Land at Craylands Lane Swanscombe, Kent

Pleistocene Geoarchaeological Test Pitting Evaluation

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Summary

Wessex Archaeology was commissioned by CgMs Heritage (Part of RPS) ('the client'), to carry out a Pleistocene geoarchaeological evaluation through a program of test pitting of a 1.73 ha parcel of land located west of Craylands Lane, Swanscombe, Kent. The evaluation area is centred on NGR 559785 174922.

A previous desk based assessment and walkover survey (ASE 2005) had demonstrated that, although large areas of the evaluation area had been previously quarried to chalk bedrock, Pleistocene deposits were likely to be preserved in the south-eastern portion of the evaluation area. To evaluate the Pleistocene geoarchaeological potential of these deposits direct geoarchaeological prospection was required. This report details the results of a Pleistocene geoarchaeological evaluation of these sediments.

This geoarchaeological evaluation comprised the excavation of 13 machine-excavated test pits. The investigations were designed to investigate the sub-surface deposits, establish their stratigraphy, their extent, and to evaluate their potential to contain Palaeolithic remains.

The evaluation established that Quaternary deposits are confined to two areas in the south-west portion of evaluation area. The deposits preserved in these areas consist of material infilling a valley cut through the chalk; this ran approximately south-west to north-east through the evaluation area prior to quarrying. The sequence reflects material deposited by slope process over an extended period, likely from the late Pleistocene to the Holocene.

The potential for the deposits to preserve artefacts and ecofacts was assessed. Gravelly horizons within the Holocene colluvium contained reworked lithic artefacts; such evidence was absent from all other deposits. Environmental evidence was present in some deposits, in all cases this either results from, or has been heavily impacted upon, by recent bioturbation.

Deposits have been correlated with the upper part of a sequence identified 150m to the south-west in Craylands Gorge (Wessex Archaeology 2004) and with Phase V of a sequence previously identified 400m to the south-west at Knockhall Road, Greenhithe (ASE 2012, Wessex Archaeology 2016, 2017); the latter have been equated to the late Devensian and early Holocene.

Based on the results of this evaluation the Pleistocene and Palaeolithic potential of the deposits across the evaluation area can be regarded as low to none and no further work is recommended.

Acknowledgements

Wessex Archaeology would like to thank Richard von Kalinowski-Meager of CgMs Heritage (Part of RPS) for commissioning the archaeological evaluation. Wessex Archaeology is also grateful for the advice of Wendy Rodgers, Senior Archaeological officer for KCC who monitored the project who monitored the evaluation on behalf of the LPA.

The fieldwork was directed by Andrew Shaw, with the assistance of Lance Lewis, Stuart Pierson and Nick Woodward. The samples were processed by Sam Rogerson and Jenny Giddins, sorted by Nicki Mulhall and assessed by Inés López-Dóriga. This report was written by Andrew Shaw with contributions by Inés López-Dóriga and edited by Rob De'Athe. The project was managed by Rob De'Athe on behalf of Wessex Archaeology.

LAND AT CRAYLANDS LANE, SWANSCOMBE, KENT

Pleistocene Geoarchaeological Test Pitting Evaluation

1 INTRODUCTION

1.1 Project and planning background

1.1.1 Wessex Archaeology was commissioned by CgMs Heritage (Part of RPS) ('the client'), to carry out a Pleistocene geoarchaeological evaluation through a program of test pitting of a 1.73 ha parcel of land located west of Craylands Lane, Swanscombe, Kent. The evaluation area is centred on NGR 559785 174922 (**Figure 1**).

1.1.2 Outline planning permission has been granted at the site for the construction of up to 110 mixed tenure residential units, including a new vehicular access to Craylands Lane, emergency access and the creation of a development platform and associated works including the demolition of existing buildings. Groundworks for the proposed development will comprise construction on piles following the in filling and levelling of the site using an engineered fill material.

1.1.3 Outline planning permission was granted on 16/02/2018 (14/01689/OUT). The outline planning permission has been varied and the current consent has ref: EDC/17/0146. Condition 12 attached to the outline planning permission relates to archaeology:

Condition 12
No work on site shall take place, other than the demolition of existing buildings, until the applicant or their agents or successors in title, has secured the implementation of a programme of archaeological work in accordance with a written specification and timetable which has been submitted to and approved by the Local Planning Authority.

Reason: To ensure that features of archaeological interest are properly examined and recorded.

1.1.4 The proposed Pleistocene geoarchaeological evaluation comprised the excavation, investigation and recording of 13 geoarchaeological test pits (each measuring 2 m by 3 m) (**Figure 1**).

1.1.5 This preliminary evaluation is part of a staged approach in determining the Pleistocene geoarchaeological potential of the site, and will inform on the nature and distribution of Quaternary deposits, and provide an initial assessment of their Palaeolithic potential. It follows non-intrusive geoarchaeological work, including a Desk-Based Assessment (DBA) and Walkover Survey (ASE 2005).

1.1.6 All works were undertaken in accordance with a written scheme of investigation (WSI) which detailed the aims, objectives, methodologies and standards to be employed to undertake the evaluation (Wessex Archaeology 2018). Kent County Council's (KCC) Heritage and Conservation Team approved the WSI, on behalf of the Local Planning Authority (LPA), prior to fieldwork commencing.

1.1.7 The evaluation was undertaken between the 30th April and 4th May 2018.

1.2 Scope of the report

1.2.1 The purpose of this report is to provide a detailed description of the results of the test pit evaluation, to interpret the results within a local, regional or wider geoarchaeological context and assess whether the aims of the evaluation have been met.

1.2.2 The presented results will provide further information on the geoarchaeological resource that may be impacted by the proposed development and facilitate an informed decision with regard to the requirement for, and methods of, any further Pleistocene geoarchaeological mitigation.

1.3 Location, topography and geology

1.3.1 The evaluation area is located 1.6km northwest of Ebbsfleet International Station and 1.6km northeast of Bluewater Shopping Centre (**Figure 1**). The area is bounded to the north by London Road and vacant land, to the east by Craylands Lane and vacant land, to the south by woodland and the North Kent Line railway, and to the west and southwest by residential development.

1.3.2 The landscape within the evaluation area has been heavily impacted by quarrying carried out in the early 20th century. Before quarrying a dry valley ran south west-north-eastern part of the evaluation area. This was filled to a maximum depth of at least 3m of "rubbly brickearth" (Bromehead 1920). In the northern and western area of the evaluation are these deposits have been removed by this quarrying activity.

1.3.3 Modern ground levels in the eastern half of the evaluation area varies from north to south between 6.0-10m AOD, whilst they are at 1.5 m AOD at the base of the most extensively quarried deposits in the west.

1.3.4 British Geological Survey data (BGS online viewer) indicates that the underlying solid geology belongs to the Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated). In the eastern and southern portions of the evaluation area Quaternary Head deposits consisting of clay sands and gravels are recorded. Head deposits are poorly sorted cold-climate slope deposits formed through solifluction processes (alternate freeze-thawing). They are often encountered on the sides and within the base of dry valleys, the latter a landform feature typical in areas of permeable bedrock, such as chalk. These deposits are the equivalent of the 'rubbly brickearth' recorded by Bromehead (1920).

1.3.5 A walkover survey (ASE 2005) demonstrated that the western half of the evaluation area is quarried through chalk bedrock and that chalk is present in this area to almost the top of all the exposed quarry faces; although the uppermost 2m of the westernmost face was obscured by scrub.

1.3.6 This western focus of quarrying activity was originally accessed via a tunnel from the east under Craylands Lane and through a tramway cutting that extended across the eastern portion of the evaluation area; this cutting is still preserved. The walkover survey (ASE 2005) indicated that areas to the immediate north and south of the tramway cutting have been less extensively quarried. Coombe deposits were exposed in sections on the northern side of the cutting; these are formed through gelifluction and are composed of a mix of chalk and flint contained within a chalky sediment matrix. Additionally, at least 1m deep of friable loam with common flint and chalk pebbles was visible in south side of the tramway cutting.

2 GEOARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1.1 The archaeological and historical background was assessed in a prior desk-based assessment and Written Scheme of Investigation (ASE 2005, Wessex Archaeology 2018). The relevant information is summarized below, with additional information included as appropriate.

2.2 Geoarchaeological and historical context

2.2.1 The evaluation area is located immediately to the north of Barnfield Pit, Swanscombe. This locale is associated with an internationally important suite of Middle Pleistocene deposits. These have produced extensive Lower Palaeolithic archaeological assemblages, an early human fossil skull and extensive environmental datasets (Conway *et al*. 1996). The Barnfield Pit deposits form part of the Boyn Hill/Orsett Heath Member of the River Thames terrace sequence. These are thought to have aggraded between 450,000 and 350,000 BP (Bridgland 1994). The current evaluation area is mostly located below the lowermost level of the Boyn Hill/Orsett Heath deposits in the area; only the western most edge of the evaluation area had the potential to preserve such deposits. However, a walkover survey (ASE 2005) demonstrated that this area has been quarried through Chalk bedrock, whilst chalk bedrock was present to almost the top of all visible quarry faces in this area. This was supported by field observations carried out during the current evaluation.

