Cotswold Archaeology

Eastern Quarry, Swanscombe, Kent

Archaeological Evaluation and Palaeolithic Test Pits

for
Eastern Quarry Limited

CA Project: 770841
CA Report: 770841_1

May 2019

Eastern Quarry, Swanscombe, Kent

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Document Control Grid						
Revision	Date	Author	Checked by	Status	Reasons for revision	Approved by
A	23/4/19	Adam Howard	Richard Greatorex	Internal Review	General Edit	Richard Greatorex

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SUMMARY

Project Name: Eastern Quarry, Road Tie In's
Location: Swanscombe, Kent
NGR: 558680 174000
Type: Evaluation
Date: 15th-18th April 2019
Location of Archive: CA Andover and Southampton University
Site Code: EQR19

An archaeological evaluation was undertaken by Cotswold Archaeology in April 2019 at Eastern Quarry, Swanscombe, Kent. Three trenches and 6 test pits were excavated.

Palaeolithic
No Palaeolithic remains were found, and it was concluded that the Site is of LOW Palaeolithic potential, and that no further work is required in relation to Palaeolithic remains.

However, Holocene colluvial deposits were found, containing moderately common Late Prehistoric lithic remains in the southern road tie-in footprint (Area F, TP 7). There is potential for further work to be carried out here, to recover a larger sample of cultural remains (lithic artefacts and pottery) and to carry out palaeo-environmental investigations.

Historical mapping shows that the southern portal of a buried tunnel dating from the late 19th or early 20th century should be preserved in Area G, associated with the industrial cement-making heritage of the area. Consideration needs to be given as to whether the proposed road tie-in here will affect this portal, and what safeguarding measures might be needed.

Holocene
Trench 3 in the northern area confirmed the western extent of the quarry pit, and due to the onsite restrictions Trench 2 was moved and contained backfilled quarry. Trench 4 was not

excavated due to the existence of a previously unknown medium pressure gas main, which was treated as live at the time of the evaluation. Test Pit 3 and Test Pit 4 were moved and encountered the western and southern edge of the quarry pit respectively.

1. INTRODUCTION

1.1 In April 2019 Cotswold Archaeology (CA) carried out an archaeological evaluation (trial trenches and Palaeolithic test pits), in conjunction with Francis Wenban-Smith (Department of Archaeology, University of Southampton) as Palaeolithic specialist, for Henley Camland 801 at Eastern Quarry, Swanscombe, Kent (centred at NGR: 558680 174000; **Figure 1**). This work is being done in advance of submission of planning application for construction of two road links between the mixed urban development within Eastern Quarry and the existing B255 carriageway that passes north-south between Eastern Quarry and the Bluewater complex (previously Western Quarry).

1.2 The evaluation follows from the previously-issued Archaeological Statement (Wenban-Smith 2016a, later re-issued as 2017a) for the wider Balance of Eastern Quarry enabling earthworks. This drew attention to the presence of unquarried plots of land with some archaeological potential at the central northern and north-western perimeter of Eastern Quarry, and within the development application area. The evaluation was carried out in accordance with a Written Scheme of Investigation (Cotswold Archaeology 2018b) approved by Lis Dyson of Kent Council's Heritage Conservation team, acting as archaeological advisor to the planning advisors of the Ebbsfleet Development Corporation.

1.3 The work was guided by the relevant professional standards and guidance: Standard and Guidance: Archaeological Field Evaluation (CIfA 2014), the Management of Research Projects in the Historic Environment (MORPHE): Project Planning Note 3 (English Heritage 2008), the Management of Research Projects in the Historic Environment (MORPHE): Project Manager's Guide (English Heritage 2006), and Kent County Council's template specification for Palaeolithic field evaluation (KCC Spec Manual B_GenericFurtherPalEval_DRAFT_Rev07.11.16).

1.4 The design of the work was also informed by the combined experience of Francis Wenban-Smith (Southampton University) and Richard Greatorex (Cotswold Archaeology) on previous phases of Palaeolithic investigation in and around Eastern Quarry.

1.5 The evaluation was carried out in accordance with a WSI (CA 2018) for an archaeological evaluation which was approved by Liz Dyson, the archaeological

advisor to Kent County Council. The fieldwork also followed *Standard and guidance: Archaeological field evaluation* (CIfA 2014). It was monitored by Liz Dyson, including site visits on 16/4/19.

The site

1.6 The site is located to the southwest of Swanscombe, Kent, at the northwest corner of Eastern Quarry, and on the east side of the B255 carriageway that passes north-south between Eastern Quarry and the Bluewater shopping complex (previously Western Quarry). There are two parts of the site, Areas F and G (**Figure 2**). The first, smaller part (Area F) comprises an area of *c*. 0.16 ha above the west face of the old Eastern Quarry, directly to the east of the roundabout providing the main access to Bluewater. The east side of Area F is defined by a vertical chalk cliff face *c*. 20m high, which forms the west side of Eastern Quarry. Based on historic mapping back to the 1860s, the ground here has not previously been affected by dwellings or other man-made constructions, other than the 19th century Cobham Terrace Road which runs north-south through this area, and numerous services along and beside this road (Figure 3). Until very recent clearance, Area F was lightly wooded.

1.7 The ground-surface of Area F slopes shallowly down to the west from *c*. 25m to 20m OD, forming the east side of a curving dry valley that runs broadly north towards the Thames. According to geological mapping (BGS 1977, 1998 and 6" sheet IX NE surveyed in 1920 by CN Bromehead - see **Figures 2, 3**) the ground is formed of Chalk bedrock. The dry valley immediately to the west is mapped as infilled with Coombe Deposits (brickearth and clay-silty gravel, overlying chalk-rubble) up to 8ft deep, and the eastern edge of these was thought likely to extend into Area F.

1.8 The second, larger part (Area G) comprises an area of *c*. 0.3 ha above the northwest corner of the old Eastern Quarry, to the southeast of the junction with the south end of Bean Road (previously Cobham Terrace Road) and the west end of Mounts Road. The north side of Area G is defined by Mounts Road, its west and northeast sides are bounded by light scrub and woodland, and it is bounded to the south and southeast by a vertical chalk cliff face c. 20m high, which forms the northwest corner of Eastern Quarry. The 19th century Cobham Terrace Road passes north-south *c*. 15m to the west of Area G.

1.9 In around 1900, a pit rail-line tunnel was dug under Cobham Terrace Road from the northwest, and much of Area G was excavated as a chalk pit (**Figure 3**). This pit was originally mapped (OS 1909 edition) as "West Works", and then was subsequently labelled as "Old Chalk Quarry" in 1953 OS mapping. The purpose of this tunnel and pit is uncertain. It may have originally been intended as the main route into what later became Eastern Quarry, with a view to expanding the quarry for chalk extraction. However this didn't happen, whether because of difficulty purchasing key land, because of unsuitable geological overburden above the Chalk, or for some other factor. The pit remained the same size from the early 20th century through to at least the late 1970s, after which it seems to have been backfilled as it isn't shown on any OS maps after the early 1980s.

1.10 The footprint of the old pit is surrounded by virgin ground, that hasn't (as far as shown on historic mapping) been subject to any construction activity. Area G is situated at the same elevation as Area F (between *c*. 20m and 25m OD) within a minor tributary inlet on the east side of the main dry valley leading towards the Thames, so one might expect this inlet to be filled with colluvial Head/Coombe deposits (**Figures 2, 3**) that feed into the larger body of similar deposits in the main dry valley.

1.11 The proposed road tie-in work will require bulk ground removal in both these areas, to allow road links to ascend from within Eastern Quarry up to join with the B255.

2. ARCHAEOLOGICAL BACKGROUND

2.1 The background information below is reproduced from the Kent HER, requested February 2019. The information below is from a 250m radius study area, centred on the site (see **Figure 3**).

Palaeolithic background, Eastern Quarry and the Swanscombe area

2.2 The site is located in an area of high importance for Palaeolithic archaeology. Many remains from the Lower/Middle Palaeolithic have been found in the Boyn Hill Terrace. This is a Middle Pleistocene sediment body preserved on the south side of the Lower Thames as an intermittent east-west trending band of deposits between Dartford Heath and Northfleet, with a major outcrop underlying Swanscombe, immediately to the north of Eastern Quarry (see **Figure 2**). The Boyn Hill Terrace deposits consist of

a sequence of predominantly-fluviatile loam, sand and gravel sediments laid down by the ancient Thames in the Hoxnian interglacial period, dating between *c*. 430,000 and 375,000 BP (years Before Present), late marine isotope stage (MIS) 12 to early MIS 10 (Bridgland 1994).

2.3 The pre-quarrying geology in the closer vicinity of the Site is shown (**Figure 2**), based on historic geological mapping by the British Geological Survey (1910 edition, Kent 6" sheets IX-NE, updated by CN Bromehead in 1920). Prior to quarrying, the area to the south of the Site formed a hill that was mostly solid Chalk, but capped by Palaeogene (Palaeocene and Eocene) deposits (in progressively deeper order down from the hill-top: London Clay, Blackheath pebble beds, Woolwich shell beds and Thanet Sand), with the junction between the base of the Thanet Sand and top of the Chalk marked by the Bullhead flint bed.

2.4 The geological mapping also shows that the Boyn Hill Terrace outcrop to the north of the site is dissected to both east and west by two north-draining dry valleys infilled with post-Boyn Hill colluvial deposits, comprising brickearth and chalky/gravelly silt and sand. The larger of these dry valleys (the Bean-Greenhithe valley) passes sinuously immediately to the west of the Site, exiting into the Thames at Greenhithe; and the smaller one (Ingress Vale) passes northwest into Swanscombe from the central northern side of Eastern Quarry, and then turns sharply to the northeast, passing between Swanscombe and Knockhall.

2.5 The Boyn Hill/Orsett Heath deposits are of international Palaeolithic significance. They have been demonstrated through a long history of investigation to be exceptionally rich in artefactual remains at many investigated sites, and also to contain rich fossil mammalian remains as well as other palaeoenvironmental evidence (Wymer 1968; Wessex Archaeology 1993; Conway *et al.* 1996). The most important Palaeolithic sites and findspots in the vicinity of the Site are shown in the site location figure (**Figure 2**), and tabulated further below (**Table 1**).

2.6 Deposits in the old Barnfield Pit (**Figure 2**, site 2), *c.* 800m to the northeast of the present site, were particularly rich. As well as artefactual and animal remains, they produced the only early Palaeolithic fossil human skull known from Britain (the Swanscombe skull), different parts of which were found on three separate occasions between 1935 and 1955. These deposits, including a continuation of the skull-bearing

horizon, are thought to extend under the built-up southern parts of Swanscombe a short distance (*c.* 200m) to the northeast of the site.

2.7 Several other nearby sites have also produced important earlier (Lower/Middle) Palaeolithic finds, including the Globe Pit at Greenhithe (**Figure 2**, site 5), and Dierden's Pit at Knockhall (**Figure 2**, site 6). Numerous handaxes were also found as surface finds on the high ground that was originally present in Eastern Quarry *c.* 500m-1km to the east and southeast of the present site (**Figure 2**, sites 12 and 17), as well as on the ground surface within the head catchment of the smaller dry valley (Ingress Vale) that exits the Eastern Quarry footprint towards Swanscombe (**Figure 2**, site 19).

2.8 However, deposits that might contain sites of this earlier (Lower/Middle) Palaeolithic age were not thought likely to be present in the present site. As shown by the historic geological mapping (**Figures 2**, **3**), the site is at the eastern side of the Bean-Greenhithe dry valley, and the northern plot (Area G) is situated within a minor subsidiary tributary valley, descending westward from the high ground that was previously present at Eastern Quarry. The Coombe/Head deposits that infill the central axis and lower horizons of this dry valley system were probably laid down in the last (Devensian) ice age between *c.* 115,000 and 12,000 BP. A major phase of colluvial sand/silt deposition is known to have occurred in the Swanscombe area (and also more widely across the north Kent Chalk downs) associated with the Last Glacial Maximum *c.* 20,000-16,000 BP, leaving a land surface on which final Upper Palaeolithic activity could have taken place (a) during the warmer late glacial episode (the Windermere interstadial) between *c.* 15,000 and 13,000 BP, and (b) during early post-glacial warming *c.* 11,700 BP. Further colluvial deposition is likely to have occurred during the Devensian/Holocene transition after 11,700 BP, and then also through the earlier Holocene, associated with local de-forestation and topsoil destabilisation from Neolithic through to Roman and even post-Medieval times.

