of proportionate archaeological and geoarchaeological work that may be required; or the formation of a proportionate mitigation strategy (to offset the impact of the development on the archaeological resource); or a management strategy; and
- Based upon the results of the evaluation, develop a research agenda to support the developing scope, aims and objectives for a proportionate mitigation strategy. This would be developed as part of subsequent WSI(s).

4.3 General objectives

4.3.1 In order to achieve the above aims, the general objectives of the post-consent assessment are to:

- determine the presence or absence of archaeological features, deposits, structures, artefacts or ecofacts within the Order Limits;
- establish, within the constraints of the assessment, the extent, character, date, condition and quality of any surviving archaeological remains;
- determine the importance of the deposits with regard to their geoarchaeological potential;

- obtain geoarchaeological samples of relevant deposits (where appropriate);
- place the deposits within their wider geoarchaeological context; place any identified archaeological remains within a wider historical and archaeological context in order to assess their significance; and
- make available information about the archaeological resource within the Order Limits by reporting on the results of the evaluation.

4.4 Completion of the Geophysical Survey

4.4.1 Detailed Magnetometry Survey has been undertaken across all parts of the Order Limits that were available (subject to landowner access restrictions) and suitable for survey (excepting areas such as roads, hedges, woodland, water bodies and edges of land parcels). The results of the survey is presented as an Annex to the ES. Due to poor weather conditions and access constraints, 14.5ha of surveyable area remains to be complete. The outstanding areas would be undertaken prior to detailed design to inform the archaeological trial trench evaluation. As the geophysical survey is a continuation of an ongoing piece of work, a Written Scheme of Investigation is already agreed and in place. As such the methods to be used for the completion of the survey are not repeated here.

4.5 Archaeological and Geoarchaeological Watching Brief on Geotechnical Works

- 4.5.1 A watching brief will be undertaken on geotechnical works post-consent. As the scope, methods and timing of these works are currently unknown, details of the watching brief are not set out here. Ground Investigation (GI) locations will be reviewed once available and interventions will be selected for monitoring, this will be dependent upon the total number of interventions proposed, the distribution of the interventions and the methods to be used. As projects of this scale usually involve a large number of GI interventions for engineering reasons, it is proposed that a sample of these are monitored, informed by the archaeological/geoarchaeological potential and in relation to the archaeological works proposed. The results of the geoarchaeological monitoring and review of any GI logs will be integrated into the existing geoarchaeological deposit model for the Onshore Project Area (see **Section 7.4**).
- 4.5.2 Geoarchaeological monitoring priorities will be determined based on the results of a prior Geoarchaeological Desk-based Assessment (Wessex Archaeology 2023). Key areas may be subject to more intensive monitoring due to increased potential such as the landfall zone (GCZ1 in the geoarchaeological DBA) where organic waterlogged deposits with high geoarchaeological potential have been identified. GI logs for any unmonitored interventions will be subject to review by a geoarchaeological specialist.
- 4.5.3 The OnSS area may be subject to impacts from piling for the OnSS foundations, these would not be required on other areas of the route, and as such this is also likely to be a key area for the monitoring of geotechnical works.
- 4.5.4 Should the GI works take place prior to the archaeological and geoarchaeological works proposed below, the scope/distribution of the archaeological and geoarchaeological works can be refined to account for the additional information provided by the GI works.
- 4.5.5 The scope of the watching brief would be agreed through a detailed WSI post-consent, which would outline the interventions to be watched and approved by the relevant planning authority under a DCO requirement.



4.6 Aims- GI Watching Brief

4.6.1 The general aims (or purpose) of the geoarchaeological monitoring of GI works, in compliance with the ClfA *Standard and guidance for archaeological field evaluation* (ClfA 2020a), are:

- provide information about the archaeological and geoarchaeological potential of the Site;
- consider the possible significance of any archaeological and geoarchaeological evidence present, or potentially present, in the context of national and regional research priorities and agendas, and
- inform either the scope and nature of any further archaeological and geoarchaeological work that may be required; or the formation of a mitigation strategy (to offset the impact of the development on the archaeological resource); or a management strategy.

4.7 Objectives- GI Watching Brief

4.7.1 The specific objectives of the geoarchaeological monitoring are as follows:

- To record the sequence of superficial deposits at each GI location;
- To obtain geoarchaeological samples of relevant deposits (where possible within the scope of the GI works);
- To undertake deposit modelling of the data arising from geoarchaeological monitoring, integrating any available existing GI data and relevant BGS archive boreholes, in order to map the extent, thickness and depth of Quaternary superficial deposits;
- Interpret the probable environments represented;
- Determine the importance of the deposits with regard to their archaeological and geoarchaeological (including palaeoenvironmental) potential; and
- Make specific recommendations for further work, where appropriate, which may include geoarchaeological borehole survey, palaeoenvironmental assessment and/or scientific dating.

5 ARCHAEOLOGICAL TRIAL TRENCHING AND TEST PITTING- FIELDWORK METHODS

5.1 Introduction

5.1.1 Health and safety will override archaeological considerations in all works. The final location of the trenches/test pits will be agreed by the relevant planning authority (via their historic environment advisors) under requirement post-consent. The trench locations will be selected in order to sample probable and possible archaeological features identified through the geophysical survey and also apparent 'blank' areas. Test pits undertaken for the assessment of Palaeolithic deposits will be placed at regular intervals. A detailed WSI post-consent will set out the number and distribution of the trenches/test pits.

5.1.2 The results of the post-consent trench/test pit evaluation will inform the location and scope of any further mitigation works that may be required. Those works will be subject to separate WSIs.



5.2 Objectives- Archaeological Trial Trenching

5.2.1 Following consideration of the archaeological potential of the site the specific objectives of the trial trench evaluation are to:

- test the results of the geophysical survey (including apparent 'blank' areas);
- test the results of the National Mapping Programme (NMP) Survey and aerial photograph examination undertaken for the application;
- assess and characterise potential prehistoric, Roman and medieval features which may exist within the Order Limits;
- assess and characterise evidence for medieval/post-medieval agricultural activity within the Site.

5.2.2 The objectives of the trial trench evaluation would be developed further with reference to specific research questions/themes based on the Revised Research Framework for the East of England (Medleycott 2011), in the detailed WSI post consent.

5.3 Objectives- Palaeolithic test pit evaluation

5.3.1 The prior GDBA (Wessex Archaeology 2023) identified the presence of Pleistocene deposits in the Project Area that may contain significant Palaeolithic geoarchaeological resources (artefacts and/or paleoenvironmental evidence). Test pitting, augmented where appropriate with purposive geoarchaeological boreholes (see **section 6**), is the most appropriate method for evaluating this resource. The specific objectives of Palaeolithic test pit evaluation are to:

- establish the potential of Pleistocene deposits to preserve Palaeolithic archaeology;
- establish the potential of Pleistocene deposits to preserve paleoenvironmental and scientific dating evidence, and
- inform on possible requirements for further targeted work that may be required to mitigate the impact of the Project on the Palaeolithic geoarchaeological resource or develop a management strategy to prevent impacts.

5.4 Setting out of the trenches/test pits

5.4.1 All trenches/test pits will be set out using a Global Navigation Satellite System (GNSS) or similar. Minor adjustments to the layout may be required to take account of constraints such as vegetation or located services, and to allow for machine manoeuvring. The trench locations will be tied into the Ordnance Survey (OS) National Grid and Ordnance Datum (OD) (Newlyn), as defined by OSTN15 and OSGM15.

5.5 Service location and other constraints

5.5.1 The Applicant will provide information regarding the presence of any below/above-ground services, and any ecological, environmental or other constraints.

5.5.2 Before excavation begins, the evaluation area will be walked over and visually inspected to identify, where possible, the location of any below/above-ground services. All trial trench/test pit locations will be scanned before and during excavation with a Cable Avoidance Tool (CAT) to verify the absence of any live underground services.



5.6 Excavation methods

Trenches

- 5.6.1 The trenches will be excavated using a 360° tracked excavator equipped with a toothless bucket. Machine excavation will be under the constant supervision and instruction of the monitoring archaeologist. Machine excavation will proceed in level spits of approximately 50–200 mm until either the archaeological horizon or the natural geology is exposed. Where necessary, the base of the trench/surface of archaeological deposits will be cleaned by hand.
- 5.6.2 All archaeological features and deposits identified will be hand-excavated, unless by agreement with the historic environment advisors to the relevant planning authority. Spoil (derived from machine stripping and hand-excavation) and any archaeological features will be scanned with a metal detector to maximise the recovery of metal objects. Artefacts and other finds will be collected and bagged by context.
- 5.6.3 The following sampling strategy is suggested;
- Linear features will be hand excavated to achieve a 10% sample along their length, with a minimum section width of 1.00m;
 - The termini of any linear feature would be 100% excavated;
 - Discrete features will be hand excavated to achieve a 50% sample;
 - Significant bonded or structural remains building slots or postholes will be preserved intact for excavation in more appropriate circumstances, even if fills are sampled;
 - Complex features such as hearths, will be 100% hand excavated, unless part of a larger structure where cleaning and preservation for excavation in appropriate circumstances would be required or where archaeomagnetic dating is being considered.
- 5.6.4 If an exceptional number and/or complexity of archaeological deposits are identified, sample excavation will aim to be minimally intrusive, but sufficient to resolve the principal aims of the evaluation, to a level agreed by the relevant planning authority under requirement.
- 5.6.5 Intersections between features will be avoided when excavating sample sections to maximise uncontaminated material and avoid removing evidence of relationships in confined circumstances. The surface of the features will be cleaned to establish the relationship as far as possible. More substantial features that extend beyond the limit of the excavation will be recorded in plan only, particularly where partial excavation has the potential to impede later characterisation, chronological assumptions or preservation of fragile artefacts such as waterlogged deposits. Where required, trenches and features deeper than 1.2m will be stepped once.
- 5.6.6 If human remains are uncovered, the specific methods outlined below (section 5.11.2) will be followed.
- 5.6.7 Where complex archaeological stratification is encountered, deposits will be left *in situ* and alternative measures taken to assess their depth, as agreed with the relevant planning authority (via their historic environment advisors). Where modern features are seen to truncate the archaeological stratification, these may be removed, where practicable, in a manner that does not damage the surrounding deposits to enable the depth of stratification to be assessed.

