Report on the Impact to the Pleistocene & Palaeolithic and Geoarchaeological Heritage from the Proposed Canterbury Eastern Movement Corridor, Kent (NGR TQ 179 595)

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Report by:

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Tables

Figures

Introduction

1.1 Introduction and planning background

1.1.1 As part of Canterbury City Council's (CCC) traffic management plan, a proposed eastern bypass is intended to alleviate traffic flows in Canterbury by allowing through traffic to bypass the city centre. The bypass is to provide a link to the east of Canterbury between the A28 Sturry Road and the A2050 New Dover Road.

1.1.2 Stantec UK Ltd were commissioned by Canterbury City Council (CCC) to undertake a preliminary feasibility assessment of 2 further alternative potential bypass routes around the east of Canterbury (Stantec, 2021).

1.1.3 Stantec's report section 6.1.18 stated the following concerning archaeology:

> *There are no statutory heritage sites affected by either alignment. At this stage, data from the Historic Environment Record has not been accessed. Both options pass over the historic Roman Road and it is likely that archaeological remains will be present. A desktop archaeological study should be considered to determine if there are further archaeological features which may affect the alignment of the bypass routes. Further surveys such as geophysics and trial trenching are likely to further inform route alignment during outline and detailed design.*

1.2 Scope

1.2.1 This report summarises the significance of the Pleistocene and Palaeolithic deposits in the area of the Fordwich Plateau and how they maybe impacted by the proposed Fordwich Bypass (Eastern Movement Corridor, hereafter referred to as the 'Fordwich Bypass'); impact to other archaeological and conservation heritage has also been considered and is included in Appendix 1.

2 Palaeolithic Archaeology

2.1 The British Palaeolithic in Context

2.1.1 Kent has a rich, deep and broad Palaeolithic heritage that has to be viewed against the wider British context, with discoveries made at sites like Reculver in 1861, from the very beginning of the study of the Palaeolithic period (Harris, Ashton et al. 2019), the international

recognized Swanscombe skull site (Oakley 1952, Wymer 1955), and the oldest Acheulean handaxe site in Britain at Fordwich (Key et al., 2022).

2.1.2 Within the last few decades the understanding of the deep antiquity of the human occupation of Britain has been challenged by the discovery of human-struck flake tools from the Cromer Forest Bed at Pakefield in Suffolk (Parfitt, Barendregt et al. 2005), and human footprints at Happisburgh Norfolk (Ashton, Lewis et al. 2014); collectively these discoveries are pushing back the archaeological record to the Early and Middle Pleistocene and the presence of early humans in northwest Europe to the period of 950,000 to 500,000 years BP (Davis, Ashton et al. 2021).

2.1.3 The chronostratigraphic records exhibited by the major English rivers, are an important resource in the continually broadening understanding of the early human occupation of Britain. Palaeolithic artefacts found within these fluvial archives can provide a useful indication of age in deposits that lack an organic or datable component (Bridgland 2003, Dale, Rawlinson et al. 2021). Recent work is increasingly showing a hitherto unknown temporal pattern in artefact assemblages (Bridgland and White 2014, Bridgland and White 2015, Bridgland 2019), suggesting that there is a correlation with Palaeolith typology and the marine isotope record. The earliest occurrence of Acheulean handaxe technology in north-west Europe is a focus of currently active research; a study of the ancient Bytham River of East Anglia has shown that there is present a pre-Anglian chronostratigraphic fluvial archive representing intermittent human occupation (Davis, Ashton et al. 2021).

2.1.4 Whilst the study of the emergence of Prepared Core Technologies (PCT), such as the Levallois technique, during MIS9 (the Purfleet interglacial) a period between 330,000 and 300,000 years BP, may represent a key change in human cognitive development (Rawlinson 2021); sites that have the potential to demonstrate the changes and complexities in lithic technologies at this key juncture during the final lower Palaeolithic, are rare, and where present should be fully investigated.

2.1.5 The Palaeolithic record for the Middle-Upper Palaeolithic is sparser, one of the most important sites being at Ebbsfleet Kent, where a huge amount of Levallois tools were recovered from the site known as ‘Bakers Hole’, this has been dated to MIS7 the period of the Aveley interglacial 230 000 to 180 000 years BP. There is then a complete absence of evidence for human occupation from the end of the Aveley interglacial through the next interglacial the Ipswichian, until then Neanderthals make a brief reappearance at the

beginning of the last glaciation the Devensian (~60 000 years BP) at this time the Neanderthals develop the unique British handaxe technology known as the Bout Coupe tradition. Modern humans Homo Sapiens appear fleetingly around 40 000 years BP, but are then absent through out the last glacial maximum finally reappearing at the end of the upper Palaeolithic ~13000 years BP.