2.9 Dry valley fill deposits such as these have produced important (and nationally rare) Late Upper Palaeolithic remains at various nearby locations, including undisturbed knapping scatters from the Final Upper Palaeolithic ("Long Blade" industry) in the Ebbsfleet Valley at Springhead (**Figure 2**, site 36), at Springhead Nursery during pre-HS1 archaeological fieldwork in 2002 (**Figure 2**, site 33), at the Ebbsfleet Green housing development immediately to the southeast of Eastern Quarry in 2014 (**Figure 2**, site 30), and during the Watching Brief for the southern portal of the HS1 tunnel

under the Thames (**Figure 2**, site 34). The Swanscombe area seems to have been rich in occupation during the final "Long Blade" phase of the Late Upper Palaeolithic, since unprovenanced surface collections from the area also contain several examples of the distinctive large blades and cores that define the industry (including a core found on the ground surface in the Eastern Quarry footprint at Stopes' site "The Mounts" - **Figure 2**, site 12, and a large blade found at Botany Bay Pit, Northfleet - **Figure 2**, site 35). Long Blade sites have also been found under the early Holocene alluvium in other nearby south-bank Thames tributary valleys such as the Cray and the Darent.

2.10 Finally, although subsequently discredited (and also based on highly speculative correlations of deposits at different localities), there were claims by JPT Burchell in the early 1930s of Upper Palaeolithic flints in association with pottery from dry valley fills in the Swanscombe area. His two main sites were close to the present Site (**Figures 1** and **2**, sites 37 and 38). He reported a deep calcareous colluvial sequence with pre-Holocene molluscs, flint artefacts "of Upper Palaeolithic type" and fire-cracked flint pieces from the quarry cutting at the eastern edge of the Bean-Greenhithe dry valley (**Figures 1** and **2**, site 37). And he reported pottery in association with "flints of similar type" from a locality in Ingress Vale (**Figures 1** and **2**, site 38). His pottery finds are described as "coarse and gritty", and one larger decorated sherd from Ingress Vale was later attributed as part of an Early Bronze Age beaker by Piggott (1934).

2.11 Despite Burchell's failure to demonstrate the association of pottery with Upper Palaeolithic flints in the fills of the dry valley, the wider accumulation of evidence suggests that they may contain Upper Palaeolithic palaeo-land-surfaces at certain horizons, that they also contain mollusc-rich horizons of palaeo-environmental significance, and that they also contain post-Palaeolithic lithic and other cultural remains.

2.12 The location of the present Site, on the eastern flank of the Bean-Greenhithe dry valley, makes it likely that late Devensian and early Holocene colluvial Coombe/Head deposits are present. And on the basis of the background above, any deposits of this type that are present have reasonable potential for containing Upper Palaeolithic and/or later Prehistoric post-Palaeolithic remains.

Site #	*Name*	*NGR-E*	*NGR-N*	*Acc. **	*Palaeolithic finds*
1	HS1 Southfleet Road elephant site	See draft polygon		A	Undisturbed elephant butchery site (associated with Clactonian material), overlain by a fluvial gravel rich in handaxes (Wenban-Smith 2013)
2	Barnfield Pit, Swanscombe	See draft polygon		A	Classic sequence of sand, gravel and loam deposits; Clactonian in lower deposits; handaxes ("Acheulian") in upper deposits, along with Swanscombe skull (Conway *et al.* 1996)
a	Skull site, Wymer excavations 1955-1960	559800	174230	A	Three different parts of Swanscombe skull found close to each other, on separate occasions between 1935 and 1955 (Ovey *et al.* 1964; Wymer 1968)
b	Waechter excavations 1968-1972	559840	174250	A	Investigation of Lower Gravel and Lower Loam, c. 50 m NE of skull site area (Conway *et al.* 1996)
c	Conway test pit transect, 1971-1972	559600	174300	A	Transect of test pits extending along NW face of Alkerden Lane allotments, to SW of skull site area (Conway *et al.* 1996)
3	Rickson's Pit	See draft polygon		A	Abundant Clactonian, handaxe and Levalloisian remains recovered, but not with good provenance (Wymer 1968)
4	Craylands Lane Pit (New/East)	See draft polygon		A	Pleistocene sequence with twisted ovates at one horizon, and Levalloisian-looking flakes in an overlying clayey gravel (Smith & Dewey 1914)
5	Globe Pit, Greenhithe	See draft polygon		A	Collection of numerous handaxes, many in fresh condition, well-made, and with varied typology (Wymer 1968)
6	Dierden's Pit/Yard	See draft polygon		A	Handaxes, flakes, and rich faunal and molluscan preservation, in places (Wenban-Smith 2009; White *et al.* 2013)
7	Swan Valley Community School	See draft polygon		A	Boyn Hill/Orsett Heath terrace (Swanscombe Middle Gravels) with abundant lithic artefacts (handaxes, cores and flakes) and some faunal remains (Wenban-Smith & Bridgland 2001)
8	Sweyne County Primary School	See draft polygon		A	Clay deposits interpreted as Upper Loam (Wenban-Smith & Bridgland 2001)

12	The Mounts	558900	173450	G	Surface finds: 11 handaxes, 2 debitage and one Late Upper Palaeolithic (Long Blade) core (Stopes Catalogue #5; Wenban-Smith 2004)
13	Bevans Wash-pit	See draft polygon		A	22 handaxes and 4 debitage (Stopes Catalogue #14 *etc.*; Wenban-Smith 2004); also reports of elephant/mammoth teeth (Spurrell 1890)
16	Swanscombe Wood	560200	172900	G	Surface finds: 3 handaxes and 9 debitage (Stopes Catalogue #29; Wenban-Smith 2004)
17	Bartholomew's Hill	559500	173500	G	Surface finds: 12 handaxes and 3 debitage (Stopes Catalogue #31; Wenban-Smith 2004)
19	Chamber's Farm, Alkerdene [sic]	559800	173950	G	Surface finds: 2 handaxes and 2 debitage (Stopes Catalogue #5; Wenban-Smith 2004)
21	St. Peter and St. Paul's cemetery, Swanscombe	560440	174080	A	Five Palaeolithic handaxes (Stopes Catalogue #687 *etc.*; Wenban-Smith 2004)
24	Swanscombe Wood, clay pit	559700	173000	E	Handaxe (Wymer 1968: 352)
29	Bevans Pit [later known as Baker's Hole]	See draft polygon		A	Numerous handaxes; Levalloisian flakes and cores; fossil animal bone (Stopes Catalogue #26 *etc.*; Wenban-Smith 2004)
30	Ebbsfleet Green LUP	560900	173275	A	Late Upper Palaeolithic (Long Blade) knapping scatter (MOLA 2014)
31	Knockhall Road	559010	174310	A	Flake found during KARU evaluation, 2001 (MKE20254)
32	Stonewood Brickyard, Bean	558600	172800	E	Handaxe (MKE99892)
33	HS1, Springhead Nursery	561800	172630	A	Late Upper Palaeolithic (Long Blade) scatter (Wenban-Smith *et al.*, in press for 2019)
34	HS1, Tunnel Portal Watching Brief (Swanscombe)	560675	175200	A	Late Upper Palaeolithic (Long Blade), several finds including knapping debitage and core (Bates & Stafford 2013, Chapter 11)
35	Botany Bay Pit, Galley Hill, Northfleet	560740	174830	E	Late Upper Palaeolithic (Long Blade), one large blade, Stopes site #34 (Wenban-Smith 2004)
36	Springhead, "Lower Floor"	561590	173080	A	Late Upper Palaeolithic (Long Blade), major concentration (Jacobi 1982)

37	Stone Castle (dry valley to east of)	558560	174110	E	Calcareous brickearth with molluscs and lithic remains, possibly Upper Palaeolithic (Burchell 1933)
38	Ingress Vale (dry valley to east of Knockhall House Orchard)	559550	174600	E	Brickearth with pottery and lithic remains, claimed as Upper Palaeolithic (Burchell 1933; Burchell & Moir 1934), but more likely Late Prehistoric (Piggott 1934)

Table 1. Major Palaeolithic sites and findspots in and around Eastern Quarry and Swanscombe [* Acc: A - site accurately located, E - location estimated from sources, G - general location]

Neolithic

2.13 Evidence for post-Palaeolithic, prehistoric activity within the study area, is limited to the chance finds of Neolithic flint artefacts and coarse pottery recovered *c*. 30m north-west and 220m west of the site, such as those at Ingress Vale.

Bronze Age

2.14 Although there is no recorded evidence of Bonze Age activity within the site, evidence of prehistoric activity from the middle Neolithic through to the Iron Age was identified at St. Clements Valley some 200m to the north west, comprising two ditches and three pits from the mid Bronze Age/Late Iron Age to the north and a pit containing middle Neolithic pottery. In 1996, also to the north-west, at Bluewater Park, Late Bronze Age/Early Iron Age pottery sherds, two worked flints and 14 burnt flints were recovered during an evaluation. Approximately 3km to the east (east of the Ebbsfleet River) at Springhead Quarter the remains of a ladder enclosure system dating potentially from the Early Bronze Age was recorded which was maintained throughout the Bronze Age, added to in the Iron Age (addition of two D-shaped enclosures), continued through the Roman period with the addition of a droveway and with evidence that an early high status 7th century cemetery respected the enclosure system suggesting it was either still visible in the landscape or still in use.

Romano-British

2.15 During the Roman period the region is likely to have been characterised by a dispersed pattern of farmsteads, villas and small rural settlements. Settlements dating to the Roman period (AD 43 – 410) are usually more extensive in scale than those of later prehistoric date, with a far greater variety of material culture (pottery, worked bone, metalwork and glass etc.); there is also widespread use of stone, brick and tile for building.

2.16 Major re-organisation of the countryside occurred throughout the 1st century BC to 2nd century AD. The changes from the second half of the 1st century AD may have been a consequence of the establishment of the Roman road network and the growth of both large towns and more localised market and crafting centres, especially near river crossings.

2.17 Whilst no evidence of settlement activity has been recorded within the site, the HEA records the discovery of an isolated chance find of a Roman poppy-headed beaker, thought to be the product of a local pottery industry, within the route of the proposed pipeline in Swanscombe Skull National Nature Reserve. No further details are known about this findspot, and is it postulated that the recorded location of the findspot could be incorrect. Although this beaker could possibly represent Roman period activity within the vicinity, its isolated location as a stray find, and the absence of associated material, suggests it may be the result of later activity, such as manuring. In 2004 at Waterstone Park, early Roman pits, ditches and field system, were recorded, possibly indicating a farming settlement (PCA 2004). A later investigation at Waterstone Park (PCA 2008), multiple phases of activity ranging between 50 BC to AD 70 were recorded. The earlier activity focused on pits and enclosures, with structured deposits, and the later activity was represented by a field system. The pits were apparently used for storage: recovered artefacts included animal bone, pottery, a whetstone, loom weights, fragments of saddle quern and metalworking. A fragment of human bone was also recorded. At Stone Castle to the east of the site, a Romano-British Cemetery was discovered in 1902-4 in advance of quarrying: 15 vessels were recovered and 5 burials, including both inhumation and cremation.

2.18 Evidence of known settlement activity has been recorded within the wider environs, at Northfleet *c.* 2km and Vagniacis 1.7km south-east of the site. Vagniacis, a Scheduled Monument and small Roman town, is also situated on Watling Street, main Roman Road between London (Londinium) and Dover (Dubis), *c.* 150m to the south of Eastern Quarry (List Entry no. 1005140; Museum of London Archaeology n.d.).

2.19 Kent was a highly productive corn-producing area densely settled from the Roman period onwards, when the landscape was characterised by large arable fields interspersed with woodland. The landscape is also likely to have witnessed quarrying, with chalk extraction for lime production undertaken on a small scale.

2.20 The discovery of a 35ft pit comprising both artefactual and human remains is recorded in the KHER *c*. 220m west of the site, adjacent to Western Cross Farm. Filled with sand, three human skeletons were found side by side at the base of the pit, and artefacts comprised ox-horn, potsherds, nails and animal bones. No further information is known about the discovery of these remains. Such a 'shaft pit' is more commonly associated with the Neolithic or Early Bronze Age.

2.21 Based on the evidence above, Roman period settlement activity is likely to have been concentrated around Vagniacis and along the recorded Roman road, and the site may have comprised part of a wider landscape likely utilised for agricultural activity. Whilst the potential for remains associated with the Roman period is considered to be low, the presence of such remains cannot be entirely ruled out.

Early medieval and medieval

2.22 The early medieval period saw an influx of people from the continent beginning to settle in eastern areas of Britain, and the former Roman infrastructure in Kent was abandoned. Whilst the Thames Estuary was a major invasion route and Swanscombe peninsula would have been attractive for settlement, there is limited recorded evidence of large-scale settlement from this period, although there is a greater wealth of burial evidence. An early, 7th century, high status cemetery was excavated at Springhead Quarter some 3km to the east; in total there were 147 burials of which 78 included grave goods. It also included a linear group of 17 burials, all of high status.