Palaeolithic test pits

- 5.6.8 Palaeolithic test pits will be carried out under the supervision of a geoarchaeological specialist experienced in interpreting Pleistocene sediments and identifying Palaeolithic artefacts. Test pits will be positioned at the end of the trenches.
- 5.6.9 The test pits will be excavated using a 360° mechanical excavator with a toothless bucket. Machine excavation will be under the constant supervision and instruction of the geoarchaeological specialist, who will record and number the sequence of sedimentary units as excavation progresses following standard descriptive practices. The textural characteristics (grain-size, consolidation, colour, material and sedimentary structures) of sedimentary units will be recorded, and the shape and nature of their lithostratigraphic contacts (dip, conformity and overall geometry).
- 5.6.10 Machine excavation will proceed in level spits of approximately 50-100 mm, respecting the interface between sedimentary units, until either the bedrock geology is exposed, or further excavation becomes impractical.
- 5.6.11 Test pits will be entered at the maximum safe depth (usually c. 1.2 m, but less if loose sands/gravel are present) to record the upper stratigraphy. After excavation has progressed beyond this depth, recording will typically take place without entering the test pit. It may be occasionally necessary to widen and step out the upper part of a test pit to allow direct access to its lower part, for instance for controlled artefact retrieval, to investigate for the presence of an undisturbed landsurface, or for controlled palaeoenvironmental and/or sediment sampling.
- 5.6.12 Sediment samples of at least 100 litre will be taken at regular intervals in stratigraphic succession through the Quaternary stratigraphy in each test pit and sieved on-site through a 10 mm mesh to investigate whether artefacts and/or macro vertebrate faunal remains are present. If the sediment encountered is not suitable for dry-sieving (i.e. too clayey), excavation will proceed in shallower spits of c. 50 mm, looking carefully for the presence of any (geo)archaeological evidence, and the spit samples will also be carefully investigated by hand (using archaeological trowels) for any archaeological evidence.
- 5.6.13 The potential for deposits to preserve paleoenvironmental evidence will be assessed for each Quaternary sediment unit by the monitoring geoarchaeological specialist. If deposits suitable for palaeoenvironmental sampling are encountered and can be safely sampled, appropriate samples will be taken. Sampling methodologies are outlined in **Section 5.13**.
- 5.6.14 Consideration will also be given to the suitability of any sediment units for luminescence dating or dating of mollusc shells, if abundant enough, by Amino Acid Racemisation (AAR).
- 5.6.15 Samples for luminescence dating may be taken if the deposits are safely accessible. Where deposits cannot be safely accessed for sampling during the evaluation stage, the outline mitigation strategy allows for stepped test pits with associated sampling as a second phase of work, if appropriate (Section 10.2.1).
- 5.6.16 If exceptionally complex/significant geoarchaeological deposits are identified, test pitting will aim to be minimally intrusive, but sufficient to resolve the aims of the evaluation, to a level agreed with the relevant planning authority (via their historic environment advisors) and The Applicant . If this is not possible, deposits will be left in situ and alternative assessment measures implemented, as agreed with the relevant planning authority (via their historic environment advisors).



- 5.6.17 If any archaeological features are identified in deposits overlying or cut into the Pleistocene stratigraphy, these will be excavated and recorded following the above methodology for trenches or the location of the test pit moved to avoid disturbance.
- 5.6.18 Where modern features are seen to truncate the geoarchaeological deposits, these may be removed, where practicable.
- 5.6.19 The results of the Palaeolithic test pit evaluation will be integrated into the existing geoarchaeological deposit model for the Onshore Project Area (see **Section 7.4**).

5.7 Recording

Trenches

- 5.7.1 All exposed archaeological deposits and features will be recorded using the archaeological contractor's pro-forma recording system.
- 5.7.2 A complete record of excavated archaeological features and deposits will be made. This will include plans and sections, drawn to appropriate scales (generally 1:20 or 1:50 for plans, 1:10 for sections) and tied to the OS National Grid.
- 5.7.3 A full photographic record will be made using digital cameras equipped with an image sensor of not less than 16 megapixels. This will record both the detail and the general context of the principal features and the Site. Digital images will be subject to managed quality control and curation processes, which will embed appropriate metadata within the image and ensure long term accessibility of the image set. Photographs will also be taken of all areas, including access routes, to provide a record of conditions prior to and on completion of the evaluation.

Test Pits

- 5.7.4 The test pits will be recorded using the archaeological contractor's pro-forma recording system, along with a drawn measured sketch section of at least one face.
- 5.7.5 For each lithostratigraphic unit descriptions and interpretations of the deposits will be provided, using the archaeological contractors in house standard geoarchaeological field and laboratory descriptions guidelines, which are in accordance with BS EN ISO 14688-1:2018 Geotechnical investigation and testing – Identification and classification of soil.
- 5.7.6 Descriptions of deposits will include information such as:
- Depth
 - Texture
 - Composition
 - Colour
 - Inclusions
 - Structure
 - Shape and nature of contacts between deposits
- 5.7.7 Interpretations will include, where possible, probable depositional environments and formation processes.



5.7.8 All samples taken will be individually numbered. The location, size, stratigraphic context, purpose and whether retained or processed on site will be recorded.

5.7.9 A full photographic record will be made using digital cameras equipped with an image sensor of not less than 10 megapixels. This will record both the detail and the general context of the principal lithological and stratigraphic features, and the evaluation area as a whole. Digital images will be subject to managed quality control and curation processes which will embed appropriate metadata within the image and ensure long term accessibility of the image set. Photographs will also be taken of all areas, including access routes, to provide a record of conditions prior to and on completion of the evaluation.

5.8 Survey

5.8.1 The real time kinematic (RTK) survey of all trenches and features will be carried out using a Leica GNSS (or similar) connected to Leica's SmartNet service. All survey data will be recorded in OS National Grid coordinates and heights above OD (Newlyn), as defined by OSTN15 and OSGM15, with a three-dimensional accuracy of at least 50 mm.

5.9 Monitoring

5.9.1 The Applicant will inform the relevant planning authority in writing in advance of the start of the evaluation and keep them updated on its progress. Access will be arranged for representatives of the relevant planning authority to make site visits to inspect and monitor the progress of the evaluation.

5.10 Reinstatement

5.10.1 The trenches will only be backfilled following inspection by or with the agreement of the Historic Environment Consultant. Trenches completed to the satisfaction of The Applicant and the relevant planning authority (via their historic environment advisors) will be backfilled using excavated materials in the order in which they were excavated, and left level on completion. No other reinstatement or surface treatment will be undertaken.

5.10.2 Test pits will be immediately backfilled on completion using excavated materials in the order in which they were excavated. No further reinstatement will be carried out.

5.11 Finds

General

5.11.1 All archaeological finds will be retained, although those of clearly very recent origin with negligible potential to provide information relevant to the project aims and objectives may be recorded on site and not retained. Where appropriate, soil samples may be taken and sieved to aid in finds recovery. Any finds requiring conservation or specific storage conditions will be dealt with immediately in line with *First Aid for Finds* (Watkinson and Neal 1998).

Human remains

5.11.2 In the event of discovery of any human remains (articulated or disarticulated, cremated or unburnt), all excavation of the deposit(s) will cease pending evaluation.

5.11.3 Initially the remains will be left *in situ*, covered and protected, pending discussions regarding the need for excavation/removal or sampling. Where this is deemed appropriate, the human remains will be fully recorded, excavated and removed from site in compliance with the DCO. If human remains are discovered, a subsample of the assemblage will be investigated so that an appropriate mitigation strategy can be developed.



- 5.11.4 Excavation and post-excavation processing of human remains will be in accordance with the archaeological contractor's protocols and in-line with current guidance documents (e.g., McKinley 2013) and the standards set out in ClfA Technical Paper 13 (McKinley and Roberts 2013). Appropriate specialist guidance/site visits will be undertaken if required.
- 5.11.5 The final deposition of human remains subsequent to the appropriate level of osteological analysis and other specialist sampling/examinations will follow the requirements set out in the DCO.

Treasure

- 5.11.6 The archaeological contractor will immediately notify The Applicant and the historic environment advisors for the relevant planning authority on discovery of any material covered, or potentially covered, by the *Treasure Act 1996*. All information required by the *Treasure Act* (i.e., finder, location, material, date, associated items etc.) will be reported to the Coroner within 14 days and the Portable Antiquities Scheme via the Essex Finds Liaison Officer.