2.2 The Stour Terraces: Geology, Geomorphology and Associated Palaeolithic Archaeology

2.2.1 The River Stour is an important former tributary of the Thames, having joined the Thames during the last 0.5 million years in the area now offshore from the North Kent coast (Bridgland & d'Olier, 1995), the Stour became detached from the parent river during the Late Holocene, with a new exit to the English Channel to the SW of the Isle of Thanet.

2.2.2 The fluvial system of the east Kent river Great Stour contains remnants of river terraces formed through successive glacial/interglacial cycles of the middle Pleistocene. The sands and gravels laid down by the former courses of the Stour have yielded many thousands of Palaeolithic handaxes and other Palaeoliths, which were recovered mainly during gravel extraction on the valley's edge during the first half of the twentieth century. These now form many of the UK's most important museum collections of Palaeolithic artefacts, but these historic collections are poorly contextualised and didn't benefit from the systematic recovery methods of modern archaeology.

2.2.3 Sixty-seven sites have been identified in the former courses of the east Kent Stour from which Palaeoliths have been found (Mepham, 2009). The discrete spatial but broad temporal range of sites within the parishes of Sturry and Fordwich is indicative of a clear terrace staircase which is currently poorly dated, but, from which handaxes of differing forms and other Palaeoliths have been collected; there is potential for these to be attributed to technologies of possibly four different hominin species, Homo antecessor, Homo heidelbergenis, Homo neanderthalensis and Homo sapiens, these varying lithic technologies represent a type-sequence.

2.2.4 The idea that a local type-sequence existed in the deposits of the Stour was first postulated in 1925 by Henry Dewey of the Geological Survey and Reginald Smith of the British Museum (Dewey & Smith, 1925). There are crude handaxes of a pre-Anglian date from Fordwich (Bridgland et al., 1998), which is the highest implementiferous deposit in the local sequence, and demonstrably older than the lower gravels at Sturry, which contain more refined bifacial

handaxes. They hoped that the sequence would compare with those observed in sites of the Thames, but the sequences at Sturry were difficult to interpret with the methods available at the time (Scott, 2002). As we approach the 100-year anniversary of Dewey & Smith's work, new research on this fluvial archive is timely, if not long overdue, and all opportunities should be exploited to revisit the Stour terraces and improve the provenance of old museum collections and find new material to answer these long-standing questions.

2.2.5 The proposed route goes from the valley bottom to c.45-50m AOD, it is likely that remnants of all the Stour Terraces that are known to preserve Palaeolithic archaeology will be encountered; in addition to the internationally important deposits on the Fordwich Plateau, deposits at the lower elevations c.10m AOD may preserve rare Palaeoenvironmental remains.

2.3 Palaeolithic Archaeology of the Fordwich Plateau

2.3.1 The Pleistocene sands and gravels capping the high ground south of Fordwich: the 'Fordwich Plateau', were deposited by an early evolution of the River Stour. These Pleistocene deposits contain some of the most important Palaeolithic Archaeology in Britain. The Palaeolithic artefacts that have been recovered from these deposits include the enigmatic 'Fordwich Handaxes' (Ashmore, 1980; Bridgland et al., 1998; Key et al., 2022; Knowles et al., forthcoming; Roe, 1967; D. Roe, 1968; Roe, 1964; D. A. Roe, 1968; Roe, 1969; Roe, 1981; Smith, 1933), these likely represent the earliest evidence for the Acheulean stone tool industry in Britain (Key et al., 2022), and probably the earliest and most northern location for this industry, they are therefore not only of national but also international scientific importance, in their ability to help answering profound questions about the development of ancient humans, their movements, lifestyles, cultural traditions and cognitive development (García-Medrano et al., 2022).

2.3.2 Almost all of our knowledge of the Palaeolith assemblage from the Fordwich Plateau is as a result of the collections made between 1923 and 1933 by Dr Willock ("Other Gifts," 1931) and Percy Powell-Cotton, but mainly Dr Tom Armstrong Bowes of Herne Bay (Roe, 1981), unfortunately these early collectors didn't always record the precise contextual location of their finds, it is therefore difficult to conclusively date these handaxes without finding a new in-*situ* find*;* to compound this problem nearly all of the deposits from which the original collections were made have been removed through aggregate extraction in the early twentieth century, the result being that the original find site (Kent HER record TR15NE24) now has little value to contribute to the further understanding of the 'Fordwich

Handaxes',however other more recent finds in the area (knowles et al., 2023) see Apendix 3, notably at Moat Rough (Kent HER TR15NE1931) and other archaeological interventions have identified that the deposits containing remnants of this early Palaeolithic archaeology are more widespread than initially thought.

2.3.3 All the known Palaeolithic finds from the Fordwich Plateau have been made to the east of the SSSI site known as Old Park or Chequers Wood (Figure 3), and none are known from within the SSSI boundary with the exception of, a piece of debitage, one sharp flake and five rolled flakes recovered from John Wymer's 1977 test pit on the eastern most periphery of the site (BNG 617922 158722). The site of the former Brett's gravel pit excavated in the 1920's and 30s is not included in the current SSSI mapping (figures 1-3).