2.23 The site lies within the parish of Swanscombe in the Hundred of Axstane. Swanscombe is possibly named after Swane, the king of Denmark who camped in the vicinity having failed to travel up the River Thames, with the Old English elements Combe and Compe derived from the Latin word campus, which signifies an open field from the medieval period onwards. However, more recent theories include it relating to an enclosed land of herdsman, particularly relating to swine farming. No evidence of early medieval activity has been recorded within the Site or immediate study area. However later medieval activity was recorded to the north-west at Waterstone Park in 2004 comprising pits, post holes and a ditch.

2.24 From the medieval period onwards, settlement grew in size in Kent and a number of towns were established, including Rochester, Dover and Tonbridge. Trade continued with the rest of England and continental Europe during this period, and Kent's ports were some of the most important.

2.25 Recorded in the Domesday Survey (1086) as Suinescamp, Swanscombe was under the ownership of the Bishop of Bayeux and comprised two areas of settlement at Greenhithe and Swanscombe, and a number of smaller hamlets. The parish is recorded as having consisted of five or six fisheries, a hithe (landing place) at Greenhithe, land for 14 ploughs, meadows and woodland.

2.26 No known evidence of medieval activity has been identified within the site. The only recorded evidence within the study area comprises the chance find of an isolated copper alloy seal matrix, located *c*. 140m north-east of the site. In terms of buildings the Stone Castle, some 200m to the north-west is thought to have medieval origins, although mostly comprise of later remodelling and additions.

2.27 During the medieval period Dartford Priory was established by Edward III in 1363, and he was endowed with a farm called 'Ingryce' (later known as Ingress Abbey) in the wider environs north-west of the site. The exact location of the farm is unknown.

2.28 This area of Kent experienced only minor contractions in the extent of arable cultivation in the 15th century, when many other arable areas saw a shift to pastoral farming. It is probable that the perceived wealth of the medieval Kentish yeoman farmer was largely derived from this area. A number of other industries were established in the area by the late 15th century, including large brewing and malting industries, tanning, tile-making, weaving, iron-working and wool production.

2.29 Much of the land in Swanscombe throughout the medieval period was held by the Church, and, following the dissolution of the monasteries in the 16th century, the cathedral chapters of Canterbury and Rochester retained much of the land. The estate at Ingress Abbey, however, was held by the Crown. The site is likely to have continued to comprise part of this wider agricultural landscape.

Post-medieval

2.30 As depicted on Saxton's map of Kent (1575, not reproduced) and Speed's map of Kent (1611, not reproduced), the landscape encompassed within the parish of Swanscombe largely comprised agricultural land and areas of dense woodland. The majority of finds listed on the KHER for the post-medieval period relate to the foreshore of Swanscombe Marshes and including shipwrecks in the River Thames. The chance find of a post-medieval silver coin is recorded *c.* 140m north-east of the site.

2.31 Within the wider environs of the site, the former farm at Ingress was replaced by a mansion, first recorded in 1649, although there is no known information regarding its exact location, form or construction. Chalk extraction and quarrying is likely to have been undertaken within this area, with documentary references to lime-kilns at Ingress Abbey. Farms at Alkerden and Western Cross, just beyond the study area are thought to have developed in the 18th century, but were subsequently greatly re-modelled and/or partially demolished.

2.32 During the 18th and early 19th century, the site continued to be located within a landscape characterised by agricultural fields, orchards and woodland as illustrated on Andrews, Drury and Herbert's *Map of Kent* (1769, not reproduced).

2.33 Quarrying in Eastern Quarry continued on in the early 21st century, with lakes visible on Google Earth imagery in the south-eastern and western extent of the site. All activity in the east and west of the quarry ceased by *c.* 2013 with much of the site reverted to scrubland. A review of planning proposals for Eastern Quarry relate to the redevelopment of this area as part of Ebbsfleet Garden City. During the walkover survey, it was noted such redevelopment has commenced in the eastern extent of the former quarry.

2.34 The 1909 OS 1:2500 series Map show that the northern area, Area B, is disturbed by a large quarry pit within the west of the area and a tunnel. The tunnel would have facilitated access for a tramway into the Eastern Quarry. Constructed with concrete lined sections, the southern end of the tunnel comprises iron gates and features fittings possibly associated with a former telegraph system.

Desk-based assessment and Historic Environment Framework (HEF)

2.35 The overall development programme for Eastern Quarry was instigated in the early 2000s. It was recognised at the outset that a thorough programme of archaeological desk-based assessment and field evaluation would be required to inform planning decision-making for such a major site. Bearing in mind the Palaeolithic importance of the area, the project's heritage consultants at that time (CgMs Consulting) took specialist advice on the Palaeolithic (from Francis Wenban-Smith, then an independent specialist) when preparing the initial desk-based assessment of the Eastern Quarry application area.

2.36 Four areas of unquarried deposits (Areas 1-4) were identified in the initial version of the specialist desk-based report on Palaeolithic potential, submitted to CgMs in late July 2002. One of these areas (Area 1) was formed of unquarried deposits around the northwest perimeter of Eastern Quarry, including the present Site. However, this area (which included the plot occupied by Western Cross Farm) was then omitted from the issued version of the desk-based assessment (CgMs Consulting 2002), which focused upon other areas of surviving deposit corresponding with Areas 2-4 of the original draft, re-named as Areas A-D.

2.37 Following this omission, the subsequent programme of fieldwork (carried out between 2002 and 2018) to initially characterise the nature and potential of the historic environment, and then subsequently carry out suitable mitigation in advance of development, paid no attention to the area of the present site. The site-wide integrated deposit model and Historic Environment Framework (HEF) prepared by Wessex Archaeology (2009a) consequently failed to extend to the northwest corner. It was only when the Archaeological Statement was prepared for the "Eastern Quarry Balance of Earthworks" programme (Wenban-Smith 2016a, followed by v2 - Wenban-Smith 2017a) that attention was re-drawn to the presence of unquarried deposits here with some Palaeolithic potential. The Archaeological Statement drew attention to the Late Upper Palaeolithic potential of the north-western corner of Eastern Quarry, and recommended that suitable evaluation (and if necessary, mitigation) work should be carried out in advance of any development impact.

Proposed development: impact and investigation strategy

2.38 The proposed development in both parts of the Site - Areas F and G - involves excavation of cuttings for road links from within Eastern Quarry up to join with the B255. These cuttings will destroy any deposits and archaeological remains in their footprint. The cutting in Area G may also affect the now-buried 19th century pit-rail tunnel portal in Area G, depending on the depth and profile of the cut.

2.39 Therefore, in accordance with the Archaeological Statement (Wenban-Smith 2016a, followed by v2 - Wenban-Smith 2017a), the programme of evaluation covered in this report was carried out.

3. AIMS AND OBJECTIVES

3.1 The general aims of the evaluation were to provide information about the archaeological resource within the site, including its presence/absence, character, extent, date, integrity, state of preservation and quality. In accordance with Standard and Guidance: Archaeological Field Evaluation (CIfA 2014), the evaluation has been designed to be minimally intrusive and minimally destructive to archaeological remains.

3.2 The information gathered will enable the EDC to identify and assess the particular significance of any heritage asset within national and regional contexts, consider the impact of the proposed development upon it, and to avoid, minimise or mitigate any conflict between the heritage asset's conservation and any aspect of the development proposal, in line with the National Planning Policy Framework (DCLG 2012).

Palaeolithic

3.3 As specified in the Written Scheme of Investigation (CA 2018b), the objectives of the Palaeolithic evaluation were to gather sufficient information to establish the presence/absence, extent, condition, character, quality and date of any archaeological deposits within those areas affected. The report on this work will summarize the distribution and character of sub-surface deposits, and consider their archaeological significance. The results will inform whether a further program of archaeological investigation/mitigation may be required, and define any research priorities for any further field investigation that may be required.

3.4 Specific objectives of the work were:

- to determine the degree of complexity of the horizontal and/or vertical stratigraphy present within the Pleistocene deposits;
- to determine the potential of the site to provide palaeo-environmental and economic evidence, and the forms in which such evidence may be present;
- to recover/record any Palaeolithic remains encountered, following the advice of the appointed Palaeolithic specialist;
- to determine the presence/absence, nature and distribution of any other Pleistocene deposits and Palaeolithic artefacts that might be present;

- to consider the suitability of any sediment units encountered for optically stimulated luminescence dating (OSL), and to undertake sampling for this where appropriate;
- to consider/assess the presence of, or potential for, Late Upper Palaeolithic remains.

Holocene Trial Trenches

3.5 The objectives of the evaluation are to provide information about the archaeological resource within the site, including its presence/absence, character, extent, date, integrity, state of preservation and quality. In accordance with Standard and guidance: Archaeological field evaluation (CIfA 2014), the evaluation has been designed to be minimally intrusive and minimally destructive to archaeological remains. The information gathered will enable the EDC to identify and assess the particular significance of any heritage asset, consider the impact of the proposed development upon it, and to avoid or minimise conflict between the heritage asset's conservation and any aspect of the development proposal, in line with the National Planning Policy Framework (DCLG 2012).

3.6 If significant archaeological remains are identified, reference will be made to the appropriate research framework, Thames Estuary Archaeological Research Framework and SERF so that the remains can, if possible, be placed within their local and regional context.

4. METHODOLOGY

4.1 The fieldwork comprised the excavation of three of the four trenches (numbers and dimensions), in the locations shown on the attached plan (**Figure 4**). All of the excavated trenches were moved due to a smaller available area. An unknown gas main was discovered on site, as such **Trench 4** was not excavated due to the presence of a medium pressure gas main. **Test Pit 3** was not excavated due to its location beyond the edge of the site, within the quarried area. These changes were made with the approval of Liz Dyson. Trenches were set out on OS National Grid (NGR) co-ordinates using Leica GPS and surveyed in accordance with CA Technical Manual 4 *Survey Manual*.

Palaeolithic Methods

4.2 The Palaeolithic evaluation was based on a combination of targeted deep test pits and examination of the base of trial trenches. The Palaeolithic test pit evaluation was originally intended to comprise seven test pits distributed across the site, TPs 1-7, with five test pits (**TP**s **1**-**5**) in Area G, and two test pits (**TP**s **6**-**7**) in Area F. These were positioned in order: (a) to avoid the footprint of the previous small quarry in Area G, (b) to target the margin of the colluvial infill of the dry valley network at the Site, (c) to avoid known services, and (d) to avoid excavation too close to the cliff-edge of Eastern Quarry. Once on site, **TP**s **2** and **5** in Area G were re-located to avoid a previously unrecorded medium pressure gas-main, and **TP 3** was omitted as it was located beyond the current cliff-edge. Therefore, six test pits were dug, **TP**s **1**-**2** and **4**-**5** in Area G, and **TP**s **6**-**7** in Area F (**Figure 3**).

4.3 Full details of the test pit excavation methodology were provided in the Written Scheme of Investigation (Cotswold Archaeology 2018b). In summary, the location of each test pit was first scanned for live services by trained Cotswold Archaeology staff using CAT and Genny equipment in accordance with the Cotswold Archaeology Safe System of Work for avoiding underground services. Each test pit was excavated by a tracked 360º excavator equipped with a 2m-wide toothless grading bucket as far as possible, although a toothed bucket was used on occasion to penetrate into Chalk bedrock. Excavation took place under direction of the Palaeolithic specialist (Francis Wenban-Smith) and the CA Field Supervisor. Topsoil and subsoil were initially removed (and stored separately) under supervision of the CA supervisor, and a record photograph made of the top of natural deposits. No post-Palaeolithic features were encountered.

4.4 Each test pit was then taken down in horizontal spits of 5-10cm, respecting the interface between sedimentary units when unit changes were encountered, and monitoring for Palaeolithic remains and sediments with palaeo-environmental potential. The Palaeolithic specialist recorded and numbered the sequence of sedimentary units as excavation progressed further down, following standard descriptive practices. Test pits were entered at the maximum safe depth (usually *c.* 1.2m) to record the upper stratigraphy. Beyond this depth, recording took place without entering the trench.

4.5 Excavation potentially went down to a maximum depth of *c.* 4m below the current ground surface, although stopped at a higher level when pre-Quaternary bedrock was indisputably identified or when the base of deposits with archaeological potential was reached. In practice, pre-Quaternary bedrock (Chalk) was reached in two test pits (**TP**s **6** and **7**) which were excavated to depths of 2.50m and 2.60m respectively. Firm chalk diamict (deposit I - see **Section 5.1**), which typically grades down into Chalk bedrock, was reached in three test pits (**TP**s **1-2** and **5**), which were excavated to depths of 1.35m, 2.50m and 2.65m respectively. And **TP4** was dug to a depth of 2m, demonstrating *c.* 1.5m of chalky colluvium (deposit IIb - see **Section 5.1**).

4.6 For each test pit, a representative section log was recorded at a scale of 1:20, and the section was photographed and surveyed, with supplementary photos/notes/drawings as thought suitable. All recording was undertaken from the top of the test pit, in relation to a GPS-surveyed spot-height, and the final 'as dug' test pit outline was recorded with GPS. All test pits were backfilled immediately after excavation, and no test pits were left open untended or overnight.