5.12 Environmental sampling- Trial Trenches

- 5.12.1 All sampling will adhere to the principles outlined in Historic England's guidance (English Heritage 2011 and Historic England 2015b).
- 5.12.2 Bulk environmental soil samples, for the recovery of plant macrofossils, wood charcoal, small animal bones and other small artefacts, will be taken as appropriate from well-sealed and dateable contexts. In general, features directly associated with particular activities (e.g., pits, latrines, cesspits, hearths, ovens, kilns, and corn driers) should be prioritised for sampling over features, such as ditches or postholes, which are likely to contain reworked and residual material. However, this will be considered on a case-by-case basis to identify deposits of interest worthy of sampling infilling other features (e.g. ditches).
- 5.12.3 Should deposits such as fired clay be discovered an archaeomagnetic dating specialist would be contacted to assess the suitability for archaeomagnetic dating. This contact would be made remotely and would include photographs of the deposit(s).
- 5.12.4 Features such as cesspits and latrines would also be sampled to assess the presence of remains such as parasites. Further details on the types and methods of samples will be provided in the detailed WSI, post-consent.
- 5.12.5 If waterlogged or mineralised deposits are encountered, an environmental sampling strategy will be devised and agreed with the relevant planning authority (via their historic environment advisors) and the Historic England Science advisor as appropriate. Specialist guidance will be provided by a member of the archaeological contractor's geoarchaeological and environmental team, with site visits undertaken if required.
- 5.12.6 Any samples will be of an appropriate size – typically 40 litres for the recovery of environmental evidence from dry contexts, and 10 litres from waterlogged deposits. Historic England guidance on the recording sampling and conservation of waterlogged wood would be consulted as appropriate (Historic England 2010).
- 5.12.7 Following specialist advice, other sampling methods such as monolith, Kubiena or contiguous small bulk (column) samples may be employed to enable investigation of deposits with regard to microfossils (e.g., pollen, diatoms) and macrofossils (e.g., molluscs, insects), soil micromorphological or soil chemical analyses.

5.13 Geoarchaeological Sampling-Test Pits

Palaeoenvironmental Sampling

- 5.13.1 The potential for Pleistocene deposits to preserve paleoenvironmental evidence will be assessed by the monitoring geoarchaeological specialist. If deposits suitable for palaeoenvironmental sampling are encountered, and are safely accessible for sampling, appropriate samples will be taken following the methodology outlined below.
- 5.13.2 Palaeoenvironmental sampling will adhere to the principles outlined in Historic England's guidance (English Heritage 2011 and Historic England 2015b). Bulk samples will be taken from suitable deposits and assessed for palaeoenvironmental indicators. The size of the samples to be taken are summarised in **Table 1**.

Table 1 Bulk palaeoenvironmental sampling

Indicator	Deposits	Sample size (litres)
Ostracods and foraminifera	Waterlain clays, silts and fine sands	0.30
Diatoms	Clays and silts	0.10
Pollen	Clays, silts and peats	0.10
Molluscs	Clays, silts and fine sands and clayey/silty gravels	2.00
Small vertebrates	Clays, silts and fine sands and clayey/silty gravels	30.00
Large vertebrates	Clays, silts and fine sands and clayey/silty gravels	80.00
Insects and plant macro remains	Organic clays, silts and peat	10.00

- 5.13.3 If appropriate, other sampling methods such as monoliths or contiguous small bulk (column) samples may be employed to enable investigation of deposits with regard to microfossils (e.g., pollen) and macrofossils (e.g., molluscs).

Sedimentological Sampling

- 5.13.4 Samples may be taken for sedimentological analysis.
- 5.13.5 To assist in assessing mode of deposition (e.g., aeolian, alluvial, colluvial etc.) of key sediments, samples of 20 millilitres may be taken from fine grained sediments for particle size analysis.
- 5.13.6 Bulk samples of 20-40 litres may be taken from clastic sediments for clast lithological analysis to assist in determining the mode of deposition and, for fluvial contexts, reconstruct palaeo-drainage history (including fluvial diversions and catchment changes).
- 5.13.7 Recommendations for sedimentological sample assessment will be made in the evaluation report, where appropriate.

Scientific Dating

- 5.13.8 Consideration will also be given to the suitability of any Pleistocene sediments exposed in the test pits for luminescence dating. Luminescence dating sampling will be carried out in accordance Historic England's *Luminescence Dating: Guidelines on using luminescence dating in archaeology* (English Heritage 2008).
- 5.13.9 If mollusc shells are identified, their potential for dating by Amino Acid Racemisation (AAR) will be considered.

5.13.10 If organic sediments are identified, their potential to contain short lived plant remains suitable for AMS radiocarbon dating will be considered.

6 GEOARCHAEOLOGICAL BOREHOLE SURVEY- FIELDWORK METHODS

6.1 Introduction

6.1.1 This section outlines the methods for the geoarchaeological borehole survey.

6.1.2 A principal focus of the borehole survey is anticipated to be deeply buried superficial deposits identified in geoarchaeological monitoring of GI (Wessex Archaeology 2022 and 2023) by the prior GDBA (Wessex Archaeology 2023) in the area of the ECC landfall between Holland Haven and Frinton on Sea. Additional purposive geoarchaeological boreholes may be required to investigate deeply buried Pleistocene deposits with geoarchaeological potential at other locations in the Project Area. The requirement for the geoarchaeological boreholes will be determined based on the results of geoarchaeological monitoring of GI.

6.1.3 It is proposed to carry out a geoarchaeological and archaeological monitoring of Ground Investigation works to be carried out as part of the project as set out in above in **Section 4.5**.

6.1.4 Geoarchaeological borehole survey may be required following monitoring of the Ground Investigation works. The requirement be dependant upon a) the quantity and distribution of the ground investigation works and b) the results of the ground investigation works. The aims of the purposive geoarchaeological borehole survey are set out below.

6.1.5 Purposive borehole survey may be required to map and characterise the superficial geological deposits across the foreshore and former marshland to the west, identifying areas of geoarchaeological and archaeological potential. It is anticipated that the borehole survey will be restricted to GCZ1 as defined in the geoarchaeological desk-based assessment (**Figure 2**), although boreholes may be required in other locations in the Project Area.

6.2 Specific aims- geoarchaeological borehole survey

6.2.1 The specific aims of the geoarchaeological borehole survey are as follows;

- provide information about the geoarchaeological potential of the survey area;
- consider the possible significance of any geoarchaeological evidence present, or potentially present, in the context of national and regional research priorities and agendas (e.g., EH 2008a, Medleycott 2011); and
- to inform on possible requirements for proportionate geoarchaeological work that may be required to offset the impacts of the proposals on the geoarchaeological resource or develop a management strategy to prevent impacts.

6.2.2 The specific aims of the survey will be addressed by achieving the following objectives;

- record the sequence of deposits at each borehole location;
- obtain geoarchaeological samples of relevant deposits including for palaeoenvironmental assessment (where possible);

- undertake deposit modelling of the data arising from the borehole survey, integrating any available GI data and relevant BGS archive boreholes, in order to map the extent, thickness and depth of deposits;
- interpret the probable environments represented;
- determine the importance of the deposits with regard to their geoarchaeological potential; and
- make specific recommendations for further work, where appropriate, which may include palaeoenvironmental assessment and/or scientific dating.

6.3 Fieldwork Methods

- 6.3.1 Boreholes will be carried out using a mechanical drilling rig. Specific drilling methods and borehole locations will be defined within a detailed WSI post-consent and will be developed in conjunction with the proposals for post-consent GI works.
- 6.3.2 The drilling rig will be operated by experienced engineers under the supervision of a suitably experienced geoarchaeologist.
- 6.3.3 The supervising geoarchaeologist will record, describe and interpret the sequences of deposits encountered in order to allow assessment of likely geoarchaeological potential. Palaeoenvironmental, sedimentological and dating sampling will be carried based on professional judgement and in accordance with aims and objective of the evaluation. Sampling will be carried out in accordance with the methodology outlined in **section 5.13**.
- 6.3.4 Where deposits of geoarchaeological potential are identified in the boreholes, the archaeological contractor will retain suitable core lengths in sleeved liners.
- 6.3.5 If deposits of geoarchaeological potential are identified in hand-dug starter pits, a suitable sampling strategy will be devised including column or bulk sampling where practical.
- 6.3.6 Retained core lengths will be sealed and marked with the project number, site number, borehole number and sample depth and retain for laboratory assessment,
- 6.3.7 Boreholes described in the field or retrieved for later description will include the following information;
- Depth
 - Texture
 - Composition
 - Colour
 - Inclusions
 - Structure
 - Contacts between deposits.
- 6.3.8 Interpretations will include, where possible, probable depositional environments and formation processes.
- 6.3.9 A full photographic record will be made using digital cameras equipped with an image sensor of not less than 10 megapixels. This will record both the detail and the general



context of the principal lithological and stratigraphic features, and the survey area as a whole.

- 6.3.10 Digital images will be subject to managed quality control and curation processes which will embed appropriate metadata within the image and ensure long term accessibility of the image set. Photographs will also be taken of all areas, including access routes, to provide a record of conditions prior to and on completion of the borehole survey.
- 6.3.11 Methods for reinstatement at borehole locations will be agreed and outlined within a detailed WSI.
- 6.3.12 The real time kinematic (RTK) survey of all boreholes will be carried out using a Leica GNSS or similar connected to Leica's SmartNet service. All survey data will be recorded in OS National Grid coordinates and heights above OD (Newlyn), as defined by OSGM15 and OSTN15, with a three-dimensional accuracy of at least 50 mm.