3 Discussion

3.1.1 The Palaeolithic potential along the route of the Fordwich Bypass has been assessed as having the highest level of potential, high, this is based on the likelihood of finding Palaeolithic remains, and the likely importance, refer to Table 1 (Appendix 1).

3.1.2 The newly proposed eastern routes avoiding the SSSI site of Chequers Park Wood, presents a likely significant impact on the Palaeolithic heritage of the Fordwich Plateau. The original proposals for the Fordwich Bypass through the SSSI and to the west of the SSSI, was much less likely to impact on significant Pleistocene deposits containing known Palaeolithic archaeology; currently the deposits through most of the SSSI site are not known to contain Palaeolithic archaeology, this is not to say that there are not Palaeolithic artifacts within the Pleistocene deposits that underlie the SSSI site, but we have to be guided by the current evidence, that the most likely deposits with significant Palaeolithic archaeology lie within a narrow corridor to the east and south of the SSSI. If the decisions that were made for the alternative eastern route of the Fordwich Bypass (now to the east of the SSSI) were based solely on the presence of potential Palaeolithic archaeology within the SSSI, then that decision now needs to be revaluated.

3.1.3 Any development through the areas highlighted as having a high Palaeolithic potential (Figure 1), will require significant specialist archaeological mitigation. If in-situ Paleolithic archaeology was found during this mitigation, this would be of international significance as it would facilitate in answering the longstanding questions on the antiquity of the 'Fordwich Handaxes': a likely outcome could be for preservation in-situ and having the site scheduled

as a monument, enhancing the sparse list of Palaeolithic scheduled monuments (Dale et-al, 2021). If that be the case as seems likely, then it would not be possible to construct EMC along the route as currently proposed.

3.1.4 A partial assessment of the HER (following KCC's standard DBA requirement that all HER records within a 500m radius of any development should be considered) was made for this report; even without assessing all of the potential archaeological heritage along the route it is immediately apparent that it will be highly likely archaeological mitigation would be required for the entire length of the Fordwich Bypass, see figure 2. The archaeological mitigation required prior to the construction of East Kent Access Road (Oxford, 2019) should be considered as a case study for understanding of the potential scale of work required here, this work presented many problems for the archaeological contractors due to the unforeseen amount of archaeology; future quotes given for work of a similar scale should consider this: this cost factor needs to be considered in the costings for the proposed route and this should be discussed with the proposers.

3.2 Conclusion

3.2.1 It is highly likely that Archaeological mitigation will be required for the entire Fordwich Bypass route. It is recommended at this early stage that an alternative route is found for the Fordwich Bypass that would avoid areas of high Palaeolithic importance, this will avoid the costly specialist archaeological interventions, and any possible subsequent re-routing.

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5 Time scales and glossary

5.1 Time scales used in this report:

Periods	Chronological Years Before Present	Marine Isotope Stages
Pliocene	5.3 million years - 2.6 million years BP	n/a
Quaternary	2.6 million years BP – to date	n/a
Pleistocene	2.6 million years BP – 11650 years BP	n/a
Holocene	11650 years BP – to date	n/a
Early Pleistocene	2.6 million years BP – 781 000 BP	103 - 20
Middle Pleistocene	781 000 BP – 120 000 BP	20 - 6
British Palaeolithic	1 million years BP – 13 000 BP	28 - 2
Lower Palaeolithic	550 000 BP – 325 000 BP	13 - 9
Anglian Glaciation	478 000 BP – 424 000 BP	12
Middle Palaeolithic	325 000 BP – 50 000 BP	8 - 4
Early Middle Palaeolithic	325 000 BP – 180 000 BP	8 – 6

5.2 Glossary

Acheulean – The name given to the stone tool technological tradition dominated by handaxes, named after the type site I St Acheul in the Somme region of France where the handaxes were first recognised as the work of ancient humans. It is the longest-lived technological tradition in the human record lasting over 300 000 years in Britain.

Anglian - The Anglian is the name for the most extreme glaciation during the last 2 million years

Anthropogenically – caused or produced by humans

Bytham – an extinct major English river destroyed by the Anglian glaciation

Chronostratigraphic – to organize geological strata to corresponding intervals of time

DBA – Desk based assessment

Flake – general term for all fragments that have intentionally been removed in the process of making stone implements, a flake can also be a tool.

Fluvial - of or found in a river

Handaxe – a prehistoric stone tool, characteristic of the lower Palaeolithic

HER – Historic Environment Record

KCC – Kent County Council

Palaeolith - a stone tool dating to the Palaeolithic

Pleistocene - the first epoch of the Quaternary period, between the Pliocene and Holocene epochs, or the system of deposits laid down during it

Pliocene - the last epoch of the Tertiary period, between the Miocene and Pleistocene epochs, or the system of rocks deposited during it.