4.7 No natural sands/gravels suitable for artefact-sieving were encountered. When Quaternary clayey sand/silt sediments not suitable for sieving were encountered, excavation progressed in shallow spits of 2-5cm, with close attention paid during excavation to the discovery of any lithic artefacts or fossil bone remains, both in the trench floor and in the freshly-excavated spoil. No sediments with potential for palaeo-environmental recovery were encountered, so no sampling for this purpose took place. Consideration was given as excavation progressed to the potential for OSL (optically stimulated luminescence) dating, but no suitable sediments were encountered so no OSL dating samples were taken.

4.8 No individually Registered Artefacts were found. However, presumed Late Prehistoric lithic artefacts (see **Section 5.2**) and lumps of fire-cracked flint were noted within context **701** (deposit IIb - see **Section 5.1**) from **TP 7**, and were collected and bagged as a group provenanced to this context. Lumps of fire-cracked flint were also noted within context **602** from **TP 6** but were not collected. Another flint artefact of uncertain date was also recovered from context **401** (modern Made Ground) in **TP 4** (see **Section 5.2**).

4.9 Fieldwork was carried out under the Cotswold Archaeology site-code EQR 19, part of CA project 770841. Fieldwork took place from 15th-18th April 2019, and was carried

out by Cotswold Archaeology with assistance of Francis Wenban-Smith (Department of Archaeology, University of Southampton) as Palaeolithic and Pleistocene geo-archaeological specialist.

Holocene Methods

4.10 All trenches were excavated by mechanical excavator equipped with a toothless grading bucket. All machine excavation was undertaken under constant archaeological supervision to the top of the first significant archaeological horizon or the natural substrate, whichever was encountered first. Where archaeological deposits were encountered they were excavated by hand in accordance with CA Technical Manual 1: *Fieldwork Recording Manual*.

4.11 Deposits were assessed for their palaeoenvironmental potential in accordance with CA Technical Manual 2: *The Taking and Processing of Environmental and Other Samples from Archaeological Sites* and no deposits were identified that required sampling. All artefacts recovered were processed in accordance with Technical Manual 3 *Treatment of Finds Immediately after Excavation*.

4.12 The archive and artefacts from the evaluation are currently held by CA at their offices in Andover and by Southampton University. Subject to the agreement of the legal landowner the artefacts will be deposited with an appropriate museum along with the site archive. A summary of information from this project, set out within Appendix D, will be entered onto the OASIS online database of archaeological projects in Britain.

5. PALAEOLITHIC RESULTS

5.1 Two main Pleistocene deposits can be recognised in the Site area, progressing from the older and stratigraphically lower group (I - Chalk diamict), to the younger and stratigraphically higher group (II - Holocene colluvium/slopewash), as well as Topsoil, Made Ground, and pre-Quaternary Chalk bedrock.

Deposit II can be sub-divided into three facies:

- IIa, a lower yellowish-brown silt/sand facies lacking in chalk pebbles, stony towards the base;
- IIb, the main part of the deposit, a middle facies rich in evenly-distributed fine chalk pebbles;
- IIc, the upper part of the deposit, similar to IIb but lacking in chalk pebbles.

5.2 These deposits and their interpretations are summarised below (**Table 2**), and this table also identifies the test pits in which different categories of sediment were found to be present. A detailed report of the sequence in each test pit is provided as an appendix (**Appendix A**), and this appendix also identifies for each test pit the depth within the sequence of deposits attributed to each deposit group, and provides a photo of the fully-excavated sequence.

Sediment Group	*Deposit, description*	*Period, interpretive notes*	*Test pits*
To	TOPSOIL. Soft/loose, humic dark brown silt/sand with occasional flint pebbles and modern CBM, with heavy rooting.	**Recent topsoil.** Generally truncated by pre-excavation site clearance, and often overlies made ground, rather than being a long-established natural deposit.	All TPs
MG	MADE GROUND. Variably chalk-rich, silt/sand/clay with occasional modern wire cables and CBM.	**Recent, mid-20th C.** Made ground was only present in Area G, infilling the previous small quarry to an unknown depth (>2m, and probably *c.* 10-12m) and surrounding its sides in a shallow layer.	TPs 1-2, 4-5
IIc	SILTY SAND. Soft brown silty sand, moderately gravelly in places.	**Mid-Holocene.** This deposit is interpreted as the upper, decalcified part of the underlying chalk-rich Holocene colluvium, deposit IIb.	TPs 2, 4-6
IIb	SILTY SAND WITH COMMON CHALK PEBBLES. Variably soft/firm, pale greyish-brown silt/sand with common evenly-distributed VF-F chalk pebbles, with moderately-common flint nodules at base; contains fire-cracked flint pieces and Late Prehistoric flint artefacts.	**Mid-Holocene.** Colluvial/slopewash deposits infilling the upper parts and flanks of the dry valley system in the vicinity of the Site.	TPs 2, 4-7
IIa	SILT/SAND, STONY TOWARDS BASE. Firm, uncohesive yellowish-brown silty sand, with pores infilled with pale/cream carbonate precipitate, and with angular frost-fractured flint pebbles/cobbles towards base	**Early-Mid Holocene.** Colluvial/slopewash deposits infilling the dry valley system in the vicinity of the Site.	TPs 2, 5

I	CHALK DIAMICT. Firm, densely-packed chalk pebbles/cobbles in pale grey and very pale brown chalk silt, grading down into Chalk bedrock, containing occasional fresh flint nodules	**Late Pleistocene/ Early Holocene.** Solifluction/slopewash deposits associated with final deepening/widening of the dry valley system in the vicinity of the Site at the Devensian/Holocene transition.	TPs 1-2, 5-7
Ch	CHALK. Firm, dry, white crumbly Chalk, heavily fractured, grading down into solid chalk	**Chalk bedrock, Cretaceous.** Degraded surface of solid Chalk bedrock; sea-floor deposits, *c.* 80,000,000-65,000.000 years old	TPs 6-7

Table 2. Major sediment groups and depositional interpretation at northwest corner of Eastern Quarry, Western Cross road tie-ins. [stratigraphic order, up through sequence]

Lithic artefacts and fire-cracked flint

5.3 Seven lithic artefacts were found, all of them made of flint (**Table 3**). Six flint flakes were recovered from the chalky colluvium (context **701**, deposit IIb) in **TP 7**. All were in moderately fresh condition. Five of them had well-developed finely-mottled blue-white patination, and the other had pure white patination. Three of them were of small size (2-5cm) and three of them were slightly larger, in the range 5-6cm. All were technologically undiagnostic, and several had small and well-defined points of percussion indicative of hard hammer percussion. Several also had small patches of carbonate encrustation adhering, indicative of dissolution and re-precipitation of calcareous constituents of the sediment. These flakes are very likely of Late Prehistoric date, Neolithic and/or Bronze Age.

5.4 One miscellaneous knapped piece was recovered from the quarry backfill (context **401**) in **TP 4**. This could be interpreted as any of a small core on a flake, a flake-tool, or a miscellaneous knapped chunk without any deliberate underlying intention. It was moderately abraded, and stained mottled orange-red on top of its patination. It is uncertain whether it is of Palaeolithic or post-Palaeolithic date, most likely the latter.

5.5 In addition to the artefacts described above, several pieces of fire-cracked flint were noted. One large piece *c.* 6cm long was recovered from the chalky colluvium (context **701**, deposit IIb) in **TP 7**. And at least two pieces were noted in the continuation of the same deposit (context **602**) in **TP 6**, although these latter were not recovered. Pieces of fire-cracked flint such as these are typically of Late Prehistoric date, Neolithic or Bronze Age.

TP	4	6	7		
Cxt	*401*	*602*	*701*	*Total*	*Notes*
Fire-cracked flint	-	2	1	**3**	Lumps 4-6cm maximum dimension; those from context 602 not recovered
Flake	-	-	6	**6**	Moderately fresh condition, mottled blue-white patination
Misc.	1	-	-	**1**	Moderately abraded, orange/red-stained on top of patination

Table 3. Lithic artefacts and fire-cracked flint.

Faunal and other palaeo-environmental remains

5.6 No faunal remains were found, nor any sediments with potential for palaeo-environmental sampling and recovery of micro-palaeontological remains. In retrospect, it is possible that the chalky colluvium (deposit IIb) may contain molluscs in places, although its history of calcareous dissolution and re-precipitation does not suggest high potential for molluscan preservation. Furthermore, the deposit is likely to have formed in a single sludging event, and no internal stratigraphic sub-divisions were noted. Both these factors would suggest low potential for recovery of a varied mollusc sequence reflecting changing environmental conditions during deposition of the deposit.

6. HOLOCENE RESULTS (FIGURES 4 & 6)

6.1 This section provides an overview of the Holocene evaluation results; detailed summaries of the recorded contexts are to be found in **Appendix B**.

6.2 No archaeological features were encountered within the 3 excavated trenches. A colluvium consisting of a light yellowy brown, clayey silt with chalk flecks was encountered in **Trenches 1** and **3** between 0.45 and 0.82m below current ground level. In **Trench 3** the colluvium was sealed by made ground (301) 0.62m thick.

6.3 The 19th century mapping showed a quarry pit within the west of the site. **Trench 3** contained the eastern edge of the quarry pit **303** cutting the made ground **301**. **Trench 2** was completely within the area of the quarry pit and contained chalk backfill **201**. All of the trenches were sealed by modern scrub and rooting of a previously wooded area, which had been felled prior to the evaluation.

7. DISCUSSION

Palaeolithic Results

Significance and potential

7.1 The Palaeolithic test pit evaluation has established that the site has LOW Palaeolithic potential. The deposits at the site were dry valley fill deposits (II), and the main body of these deposits (IIb and IIc) is Holocene colluvium with reworked Late Prehistoric remains. The underlying deposits (IIc and I) did not produce any cultural remains. These are thought to have formed at the Devensian/Holocene transition and the Early Holocene, and there was no sign of preservation of a palaeo-landsurface with potential for the presence of Late Upper Palaeolithic remains.

7.2 The main body of chalk-rich colluvium (deposit IIb) contained moderately common Late Prehistoric lithic artefacts in the southernmost test pit, TP 7 in Area F. Sieving of a larger sample of this deposit here would lead to recovery of a larger sample of lithic artefacts, with technologically and typologically diagnostic pieces, and perhaps also some identifiable pottery sherds, that should help in identifying the period represented.

7.3 There is perhaps some potential for recovery of palaeo-environmental remains (molluscan and ostracod) from deposit IIb. If present, these would have the potential to confirm their date as Holocene, and perhaps also to relate the deposit to a particular stage of the Holocene.

Development impact and further investigation

7.4 The excavation of deposits for the two road tie-ins in Areas F and G will destroy the natural Quaternary deposits in the footprints of the cuttings, along with any contained archaeological remains. As discussed above, these deposits are of LOW Palaeolithic potential, but have some potential for investigation and recovery of Late Prehistoric remains. There is also a late 19th century (or very early 20th century) tunnel portal in Area G, associated with the cement-making history of the area.

7.5 The following further investigations should be considered:

- model the profile of the tie-in cutting in Area G, consider its impact upon the 19th/20th century tunnel and its southern portal, and liaise with planning authorities on appropriate actions;

- excavate a small stepped trench, oriented WNW-ESE, in the vicinity of TP 7, make a record of the stratigraphic sequence of colluvial deposits towards the edge of the dry valley fill, carry out large-scale on-site sieve sampling to recover lithic (and maybe other) cultural remains, and carry out some small-scale palaeo-environmental sampling for molluscan and ostracods remains.

Holocene Results

7.2 No archaeology was encountered within the trail trenches. The eastern and southern edge of the smaller 19th century quarry pit, within the west of the site, was confirmed by **Trench 3** and **Test Pits 4** and **5**.

8. CA PROJECT TEAM

8.1 Fieldwork was undertaken by Adam Howard with Dr Francis Wenban-Smith as Palaeolithic specialist, assisted by Agata Kowalska, Craig Jones and Majbritt Bengston. The report was written by Adam Howard and Francis Wenban-Smith. The illustrations were prepared by Amy Write. The archive has been compiled by Richard Paxford, and prepared for deposition by Hazel O'Neill. The project was managed for CA by Richard Greatorex.