2.2.2 There are also indications that post-Boyn Hill/Orsett Heath later Middle Pleistocene fluvial deposits may be present in the region of the evaluation area. This is based on presence of Levallois material, something which is not associated with the Boyn Hill/Orsett Heath Member, in artefact collections from nearby localities, including Dierden's Pit, New Craylands Lane Pit and Galley Hill Pit. Furthermore, lower level, post-Boyn Hill fluvial deposits that have been identified at the north side of New Craylands Lane (Wenban-Smith 1999).

2.2.3 The desk-based assessment and walkover survey (ASE 2005) identified Quaternary deposits preserved in the less extensively quarried south-eastern portion of the evaluation area. The deposits appeared to include to slope deposits in-filling the preserved portions of the dry valley which ran through the area prior to quarrying. Similar slope deposits have been identified 150m to the south-west of the evaluation area in Craylands Gorge (Wessex Archaeology 2004) and 400m to the south-west at Knockhall Road, Greenhithe (ASE 2012, Wessex Archaeology 2016, 2017); the latter have been equated with the late Devensian and early Holocene. A worked flake was recovered from the base of the same sequence in Craylands Gorge. Described as 'Coombe Rock', this unit consists of nodular flint and rounded chalk clasts, which was possibly originally water-lain (Wessex Archaeology 2004).

2.2.4 Holocene slope deposits have been suggested to be present in the evaluation area (ASE 2005). These have the potential to contain eroded and redeposited artefacts and seal underlying stratigraphy in the form of buried former land surfaces.

2.3 Summary of the possible Pleistocene geoarchaeological potential

2.3.1 The geoarchaeological potential of the evaluation can be summarized as follows:

- Large areas of the evaluation area have been quarried through to chalk bedrock.

- A previous desk based assessment and walkover survey (ASE 2005) demonstrated that no Quaternary deposits are preserved in the western portion of the evaluation area.

- A previous desk based assessment and walkover survey (ASE 2005) has demonstrated that Quaternary deposits are preserved in the south-eastern portion of the evaluation area.

- These deposits are likely to be infilling remnants of the dry valley which ran through the evaluation area prior to quarrying. Such deposits have the potential to preserved Pleistocene and/or Holocene archaeology and paleoenvironmental datasets.

3 AIMS AND OBJECTIVES

3.1 General aims

3.1.1 The general aims (or purpose) of the evaluation, in compliance with the CIfA *Standard and guidance for archaeological field evaluation* (CIfA 2014a) and Kent County Council's (KCC) draft *Manual of Specification Part B: Specification for Preliminary Evaluation of Quaternary Deposits and Palaeolithic Potential*, were:

- To establish the broad presence/absence, nature and distribution of Quaternary deposits across the evaluation area and, where necessary, to correlate these as a deposit model.
- To develop a preliminary assessment of the possible Pleistocene geoarchaeological potential of the evaluation area.
- To establish a broad preliminary model for the evaluation areas Pleistocene geoarchaeological potential.

3.2 General objectives

3.2.1 To achieve the above aims, the general objectives of the evaluation were:

- To ascertain (where Quaternary deposits are encountered) their extent, depth below ground surface, character and date.
- To establish the extent to which previous development and/or other processes have affected Quaternary deposits at the site.
- To establish the likely impact on any surviving Quaternary deposits of the proposed development.
- To determine the presence and potential of lithic artefact evidence and faunal remains in the sediments encountered.
- To determine the presence and potential of palaeoenvironmental evidence in the sediments encountered.
- To determine the presence of, or potential for, undisturbed primary context Palaeolithic occupation surfaces in the sediments encountered.
- To interpret the depositional and post-depositional history of any artefactual or biological evidence found.
- To establish correlations of any Pleistocene deposits found with reference to adjacent and regional sequences and to national frameworks.

- To assess in local, regional and national terms, the archaeological and geological significance of any Pleistocene deposits encountered, and their potential to fulfil current research objectives.
- To establish whether further field evaluation to clarify the Pleistocene geoarchaeological potential is required, and if so to make recommendations on the methods and location of further intrusive or non-intrusive works.

3.3 Site-specific objectives

3.3.1 Following consideration of the geoarchaeological potential of the site, the site-specific objectives of the evaluation were:

- To evaluate the geoarchaeological potential of Pleistocene and Holocene deposits that are infilling the remnant dry valley that extended through the evaluation area prior to quarrying.
- To evaluate whether post-Boyn Hill/Orsett Heath later Pleistocene fluvial deposits may be present in the evaluation area.
- To evaluate the extent of to which these deposits have been impacted by previous quarrying activity.
- To correlate these sediment bodies with those in the wider area.
- To provide an evaluation of the potential of these deposits to preserve Palaeolithic artefactual remains, paleoenvironmental evidence and material suitable for dating.
- To assess the extent of postpositional processes which have impacted on Palaeolithic artefact and Pleistocene paleoenvironmental datasets.
- To identify any deposits which require more detailed field evaluation.

4 METHODS

4.1 Introduction

4.1.1 All works were undertaken in accordance with the detailed methods set out within the WSI (Wessex Archaeology 2018) and in general compliance with the standards outlined in relevant CIfA and Historic England guidance (CIfA 2014a, Historic England 2015). The methods employed are summarised below.

4.2 Fieldwork methods

General

4.2.1 The test pit locations were set out in the positions proposed in the WSI, with the exceptions of Test Pit 6, which had to be moved eastwards to avoid buried services, and Test Pit 13 that was re-sited to the east to allow for safe machine access (**Figure 1**). Test Pits 1 and 3 were not excavated as the locations were near services and the areas capped by the concrete bases of now demolished buildings. Test pits positions were located through real time kinematic (RTK) survey using a Leica GNSS connected to Leica's SmartNet service. All survey data was recorded in OS National Grid coordinates and heights above OD (Newlyn), as defined by OSGM15 and OSTN15, with a three-dimensional accuracy of at least 50 mm.

4.2.2 Immediately prior to fieldwork commencing the client provided information regarding the presence of any below/above-ground services, and any ecological, environmental or other constraints.

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

4.2.4 11 test pits, each measuring approximately 3 m in length and 2 m wide, were excavated using a 360º excavator equipped with a toothless bucket, under the constant supervision and instruction of a recognised Palaeolithic specialist with experience of recording, interpreting and sampling Pleistocene sediments. Machine excavation proceeded in level spits of approximately 50-100 mm, respecting the interface between sedimentary units, until either the solid geology was exposed or further excavation became impractical.

4.2.5 Test pits were entered at the maximum safe depth (usually c. 1.2m, but less if loose sands/gravel are present) to record the upper stratigraphy. After excavation had progressed beyond this depth, recording took place without entering the test pit.

4.2.6 Test pits completed to the satisfaction of the client and the Kent County Council's (KCC) Heritage and Conservation Team were backfilled using excavated materials in the order in which they were excavated, and left level on completion. No other reinstatement or surface treatment was undertaken.

Sampling

4.2.7 Samples of suitable deposits were taken at appropriate intervals (usually 100l every 20 cm), in stratigraphic succession and sieved on site through a 10-mm mesh to investigate whether artefacts and/or macro mammalian faunal remains are present. Where found, these were collected and bagged by context. Two units were suitable for sampling: gravelly horizons within colluvial deposits and Coombe deposits (see **Table 1**).

Table 1 Number of litres of sampled by stratigraphic context

Stratigraphic	Litres
Phase I: Coombe deposits	1800
Phase III: Colluvium	1500

4.2.8 When sediments were encountered that were not suitable for dry-sieving (i.e. too clayey), excavation proceeded in shallower spits of c. 5cm, looking carefully for the presence of any geoarchaeological evidence, and the spit samples will also be carefully investigated by hand.