Quaternary - most recent and current geological period, means last quarter, and is characterised by growth and decay of continental ice sheets

Terrace – a river terrace is a bench or step that extends along the side of a valley and represents a former level of the valley floor

6 Appendix 1 Tables, Maps and Figures

Potential	*Likelihood*	*Likely importance*
Very low	Very unlikely	Low, moderate or high
	Low	Low
Low	Moderate	Low
	Low	Moderate
Moderate	Low	High
	Moderate	Moderate
	High	Low
High	Moderate	High
	High	Moderate
Unknown	Unknown	Low, moderate or high
	Low, moderate or high	Unknown

Table 1: A crude tabular summary of how likelihood and importance are combined to reach potential. This is a judgement based on a combination of two criteria: (a) the likelihood of finding Palaeolithic remains; and (b) the likely importance of any remains that are present, as shown in the MVPP (Wenban-Smith, et-al, 2007).

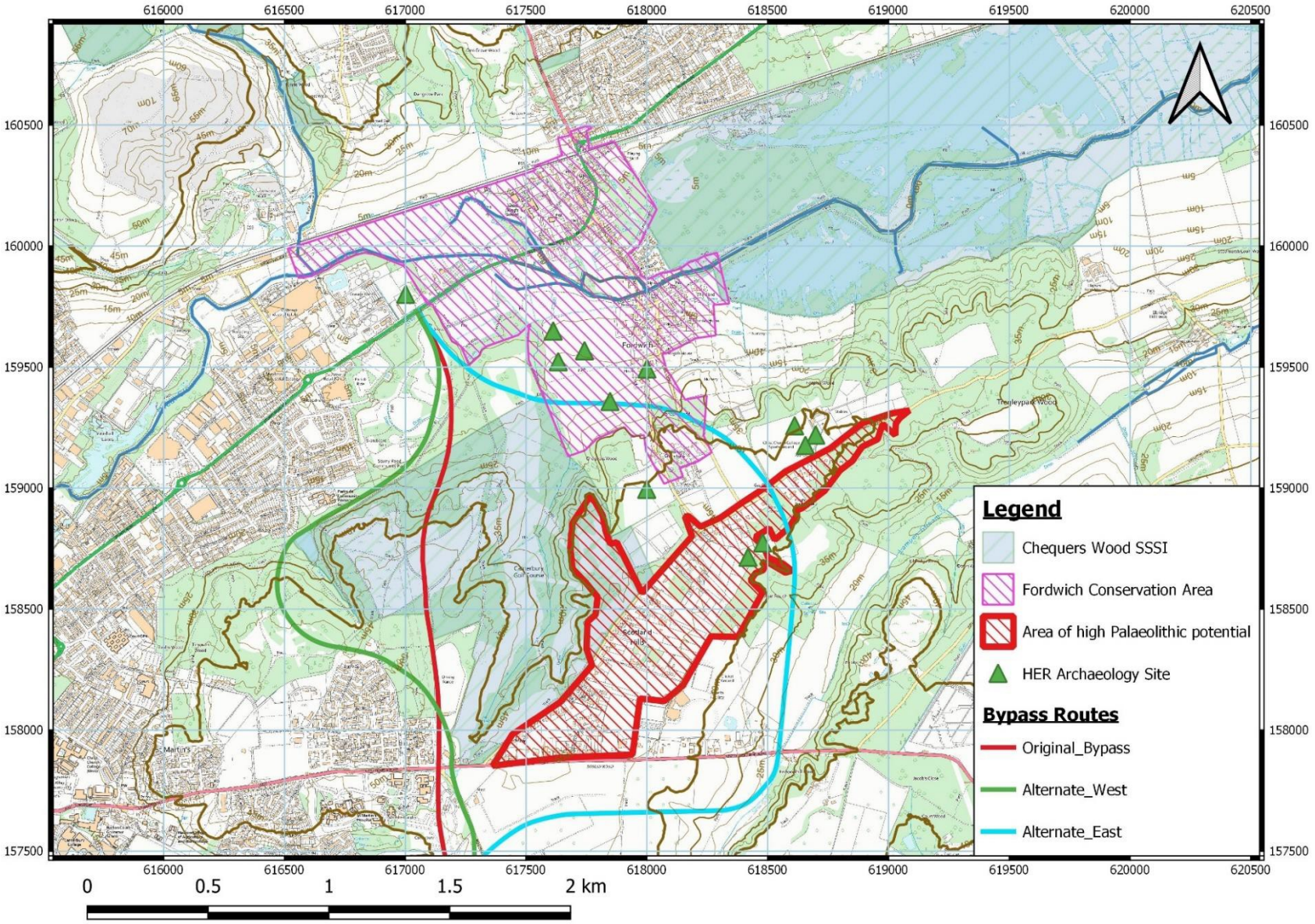
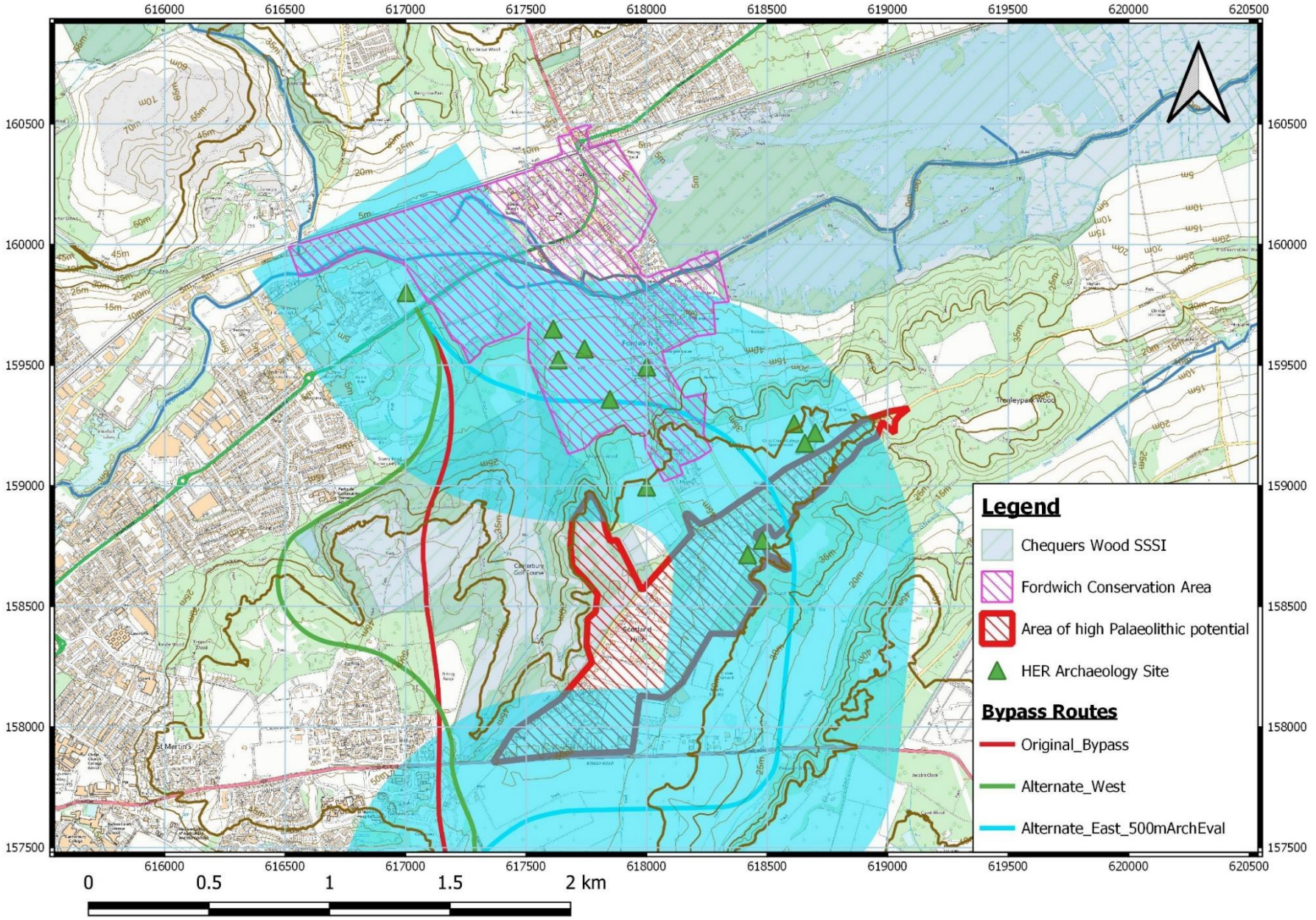


Figure 1: Map showing the impact of the proposed eastern route, on the: SSSI, Fordwich Conservation Area and area of high impact on potential Palaeolithic archaeology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Legend
Chequers Wood SSSI
Fordwich Conservation Area
Area of high Palaeolithic potential
HER Archaeology Site
Bypass Routes
Original_Bypass
Alternate_West
Alternate_East_500mArchEval
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0.5
1
1.5
2 km

Figure 2: Sample of archaeological finds and sites registered with Kent HER that lie within a 500m radius of the proposed route