7 POST-EXCAVATION METHODS

7.1 Trial Trenches

Stratigraphic evidence

- 7.1.1 All written and drawn records from the evaluation will be collated, checked for consistency and stratigraphic relationships. Key data will be transcribed into a database, which can be updated during any future analyses. The preliminary phasing of archaeological features and deposits will be undertaken using stratigraphic relationships and the spot dating from finds, particularly pottery.
- 7.1.2 A written description will be made of all archaeologically significant features and deposits that were exposed and excavated, ordered either by trench or by period as appropriate. Detail of all contexts will be provided in trench tables in the appendix of the report.

Finds evidence

- 7.1.3 All retained finds will, as a minimum, be washed (as appropriate), weighed, counted and identified. They will then be recorded to a level appropriate to the aims and objectives of the evaluation. Recording and reporting will conform to the Type 2 (Appraisal) level according to ClfA's *Toolkit for Specialist Reporting*, to include appropriate quantification, characterisation and assessment of significance and potential. The report will include a table of finds by feature/context or trench.
- 7.1.4 Metalwork from stratified contexts will be X-rayed and, along with other fragile and delicate materials, stored in a stable environment. The X-raying of objects and other conservation needs will be undertaken by an appropriate conservation centre.
- 7.1.5 Finds will be suitably bagged and boxed in accordance with the guidance given by the relevant museum and generally in accordance with the standards of the ClfA (2014b).

Environmental evidence

- 7.1.6 Bulk environmental soil samples will be processed by standard flotation methods. The residues will be fractionated into 5.6/4 mm and 1/0.5 mm and dried if necessary. The coarse residue fraction (>5.6/4 mm), and the fine fraction when appropriate, will be sorted and discarded, with any finds recovered given to the appropriate specialist. The flot will be retained on a 0.25 mm mesh and scanned to assess the range of environmental remains present and their preservation. Unsorted fine residues will be retained until after any

analyses and discarded following final reporting (in accordance with the Selection policy, below).

- 7.1.7 In the case of samples from cremation-related deposits the flots will be retained on a 0.25 mm mesh, with residues fractionated into 4 mm, 2 mm and 1 mm. In the case of samples from inhumation burial deposits, the sample will be wet-sieved through 9.5 mm and 1 mm mesh sizes. The coarse fractions (9.5 mm) will be sorted with any finds recovered given to the appropriate specialist together with the finer residues.
- 7.1.8 Any waterlogged samples will be processed by standard waterlogged flotation methods.
- 7.1.9 Recording and reporting will conform to the Type 2 (Appraisal) level according to ClfA's *Toolkit for Specialist Reporting*, to include appropriate quantification, characterisation and assessment of significance and potential.

7.2 Test Pitting

Lithostratigraphic Evidence

- 7.2.1 All written and drawn records from the evaluation will be collated, checked for consistency.
- 7.2.2 Where possible, probable depositional environments, formation processes and chronology will be considered.
- 7.2.3 A written description will be made of all geoarchaeological deposits, ordered either by intervention and lithostratigraphy. Details of all lithostratigraphic contexts will be provided in tables in an appendix to the report.

Finds Evidence

- 7.2.4 All retained finds will, as a minimum, be washed, weighed, counted and identified (as appropriate). They will then be recorded to a level appropriate to the aims and objectives of the evaluation. The report will include a table of finds by lithostratigraphic context and/or intervention.
- 7.2.5 Metalwork from stratified contexts will be X-rayed and, along with other fragile and delicate materials, stored in a stable environment. The X-raying of objects and other conservation needs will be undertaken by an appropriate conservation centre.
- 7.2.6 Finds will be suitably bagged and boxed in accordance with the guidance given by the relevant museum and generally in accordance with the standards of the ClfA (2014b).

Palaeoenvironmental, Sedimentological and Scientific dating samples

- 7.2.7 Palaeoenvironmental and dating samples may be obtained during the evaluation. Where appropriate samples are identified, and which have the potential to contribute to the overarching aims and objectives of the evaluation, sample assessment and/or dating may be recommended. Recommendations will be made in the evaluation report.

7.3 Borehole Survey

Stratigraphic evidence

- 7.3.1 All written and drawn records from the evaluation will be collated, checked for consistency.
- 7.3.2 Where possible, probable depositional environments, formation processes and chronostratigraphic context will be considered.



7.3.3 Deposits will be preliminary phased using stratigraphic relationships, augmented with additional chronological information, if available.

7.3.4 A written description will be made of all geoarchaeological deposits, ordered by intervention. Detail of all contexts will be provided in tables in the appendix of the report.

Finds Evidence

7.3.5 All retained finds will, as a minimum, be washed, weighed, counted and identified. They will then be recorded to a level appropriate to the aims and objectives of the evaluation. Recording and reporting will conform to the Type 2 (Appraisal) level according to ClfA's *Toolkit for Specialist Reporting*, to include appropriate quantification, characterisation and assessment of significance and potential. The report will include a table of finds by feature/context or trench.

7.3.6 Metalwork from stratified contexts will be X-rayed and, along with other fragile and delicate materials, stored in a stable environment. The X-raying of objects and other conservation needs will be undertaken by an appropriate conservation centre.

7.3.7 Finds will be suitably bagged and boxed in accordance with the guidance given by the relevant museum and generally in accordance with the standards of the ClfA (2014b).

Palaeoenvironmental assessment and scientific dating

7.3.8 Where appropriate deposits are identified in retained cores, and which have the potential to contribute to the overarching aims and objectives of the borehole survey, paleoenvironmental assessment and dating may be recommended.

7.3.9 This assessment may include a suite of complementary techniques comprising targeted and proportionate assessment of pollen, diatom, ostracod, plant macrofossil, molluscan and coleopteran remains, supported by radiocarbon and/or Optically Stimulated Luminescence (OSL) dating. Multiple techniques are typically assessed in accordance with Historic England guidelines on good practice in environmental archaeology (Historic England 2011) and geoarchaeology (Historic England 2015).

7.3.10 Detailed recommendations for assessment will be provided in the borehole survey report.

7.4 Deposit Modelling

7.4.1 Data obtained during the evaluation will be used to update the geoarchaeological deposits model for the Project provided in the prior GDBA (Wessex Archaeology 2023). Data will principally derive from geoarchaeological monitoring of GI, Palaeolithic test pitting evaluation and geoarchaeological borehole survey, but will be augmented with the results of the archaeological trial trenching as appropriate.

7.4.2 Deposit modelling identifies the range of Quaternary deposits that may be present in a defined area and maps their lateral extent and depth. The deposit modelling will be carried out in accordance with *Deposit modeling and archaeology: guidance for mapping buried deposits* (HE 2020).

7.4.3 Only lithostratigraphic records with sufficiently detailed descriptive terminology and location data (including surface elevation) will be included in the model.

7.4.4 All available data points will be entered into industry standard geological utilities software (Rockworks™ 23). Each stratigraphic unit will be given a colour and pattern allowing cross

correlation and grouping of the different sedimentary units. The grouping of these deposits will be based on lithological descriptions, which define distinct depositional environments referred to as 'stratigraphic units' (e.g., Bedrock, Alluvium and Made Ground)

- 7.4.5 Outputs generated using RockWorks 23™ may include two-dimensional stratigraphic profiles ('transects') of selected interventions and/or models of surface height and/or thickness were generated using an inverse-distance weighted (IDW) algorithm for the stratigraphic units present.
- 7.4.6 The modelling algorithms employed in the creation of the outputs will be described in the methods section of the report. The results of the deposit modelling will be reviewed and utilised within the final report with a comment on data coverage and the limitations and practical use of the deposit model.

7.5 Geoarchaeological Landscape Characterisation

- 7.5.1 The results of the GI monitoring and evaluation will be used to provide an updated GLC for VE provided in the prior GDBA (Wessex Archaeology 2023). The GLC works on the same principles as a Historic Landscape Characterisation (English Heritage 2004) and Landscape Character Assessment (Natural England 2014), but in this case largely considers the shallow buried and outcropping superficial geological elements of the landscape.
- 7.5.2 The GLC will consider variations in the Quaternary geology across the site, sub-dividing the evaluation into different Geoarchaeological Characterisation Zones (GCZs), where appropriate.
- 7.5.3 The GLC will provide an assessment of the archaeological and geoarchaeological potential of Quaternary deposits in each GCZ. It provides a framework for more precisely determining archaeological and geoarchaeological potential at a scale which can most effectively inform future decision making, including the formation of details for the mitigation strategy (to offset the impact of the proposals on the geoarchaeological resource); or a management strategy to prevent impacts.

8 REPORTING

General

- 8.1.1 Following completion of the fieldwork and the evaluation of the stratigraphic, artefactual and ecofactual evidence, draft reports will be submitted for approval the relevant planning authority (via their historic environment advisors), for comment. Once approved, a final version will be submitted.
- 8.1.2 The report will include the following elements:
- Non-technical summary;
 - Project background;
 - Archaeological and historical context;
 - Aims and objectives;
 - Methods;
 - Results – stratigraphic, finds and environmental;



- Conclusions in relation to the project aims and objectives, and discussion in relation to the wider local, regional or other archaeological contexts and research frameworks and recommendations for further work, as appropriate;
- Archive preparation and deposition arrangements;
- Appendices, including trench summary tables;
- Illustrations; and
- References.

8.1.3 A copy of the final report will be deposited with the HER, along with surveyed spatial digital data (.dxf or shapefile format) relating to evaluation.