4.2.9 The potential for deposits to preserve paleoenvironmental evidence was assessed for each sediment unit by the monitoring Pleistocene geoarchaeological specialist. Bulk sediment samples of suitable deposits were taken to be subsampled for rapid palaeoenvironmental assessment (**Table 2**)

Table 2 Samples taken for rapid palaeoenvironmental assessment

Sample number	Context number	Stratigraphic context	Description	Sample Size
704	704	Phase I: Coombe deposits	Light yellow clay with silty clay horizons; frequent fine-medium sub-angular chalk clasts; moderately frequent medium-coarse sub-angular flint clasts; compact; well consolidated	10L
705	704	Phase I: Coombe deposits	Light yellow clay with silty clay horizons; frequent fine-medium sub-angular chalk clasts; moderately frequent medium-coarse sub-angular flint clasts; compact; well consolidated	10L
806	806	Phase II: Valley fill	Dark orange-brown sandy clay silt; fine sand; occasional fine-coarse sub-angular flint clasts; occasional rounded flint clasts (reworked Tertiary); moderately compact; moderately consolidated	10L
807	807	Phase II: Valley fill	Light orange sandy silt; fine sand; occasional fine-medium sub-angular flint clasts; occasional rounded flint clasts (reworked Tertiary); moderately compact; moderately consolidated	10L
907	905	Phase I: Colluvium	Light greyish brown, slightly sandy, silty clay; frequent fine sub-angular chalk and flint clasts; moderately compact; poorly consolidated	10L
1005	1005	Phase II: Valley fill	Light orange slightly sandy silt; fine sand; occasional fine sub-angular flint clasts; occasional fine-medium rounded flint clasts (reworked Tertiary); moderately compact; moderately consolidated	10L
1006	1006	Phase II: Valley fill	Medium orange-brown slightly sandy clay silt; fine sand; occasional fine-medium sub-angular flint clasts; frequent rounded flint clasts (reworked Tertiary); moderately compact; moderately consolidated	10L
1101	1105	Phase II: Valley fill	Light orange slightly clayey silt; very occasional fine sub-angular flint clasts; very occasional fine-medium rounded flint clasts (reworked Tertiary); moderately compact; well consolidated	10L

4.2.10 Sampling strategies, including for the recovery, processing and assessment of environmental samples, were in line with those detailed in the WSI (Wessex Archaeology 2018). The treatment of environmental remains was in general accordance with Wessex Archaeology's in-house guidance, which adheres to the principles outlined in Historic

England's guidance (English Heritage 2011 and Historic England 2015). *Guidance for the collection, documentation, conservation and research of archaeological materials* (CIfA 2014b) and *Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation* (English Heritage 2011).

4.2.11 Consideration was given to the suitability of any sediment units for optically stimulated luminescence dating (OSL).

Recording

4.2.12 A representative section from each test pit was drawn at a scale of 1:20 and photographed in colour (digital) once excavation has reached its full depth, and at appropriate stages during excavation if features of interest are revealed. Other sections were drawn and/or photographed as appropriate.

4.2.13 Accompanying geoarchaeological descriptions and interpretations were recorded (see **Appendix 1**).

4.2.14 A full photographic record was made using a digital camera. This recorded both the detail and the general context of the principal lithological and stratigraphic features, and the evaluation area as a whole. Digital images have been subject to managed quality control and curation processes, which has embedded appropriate metadata within the image and will ensure long term accessibility of the image set.

4.3 Monitoring

4.3.1 The client informed the Senior Archaeological Officer to KCC of the start of the geoarchaeological test pitting and its progress. Wendy Rodgers, Senior Archaeological at Kent County Council, monitored the evaluation on behalf of the LPA.

5 RESULTS

5.1 Stratigraphic evidence

5.1.1 The specific lithologies and stratigraphic succession encountered in each test pit are outlined in **Appendix 1**. This data was entered in Rockworks 17 to create a projected cross-section through the deposits encountered (**Figure 2**).

5.1.2 The deposits form a consistent sequence reflecting material in-filling the preserved portions of the dry valley. These have been removed from much of the site, but are preserved within two areas in the south-east of the evaluation area, separated by a tramway cutting excavated to chalk bedrock.

5.1.3 The stratigraphy was consistent between the test pits and followed the geometry of valley. The generalised sequence is listed and the deposits described below:

- *Phase C: Structural chalk*
- *Phase I: Coombe deposits*

  Coombe deposits are poorly sorted, cold-climate slope deposits formed through gelifluction processes (alternate freeze-thawing). These deposits are composed of a mix of chalk and flint contained within a mass of chalky matrix.
- *Phase II: Valley fill deposits*

These primarily reflect material eroded and reworked downslope from the valley margins. They may include an alluvial component reflecting episodic floodwater flow.

- *Phase III: Colluvium*

  Colluvium is a slope deposit of Holocene age formed in areas of topographical relief where soil instability has been bought on by activities such as clearance of woodland, agricultural activity and soil degradation, leading to downslope movement of sediment.

- *Phase TS: Top soil/made ground*

Phase C: Structural chalk

5.1.4 This was exposed within Test Pits 5, 6, 7, 12 and 13 and its surface geometry reflects that of the valley. It slopes down from near the surface along the south and eastern edge of the evaluation area, to the west where the Coombe and valley fill deposits are at their deepest. Where observed, it was directly overlain by Coombe deposits.

Phase I: Coombe deposits

5.1.5 This consists of fine-medium angular and sub-angular chalk and reworked, rounded Tertiary flint clasts within a clay-silty clay matrix (**Plate 1**). The deposit reflects material gelifllucted downslope under periglacial conditions (alternate freeze-thawing). When present, in the eastern most Test Pits (6, 7 and 13) its surface has been truncated and any overlying deposits removed.

Phase II: Valley fill deposits

5.1.6 These deposits consist of structureless, fine grained silty clays with containing very occasional sub-angular flint clasts and rounded flint clasts derived from Tertiary outcrops (**Plate 2**). They generally reflect fine grained material eroded from the valley margins and deposited through slope processes; the silt fraction is likely to include reworked, subaerially deposited loessic material. The deposit tends to become siltier and sandier with depth and may include an alluvial component.

5.1.7 These units are absent from eastern-most areas of the evaluation are and thicken from south-west to east, following the geometry of the valley. In the central area (Test Pits 8, 9 and 10) these deposits are more than 1.50m thick; this represents the deepest extant part of the valley.

5.1.8 Along the eastern valley margin, where these deposits are shallowest, they directly overlie Coombe deposits. Similarly, this appears to have been the case along the largely quarried eastern margin of the valley; this is indicated by a localised remnant of sediments preserved at the eastern side of the heavily quarried western part of the evaluation area, where this same relationship can be observed.

5.1.9 Within the deepest part of the valley (Test Pits 8, 9 and 10) the deposits underlying the valley fill sediments were generally not observed due to the depth of the overlying material, however, within Test Pit 11 2.10m of Valley fill deposits are underlain by Coombe deposits.

5.1.10 Within the base of Test Pit 10 (at a depth of 3.80 m) a coarse to very coarse rounded and sub-rounded flint gravel was encountered. Based on this limited exposure, this gravel

appears to be largely matrix free implying that it may be a lag gravel from which the fine-grained material has been removed.

Phase III: Colluvial deposits

5.1.11 The sequence is overlain by silty clay with varying frequencies of medium sub-angular flint clasts and medium round flint clasts derived from Tertiary sources. This reflects colluvial material resulting from the downslope movement of generally fine-grained sediments. Where preserved, this varies in thickness from ~0.40m on the western eastern margins of the valley to ~2.00m – 1.50 m within the centre (Test Pits 4, 8, 9, 10 and 11).

5.2 Artefactual evidence

Introduction

5.2.1 Artefactual material was obtained from the colluvial deposits (Phase III); no material was encountered in the any units within other stratigraphic phases.

Table 3 Finds by material type and context

Test Pit	Sample	Context	Unit	Description	Condition
8	801	805	Colluvium	Hard hammer flint flake	Unabraded; edge damaged; moderately patinated
8	801	805	Colluvium	Oyster shell fragment	
8	802	805	Colluvium	Oyster shell fragment	
8	804	805	Colluvium	Hard hammer flint flake	Unabraded; edge damaged; moderately patinated
8	804	805	Colluvium	Soft hammer flint flake	Unabraded, edge damaged; unpatinated
9	901	905	Colluvium	Hard hammer flint flake	Unabraded; edge damaged; moderately patinated
9	901	905	Colluvium	Bone fragment	
9	901	905	Colluvium	Bone fragment	
9	903	905	Colluvium	Hard hammer flint flake	Unabraded; edge damaged; moderately patinated
9	903	905	Colluvium	Hard hammer flint flake	Unabraded; edge damaged; heavily patinated
9	904	905	Colluvium	Hard hammer flint flake	Unabraded; edge damaged; moderately patinated
9	904	905	Colluvium	Hard hammer flint flake	Unabraded; edge damaged; heavily patinated
9	904	905	Colluvium	Soft hammer flint flake	Unabraded; edge damaged; heavily patinated
9	904	905	Colluvium	Soft hammer flint flake	Unabraded, heavily patinated
10	1001	1003	Colluvium	Hard hammer flint flake	Unabraded; edge damaged; heavily patinated
10	1003	1003	Colluvium	Hard hammer flint flake	Unabraded; edge damaged; heavily patinated

Lithics

5.2.2 The small lithic assemblage from the colluvium is techno-typologically undiagnostic, cannot be assigned to any period and consists of both hard hammer and soft hammer flakes. Its edge damaged condition and the fact that it was only recovered from gravelly horizons within the colluvium indicate that it represents material reworked downslope as clasts within these coarser sediments

Other material

5.2.3 Two long bone bones and two oyster shell fragments were recovered from the colluvium. The bone fragments are small, heavily acid etched, fragments; they are not attributable to species but may be derived from the same element. They were recovered from the same context as the lithic material (coarser, gravelly horizons within the colluvium). They are thus similarly likely to have been derived through slope processes.