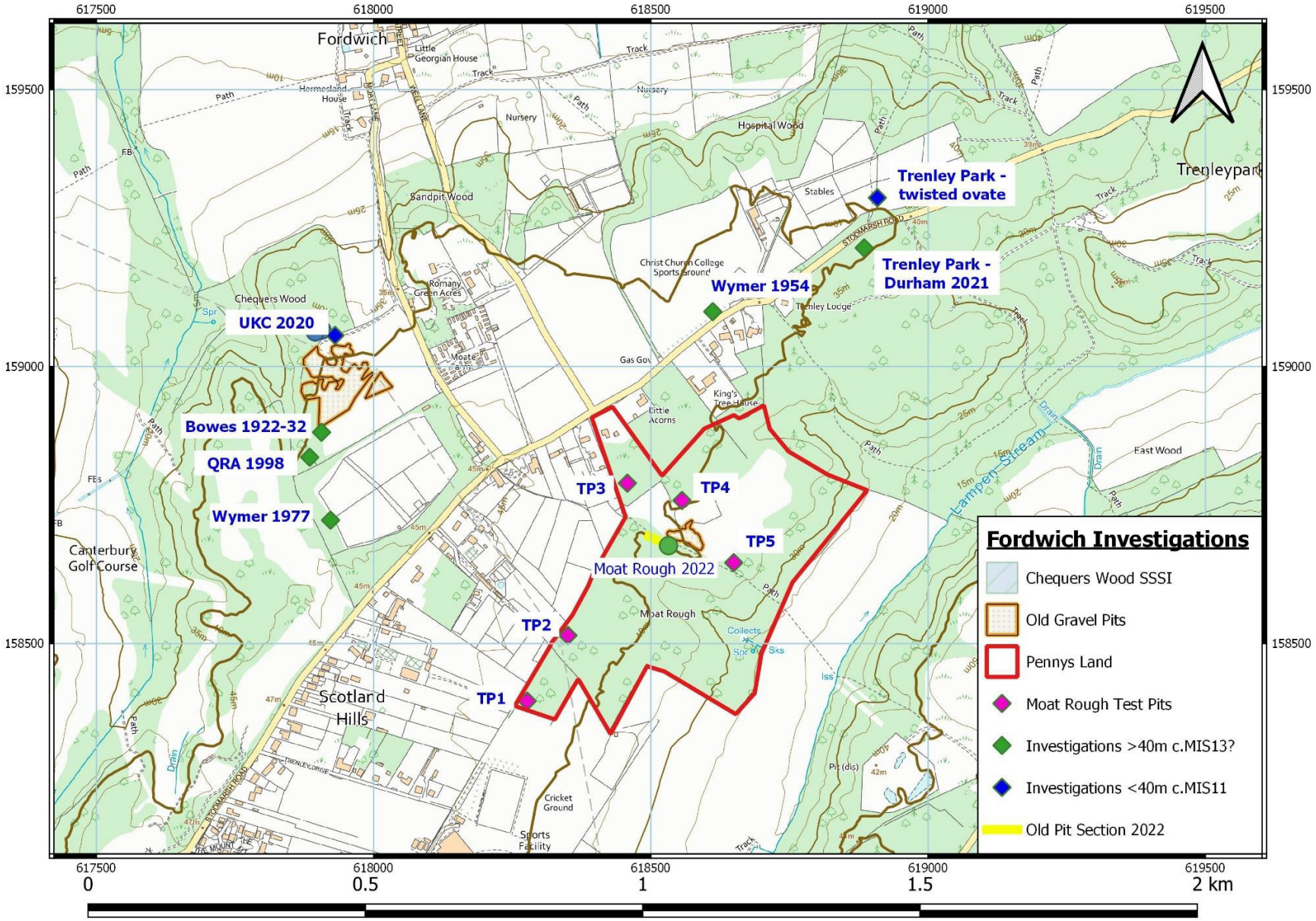

Figure 3: Palaeolithic find spots and investigation locations

7 Appendix 2

7.1 Archaeology from Kent HER

7.1.1 Numerous Historic Environment Record's are shown with in a 500m radius along the proposed route. The 500m radius is the required area that must be considered for any further preliminary archaeological evaluations that may subsequently lead to full archaeological evaluations.

7.1.2 A preliminary search of the Kent HER along a section of the proposed route (Sturry Road to Moat Rough) has shown that archaeology from all periods from c. 600 000 years BP to the Second World War is likely to be present.

7.1.3 The East Kent Access Road https://www.wessexarch.co.uk/our-work/east-kent-access-road is an example of a similar venture and would be a useful case study for comparison to the Fordwich Bypass.

7.2 Conservation Area

7.2.1 The proposed route bisects the Fordwich conservation area, which is a designated heritage asset. https://historicengland.org.uk/advice/hpg/has/conservation-areas/

7.2.2 Under the National Planning Policy Framework (NPPF) conservation areas are designated heritage assets and their conservation is to be given great weight in planning permission decisions. From https://historicengland.org.uk/advice/hpg/has/conservation-areas/

7.2.3 Somebody should look into this further as it's possible that CCC maybe infringing on the planning notice required for development in Conservation areas.