Publication

8.1.4 If no further mitigation works are undertaken, a short report on the results of the evaluation will be prepared for publication in a suitable journal, if considered appropriate and agreed with The Applicant and the relevant planning authority (via their historic environment advisors).

OASIS

8.1.5 An OASIS (online access to the index of archaeological investigation) record (<http://oasis.ac.uk>) will be created, with key fields completed, and a .pdf version of the final report submitted. Subject to any contractual requirements on confidentiality, copies of the OASIS record will be integrated into the relevant local and national records and published through the Archaeology Data Service (ADS) ArchSearch catalogue.

8.1.6 An OASIS sheet shall be completed at the end of the project and supplied to the relevant planning authority (via their historic environment advisors). This will be completed in digital form. A copy should also be emailed to the Hon. Editor of the Essex Archaeology and History Journal for inclusion in the annual round-up of projects in the Journal.

9 ARCHIVE STORAGE AND CURATION

9.1 Museum

9.1.1 It is recommended that the project archive resulting from the evaluation be deposited with Colchester Museum. Provision has been made for the cost of long-term storage in the post-fieldwork costs. The museum will receive notification of the project prior to fieldwork commencing. A Site code for the evaluation will be obtained from the relevant planning authority (via their historic environment advisors).

9.2 Transfer of title

9.2.1 On completion of the evaluation (or extended fieldwork programme), every effort will be made to persuade the legal owner of any finds recovered (i.e., the landowner), with the exception of human remains and any objects covered by the *Treasure Act 1996*, to transfer their ownership to the museum in a written agreement.

9.3 Preparation of archive

Physical archive

9.3.1 The complete physical archive, which may include paper records, graphics, artefacts, and ecofacts, will be prepared following the standard conditions for the acceptance of excavated archaeological material by Colchester Museum, and in general following nationally

recommended guidelines (Brown 2011; ClfA 2014b; SMA 1995). The archive will usually be deposited within one year of the completion of the project, with the agreement of The Applicant.

Digital archive

- 9.3.2 The digital archive generated by the project will be deposited with a Trusted Digital Repository, in this instance the Archaeology Data Service (ADS), to ensure its long-term curation. Digital data will be prepared following ADS guidelines (ADS 2013 and online guidance) and accompanied by metadata.

9.4 Selection strategy

- 9.4.1 It is widely accepted that not all the records and materials (artefacts and ecofacts) collected or created during the course of an archaeological project require preservation in perpetuity. These records and materials will be subject to selection in order to establish what will be retained for long-term curation, with the aim of ensuring that all elements selected to be retained are appropriate to establish the significance of the project and support future research, outreach, engagement, display and learning activities, i.e., the retained archive should fulfil the requirements of future researchers and the receiving Museum.
- 9.4.2 The selection strategy, which details the project-specific selection process, is underpinned by national guidelines on selection and retention (Brown 2011, section 4) and generic selection policies (SMA 1993) and follows ClfA's *Toolkit for Selecting Archaeological Archives*. It should be agreed by all stakeholders and fully documented in the project archive.
- 9.4.3 In this instance, given that the level of finds recovery is expected to be relatively low, decisions on selection will be deferred until after the fieldwork stage, and no detailed strategy is presented here. Any material not selected for retention may be used for teaching or reference collections by the museum, or by Wessex Archaeology.

9.5 Security copy

- 9.5.1 In line with current best practice (e.g., Brown 2011), on completion of the project a security copy of the written records will be prepared in the form of a digital PDF/A file. PDF/A is an ISO-standardised version of the Portable Document Format (PDF) designed for the digital preservation of electronic documents through omission of features ill-suited to long-term archiving.

10 FURTHER MITIGATION STRATEGY

10.1 Introduction

- 10.1.1 Preservation in situ and preservation by record are the two options by which impacts to archaeological remains can be mitigated. Preservation in situ is the conservation of an archaeological asset in their original location and is the preferred method of conservation for assets of national or international significance in accordance with best practice. Preservation by record through archaeological and geoarchaeological investigation is the process by which archaeological and geoarchaeological remains are excavated and sampled, recorded, assessed, analysed and published to offset the construction effects and to disseminate information to the public.

10.2 Mitigation Strategy OnSS Area

10.2.1 Archaeological assessment of the OnSS area has been undertaken to inform the Environmental Statement. Dependent upon the final location of the OnSS, depth of the works and associated activities works may be required to mitigate the effects of the proposals. Detailed recommendations for mitigation work that may be required are provided in evaluation reports (Wessex Archaeology 2023). In summary, recommendations made comprise:

- Geoarchaeological stepped test pits with associated sampling, sample assessment, dating and, if required, analysis to investigate in detail selected Pleistocene deposits with uncertain Palaeolithic geoarchaeological potential.
- Purposive geoarchaeological borehole survey and/or geoarchaeological monitoring of GI boreholes to investigate Pleistocene deposits >3.20 m bgl.
- Palaeoenvironmental assessment and, if required, analysis of geoarchaeological samples recovered during evaluation;
- Strip, map sample excavation of defined areas such as the possible Roman Road or area around the cremation burial, should these areas be subject to below ground impacts.

10.2.2 The need for and scale of the mitigation works will be developed following the detailed design phase once the below ground impacts in this area are known. Areas for test pitting, borehole survey or excavation, within the OnSS area will be defined through a Written Scheme of Investigation approved by the relevant planning authority under requirement.

10.3 Mitigation Strategy (outline)

10.3.1 Once the evaluation of the Onshore ECC is complete and combined with the existing information gathered pre-determination, the mitigation strategy can be refined based on the results of the investigations. The details and scope of these further works will be discussed with the relevant planning authority (via their historic environment advisors) and detailed WSIs will be produced. Where there is still some flexibility with design through the Rochdale Envelope, the results of the evaluation will be used to inform detailed design of the elements not yet finalised, where applicable. Mitigation could comprise;

- Excavation- undertaken in areas where significant archaeology has been identified through evaluation;
- Detailed geoarchaeological recording, sampling and dating of deposits identified through evaluation;
- Preservation in situ- as described above where archaeological remains of national or international significance are identified and where it is practicable to do so;
- Amendments to design- the Rochdale envelope allows for some degree of flexibility within certain aspects of the design (such as micro-siting within the Onshore ECC or the use of trenchless technologies to cross features). Potential archaeological concerns will be considered during the finalisation of the detailed design;
- Watching Brief- a watching brief involves the monitoring of groundworks during construction in areas where the archaeological potential is considered to be low.

10.3.2 The design of the mitigation will be informed by the construction programme, so that appropriate techniques can be programmed (either before or during construction) without causing delay to the construction programme. Ideally as much of the mitigation as possible



would be carried out prior to the main construction phase to minimise delays during construction.

10.3.3 All phases of mitigation would be subject to one or more detailed WSIs informed by earlier phases of work and consultation with the relevant planning authority (via their historic environment advisors).

10.4 Excavation Methodology

10.4.1 In accordance with the ClfA guidance Standards and Universal Guidance for Archaeological Excavation (2023b), the general aims of the archaeological excavation will be to:

- Further define the features identified during the evaluation;
- Examine the archaeological resource within the Order Limits;
- Seek a better understanding of and compile a lasting record of the resource, within a defined framework of research objectives; and
- Analyse and interpret the results and disseminate them.

10.4.2 Archaeological excavation should entail:

- Removal of the topsoil or made ground under archaeological supervision to either the subsoil or first archaeological horizon;
- Hand cleaning of archaeological deposits to identify the extent of discrete features. Features should be surveyed, photographed and recorded;
- Sampling techniques and sizes will be set out within the WSI but this could include sections of circular or linear features, quadrants of large circular features. Features would be hand excavated to record internal stratigraphy and for artefact recovery. Typical sample based excavations involve hand excavation of 50% of discrete features and 20-25% of linear features;
- Certain types of features (burials, hearths, stratified remains or significant features) may be hand excavated in their entirety by the archaeologist and recorded; and
- Palaeoenvironmental sampling of buried soil horizons and bulk sampling of certain deposits will also be undertaken to retrieve additional evidence.

10.4.3 The depth and complexity of archaeological deposits across the site will be assessed. Sections shall be positioned to record accurate cross section profiles of any remains and to identify structural/phasing sequences (for example terminus and intersections).

10.4.4 The spot height of all principal features and levels will be calculated in meters relative to Ordnance Datum, correct to two decimal places. Plans, sections and elevations will be annotated with spot heights as appropriate.

10.4.5 Should prehistoric lithic scatters, including those of Palaeolithic date, be identified through evaluation, any required excavation should be carried in accordance with a WSI that conforms to Historic England guidance 'Managing Lithic Scatters and Sites' (consultation draft) and 'Advice on Excavation and Recording of Lithic Scatters' (Pope, 2016).

10.4.6 A full photographic record will be maintained using digital images, to include detailed views of archaeological features and deposits, the general context of archaeological remains and to record the progress of the investigations, including images potentially suitable for use in publicity material.



10.4.7 Metal detectors may be used as appropriate to scan stripped surfaces and archaeological features prior to and during excavation as appropriate, and to scan spoil heaps where practicable.

10.4.8 Details of the methods and types of samples to be taken would be specific to the excavation and would be provided in the detailed WSI for the work.

10.5 Geoarchaeological sampling, sampling assessment and analysis

10.5.1 Appropriate methods of geoarchaeological sampling are dependent on sampling requirements but could include stepped test pits or trenches for controlled recovery of artefacts, and/or palaeoenvironmental and dating samples or targeted boreholes to recover palaeoenvironmental and dating samples. Geoarchaeological sampling, sample assessment and, if required, analysis is usually subject to a staged program of investigation, with detailed requirements determined at each stage.