5.3 Palaeoenvironmental assessment

Introduction

5.3.1 Seven bulk samples taken from the Coombe and valley fill deposits were processed by wet-sieving and flotation and rapidly assessed for the presence/ absence/ abundance of palaeoenvironmental evidence. The purpose of this assessment is to determine the potential of the palaeoenvironmental remains to address the projects aims and to provide data valuable for wider research frameworks.

Table 4 Sample Processing Summary

Deposits	No. of samples	Volume (litres)	Processing	Processing mesh size	Sorting fractions
Phase I: Coombe deposits	2 (<704>, <705>)	20 (10 each)	Flotation	250 µm (flot), 500 µm (residue)	>4mm, >2mm, >1mm, >500µm, >250µm
Phase II: Valley fill	5 (<806>, <807>, <1005>, <1006>, <1101>)	2.5 (0.5 each)	Wet-sieving	63µm	>500µm, >250µm, >125µm, >63µm
Totals	**7**	**22.5**			

Methods

5.3.2 Five samples from the valley deposits were identified as suitable for rapid assessment of their potential to preserve key palaeoenvironmental indicators. The 10l bulk samples were sub-sampled and five 0.5 litre sub-samples processed. These were wet sieved through a 63µm sieve. The residues were dried and split into 500µm, 250µm, 125µm fractions

5.3.3 Due to the coarse lithology of the Coombe deposits two 10l bulk samples were processed in their entirety by standard flotation methods, and scanned to provide a rapid assessment of their potential to preserve key palaeoenvironmental indicators. These samples (of 10 litres of volume) were processed by standard flotation methods on a Syraf-type flotation tank; the flot retained on a 250µm mesh and the residues on a 500µm. The residues were fractionated into 4 mm and 1 mm fractions and dried.

5.3.4 The coarse fractions (>4 mm) were sorted with the naked eye; the finer fractions of the residues and the flots were scanned using a stereo incident light microscopy (Leica MS5 microscope) at magnifications of up to x40 for the identification of environmental remains. The preservation, relative abundance and nature of the environmental remains (charred plant remains, charcoal, molluscs, small vertebrates, ostracods, foraminifera, slug plates) was recorded, as well as the presence of bioturbation proxies that hint to the effect of post depositional agents on the vertical and horizontal distribution of the remains and their possible intrusive or residual character. Nomenclature follows Anderson (2005) for molluscs and Stace (1997) for plants.

Results

5.3.5 The samples from the Phase II: valley fill deposits provided small assemblages of environmental remains (**Appendix 2**). These are result of recent bioturbation, as shown

by the presence of plant roots, uncharred seeds, earthworm eggs and remains of blind snails (*Cecilioides acicula*), a burrowing taxon of relatively recent (Medieval) introduction.

5.3.6 The Phase 1: Coombe deposit have similarly been affected by extensive recent bioturbation; presence of plant roots, uncharred seeds, earthworm eggs and remains of *Cecilioides acicula.* One of the samples contains abundant mollusc remains. This includes species with a wide range of environmental tolerances, which is likely to reflect this bioturbation; some of these species could, however, be contemporary with these cold stage deposits. These samples include fossilised ostracods, foraminifera and fish teeth reworked from Tertiary deposits.

Conclusions

5.3.7 The assemblages have low palaeoenvironmental potential due to their small size and diversity and impact of recent bioturbation.

5.4 Scientific dating potential

5.4.1 Consideration was given to the suitability of sediment units for optically stimulated luminescence dating (OSL). Although the sandy silts found at depth within the valley fill deposits (Test pits 8, 9 and 10) may have contained horizons with potential for successful OSL dating, these were not safely accessible, and in any case lacked significant artefactual or ecofactual material. No accessible deposits were suitable for OSL dating, and no samples were taken.

6 DISCUSSION

6.1.1 The results of the Pleistocene test pitting evaluation can be summarized as follows:

- Quaternary deposits are absent from the quarried regions of the evaluation area, but are preserved in two areas in the south-east (**Figure 1**).
- The deposits preserved in these areas form part of a sequence infilling a valley that ran approximately from south-west to north east through the evaluation area prior to quarrying.
- These deposits generally reflect material deposited by slope process and include Combe, valley fill and colluvial deposits. In the deepest preserved parts of this sequence the valley fill deposits may include an alluvial component, with a possible lag gravel identified at depth in Test pit 10.
- The colluvial deposits contain derived Holocene artefacts and ecofacts.
- The potential of Combe deposits and valley fill to provide secure palaeoenvironmental datasets has been assessed; the results of this assessment indicate that this potential is low.

6.1.2 The youngest units encountered consist of Holocene colluvium (Phase III), which results from the down slope movement of fine grained material caused by soil instability bought on by activities such as clearance of woodland, agricultural activity and soil degradation. The evaluation has demonstrated that coarser, more gravelly horizons within this contain displaced prehistoric lithic artefacts and ecofacts. No specifically datable artefacts were identified.

6.1.3 In the areas where Quaternary sediments are preserved, the Holocene colluvium overlies a series of fine grained valley fill sediments (Phase II) and coarser Coombe deposits (Phase I). Due to the depth of the valley fill deposits in western part of evaluation area, the stratigraphic relationship between these two units was only observed along the valley edges. Here, valley fill sediments were observed to overly the Coombe deposits.

6.1.4 The Coombe deposits reflect material geliflucted downslope under periglacial conditions (alternate freeze-thawing), likely during the last glacial period.

6.1.5 The valley fill deposits consist of clay silts and silty clays, with a coarse gravel at their base in Test Pit 10. The material generally reflects slope wash with an aeolian input, but there is some indication of episodic floodwater flow involved in their deposition at their base. The valley fill deposits probably date to the late last glacial and early Holocene.

6.1.6 The sequence of Quaternary deposits encountered in the evaluation area resembles some of those identified within the Craylands Gorge (Wessex Archaeology 2004) and at Knockhall Road, Greenhithe (ASE 2012, Wessex Archaeology 2016, 2017).

6.1.7 During a walkover survey, deposits were identified 150m south-west of the evaluation area in Craylands Gorge. This formed a sequence of 2.30m of decalcified/oxidised sandy silt, overlying 0.70cm of decalcified, possibly water-lain, 'Coombe Rock' with nodular flint and rounded chalk, which rested on degraded chalk (Wessex Archaeology 2004, Figure 8). A worked flake was recovered from this 'Coombe Rock'. The sandy silt in this exposure resembles the valley fill sediments (Phase II) identified in the evaluation. The 'Coombe Rock' would appear not to be represented in the evaluation area; it is lithologically distinct from the geliflucted Coombe deposits (Phase I) and was likely deposited through different (fluvial) depositional processes.

6.1.8 At Knockhall Road a sequence of valley deposits (Phase V of the Knockhall Road sequence) have been identified, which consist of slope wash that was generally coarser-grained (more gravelly) at the base and finer (more sandy, and clayey/silty) upwards. These have been equated to the late Devensian and early Holocene.

6.1.9 The geological mapping indicates that the sandy silt in the Craylands Gorge section and valley deposits at Knockhall Road are within the same valley as those identified within the current evaluation, (BGS online viewer) and are likely to form part of an analogous sequence valley fill deposits.

6.1.10 Similar deposits infilling dry valleys that dissect the local landscape have also been recorded by Burchell (1931a, 1931b, and 1933). As with the current evaluation, this work records numerous lithic and pottery remains through the upper parts of these sequences (Holocene colluvium), as well as local concentrations of molluscan remains in un-decalcified parts of the colluvial build-up.

6.2 Assessment of Pleistocene potential

6.2.1 Large areas of the site have been quarried to chalk bedrock and have no Pleistocene geoarchaeological potential.

6.2.2 Two areas where Quaternary deposits are preserve Quaternary deposits; these are in the south-eastern port of the evaluation area (**Figure 2**). These form part of a sequence of late Pleistocene and Holocene slope deposits. Based on the results of this evaluation and consideration of analogous deposits in the wider study area, the Pleistocene geoarchaeological potential of these deposits is regarded as low.

7 CONCLUSIONS

7.1.1 The Pleistocene geoarchaeological test pitting evaluation has demonstrated that remnants of Quaternary deposits are preserved in two areas of the evaluation area. These are part of a single sequence of deposits infilling a valley that ran approximately from south-west to north east through the evaluation area prior to quarrying.

7.1.2 The sequence generally reflects material deposited by slope process over an extended period (the late Pleistocene to the Holocene).

7.1.3 The potential for the deposits to preserve artefacts and ecofacts was assessed. Gravelly horizons within the Holocene colluvium contain reworked lithic artefacts; such evidence was absent from all other deposits. Environmental evidence was present is some deposits, in all cases this either results from, or has been heavily impacted upon, by recent bioturbation.