8 Appendix 3

8.1 A New Palaeolithic Handaxe Discovery from the Fordwich Plateau

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During recent engagements with the Friends of Fordwich & District community group for his PhD research the author was informed about the discovery in the early 1950s of a small crude handaxe of the classic pear-shaped Fordwich type.
Almost all of our knowledge of the Palaeolith assemblage attributed to Fordwich is as a result of the collections made between 1923 and 1933 by Dr Willock ("Other Gifts," 1931) and Percy Powell-Cotton, but mainly Dr Tom Armstrong Bowes of Herne Bay (Roe, 1981). It has long been expected that this enigmatic assemblage of trihedral picks, crude pear shaped handaxes and more refined bifacial handaxes may be evidence for one of the earliest Acheulean handaxe industries in Britain. Chronology of the local terrace sequences suggests that the oldest of these handaxes may be from the MIS 15 interglacial (Bridgland et al., 1998; Knowles, in press); new dating work is adding strength to this theory but is not yet conclusive, deposits at the edge of the Fordwich plateau are suggestive of being deposited during MIS 14 (Key et al., 2022). No new discoveries of in-situ artefacts which are comparable with those in the original collections have been made in nearly ninety years. The location of the discovery of this handaxe, at a site known as Moat Rough, which is separate from where the original collections were made, gives a significant new insight, as it shows that the artefact-bearing deposits are more widespread than originally thought. The condition of the handaxe is comparable with the existing assemblage; it is in a slightly to rolled condition which would suggest that when found it had not been transported far from its location of original discard.

Collection and Site History
The collection of Dr Tom Armstrong Bowes forms the majority of the extant assemblage, his original collection numbering over 600 artefacts, although the entire known extant collection is approximately half of this. Bowes immediately recognised the significance of the artefacts being found at Fordwich as they appeared to be of a cruder form and were from a higher elevation in the local sequence; to him it was clear that they were from a higher terrace than the discoveries being made elsewhere in the district, at Canterbury, Sturry and Reculver. So, he drew up an exclusive contract with Canterbury antiquity dealer Valentine Sinclair, so that he could be supplied with the best 'Stones' [sic] from the newly worked pit by Brett and Son's, just north of the Stodmarsh Road and south of Fordwich. This pit became known as Fordwich High Pit.

The Site
The handaxe was discovered by Penny Lewis on her parent's land at Moat Rough, which was being exploited for gravel extraction in the post-war period. Penny often searched the gravel pit to add to her fossil and curio collection. The handaxe was spotted about midway down a north face of the gravel cutting, Penny recalled that the depth of the pit was about eight feet and the handaxe was at eye level, approximately four feet below ground level. We don't know if the handaxe was stratified or in a loose slope deposit or spoil heap against the pit edge. Its precise geological stratigraphic depositional state is therefore uncertain. Sections have been cut in another adjacent old pit in attempt to understand the nature of the deposits and how they may relate to the other sites on the Fordwich plateau. These are revealing a sequence of, topsoil, loess, coarse poorly bedded gravels, coarse sand and gravel, coarse gravels, sands, coarse gravels, bedrock sand.

Geoarchaeological Interpretation

The site (Moat Rough) is a large open glade surrounded by managed coppice woodland. It is approximately 1km south of Fordwich town hall and approximately 100m south of Stodmarsh road, at an elevation between 40-45m AOD (Figure 1).

The topography of the site is a plateau at elevations 50-40m AOD, which lies east of Canterbury and south of the present course of the River Great Stour. An isthmus of this plateau descends in elevation towards the east and separates the valleys of the Great and Little Stour). Across this plateau lie the fluvial sands and gravels of the Fordwich Terrace, Coleman's 125' Terrace (1952).

The bedrock geology is composed of Palaeogene beds, the dip of which is such that exposures of differing formations are variously exposed as the elevation rises across the plateau, from east to west: Thanet Sand, Upnor Formation, Harwich Formation. At the boundary between the Upnor and Harwich formations is a distinct band of Tertiary pebbles.

The Handaxe

The handaxe is a crudely made biface of Wyme'r (1968) type D (crude pointed); it exhibits similar characteristic to handaxes collected by Boucher de Perthes from Moulin Quignon (Antoine et al., 2019), characterized by deep flake removals on both faces from a hard hammer. It has remnant patches of cortex on both faces and on the butt, which has only been partially worked. This has enabled us to establish that it has been reduced from a small irregular or cylindrical flint nodule, such as are typically found locally in the alluvial gravels. Although the handaxe has been bifacially worked, its refinement ratio using Roe's methodology (D. A. Roe, 1968) (max thickness to breadth) is low (0.83); when viewed in section it appears almost lozenge shaped. The laterals are quite battered but it is possible to establish that when fresh the usable cutting edge would have only encompassed the top half (point). It is patinated and stained a deep ocherous colour with Fe-oxide staining.