10.5.2 Mitigative geoarchaeological works should be carried out in accordance with a WSI that conforms to Historic England guidance 'Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record' (2015b) and 'Curating the Palaeolithic' (2023).

10.6 Archaeological Monitoring and Recording

10.6.1 Archaeological Monitoring and Recording is a programme of observation, investigation and recording of archaeological remains discovered during the construction of the proposed development. It is used where archaeological remains have not been identified during the earlier stages of assessment but where there remains potential for archaeological remains to exist. The ground works would be monitored by an archaeologist and as such the method of working would not be directly controlled by the archaeologist (unless significant discoveries were made).

10.6.2 Both types described below involve monitoring attendance to observe the ground works and investigate and record archaeological remains observed during the works.

10.6.3 All work would be carried out in accordance with the ClfA Standards and Guidance for Archaeological Monitoring and Recording (2023c). Should watching brief be required the scope and methods would be agreed via a Written Scheme of Investigation approved by the relevant planning authority under requirement. This would agree the scope, methods, recording and sampling strategy to be used for the Archaeological Monitoring and Recording.

11 HERITAGE INTERPRETATION AND COMMUNITY ENGAGEMENT

11.1.1 Public benefit and engagement with the community could help to offset some of the physical effects of the development proposals. This would enhance the public value and engagement with the historic environment, contribute to place-making and provide information to the public on the special archaeological and historic interest of the area. The form of the community engagement will be dependent upon the findings of the investigations but some options could include:

- School workshops, activities and loan boxes;
- Workshops for local groups including finds handling and Q&A sessions;
- Guided site tours while archaeological investigations are in progress;



- Lectures and talks to local community groups to include both professional archaeologists and specialists;
- Ongoing blogs/vlogs or social media updates as the works progress;
- Information for use by The Applicant for newsletters, web content or media (social media or traditional media outlets);
- Provision of content for third party publishers (TV companies/Journalists);
- Displays and exhibitions in the local area either permanent or temporary; and/or
- Volunteer or student placements.

REFERENCES

- ADS 2013. *Caring for Digital Data in Archaeology: a guide to good practice*. Archaeology Data Service & Digital Antiquity Guides to Good Practice.
- Brown, D. H. 2011. *Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation* (revised edition). Archaeological Archives Forum.
- Chartered Institute for Archaeologists [ClfA] 2023a. Standard and Universal Guidance for Archaeological Field Evaluation. Reading: Chartered Institute for Archaeologists. Available at [Layout 1 \(archaeologists.net\)](#) and [Layout 1 \(archaeologists.net\)](#)
- ClfA, 2023b. Standard and Universal Guidance for Archaeological Excavation. Reading: Chartered Institute for Archaeologists. Available at: [Layout 1 \(archaeologists.net\)](#) and [Layout 1 \(archaeologists.net\)](#)
- ClfA, 2023b. Standard and Universal Guidance for archaeological monitoring and recording. Reading: Chartered Institute for Archaeologists. Available at: [Layout 1 \(archaeologists.net\)](#) and [Layout 1 \(archaeologists.net\)](#)
- ClfA 2014a. *Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials* (revised edition October 2020). Reading: ClfA.
- ClfA 2014b. *Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives* (revised edition October 2020). Reading: ClfA.
- ClfA 2014c. *Code of Conduct* (revised edition October 2022). Reading: ClfA.
- ClfA 2019. *Regulations for Professional Conduct* (revised edition July 2021). Reading: ClfA.
- ClfA 2022a. *Toolkit for Specialist Reporting* <https://www.archaeologists.net/reporting-toolkit> (accessed 19/12/2023).
- ClfA 2022b. *Toolkit for Selecting Archaeological Archives* <https://www.archaeologists.net/selection-toolkit> (accessed 19/12/2023).
- English Heritage 2011. *Environmental Archaeology. A Guide to the Theory, Practice of Methods, from Sampling and Recovery to Post-excavation* (2nd edition). Portsmouth: English Heritage.
- Historic England, 2010. *Guidelines on the recording, sampling, conservation and curation of waterlogged wood*. Swindon.
- Historic England 2015a. *Management of Research Projects in the Historic Environment: the MoRPHE project managers' guide*. Swindon: Historic England.
- Historic England 2015b. *Geoarchaeology. Using Earth Sciences to Understand the Archaeological Record*. Swindon: Historic England.
- Historic England, 2023. *Curating the Palaeolithic*. Swindon: Historic England.
- McKinley, J. I. 2013. 'Cremation: excavation, analysis and interpretation of material from cremation-related contexts', in Tarlow, S. and Nilsson Stutz, L. (eds), *The Oxford*



Handbook of the Archaeology of Death and Burial, 147 – 71. Oxford: Oxford University Press.

McKinley, J. I. and Roberts, C. 1993. *Excavation and Post-excavation Treatment of Cremated and Inhumed Human Remains*. Reading: ClfA Technical Paper 13.

Medleycott, M. 2011. *Research and Archaeology Revisited: A revised framework for the East of England*. Occasional Paper 24.

Pope, M. 2016. *Advice on Excavation and Recording of Lithic Scatters*. La Manche Prehistoric Research Group.

SMA 1993. *Selection, Retention and Dispersal of Archaeological Collections*. London: Society of Museum Archaeologists.

SMA 1995. *Towards an Accessible Archaeological Archive*. London: Society of Museum Archaeologists.

Watkinson, D. and Neal, V. 1998. *First Aid for Finds: practical guide for archaeologists*. United Kingdom Institute for Conservation of Historic & Artistic Works.

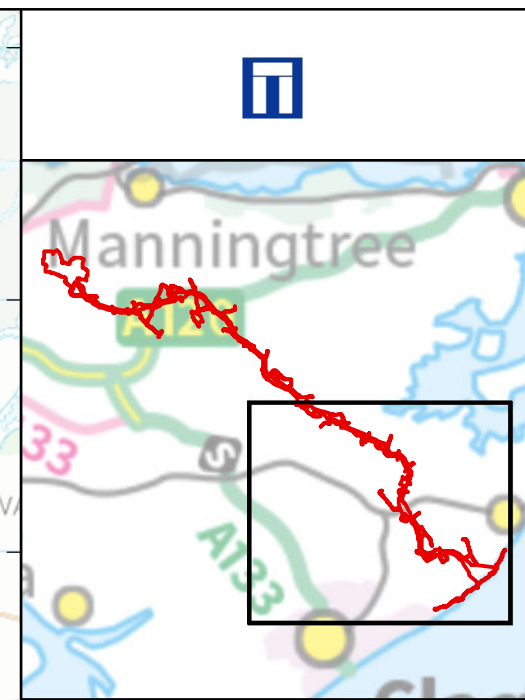
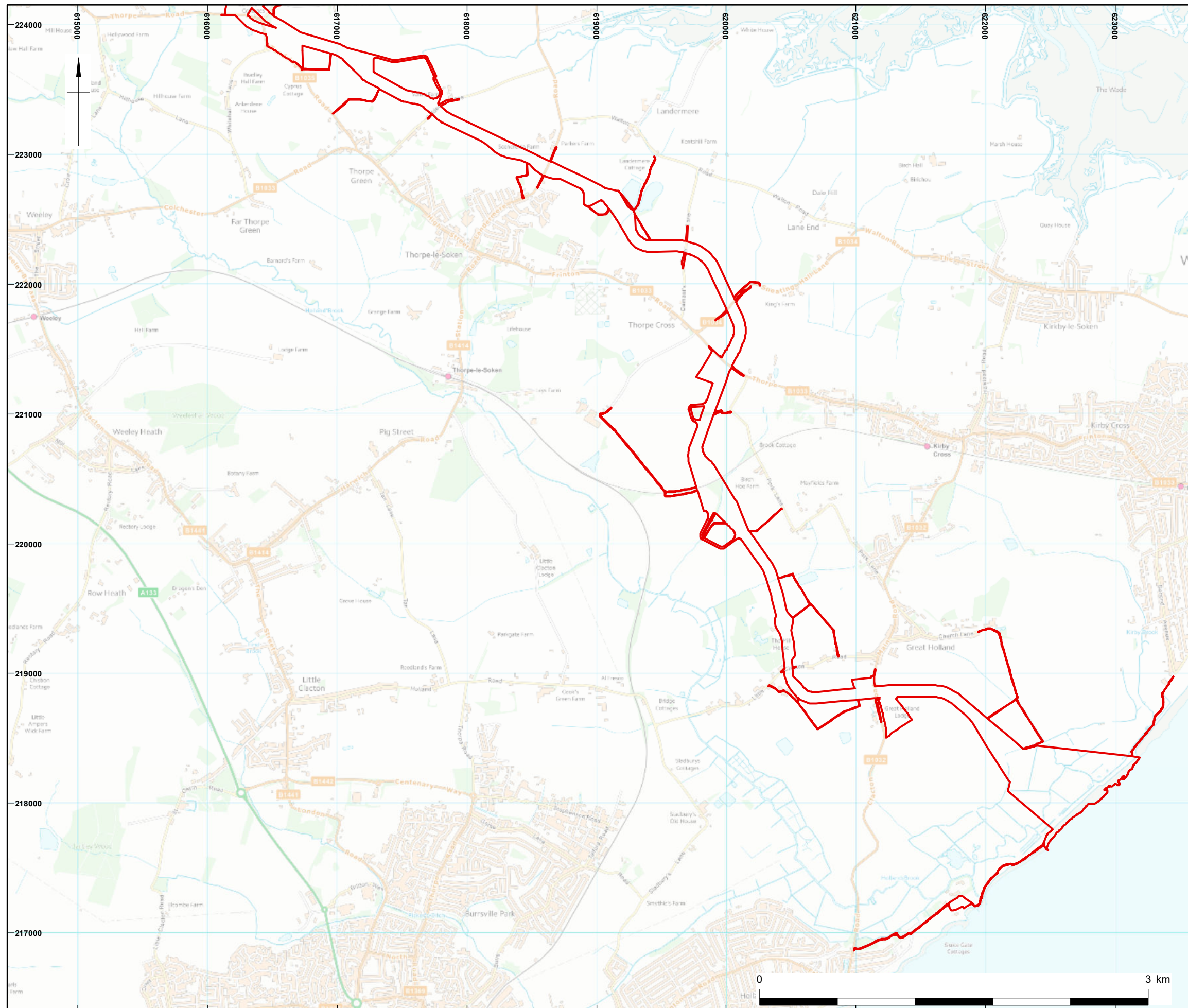
Wessex Archaeology 2022a. *Five Estuaries OSWF Onshore Cable Route Archaeological and Geoarchaeological Monitoring of Ground Investigation Works*. Report Ref: 231912.02