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APPENDIX A. TEST PIT SUMMARIES AND CONTEXT DESCRIPTIONS

Glossary for sediment description terms and abbreviations

Some common terms

Clast	-	Coarser pebbles/cobbles or other larger items in an otherwise fine-grained sediment
Cobbles	-	Clasts from 6.4cm to 25.6cm
Diamict	-	A densely-packed mixture of clasts (usually chalk) of widely-varying sizes, in a matrix of clay/sand/silt
Diapir	-	Wedge of sediment that is generally sub-vertically oriented and intrusive from lower horizons into upper ones, formed by ground heaving and pressure of overburden leading to upward-squeezing/distortion of a soft/plastic water-saturated sediment; can finish in a pointed taper or a mushroom-shaped cap
Gravel	-	Sediment, typically matrix-supported with combination of pebbles, cobbles and finer-grained matrix (sand/clay/silt); can also be "clast-supported" and lacking in finer-grained matrix
Pebble	-	Clast from 2mm up to 6.4cm
Matrix	-	The finer-grained part of a sediment that contains clasts
Sand	-	Sediment grains from 0.0625mm up to 2mm, uncohesive unless in combination with finer clay/silt particles

Sand/gravel/cobble particle-size grades

Sediment	*Size*	*Abbreviation*	*Size-grade (Wentworth)*
SAND	Very fine	VF	0.0625 - 0.125 mm
	Fine	F	0.125 - 0.25 mm
	Medium	M	0.25 - 0.50 mm
	Coarse	C	0.5 - 1.0 mm
	Very coarse	VC	1 - 2 mm
GRAVEL	Very fine	VF	2 - 4 mm
	Fine	F	4 - 8 mm
	Medium	M	8 - 16 mm
	Coarse	C	16 - 32 mm
	Very coarse	VC	32 - 64 mm
COBBLES	Small	Sm	6.4 - 12.8 cm
	Large	Lg	12.8 - 25.6 cm

Some other common abbreviations

Mod.	-	Moderately
Sl.	-	Slightly
Occ.	-	Occasional
CBM	-	Ceramic building material

Site:	Eastern Quarry			**Test-pit:**	1
Site-code [CA]:	EQR 19, 770841	**Project [CAHO-C]:**	005-Q12/.x4		
Site sub-div:	Western Cross Road Tie-ins			**Date:**	16th April 2019
Dimensions:	**Length (m)** 4.00	**Co-ords (NGR)**	**East:** 558755	**Ground level, m OD:**	20.43
	Width (m) 2.00		**North:** 174058		
	Depth (m) 1.35				

Sed. group	*Context*	*Description*	*Log depth*	*<Samples> - vol (L)*	*Lithic finds*	*Enviro remains*
To	100	TOPSOIL. Mod. soft, friable dark greyish-brown silt/sand with dense root-mat. [truncated surface of topsoil after de-vegetation and ground clearance] *Sharp even base, dipping shallowly to SW*	0.00-0.19	-	-	-
MG	101	MADE GROUND. Firm chalk diamict (clasts 2-8cm maximum size), with common flint nodules (fresh condition, 5-15cm max. size) in very pale grey silt matrix. *Mod. sharp uneven basal junction, dipping to SW*	0.19-0.30	-	-	-
	102	MADE GROUND. Very firm chalk diamict (mod. rounded pebbles and cobbles up to 30cm maximum size), with occ. flint nodules (fresh condition, often broken, 10-15cm max. size) in very pale grey silt matrix, with occasional modern twisted-metal cables *Diffuse base, dipping to SW*	0.30-0.95	-	-	-
	103	MADE GROUND. Mod. firm, uncohesive, dark grey silt with mod. angular VF-F chalk pebbles; deposit thins and fades out to SW. *Sharp base, dipping shallowly to SW*	0.95-0.98	-	-	-
I	104	CHALK DIAMICT. Dry white crumbly chalk rubble in white chalk silt matrix, chalk clasts 2-12cm, mod. angular. *Base not reached*	0.98-1.35	-	-	-

Test pit 1, looking SW

Site:	Eastern Quarry			**Test-pit:**	2
Site-code [CA]:	EQR 19, 770841	**Project [CAHO-C]:**	005-Q12/.x4		
Site sub-div:	Western Cross Road Tie-ins			**Date:**	16th April 2019
Dimensions:	**Length (m)** 4.50	**Co-ords (NGR)**	**East:** 558779	**Ground level, m OD:**	23.23
	Width (m) 2.00		**North:** 174035		
	Depth (m) 2.50				

Sed. group	*Context*	*Description*	*Log depth*	*<Samples> - vol (L)*	*Lithic finds*	*Enviro remains*
To	200	TOPSOIL. Mod. soft, sl. cohesive, dark brown sl. clayey silt/sand with common VC flint pebbles, yellow/ochre bricks and glassy slag pieces. [truncated surface of topsoil after de-vegetation and ground clearance] *Sharp, even sub-horizontal base*	0.00-0.20	-	-	-
MG	201	MADE GROUND. Mod. soft, friable very pale brown chalk silt with VF chalk pebbles (densely-packed) and occ. larger chalk pebbles, and with occ. pieces of slag. *Sharp sub-horizontal base*	0.20-0.30	-	-	-
IIc	202	SAND. Mod. firm, uncohesive brownish-grey VF sand with occ. VF chalk pebbles, and occ. (presumed intrusive) pieces of post-Medieval ceramic material and slag, and with mod. common VF chalk pebbles in bottom 10cm. [de-calcified upper part of 203] *Mod. sharp, wavy sub-horizontal base*	0.30-0.80	-	-	-
IIb	203	CHALK-RICH SILT. Firm, uncohesive, pale greyish-brown silt with very common F-M chalk pebbles evenly distributed throughout, and with intermittent layer of flint nodules 10-15cm max. size at base. *Sharp, sub-horizontal base*	0.80-1.90	-	-	-
IIa	204	STONY SILT/SAND. Mod. firm, uncohesive, yellowish-brown silt/sand (VF-F) with occ. VF chalk pebbles and F-C flint pebbles. *Mod. sharp, sub-horizontal base*	1.90-2.15	-	-	-
I	205	CHALK DIAMICT. Very firm, densely-packed chalk pebbles in very pale brown chalk silt matrix, with chalk pebbles increasing in size downward from VF-F to M-C. *Base not reached*	2.15-2.50	-	-	-

Test pit 2, looking SE

Site:	Eastern Quarry			**Test-pit:**	4
Site-code [CA]:	EQR 19, 770841	**Project [CAHO-C]:**	005-Q12/.x4		
Site sub-div:	Western Cross Road Tie-ins			**Date:**	16th April 2019
Dimensions:	**Length (m)** 5.00	**Co-ords (NGR)**	**East:** 558776	**Ground level, m OD:**	23.43
	Width (m) 2.00		**North:** 174019		
	Depth (m) 2.00				

Sed. group	*Context*	*Description*	*Log depth*	*<Samples> - vol (L)*	*Lithic finds*	*Enviro remains*
To	400	TOPSOIL. Soft/loose dark brown sl. sandy silt with occ. VF-F chalk pebbles, heavily rooted. [truncated surface of topsoil after de-vegetation and ground clearance] *Sharp wavy base, dipping to NW*	0.00-0.10	-	-	-
MG	401	MADE GROUND. Firm, brownish-grey sl. clayey silt with very common F-M chalk pebbles, becoming more densely-packed downwards, with occ. larger flint pebbles and small cobbles, and with one large lump of reddish-brown sandy clay-silt ("brickearth"); contained one flint artefact, stained orange/red. *Sharp base, dipping steeply to NW* [cut of previous quarry]	0.10-0.75	-	-	-
IIc	402	SAND. Soft, grey/brown sl. silty sand (VF-F) with occ. flint pebbles (very well-rounded derived Tertiary pebbles). [de-calcified upper part of 403] *Diffuse base, sub-horizontal at SE end of exposed face, then dipping steeply to NW parallel with the base of the quarry cut*	0.75-0.95	-	-	-
IIb	403	CHALK-RICH SILT/SAND. Mod. firm, friable mod. pale brownish-grey silt/sand with very common VF-F chalk pebbles evenly distributed throughout, and mod. common angular/sub-angular flint (and occ. ironstone) pebbles 2-5cm max. size. *Base not reached*	0.95-2.00	-	-	-

Test pit 4, looking SW

Site:	Eastern Quarry			**Test-pit:**	5
Site-code [CA]:	EQR 19, 770841	**Project [CAHO-C]:**	005-Q12/.x4		
Site sub-div:	Western Cross Road Tie-ins			**Date:**	17th April 2019
Dimensions:	**Length (m)** 5.00	**Co-ords (NGR)**	**East:** 558762	**Ground level, m OD:**	22.89
	Width (m) 2.00		**North:** 174013		
	Depth (m) 2.65				

Sed. group	*Context*	*Description*	*Log depth*	*<Samples> - vol (L)*	*Lithic finds*	*Enviro remains*
To	500	TOPSOIL. Soft/loose brown silt/sand with occ. flint/chalk pebbles, heavily rooted. [truncated surface of topsoil after de-vegetation and ground clearance] *Sharp, sub-horizontal base*	0.00-0.10	-	-	-
MG	501	MADE GROUND. Top 50cm of deposit is dominated by mod. firm cohesive reddish-brown clay-silt with common chalk clasts, and occasional large lumps of solid brickearth and chalk; below that, deposit is grey sand/silt with very common VF-M chalk pebbles. *Sharp, straight base, dipping at c. 45º to N*	0.10-0.96	-	-	-
IIc	502	SAND. Soft, grey/brown sl. silty sand (VF-F) with occ. flint pebbles. [de-calcified upper part of 503] *Diffuse base, sub-horizontal at S end of exposed face, then dipping steeply to N parallel with the base of the quarry cut*	0.96-1.05	-	-	-
IIb	503	CHALK-RICH SILT/SAND. Mod. firm, friable mod. pale brownish-grey silt/sand with very common VF-F chalk pebbles evenly distributed throughout, and mod. common angular/sub-angular M-C flint pebbles. *Sharp, straight sub-horizontal base*	1.05-1.50	-	-	-
IIa	504	SILTY SAND. Very firm, uncohesive, pale yellowish-brown silty VF sand with flecks of pale cream carbonate precipitate infilling pores and minor hollows, and with occ. angular flint cobbles at base, up to 18cm max. size, with patches of carbonate crust adhering, and with internal frost-fracturing. *Sharp and very contorted base, sub-horizontal*	1.50-2.50	-	-	-
I	505	CHALK DIAMICT. Very firm chalk pebbles/cobbles in pale brown silt matrix, with occ. flint nodules (and broken pieces of) 15-20cm maximum size, often with internal frost-fracturing. *Base not reached*	2.50-2.65	-	-	-

Test pit 5, looking NE

Site:	Eastern Quarry			**Test-pit:**	6
Site-code [CA]:	EQR 19, 770841	**Project [CAHO-C]:**	005-Q12/.x4		
Site sub-div:	Western Cross Road Tie-ins			**Date:**	17th April 2019
Dimensions:	**Length (m)** 4.00	**Co-ords (NGR)**	**East:** 558676	**Ground level, m OD:**	23.55
	Width (m) 2.00		**North:** 173900		
	Depth (m) 2.50				

Sed. group	*Context*	*Description*	*Log depth*	*<Samples> - vol (L)*	*Lithic finds*	*Enviro remains*
To	600	TOPSOIL. Soft/loose brown silt/sand with occ. flint/chalk pebbles, heavily rooted. [truncated surface of topsoil after de-vegetation and ground clearance] *Sharp, sub-horizontal base*	0.00-0.15	-	-	-
IIc	601	SAND/SILT. Mod. soft, uncohesive, brownish-grey silt/sand (VF) with occ. VF chalk pebbles and angular flint pebbles 2-4cm. [de-calcified upper part of 602] *Diffuse sub-horizontal base*	0.15-0.55	-	-	-
IIb	602	CHALK-RICH SAND/SILT. Mod. soft, uncohesive, brownish-grey silt/sand (VF) with very common VF-F chalk pebbles evenly distributed throughout, mod. common angular/sub-angular flint pebbles 2-4cm (fresh to well-abraded), becoming sandier towards base, and with larger chalk pebbles; contains pieces of fire-cracked flint 2-4cm max. size. [Holocene colluvium] *Sharp, wavy sub-horizontal base*	0.55-1.52	-	-	-
I	603	CHALK DIAMICT. Firm, uncohesive, densely-packed chalk pebbles in very pale brown chalk silt matrix with occ. very well-rounded derived Tertiary flint pebbles and fresh/unstained flint nodules (and broken pieces of). *Sharp, wavy sub-horizontal base*	1.52-1.90	-	-	-
Ch	604	CHALK. Dry, white crumbly angular chalk pebbles/cobbles in white chalk silt matrix with occ. fresh flint nodules. *Base not reached*	1.90-2.50	-	-	-

Test pit 6, looking SW

Site:	Eastern Quarry			**Test-pit:**	7
Site-code [CA]:	EQR 19, 770841	**Project [CAHO-C]:**	005-Q12/.x4		
Site sub-div:	Western Cross Road Tie-ins			**Date:**	17th April 2019
Dimensions:	**Length (m)** 4.00	**Co-ords (NGR)**	**East:** 558654	**Ground level, m OD:**	23.91
	Width (m) 2.00		**North:** 173859		
	Depth (m) 2.60				

Sed. group	*Context*	*Description*	*Log depth*	*<Samples> - vol (L)*	*Lithic finds*	*Enviro remains*
To	700	TOPSOIL. Soft/loose brown silt/sand with occ. flint/chalk pebbles, heavily rooted. [truncated surface of topsoil after de-vegetation and ground clearance] *Sharp, even base, dipping shallowly to NW*	0.00-0.15	-	-	-
IIb	701	CHALK-RICH SILT/SAND. Mod. firm, uncohesive, pale grey/brown sandy (VF) silt with common VF-F (occ. M) chalk pebbles evenly distributed throughout, and mod. common M-VC flint pebbles (and occ, up to 10cm max. size); flint clasts often white-stained and well-abraded, with faint network of dendritic carbonate encrustation, and also with mod. common angular and blue-white patinated natural frost-fractured flint pebbles; contains moderately common, moderately fresh blue-white patinated flint artefacts and occ. pieces of fire-cracked flint. *Sharp, sub-horizontal base*	0.15-1.20	-	-	-
I	702	CHALK DIAMICT. Firm, uncohesive, densely-packed chalk pebbles and small cobbles in very pale brown chalk silt matrix with occasional flint nodules (and broken pieces of) 5-10cm max. size, pale grey stained on broken faces. *Diffuse, sub-horizontal base*	1.20-1.98	-	-	-
Ch	703	CHALK. Dry, white crumbly angular chalk pebbles/cobbles in white chalk silt matrix with occ. fresh flint nodules. *Base not reached*	1.98-2.60	-	-	-

Test pit 7, looking W

APPENDIX B.