7.1.4 The sequence of deposits encountered equate with Phase V of sequence previously identified at Knockhall Road, Greenhithe (ASE 2012, Wessex Archaeology 2016, 2017).

7.1.5 Based on the results of this evaluation the Pleistocene potential of the deposits across the evaluation area can be regarded as low to none and no further work is recommended.

8 ARCHIVE STORAGE AND CURATION.

8.1 Museum

8.1.1 The archive, which includes paper records, graphics and digital data, will be prepared following the standard conditions for the acceptance of excavated archaeological material, and in general following nationally recommended guidelines (SMA 1995; CIfA 2014c; Brown 2011; ADS 2013).

8.2 Preparation of the archive

8.2.1 The archive, which includes paper records, graphics and digital data, will be prepared following the standard conditions for the acceptance of excavated archaeological material, and in general following nationally recommended guidelines (SMA 1995; CIfA 2014c; Brown 2011; ADS 2013).

8.2.2 All archive elements are marked with the site code **204360**, and a full index will be prepared. The physical archive currently comprises the following:

- 01 files/document cases of paper records and A3/A4 graphics;

8.3 Selection policy

8.3.1 Wessex Archaeology follows national guidelines on selection and retention (SMA 1993; Brown 2011, section 4). In accordance with these, and any specific guidance prepared by the museum, a process of selection and retention will be followed so that only those artefacts or ecofacts that are considered to have potential for future study will be retained. The selection policy will be agreed with the museum, and is fully documented in the project archive.

8.4 Security copy

8.4.1 In line with current best practice (eg, Brown 2011), on completion of the project a security copy of the written records will be prepared, in the form of a digital PDF/A file. PDF/A is an

ISO-standardised version of the Portable Document Format (PDF) designed for the digital preservation of electronic documents through omission of features ill-suited to long-term archiving.

8.5 OASIS

8.5.1 An OASIS online record (http://oasis.ac.uk/pages/wiki/Main) has been initiated, with key fields and a .pdf version of the final report submitted. Subject to any contractual requirements on confidentiality, copies of the OASIS record will be integrated into the relevant local and national records and published through the Archaeology Data Service ArchSearch catalogue.

9 COPYRIGHT

9.1 Archive and report copyright

9.1.1 The full copyright of the written/illustrative/digital archive relating to the project will be retained by Wessex Archaeology under the *Copyright, Designs and Patents Act* 1988 with all rights reserved. The client will be licenced to use each report for the purposes that it was produced in relation to the project as described in the specification. The museum, however, will be granted an exclusive licence for the use of the archive for educational purposes, including academic research, providing that such use conforms to the *Copyright and Related Rights Regulations* 2003. In some instances, certain regional museums may require absolute transfer of copyright, rather than a licence; this should be dealt with on a case-by-case basis.

9.1.2 Information relating to the project will be deposited with the Historic Environment Record (HER) where it can be freely copied without reference to Wessex Archaeology for the purposes of archaeological research or development control within the planning process.

9.2 Third party data copyright

9.2.1 This document and the project archive may contain material that is non-Wessex Archaeology copyright (eg, Ordnance Survey, British Geological Survey, Crown Copyright), or the intellectual property of third parties, which Wessex Archaeology are able to provide for limited reproduction under the terms of our own copyright licences, but for which copyright itself is non-transferable by Wessex Archaeology. Users remain bound by the conditions of the *Copyright, Designs and Patents Act* 1988 with regard to multiple copying and electronic dissemination of such material.

REFERENCES

Anderson, R., 2005, An annotated list of the non-marine Mollusca of Britain and Ireland, *Journal of Conchology* 38, 607-637

Archaeology South East 2005 *An Archaeological Desk-Based Assessment and Walkover Survey of land Adjacent to London Road and Craylands Lane (Little Swanscombe), Swanscombe, Kent* ASE Project Number 1996

Archaeology South-East, 2012. *Stage 2 Geo-Archaeological Evaluation and Assessment: Land at the Former Empire Sports Ground, Knockhall Road Greenhithe, Kent, DA9 9EZ*. Unpublished client report submitted to Kent County Council.

ADS 2013 *Caring for Digital Data in Archaeology: a guide to good practice*. Archaeology Data Service and Digital Antiquity Guides to Good Practice

British Geological Survey online viewer http://mapapps.bgs.ac.uk/geologyofbritain/home.html (accessed 17/05/18)

Brown, D H 2011 *Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation* (revised edition). Archaeological Archives Forum

Bridgland D R. 1994. *The Quaternary of the Thames*. Chapman & Hall: London.

Bromehead, C N 1920 BGS 6'' Survey, notes on sheet X northwest

Burchell JPT, 1931a. Pottery with flint implements of Upper Palaeolithic facies from Swanscombe, Kent. *Nature* 128 (no. 3230): 548

Burchell JPT, 1931b. Derived early Mousterian (Levalloisian) implements in the melt-water gravels of the Coombe Rock glaciation. *Nature* 128 (no. 3239): 909

Burchell JPT, 1933. The Northfleet 50 ft. submergence later than the Coombe Rock of post-Early Mousterian times. *Archaeologia* 83: 67-91.

CIfA 2014a *Standard and Guidance for Archaeological Field Evaluation*. Reading, Chartered Institute for Archaeologists

CIfA 2014b *Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials*. Reading, Chartered Institute for Archaeologists

CIfA 2014c *Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives*. Reading, Chartered Institute for Archaeologists

Conway, B W, McNabb, J, and Ashton, N. (eds) 1996. *Excavations at Barnfield Pit, Swanscombe, 1968-72*. British Museum Occasional Paper 94, London.

English Heritage 2011 *Environmental Archaeology: a guide to theory and practice of methods, from sampling and recovery to post-excavation*. Swindon, Centre for Archaeology Guidelines

Historic England 2015 *Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record*. Swindon, Historic England

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

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

Stace, C 1997 New flora of the British Isles (2nd edition), Cambridge: Cambridge University Press

Wessex Archaeology, 2004. *Swanscombe Heritage Park and Craylands Gorge, Swanscombe, Kent: Archaeological and Geological Desk-Based Assessment*. Unpublished client report [March 2004] submitted to Kent County Council

Wessex Archaeology, 2016. *Former Empire Sports Ground, Knockhall, Greenhithe, Kent: Palaeolithic Test Pit Evaluation (1st and 2nd phases): Integrated Report and Historic Environment Framework*. Unpublished client report [October 2016] submitted to Kent County Council

Wessex Archaeology 2018 *Land at Craylands Lane, Swanscombe, Kent. Written Scheme of Investigation for Pleistocene Geoarchaeological Test Pitting Evaluation*

APPENDICES

Appendix 1 Test pit summaries

The stratigraphic succession encountered in each test pit are outlined below. Heights are given in metres above OD.

NGR coordinates and OD heights taken at centre of each trench; depth bgl = below ground level

Site:	Craylands Lane, Swanscombe		**Test Pit ID:**	TP 2	**Comments:**		
Site code:	204360				NGR Easting/Northing 559835.023, 174932.938		
Level (top):	6.18 m aOD	**Length:**	2.80 m				
		Width:	2.00 m				
		Depth:	2.70 m				

Depth		**Sediment description**	**Interpretation**	**Context**	**Samples < >**	**Lithic finds**	**Enviro remains**
Mbg	**mOD**						
0.00−+2.70	6.18−+3.48	Made ground	MADE GROUND	201	-	-	-

Site:	Craylands Lane, Swanscombe		**Test Pit ID:**	TP 4	**Comments:**		
Site code:	204360				NGR Easting/Northing 559835.190. 174908.082		
Level (top):	6.32 m aOD	**Length:**	3.00 m				
		Width:	2.00 m				
		Depth:	3.00 m				

Depth		**Sediment description**	**Interpretation**	**Context**	**Samples < >**	**Lithic finds**	**Enviro remains**
Mbg	**mOD**						
0.00−0.18	6.32−6.14	Black, slightly sandy, silty loam; soft; loose; unconsolidated; friable −ABRUPT –	TOPSOIL/ MODERN VEGETATION	401	-	-	-
0.18−0.26	6.14−5.88	Light yellow, gravelly, silty sand; fine sand; frequent medium angular flint clasts and rounded flint clasts; loose; unconsolidated − SHARP –	RE-DEPOSITED MATERIAL	402	-	-	-
0.26−0.54	5.88−5.62	Dark grey, slightly silty, clay loam; moderately frequent fine sub-angular chalk clasts; occasional medium sub-angular flint clasts; occasional brick fragments; soft; loose; unconsolidated −ABRUPT –	TOPSOIL	403	101	-	-

Site:	Craylands Lane, Swanscombe		**Test Pit ID:**	TP 4	**Comments:**
Site code:	204360				NGR Easting/Northing 559835.190. 174908.082
Level (top):	6.32 m aOD	**Length:**	3.00 m		
		Width:	2.00 m		
		Depth:	3.00 m		