Wessex Archaeology 2023a. *Onshore Geophysics Five Estuaries, Essex, Detailed Gradiometer Survey Report*. Report Ref: 231911.03.

Wessex Archaeology 2023b. *Five Estuaries OSWF, Geoarchaeological Monitoring of GI Works*. Report Ref: 231914.01

Wessex Archaeology 2023c. *Five Estuaries OSWF, North Falls OSWF, Onshore Substation Area, Little Bromley, Essex, Archaeological Evaluation: Phase 1*. Report Ref: 231916

Wessex Archaeology 2023d. *Five Estuaries OSWF, North Falls OSWF, Onshore Substation Area, Little Bromley, Essex, Archaeological Evaluation: Phase 2*. Report Ref 231917.02





 Proposed Order Limits

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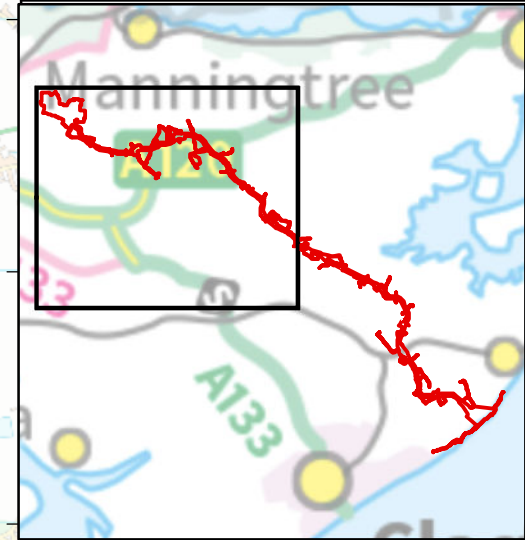
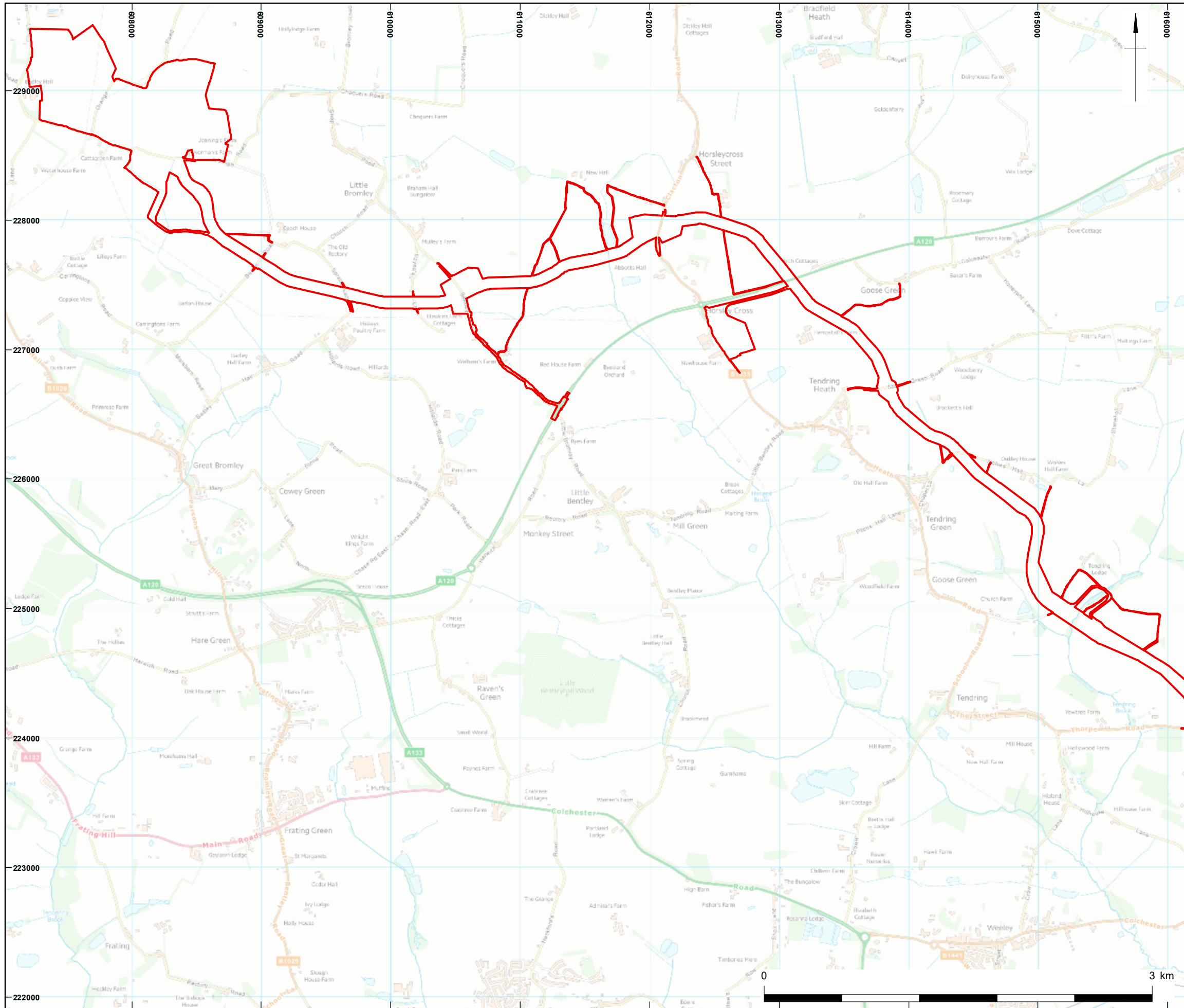
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Proposed Order Limits Location Plan

Figure 1A



Proposed Order Limits

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Proposed Order Limits Location Plan

Figure 1B

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- Proposed Order Limits
- Geoarchaeological character zones



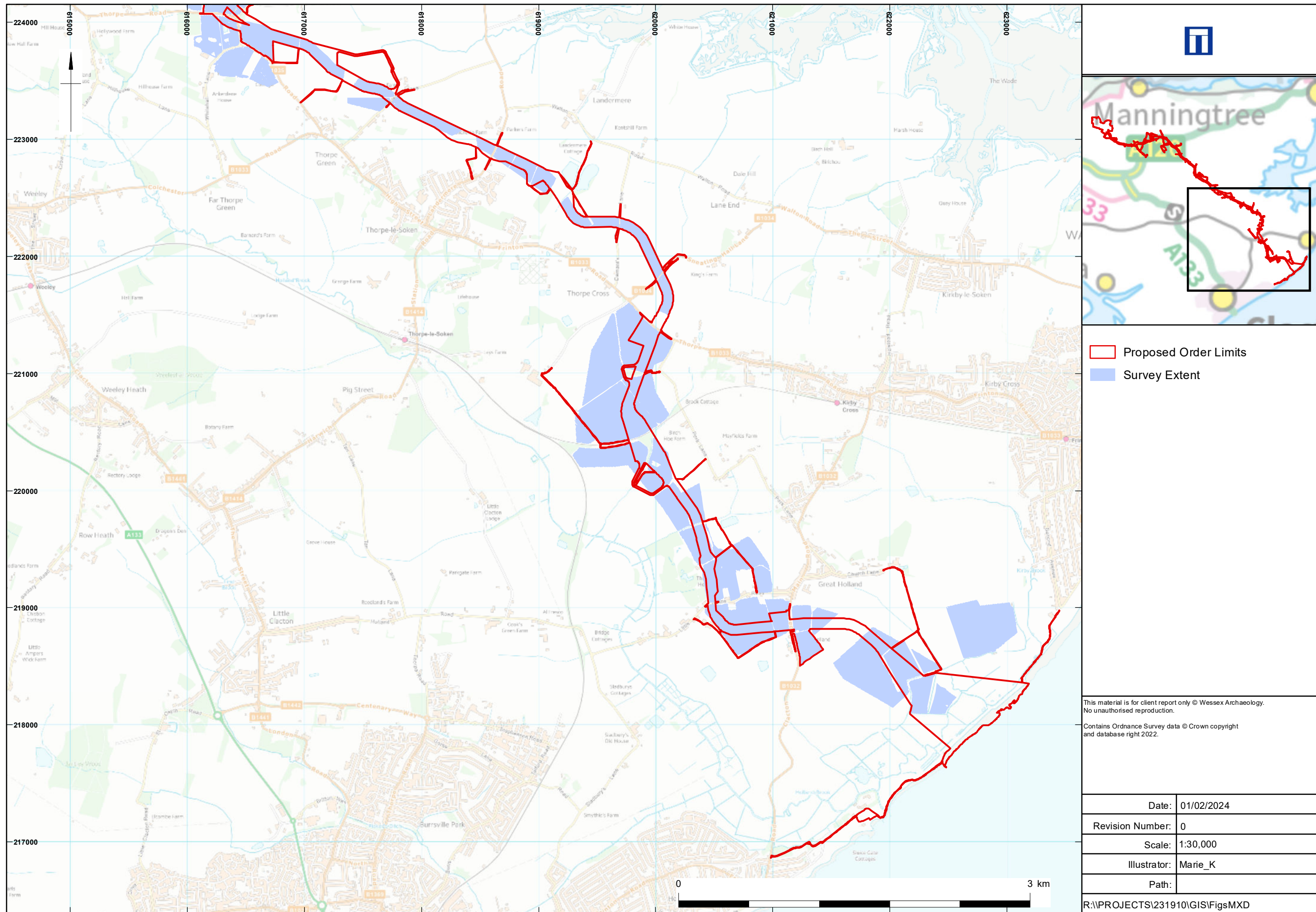
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Figure 2: Revised Geoarchaeological Character Zones (GCZs)