HISTORIC ENVIRONMENT FRAMEWORK, AREA SUMMARIES: E9-E11, E13A

Contents (Appendix B)

Attribute table structure, and field entry explanations

Attribute	*Field entry*
HEF area #	E10, E11, E12, E13a-e, unique IDs for Eastern Quarry Historic Environment Framework (HEF) areas (vicinity of Alkerden Farm)
Summary description	Short summary text of geomorphological and topographic situation
Sediment sequence	Description of the Quaternary deposits that may be, or are likely to be, present
Palaeolithic artefacts	Description of Palaeolithic artefactual remains that may be, or are likely to be, present
Palaeo-environmental remains	Description of faunal (and other palaeo-environmental) remains that may be, or are likely to be, present
Palaeolithic potential	Attribution based on matrix of likelihood and importance, and supported by brief explanatory text *
Likelihood of Palaeolithic remains *	Attribution based on likely type/s of deposit present and previous artefact and palaeo-environmental find records, supported by brief explanatory text
Likely importance of Palaeolithic remains *	Attribution based on likely type/s of deposit present, and supported by brief explanatory text
Priorities for further investigation	Key questions that need answering, to allow proper consideration of the Palaeolithic potential/importance of the HEF area
Approaches to further investigation	Suitable methods and approaches that could be applied to address the evaluation priority questions specified above
Any other comments	Any particular points not covered by other fields

* See page 3 for criteria for different categories of likelihood and importance, and then these are combined in a matrix to arrive at an overall assessment of potential

Attribute grades for Likelihood and Importance of Palaeolithic remains

Attribution	*Likelihood*	*Importance*
VERY HIGH	Certain knowledge of Pleistocene deposits with lithic or palaeo-environmental remains	Nationally important remains: undisturbed occupation surfaces or minimally disturbed artefact concentrations; abundant faunal /palaeo-environmental remains, deposits with key sequences and lithostratigraphic relationships
HIGH	High likelihood of Pleistocene deposits with lithic or palaeo-environmental remains	Undisturbed occupation surfaces or minimally disturbed concentrations; abundant remains from deposits of good stratigraphic and chronological integrity, biological associations; deposits with important lithostratigraphic sequences and relationships
MODERATE	Reasonable likelihood of deposits with remains	Less abundant disturbed artefactual and/or faunal remains from units of reasonable stratigraphic and chronological integrity; deposits with moderate lithostratigraphic sequences and relationship
LOW	Remains are known to occur, but rare	Disturbed remains from deposits of low stratigraphic and chronological integrity; deposits with minimal lithostratigraphic sequences and relationships
VERY LOW	Remains very unlikely to occur	Thought extremely unlikely for there to be any Pleistocene deposits containing remains, any remains found will be residual and reworked
NONE	No possibility of remains	Not applicable
UNCERTAIN	Insufficient information on which to assess likelihood	Insufficient information on which to assess importance

Matrix for assessment of Palaeolithic potential

Palaeolithic potential	*Likelihood*	*Likely importance*
VERY HIGH	Very high	High
	High	Very high
HIGH	High	High, Moderate
	Moderate	High
MODERATE	High	Low
	Moderate	Moderate
	Low	Very high, High
LOW	Moderate	Low
	Low	Moderate
	Very low	Very high, High, Moderate,
VERY LOW	Moderate	Very low
	Low, Very low	Low, Very low
NONE	None	na
UNCERTAIN	Uncertain	High, moderate, low or very low
	High, moderate, low or very low	Uncertain

HEF #	E9
Summary description	Unquarried plot of higher land to the north of the main quarried area of Eastern Quarry, named the "Panhandle" in this work, and including the northwest corner of Area B. The Panhandle is mostly covered by woodland, and with the ground surface forming a plateau with maximum height c. 55 m OD. The ground surface drops off to the east, descending to c. 40 m OD at the eastern side of the zone, within Area B.
Sediment sequence	On the plateau of the Panhandle, there is a thin veneer of gravelly clay immediately beneath the topsoil, overlying clayey and shelly Woolwich Bed sediments. Further downslope to the east, made ground covers the natural sequence, thickening as it progresses eastwards. Under the made ground, there are occasional beds and pockets of gravelly clay-silt 50-60cm thick, of similar nature, but not necessary equivalent, to the gravelly clay on the plateau.
Palaeolithic artefacts	None known.
Palaeo-environmental remains	None known.
Palaeolithic potential *	LOW
Likelihood of Palaeolithic remains *	Low
Likely importance of Palaeolithic remains *	Low
Priorities for further investigation	-
Approaches to further investigation	-
Any other comments	The 2006 evaluation (Wessex Archaeology 2006c) was sufficient to establish that there is no Palaeolithic interest in this area

* See page 3 for criteria for different categories of likelihood and importance, and then these are combined in a matrix to arrive at an overall assessment of potential

HEF #	E10
Summary description	Uninvestigated area of former allotments at the central northern edge of Eastern Quarry, between Area A (Alkerden Farm) and the Panhandle, extending into an uninvestigated strip to the north of the Panhandle
Sediment sequence	No information known about the Pleistocene sequence. Probably has clayey/shelly (and slightly sandy/gravelly) slopewash/solifluction deposits dipping northwards towards Swanscombe at its northern edge, and sandy/silty deposits dipping/thickening south towards the dry valley axis in its central and southern parts.
Palaeolithic artefacts	None known.
Palaeo-environmental remains	None known.
Palaeolithic potential *	Generally LOW, but UNCERTAIN/HIGH? in uninvestigated northern part of this zone
Likelihood of Palaeolithic remains *	Low
Likely importance of Palaeolithic remains *	Low
Priorities for further investigation	• To establish the nature and formation process of any Quaternary deposits in the uninvestigated northern part of this zone • To establish how any deposits present in this zone relate to the upper phases of the Boyn Hill/Orsett Heath Formation (especially the Upper Loam), which are present under the built-up area of Swanscombe immediately to the north • To establish the presence/prevalence of any Palaeolithic remains in any Quaternary deposits in the uninvestigated northern part of this zone
Approaches to further investigation	Machine-dug test pits
Any other comments	The northern strip of this zone remains uninvestigated, both in the former allotments site and in the panhandle site. Despite the lack of remains in other parts of this zone, this northern strip merits some investigation if any development is planned, due to its potential relationship (or equivalence) with the Upper Loam, and the potential to contain little-disturbed Palaeolithic remains

* See page 3 for criteria for different categories of likelihood and importance, and then these are combined in a matrix to arrive at an overall assessment of potential

HEF #	E11
Summary description	A narrow strip along the northern edge of the east half of the Alkerden Farm plot (Area A). This area forms a spur of high ground in the local topography, with its crest dipping shallowly northwest from c. 42.5 m OD to c. 36 m OD, and the ground to the southwest dipping down into the dry valley that runs across the southwest side of Area A.
Sediment sequence	Pleistocene sediments comprise gravelly and sandy clay deposits, including beds rich in derived Tertiary shell fragments. These deposits, which overlie Thanet Sand, are absent along the southwest edge of the zone, but dip steeply, and thicken correspondingly, to the northeast.
Palaeolithic artefacts	None known.
Palaeo-environmental remains	None known.
Palaeolithic potential *	LOW
Likelihood of Palaeolithic remains *	Low
Likely importance of Palaeolithic remains*	Low
Priorities for further investigation	• To date the formation of the north-dipping sandy/gravelly/shelly clay-rich sediments • To establish their relationship with the upper deposits of the Barnfield Pit sequence, namely: the Upper Loam and the Upper Gravel • To establish whether they contain archaeological remains
Approaches to further investigation	Further test pits; recording of a longer continuous section heading northeast from the zone into Swanscombe
Any other comments	Even though any lithic remains within the deposits will probably be reworked and derived, they would be of importance in establishing a Middle Pleistocene *post quem* date of formation of the deposits

* See page 3 for criteria for different categories of likelihood and importance, and then these are combined in a matrix to arrive at an overall assessment of potential

HEF #	E13a
Summary description	This zone occupies the majority of the Alkerden Farm site (Area A). It covers the dry valley axis that runs through the southwest side of the site, and the north-eastern flank of the dry valley sloping up towards zones E11 and E12.
Sediment sequence	The central axis of the dry valley contains a deep fill of sand/silt-rich colluvial sediments, with a basal sandy/gravelly bed. These deposits extend up the flanks of the dry valley, becoming thinner higher up the slope.
Palaeolithic artefacts	None known.
Palaeo-environmental remains	None known.
Palaeolithic potential *	LOW
Likelihood of Palaeolithic remains *	Low
Likely importance of Palaeolithic remains *	Low
Priorities for further investigation	None
Approaches to further investigation	-
Any other comments	-

* See page 3 for criteria for different categories of likelihood and importance, and then these are combined in a matrix to arrive at an overall assessment of potential

APPENDIX C: CONTEXT DESCRIPTIONS

Trench No.	Context No.	Type	Fill of	Context interpretation	Description	L (m)	W (m)	Depth/ thickness (m)
1	100	layer		Topsoil	dark grey brown clay silt frequent roots loose	18.4	1.9	0 - 0.45
1	101	layer		Colluvium	mid yellow brown silty clay friable frequent chalk flecks	18.4	1.9	0.45+
2	200	layer		Topsoil	dark grey brown clay silt frequent roots loose	11.2	1.9	0-0.22
2	201	layer		Backfill	chalk and redeposited topsoil back fill compact	11.2	1.9	0.22-0.28
3	300	layer		Topsoil	dark grey brown clay silt frequent roots loose	14.5	1.9	0-0.20
3	301	layer		made ground	dark greyish brown silty clay friable	14.5	1.9	0.2-0.82
3	302	layer		Colluvium	light yellowy brown clayey silt moderate compaction frequent chalk flecks	14.5	1.9	0.82+
3	303	cut		19th century quarry pit	steep side, base not excavated, suboval in plan	14.5	1.9	0.2-0.82
3	304	fill		Back fill	friable dark grey brown clayey silt	14.5	1.9	0.2-0.82
3	305	fill		back fill	light yellowish brown clayey silt and chalk rubble backfill	14.5	1.9	0.2-0.82