Depth		**Sediment description**	**Interpretation**	**Context**	**Samples < >**	**Lithic finds**	**Enviro remains**
Mbg	**mOD**						
0.54−2.10	5.62−4.06	Medium brown. slightly sandy, clay; fine sand; frequent fine sub-angular chalk clasts; occasional medium rounded flint clasts (reworked Tertiary); moderately compact; moderately consolidated −ABRUPT –	COLLUVIUM	404	-	-	-
2.10−2.50	4.06−3.66	Dark orange silty clay; very occasional fine-medium sub-angular flint clasts; very occasional fine-medium rounded flint clasts (reworked Tertiary); compact; well consolidated −SHARP –	SLOPE DEPOSIT	405	-	-	-
2.50−+3.00	3.66-+3.16	Light yellow silty clay; frequent fine-medium sub-angular chalk clasts; moderately frequent medium-coarse sub-angular flint clasts; compact; well consolidated	COOMBE DEPOSIT	406	401 402	- -	- -

Site:	Craylands Lane, Swanscombe		**Test Pit ID:**	TP 5	**Comments:**
Site code:	204360				NGR Easting/Northing 559854.112, 174907.243
Level (top):	6.88 m aOD	**Length:**	3.20 m		
		Width:	2.00 m		
		Depth:	2.25 m		

Depth		**Sediment description**	**Interpretation**	**Context**	**Samples < >**	**Lithic finds**	**Enviro remains**
Mbg	**mOD**						
0.00−0.30	6.88−6.58	Black, slightly sandy, silty loam; fine sand; soft; loose; unconsolidated; friable −SHARP –	TOPSOIL/ MODERN VEGETATION	501	-	-	-
0.30−0.64	6.58−6.24	Dark grey, slightly silty, clay loam; occasional medium sub-angular flint clasts; occasional round flint clasts (reworked Tertiary); rooted; soft; loose; unconsolidated −SHARP –	TOPSOIL	502	-	-	-

Site:	Craylands Lane, Swanscombe		**Test Pit ID:**	TP 5	**Comments:**
Site code:	204360				NGR Easting/Northing 559854.112, 174907.243
Level (top):	6.88 m aOD	**Length:**	3.20 m		
		Width:	2.00 m		
		Depth:	2.25 m		

Depth		**Sediment description**	**Interpretation**	**Context**	**Samples < >**	**Lithic finds**	**Enviro remains**
Mbg	**mOD**						
0.64-1.10	6.24−5.14	Dark grey brown, slightly silty, clay; moderately frequent fine-medium sub-angular chalk and flint clasts; compact; moderately consolidated −SHARP –	COLLUVIUM	503	-	-	-
1.10−2.12	5.14−4.12	Light yellow clay with silty clay horizons; frequent fine-medium sub-angular chalk clasts; moderately frequent medium-coarse sub-angular flint clasts; occasional round flint clasts (reworked Tertiary); compact; well consolidated −SHARP –	COOMBE DEPOSIT	504	501 502 503 504	- - - -	- - - -
2.12−+2.25	4.12−+3.97	Structural chalk	CHALK	505	-	-	-

Site:	Craylands Lane, Swanscombe		**Test Pit ID:**	TP 6	**Comments:**
Site code:	204360				Surface of Coombe deposits (602) truncated NGR Easting/Northing 559881.120, 174899.027
Level (top):	9.02 m aOD	**Length:**	2.65 m		
		Width:	2.00 m		
		Depth:	1.05 m		

Depth		**Sediment description**	**Interpretation**	**Context**	**Samples < >**	**Lithic finds**	**Enviro remains**
Mbg	**mOD**						
0.00−0.35	9.02−8.67	Black, slightly sandy, silty loam; fine sand; soft; loose; unconsolidated; friable −SHARP –	TOPSOIL/ MODERN VEGETATION	601	-	-	-
0.35−0.81	8.67−8.61	Light yellow clay with silty clay horizons; frequent fine-medium sub-angular chalk clasts; moderately frequent medium-coarse sub-angular flint clasts; compact; well consolidated −SHARP –	COOMBE DEPOSIT	602	601 602	- -	- -
0.81−+1.05	8.61−8.37	Structural chalk	CHALK	603	-	-	-

Site:	Craylands Lane, Swanscombe		**Test Pit ID:**	TP 7	**Comments:**
Site code:	204360				Surface of Coombe deposits (703) truncated
Level (top):	7.21 m aOD	**Length:**	3.40 m		NGR Easting/Northing 559866.568, 174897.670
		Width:	2.00 m		
		Depth:	1.25 m		

Depth		**Sediment description**	**Interpretation**	**Context**	**Samples < >**	**Lithic finds**	**Enviro remains**
Mbg	**mOD**						
0.00−0.22	7.21−6.99	Black, slightly sandy, silty loam; fine sand; soft; loose; unconsolidated; friable −SHARP –	TOPSOIL/ MODERN VEGETATION	701	-	-	-
0.22-0.62	6.99−6.59	Dark grey, slightly silty, clay loam; occasional medium sub-angular flint clasts; rooted; soft; loose; unconsolidated −SHARP –	TOPSOIL	702	-	-	-
0.62−1.17	6.59−6.04	Light yellow clay with silty clay horizons; frequent fine-medium sub-angular chalk clasts; moderately frequent medium-coarse sub-angular flint clasts; compact; well consolidated −SHARP –	COOMBE DEPOSIT	703	701 702 703 704 705	- - - - -	- - - - -
1.17−+5.96	6.04−+5.96	Structural chalk	CHALK	704	-	-	-

Site:	Craylands Lane, Swanscombe		**Test Pit ID:**	TP 8	**Comments:**
Site code:	204360				NGR Easting/Northing 559778.418, 174889.894
Level (top):	7.56 m aOD	**Length:**	3.20 m		
		Width:	2.00 m		
		Depth:	4.15 m		

Depth		**Sediment description**	**Interpretation**	**Context**	**Samples < >**	**Lithic finds**	**Enviro remains**
Mbg	**mOD**						
0.00−0.15	7.56−7.41	Black, slightly sandy, silty loam; fine sand; soft; loose; unconsolidated; friable −ABRUPT –	TOPSOIL/ MODERN VEGETATION	801	-	-	-
0.15-0.32	7.41−7.24	Dark grey silty clay loam; occasional medium sub-angular flint clasts; occasional round flint clasts (reworked Tertiary); soft; loose; unconsolidated −ABRUPT –	TOPSOIL	802	-	-	-

Site:	Craylands Lane, Swanscombe		**Test Pit ID:**	TP 8	**Comments:**		
Site code:	204360				NGR Easting/Northing 559778.418, 174889.894		
Level (top):	7.56 m aOD	**Length:**	3.20 m				
		Width:	2.00 m				
		Depth:	4.15 m				

Depth		**Sediment description**	**Interpretation**	**Context**	**Samples < >**	**Lithic finds**	**Enviro remains**
Mbg	**mOD**						
0.32−0.45	7.24−7.11	Light greyish brown, slightly sandy, silty clay; fine sand; soily lenses; frequent fine sub-angular chalk and flint clasts; moderately compact; poorly consolidated −ABRUPT –	RE-DEPOSITED (805)	803	-	-	-
0.45−0.70	7.11−6.86	Dark grey silty clay; moderately frequent fine sub-angular chalk clasts; moderately frequent fine-medium sub-angular flint clast; moderately frequent rounded flint clasts (reworked Tertiary); loose; poorly consolidated −ABRUPT –	BURRIED TOPSOIL	804	-	-	-
0.70−2.38	6.86−5.18	Light greyish brown, slightly sandy, silty clay; fine sand; frequent fine sub-angular chalk and flint clasts; moderately compact; poorly consolidated −ABRUPT –	COLLUVIUM	805	801 802 803 804 805	2 flint flakes - - 2 flint flakes -	1 oyster shell frag. 1 oyster shell frag. - - -
2.38−3.96	5.18−3.67	Dark orange-brown sandy clay silt; fine sand; occasional fine-coarse sub-angular flint clasts; occasional rounded flint clasts (reworked Tertiary); moderately compact; moderately consolidated −ABRUPT –	SLOPE DEPOSIT	806	806	-	-
3.96−+4.15	3.67−3.48	Light orange sandy silt; fine sand; occasional fine-medium sub-angular flint clasts; occasional rounded flint clasts (reworked Tertiary); moderately compact; moderately consolidated	SLOPE DEPOSIT; POSS. ALLUVIAL COM-PONENT	807	807	-	-

Site:	Craylands Lane, Swanscombe		**Test Pit ID:**	TP 9	**Comments:** Cut for pipe trench in northern end of test pit NGR Easting/Northing 559780.013. 174891.511
Site code:	204360				
Level (top):	7.69 m aOD	**Length:**	3.30 m		
		Width:	2.00 m		
		Depth:	3.37 m		