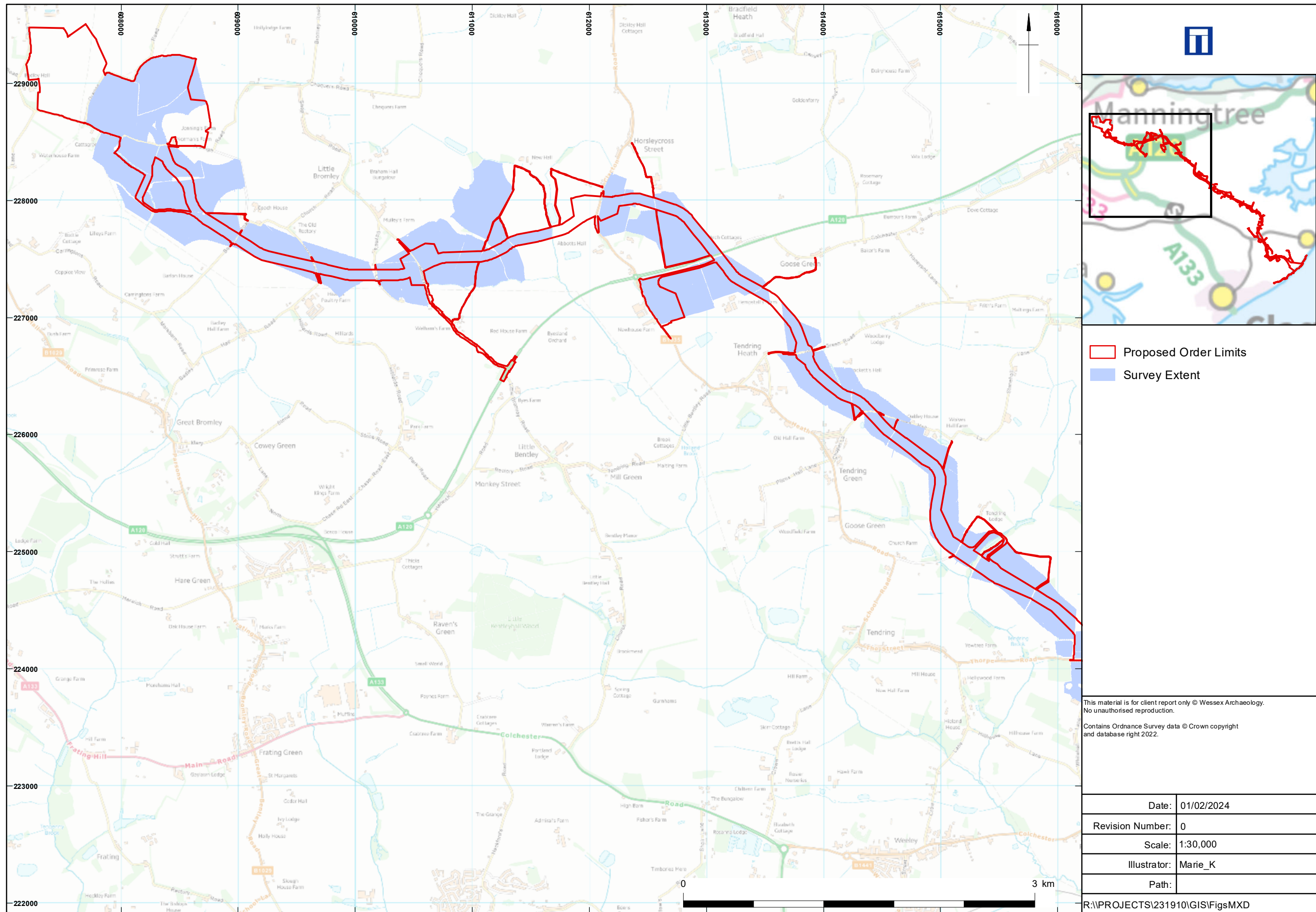
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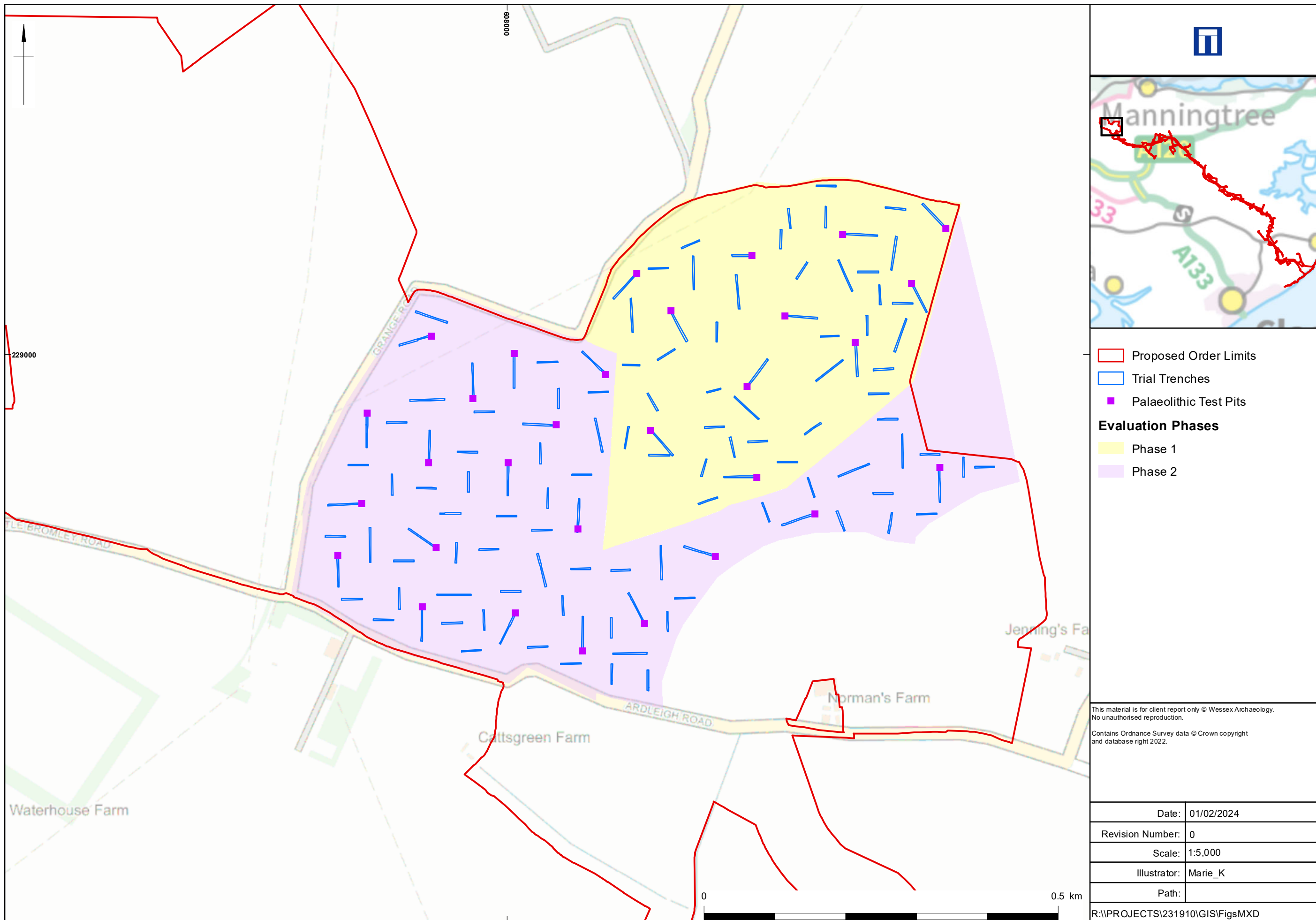
Completed areas of pre-consent geophysical survey

Figure 3A



Completed areas of pre-consent geophysical survey

Figure 3B



Completed pre-consent archaeological trial trenching and palaeolithic test pitting

Figure 4



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