APPENDIX D: OASIS REPORT FORM

PROJECT DETAILS	
Project Name	Eastern Quarry Swanscombe Kent
Short description	An archaeological evaluation was undertaken by Cotswold Archaeology in April 2019 at Eastern Quarry, Swanscombe, Kent. Three trenches and 6 test pits were excavated. Palaeolithic No Palaeolithic remains were found, and it was concluded that the Site is of LOW Palaeolithic potential, and that no further work is required in relation to Palaeolithic remains. However, Holocene colluvial deposits were found, containing moderately common Late Prehistoric lithic remains in the southern road tie-in footprint (Area F, TP 7). There is potential for further work to be carried out here, to recover a larger sample of cultural remains (lithic artefacts and pottery) and to carry out palaeo-environmental investigations. Historical mapping shows that the southern portal of a buried tunnel dating from the late 19th or early 20th century should be preserved in Area G, associated with the industrial cement-making heritage of the area. Consideration needs to be given as to whether the proposed road tie-in here will affect this portal, and what safeguarding measures might be needed. Holocene Trench 3 in the northern area confirmed the western extent of the quarry pit, and due to the onsite restrictions Trench 2 was moved and contained backfilled quarry. Trench 4 was not excavated due to a previously unknown gas main service. Test Pit 3 and Test Pit 4 were moved and encountered the western and southern edge of the quarry pit respectively.
Project dates	15th-18th April 2019
Project type	Evaluation and Palaeolithic Test Pits
Previous work	Wenban-Smith FF, 2013. The Ebbsfleet Elephant: Excavations at Southfleet Road, Swanscombe in Advance of High Speed 1, 2003-4. Oxford Archaeology Monograph No. 20. Oxford Archaeology, Oxford. Wenban-Smith FF, 2016a. Archaeological Statement for Balance of Eastern Quarry, Enabling Earthworks at the Western Side. Unpublished client report prepared for Wessex Archaeology and Henley Camland Developments (v1 issued 15th September 2016). Wenban-Smith FF, 2017a. Archaeological Statement for Balance of Eastern Quarry, Enabling Earthworks at the Western Side. Unpublished client report prepared for Cotswold Archaeology and Henley Camland Developments (v2 issued 1st May 2017). Wenban-Smith FF, Bridgland DR, 2001. Palaeolithic archaeology at the Swan Valley Community School, Swanscombe, Kent. Proceedings of the Prehistoric Society 67: 219-259. Wenban-Smith FF, Stafford E, Bates MR, Parfitt SA (eds). In press for 2019. Prehistoric Ebbsfleet: Excavations and Research in Advance of High Speed 1 and STDR 4. Monograph in Oxford Wessex Archaeology High Speed 1 series.
Future work	Unknown

PROJECT LOCATION		
Site Location	Eastern Quarry Swanscombe Kent	
Study area (M^2/ha)	0.16ha	
Site co-ordinates	558680 174000	
PROJECT CREATORS		
Name of organisation	Cotswold Archaeology	
Project Brief originator	Cotswold Archaeology	
Project Design (WSI) originator	Cotswold Archaeology	
Project Manager	Richard Greatorex	
Project Supervisor	Adam Howard	
MONUMENT TYPE	None	
SIGNIFICANT FINDS	None	
PROJECT ARCHIVES	Intended final location of archive (museum/Accession no.)	Content
Physical		Worked flint
Paper		Test Pit Logs, trench sheets, Photographic register
Digital		Survey Data photographs
BIBLIOGRAPHY		
CA (Cotswold Archaeology) 2019 *Eastern Quarry, Swanscombe, Kent: Archaeological Evaluation and Test pits.* CA typescript report **770841_1**		

N

0 1km

Cotswold Archaeology

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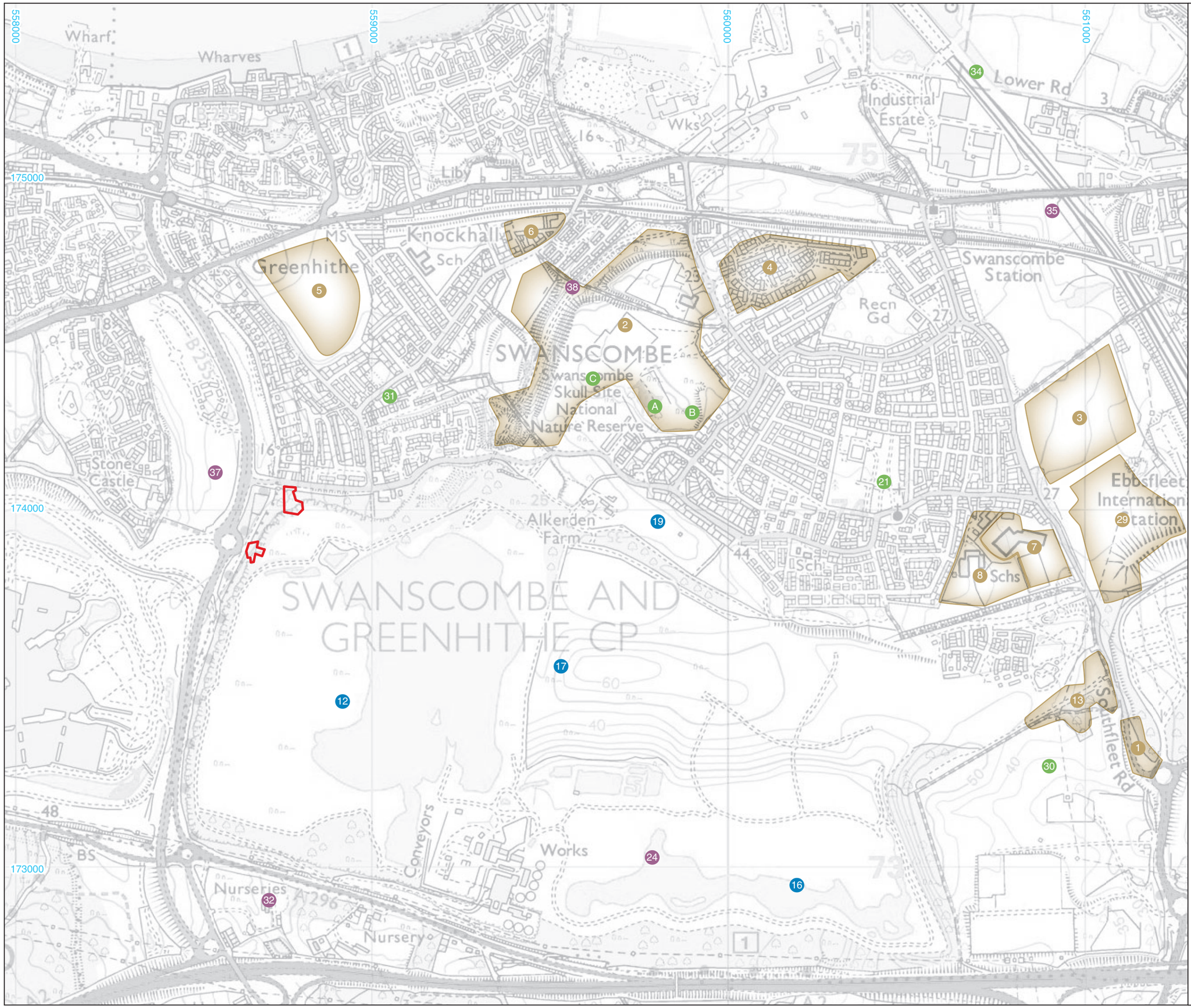
PROJECT TITLE

Eastern Quarry Road, Ebbsfleet, Kent

FIGURE TITLE

Site location plan

DRAWN BY	**AW**	*PROJECT NO.*	**770841**	*FIGURE NO.*
CHECKED BY	**RP**	*DATE*	**01.03.19**	**1**
APPROVED BY	**RG**	*SCALE@A4*	**1:25,000**	



N

Site boundary

Palaeolithic site location:

- Area
- Accurate
- Estimated
- General

0 1:10,000 500m

Cotswold Archaeology

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e enquiries@cotswoldarchaeology.co.uk

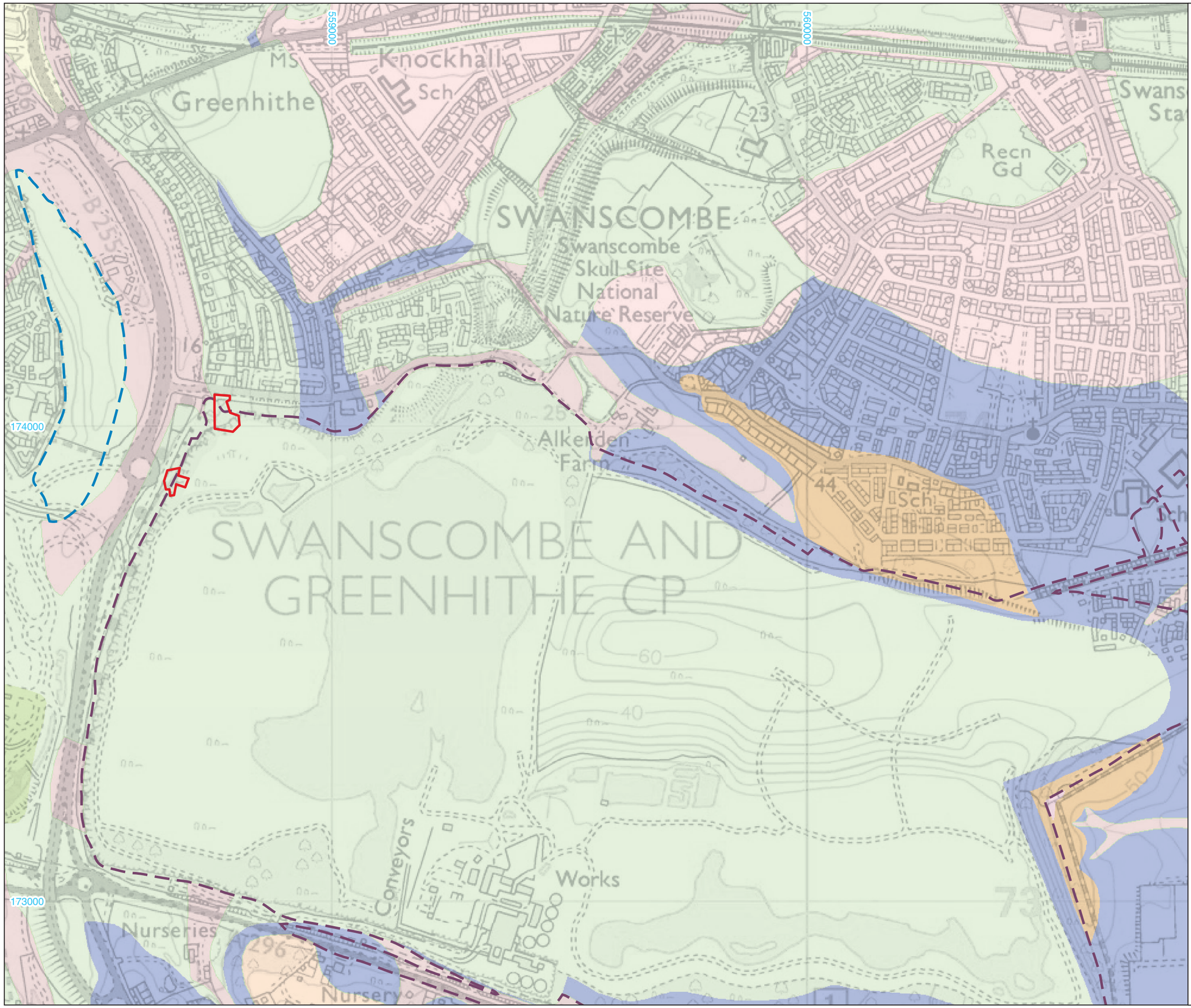
PROJECT TITLE

Eastern Quarry Road, Ebbsfleet, Kent

FIGURE TITLE

Western Cross road tie-ins: site location and Palaeolithic background sites

DRAWN BY	AW	PROJECT NO.	770841	FIGURE NO.
CHECKED BY	DJB	DATE	26.04.19	2
APPROVED BY	RG	SCALE@A3	1:10,000	



N

Site boundary

Eastern Quarry

Castle Pit Quarry

Bedrock:

Lewes Nodular Formation; Seaford Chalk Formation; Newhaven Chalk Formation

Thanet Formation

Lambeth Group

Superficial:

Boyn Hill Gravel Member (sand and gravel)

Head (clay, silt, sand and gravel)

Alluvium (clay, silt, sand and gravel)

River Terrace Deposits (sand and gravel)