Depth		**Sediment description**	**Interpretation**	**Context**	**Samples < >**	**Lithic finds**	**Enviro remains**
Mbg	**mOD**						
0.00−0.13	7.69−7.56	Black, slightly sandy, silty loam; fine sand; soft; loose; unconsolidated; friable; heavily rooted −ABRUPT –	TOPSOIL/ MODERN VEGETATION	901	-	-	-
0.13−0.48	7.56−7.21	Dark grey-brown silty clay; occasional medium sub-angular flint clasts; occasional round flint clasts (reworked Tertiary); soft; loose; unconsolidated −SHARP –	TOPSOIL	902	-	-	-
0.48−0.55	7.21−7.14	Light greyish brown, slightly sandy, silty clay; fine sand; soily lenses frequent fine sub-angular chalk and flint clasts; moderately compact; poorly consolidated −SHARP –	RE-DEPOSITED (905)	903	-	-	-
0.55−0.73	7.14−6.96	Dark grey silty clay; moderately frequent fine sub-angular chalk clasts; moderately frequent fine-medium sub-angular flint clast; moderately frequent rounded flint clasts (reworked Tertiary); loose; poorly consolidated −ABRUPT –	BURRIED TOPSOIL	904	-	-	-
0.73−2.57	6.96−5.12	Light greyish brown, slightly sandy, silty clay; fine sand; frequent fine sub-angular chalk and flint clasts; moderately compact; poorly consolidated −ABRUPT –	COLLUVIUM	905	901 902 903 904 905 906 907	1 flint flake - 2 flint flakes - - - -	2 bone frags. - - - - - -
2.57−+3.37	5.12-+4.32	Dark orange-brown, slightly sandy, silty clay; fine sand; occasional fine-medium sub-angular flint clasts; frequent rounded flint clasts (reworked Tertiary); moderately compact; moderately consolidated	SLOPE DEPOSIT	906			

Site:	Craylands Lane, Swanscombe		**Test Pit ID:**	TP 10	**Comments:**
Site code:	204360				NGR Easting/Northing 559794.410, 174889.541
Level (top):	6.96 m aOD	**Length:**	3.00 m		
		Width:	2.00 m		
		Depth:	3.97 m		

Depth		**Sediment description**	**Interpretation**	**Context**	**Samples**	**Lithic finds**	**Enviro remains**
Mbg	**mOD**				**< >**		
0.00–0.11	6.96–6.85	Black, slightly sandy, silty loam; fine sand; soft; loose; unconsolidated; friable; heavily rooted –ABRUPT–	TOPSOIL/ MODERN VEGETATION	1001	-	-	-
0.11–0.56	6.85–6.40	Dark grey-brown silty clay; occasional medium sub-angular flint clasts; occasional round flint clasts (reworked Tertiary); soft; loose; unconsolidated –ABRUPT –	TOPSOIL	1002	-	-	-
0.56–1.41	6.40–5.55	Light greyish brown silty clay; frequent fine-medium sub-angular flint clasts; frequent round flint clasts (reworked Tertiary); moderately compact; poorly consolidated –ABRUPT –	COLLUVIUM	1003	1001 1002 1003 1004	1 flint flake - 1 flint flake -	- - - -
1.41–2.37	5.55–4.59	Dark orange-brown, slightly sandy, silty clay; fine sand; occasional fine-medium sub-angular flint clasts; frequent rounded flint clasts (reworked Tertiary); moderately compact; moderately consolidated –DIFFUSE–	SLOPE DEPOSIT	1004	-	-	-
2,37–2.92	4.59–4.04	Light orange, slightly sandy, silt; fine sand; occasional fine sub-angular flint clasts; occasional fine-medium rounded flint clasts (reworked Tertiary); moderately compact; moderately consolidated –DIFFUSE–	SLOPE DEPOSIT; POSS. ALLUVIAL COM-PONENT	1005	1005	-	-
2.92–3.80	4.04-3.16	Medium orange-brown, slightly sandy, clay silt; fine sand; occasional fine-medium sub-angular flint clasts; frequent rounded flint clasts (reworked Tertiary); moderately compact; moderately consolidated –ABRUPT–	SLOPE DEPOSIT; POSS. ALLUVIAL COM-PONENT	1006	-	-	-

Site:	Craylands Lane, Swanscombe		**Test Pit ID:**	TP 10	**Comments:**
Site code:	204360				NGR Easting/Northing 559794.410,174889.541
Level (top):	6.96 m aOD	**Length:**	3.00 m		
		Width:	2.00 m		
		Depth:	3.97 m		

Depth		**Sediment description**	**Interpretation**	**Context**	**Samples < >**	**Lithic finds**	**Enviro remains**
Mbg	**mOD**						
3.80−+3.97	3.16-2.99	Coarse-very coarse rounded and sub-rounded flint gravel; ?matrix free	?LAG GRAVEL	1007	-	-	-

Site:	Craylands Lane, Swanscombe		**Test Pit ID:**	TP 11	**Comments:**
Site code:	204360				NGR Easting/Northing 559811.768, 174874.665
Level (top):	6.66 m aOD	**Length:**	3.80 m		
		Width:	2.00 m		
		Depth:	3.05 m		

Depth		**Sediment description**	**Interpretation**	**Context**	**Samples < >**	**Lithic finds**	**Enviro remains**
Mbg	**mOD**						
0.00−0.15	6.66−6.51	Black, slightly sandy, silty loam; fine sand; soft; loose; unconsolidated; friable; heavily rooted –ABRUPT–	TOPSOIL/ MODERN VEGETATION	1101	-	-	-
0.15−0.40	6.51−6.26	Dark grey-brown silty clay; occasional medium sub-angular flint clasts; occasional round flint clasts (reworked Tertiary); soft; loose; unconsolidated –ABRUPT –	TOPSOIL	1102	-	-	-
0.40−0.84	6.26−5.72	Grey-brown, slightly sandy, silty clay; fine sand; occasional fine-medium sub-angular flint clasts; occasional round flint clasts (reworked Tertiary); moderately compact; poorly consolidated –DIFFUSE –	COLLUVIUM	1103	-	-	-
0.84−2.10	5.72−4.46	Dark orange-brown, slightly sandy, silty clay; fine sand; moderately frequent fine-medium sub-angular flint clasts; occasional rounded flint clasts (reworked Tertiary); moderately compact; moderately consolidated –ABRUPT–	SLOPE DEPOSIT	1104	-	-	-

Site:	Craylands Lane, Swanscombe		**Test Pit ID:**	TP 11	**Comments:**
Site code:	204360				NGR Easting/Northing 559811.768, 174874.665
Level (top):	6.66 m aOD	**Length:**	3.80 m		
		Width:	2.00 m		
		Depth:	3.05 m		

Depth		**Sediment description**	**Interpretation**	**Context**	**Samples < >**	**Lithic finds**	**Enviro remains**
Mbg	**mOD**						
2,10−2.41	4.46−4.15	Light orange, slightly clayey, silt; very occasional fine sub-angular flint clasts; very occasional fine-medium rounded flint clasts (reworked Tertiary); moderately compact; well consolidated –ABRUPT–	SLOPE DEPOSIT	1105	1101	-	-
2.41−2.94	4.15−3.62	Dark orange silty clay; very occasional fine-medium sub-angular flint clasts; very occasional rounded flint clasts (reworked Tertiary); moderately compact; moderately consolidated –SHARP–	SLOPE DEPOSIT;	1106	-	-	-
2.94−+3.05	3.62−+3.51	Light yellow clay with slightly silty clay horizons; frequent fine-medium sub-angular chalk clasts; moderately frequent medium-coarse sub-angular flint clasts; rounded flint clasts (reworked Tertiary); compact; well consolidated	COOMBE DEPOSIT		-	-	-

Site:	Craylands Lane, Swanscombe		**Test Pit ID:**	TP 12	**Comments:**
Site code:	204360				NGR Easting/Northing 559851.374,174868.392
Level (top):	8.83 m aOD	**Length:**	3.60 m		
		Width:	2.00 m		
		Depth:	1.62 m		

Depth		**Sediment description**	**Interpretation**	**Context**	**Samples < >**	**Lithic finds**	**Enviro remains**
Mbg	**mOD**						
0.00−0.18	8.83−8.65	Black, slightly sandy, silty loam; fine sand; soft; loose; unconsolidated; friable; heavily rooted –ABRUPT–	TOPSOIL/ MODERN VEGETATION	1201	-	-	-

Site:	Craylands Lane, Swanscombe		**Test Pit ID:**	TP 12	**Comments:**		
Site code:	204360				NGR Easting/Northing 559851.374,174868.392		
Level (top):	8.83 m aOD	**Length:**	3.60 m				
		Width:	2.00 m				
		Depth:	1.62 m				