Conclusion

After lying fallow for decades, the ancient river deposits of the Stour on the Fordwich Plateau and the Palaeoliths that have been derived from them are now receiving much needed renewed scientific investigation. The addition of this handaxe to the known assemblage has informed us that the artefact-bearing fluvial gravels, which have yielded crude handaxe types, are widespread across the Fordwich Plateau. This gives a greater scope for finding potential *in situ* artefacts, which will help to answer long-standing question on the antiquity of the Fordwich handaxes, and whether they represent the earliest north-western advance of the Acheulean culture.

Acknowledgments

The author would like to acknowledge and thank the following for their help with this paper and ongoing research in the Fordwich area, June Hardcastle from the Friends of Fordwich & District ~~c~~ommunity group for liaising with residents and arranging talks, Roger Green for ongoing assistance with facilitating and helping with fieldwork and Penny Lewis for allowing us to excavate on her land and for allowing us to study her handaxe.

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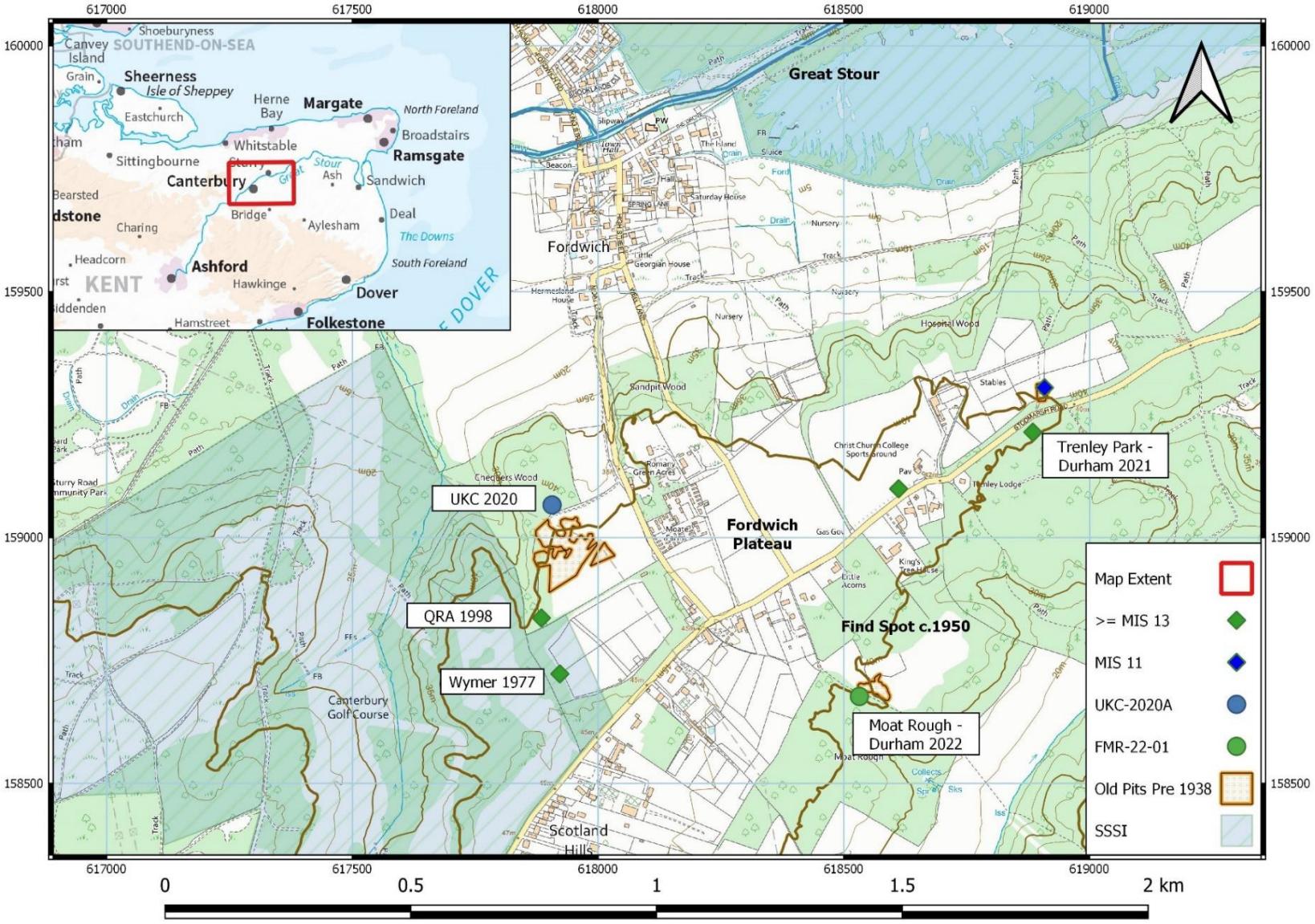

Figure 4: The Fordwich Plateau, showing the find spot in relation to sites of current and previous investigations and their expected age

Figure 5: Handaxe FMR_001