0 1:7,500 250m

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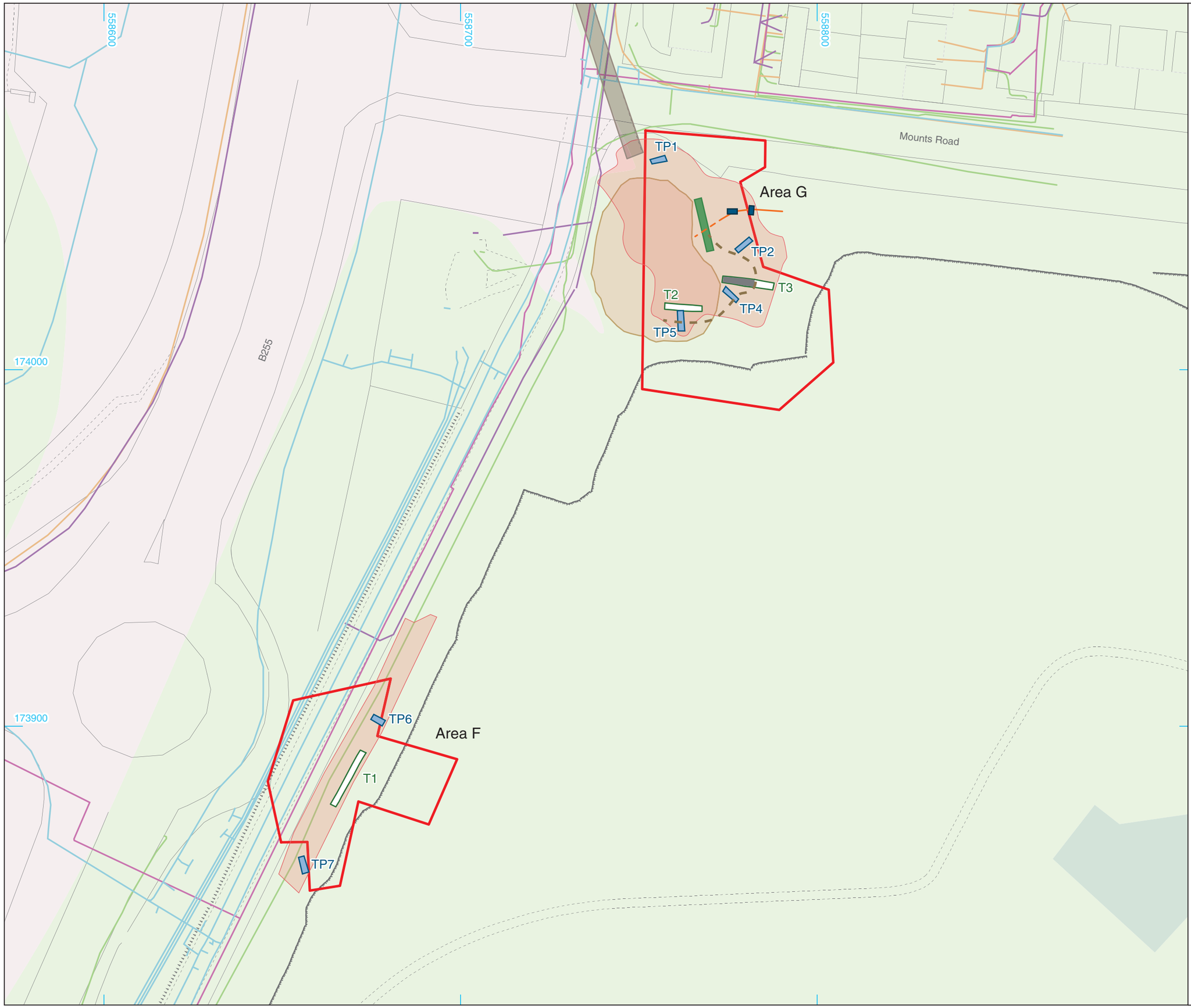
PROJECT TITLE

Eastern Quarry Road, Ebbsfleet, Kent

FIGURE TITLE

Western Cross road tie-ins: site location and geological background

DRAWN BY	**AW**	*PROJECT NO.*	**770841**	*FIGURE NO.*
CHECKED BY	**DJB**	*DATE*	**26.04.19**	**3**
APPROVED BY	**RG**	*SCALE@A3*	**1:7,500**	



N

Site boundary
Actual area available for excavation
Palaeolithic test pit
Hand-dug test pit
Evaluation trench
Unexcavated evaluation trench
Feature
Mapped quarry pit
Revised edge of quarry pit
Historical tunnel

Services:
BT
Virgin
Gas
Water
Electricity
Line of previously unknown gas main (projected)

Geology:
Lewes Nodular Formation; Seaford Chalk Formation; Newhaven Chalk Formation
Boyn Hill Gravel Member (sand and gravel)

0 1:1000 50m

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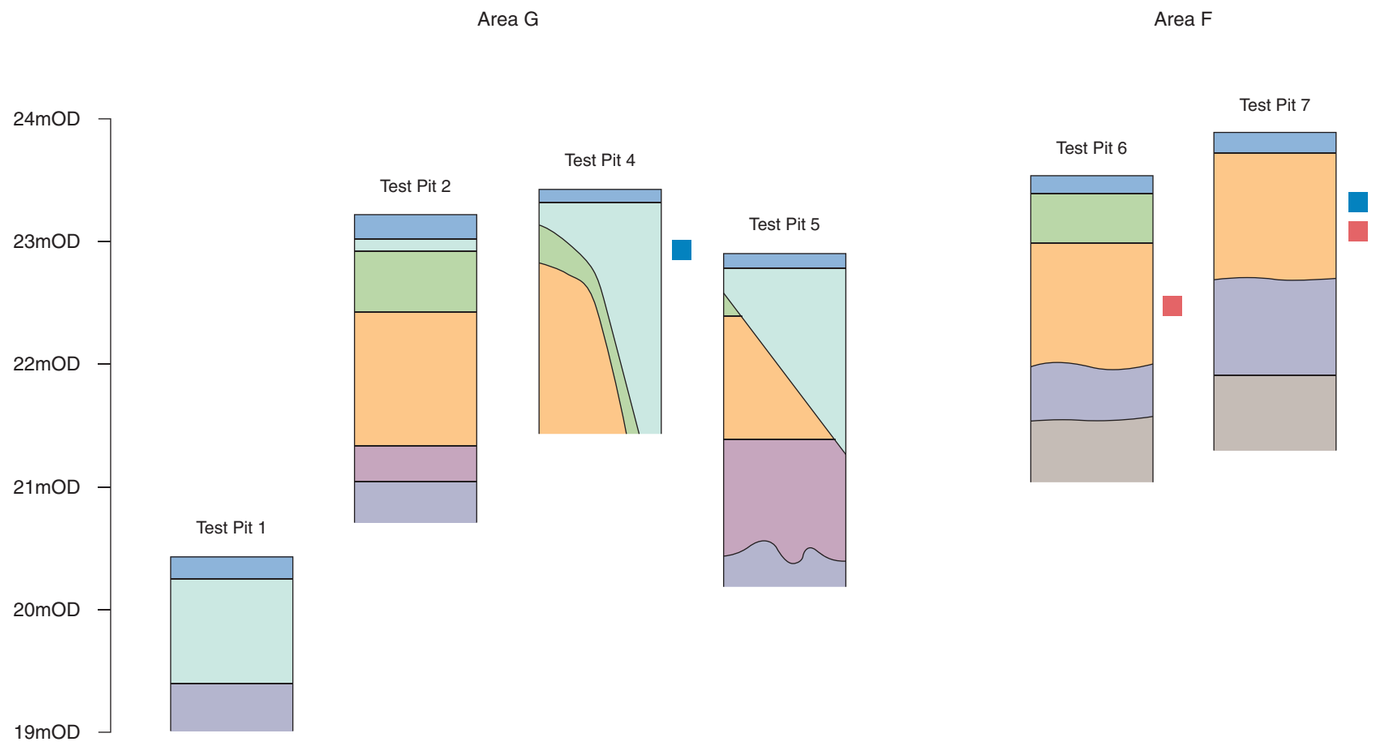
PROJECT TITLE
Eastern Quarry Road, Ebbsfleet, Kent

FIGURE TITLE
Western Cross road tie-ins: test pit layout and geological background

DRAWN BY	AW	PROJECT NO.	770841	FIGURE NO.
CHECKED BY	DJB	DATE	11.04.19	4
APPROVED BY	RG	SCALE@A3	1:1000	



- Topsoil/roots
- Made ground
- IIc - decalcified sandy colluvium
- IIb - sand/silt colluvium with chalk pebbles
- IIa - sand/silt colluvium, stony in places
- I - chalk diamict
- Chalk bedrock, degraded in part
- Flint artefacts
- Fire-cracked flint artefacts

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PROJECT TITLE

Eastern Quarry Road, Ebbsfleet, Kent

FIGURE TITLE

Western Cross road tie-ins: test pit sequences

DRAWN BY	**AW**	*PROJECT NO.*	**770841**	*FIGURE NO.*
CHECKED BY	**DJB**	*DATE*	**29.04.19**	**5**
APPROVED BY	**RG**	*SCALE@A3*	**NA**	

Trench 1 showing colluvium, looking south-west (1m scales)

Trench 2 showing back fill of quarry pit, looking west (1m scales)

Trench 3 showing eastern edge of smaller quarry pit, looking west (1m scales)

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PROJECT TITLE

Eastern Quarry Road, Ebbsfleet, Kent

FIGURE TITLE

Photographs

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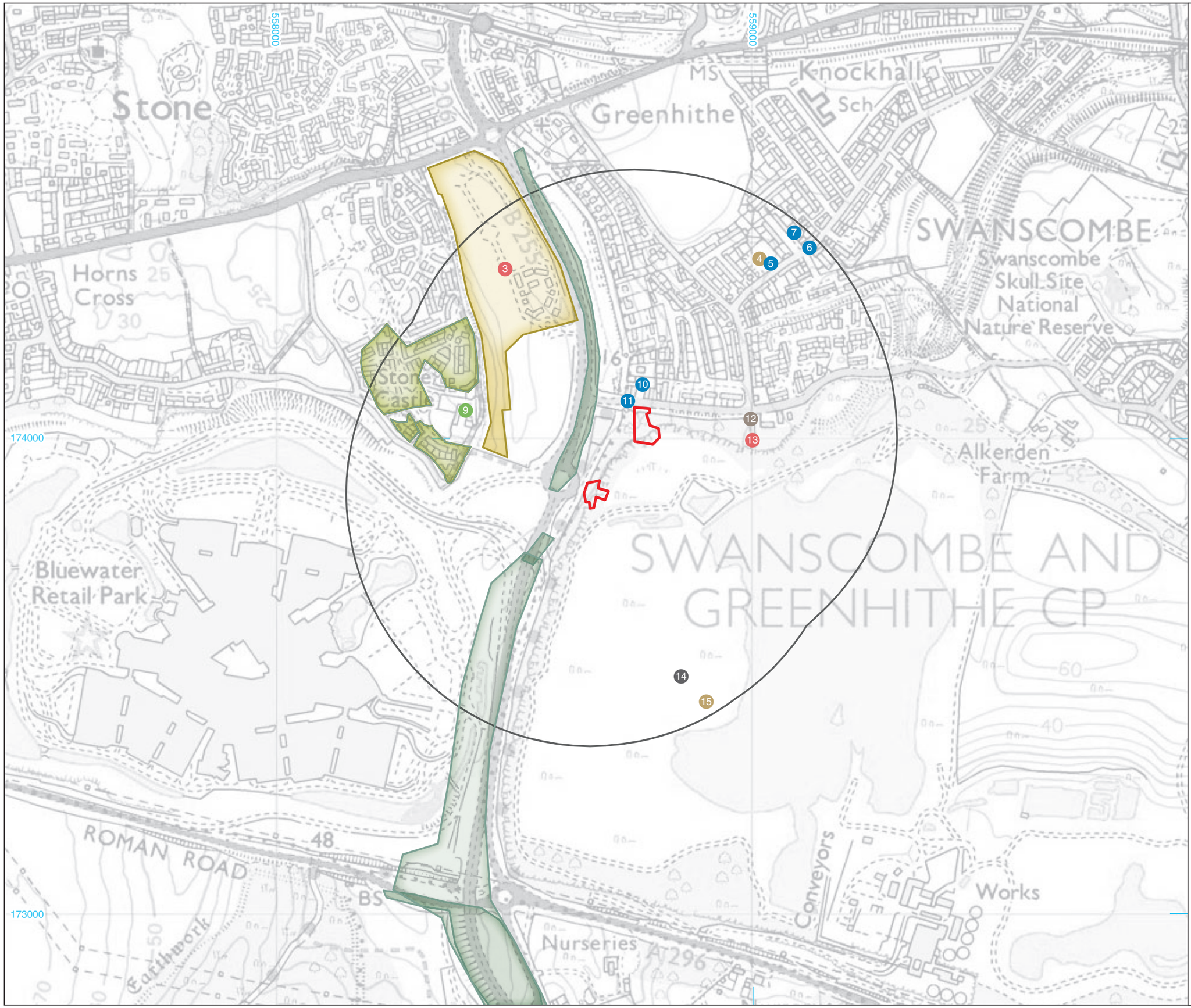
CHECKED BY	**DJB**	*DATE*	**29.04.19**	**6**
APPROVED BY	**RG**	*SCALE@A3*	**NA**	



Site boundary
Site buffer
Palaeolithic
Neolithic
Roman
Medieval
Modern
Undated
St Clements Valley (1)
Bluewater Park (2)
Waterstone Park (8)

0 1:7,500 250m

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PROJECT TITLE
Eastern Quarry Road, Ebbsfleet, Kent

FIGURE TITLE
Site location showing heritage assets

DRAWN BY	AW	PROJECT NO.	770841	FIGURE NO.
CHECKED BY	RP	DATE	01.03.19	7
APPROVED BY	RG	SCALE@A3	1:7,500	

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