Depth		**Sediment description**	**Interpretation**	**Context**	**Samples < >**	**Lithic finds**	**Enviro remains**
Mbg	**mOD**						
0.18–0.39	8.65–8.44	Dark grey-brown silty clay; occasional medium sub-angular flint clasts; occasional round flint clasts (reworked Tertiary); soft; loose; unconsolidated –ABRUPT –	TOPSOIL	1202	-	-	-
0.39–0.54	8.44–8.29	Grey-brown, slightly sandy, silty clay; fine sand; occasional fine-medium sub-angular flint clasts; occasional round flint clasts (reworked Tertiary); moderately compact; moderately consolidated –ABRUPT –	COLLUVIUM	1207	-	-	-
0.39–0.79	8.44–8.04	Dark orange-brown, slightly sandy, silty clay; fine sand; moderately occasional fine-medium sub-angular flint clasts; frequent rounded flint clasts (reworked Tertiary); moderately compact; poorly consolidated – heavily rooted –SHARP–	SLOPE DEPOSIT	1203	-	-	-
0.79–1.05	8.04–7.78	Light yellow clayey silt; frequent fine sub-angular flint clasts; frequent fine-medium rounded flint clasts (reworked Tertiary); moderately compact; moderately consolidated –SHARP–	SLOPE DEPOSIT	1206	-	-	-
0.79–1.20	8.04–7.63	Light yellow clay with slightly silty clay horizons; frequent fine-medium sub-angular chalk clasts; moderately frequent medium-coarse sub-angular flint clasts; moderately frequent rounded flint clasts (reworked Tertiary); compact; well consolidated –SHARP–	COOMBE DEPOSIT	1204	1201 1202 1203	- - -	- - -
1.20–+1.62	7.63–+7.21	Structural chalk	CHALK	1205	-	-	-

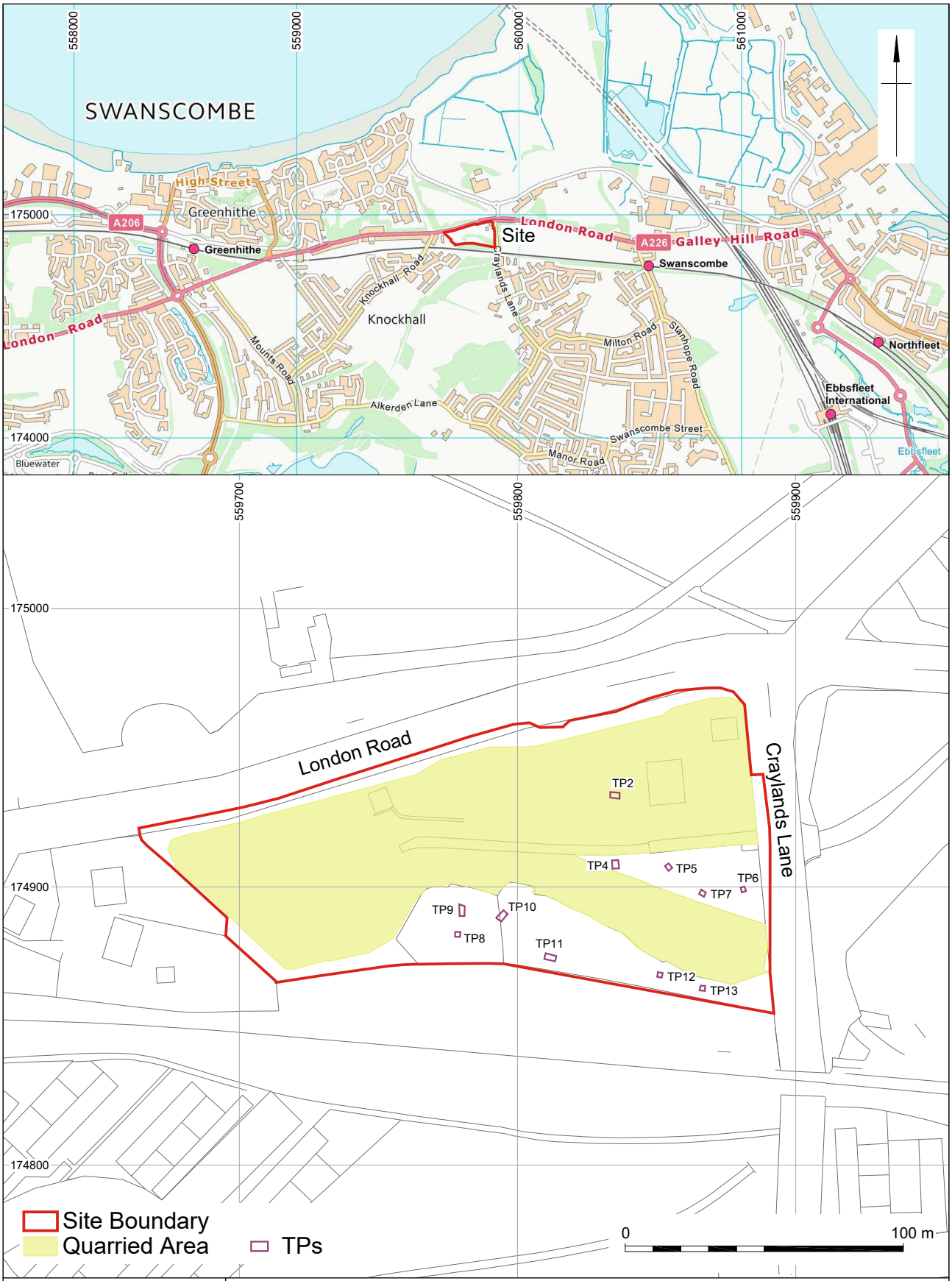
Site:	Craylands Lane, Swanscombe		**Test Pit ID:**	TP 13	**Comments:**
Site code:	204360				Description refers to north facing section; south facing section has topsoil (1302) overlying structural chalk (1303) at 9.70 m OD.
Level (top):	10.28 m aOD	**Length:**	3.30 m		Surface of structural chalk marked by periglacial stripes.
		Width:	2.00 m		
		Depth:	1.30 m		
			NGR Easting/Northing 559866.379,174863.583		

Depth		**Sediment description**	**Interpretation**	**Context**	**Samples < >**	**Lithic finds**	**Enviro remains**
Mbg	**mOD**						
0.00–0.17	10.28–10.11	Black, slightly sandy, silty loam; fine sand; soft; loose; unconsolidated; friable; heavily rooted –ABRUPT–	TOPSOIL/ MODERN VEGETATION	1301	-	-	-
0.17–0.41	10.11–9.70	Dark grey-brown silty clay; occasional medium sub-angular flint clasts; occasional round flint clasts (reworked Tertiary); soft; loose; unconsolidated –SHARP –	TOPSOIL	1302	-	-	-
0.41–1.02	9.70–9.09	Orange-brown to light yellow silty clay; frequent fine-medium sub-angular chalk clasts; frequent medium-coarse sub-angular flint clasts; compact; well consolidated –SHARP–	COOMBE DEPOSIT	1303	-	-	-
1.02–+1.30	9.09–+8.81	Structural chalk	CHALK	1304	-	-	-

Appendix 2: Environmental Data

Sample no.	Context no.	Sample volume (l)	Residue volume (ml)	Flot volume (ml)	Bioturbation proxies	Charred plant remains		Invertebrates		Vertebrates
						Wood charcoal	Charred Other	Insects	Molluscs + Crustaceans	
806	806	0.5	168	-	-	C (Mature)	-	-	C - Moll shell fragments, slug plate	-
807	807	0.5	192	-	Moll-t (*Cecilioides acicula*)	C (Mature)	-	-	B - Moll-t, Moll (mussel), Slug plate	-
1005	1005	0.5	215	-	Roots, Moll-t (*Cecilioides acicula*)	B (Mature)	-	-	C - Moll-t (*Vallonia* sp.)	-
1006	1006	0.5	146	-	Roots, Moll-t (*Cecilioides acicula*)	-	-	C		
1101	1105	0.5	150	-	Roots	-	-	-	-	-
704	704	10	835	35	80% roots, uncharred seeds (C, *Rubus* sp.), earthworm eggs, Moll-t (*Cecilioides acicula*)	C (Mature)	C - *Rumex* sp.	-	**C** - Moll-t (*Vallonia* sp.), Moll (mussel) **A** - Ostracods, Foraminifera	C - Fish teeth
705	704	10	675	80	80% roots, uncharred seeds (A, *Rubus* sp., *Mercuralis* sp., Chenopodiaceae), earthworm eggs, insect	C (Mature)	C -*Valerianella* sp., Asteraceae	-	**A*** - Moll-t (*Vallonia* sp., *Pupilla muscorum*, *Discus rotundatus, Cochlicopa* sp., cf *Candidula intersecta,* cf *Cernuella* sp., *Candidula gigaxii?, Aegopinella nitidula*, slug plates), Moll-f (Mussel shell frag) **A** -Ostracods, Foraminifera	C - Fish teeth

Key: A*** = exceptional, A** = 100+, A* = 30-99, A = >10, B = 9-5, C = <5; Moll-t = terrestrial molluscs, Moll-f = aquatic molluscs, Moll-m = marine molluscs



Coordinate system: OSGB36 (OSTN15/OSGM15)

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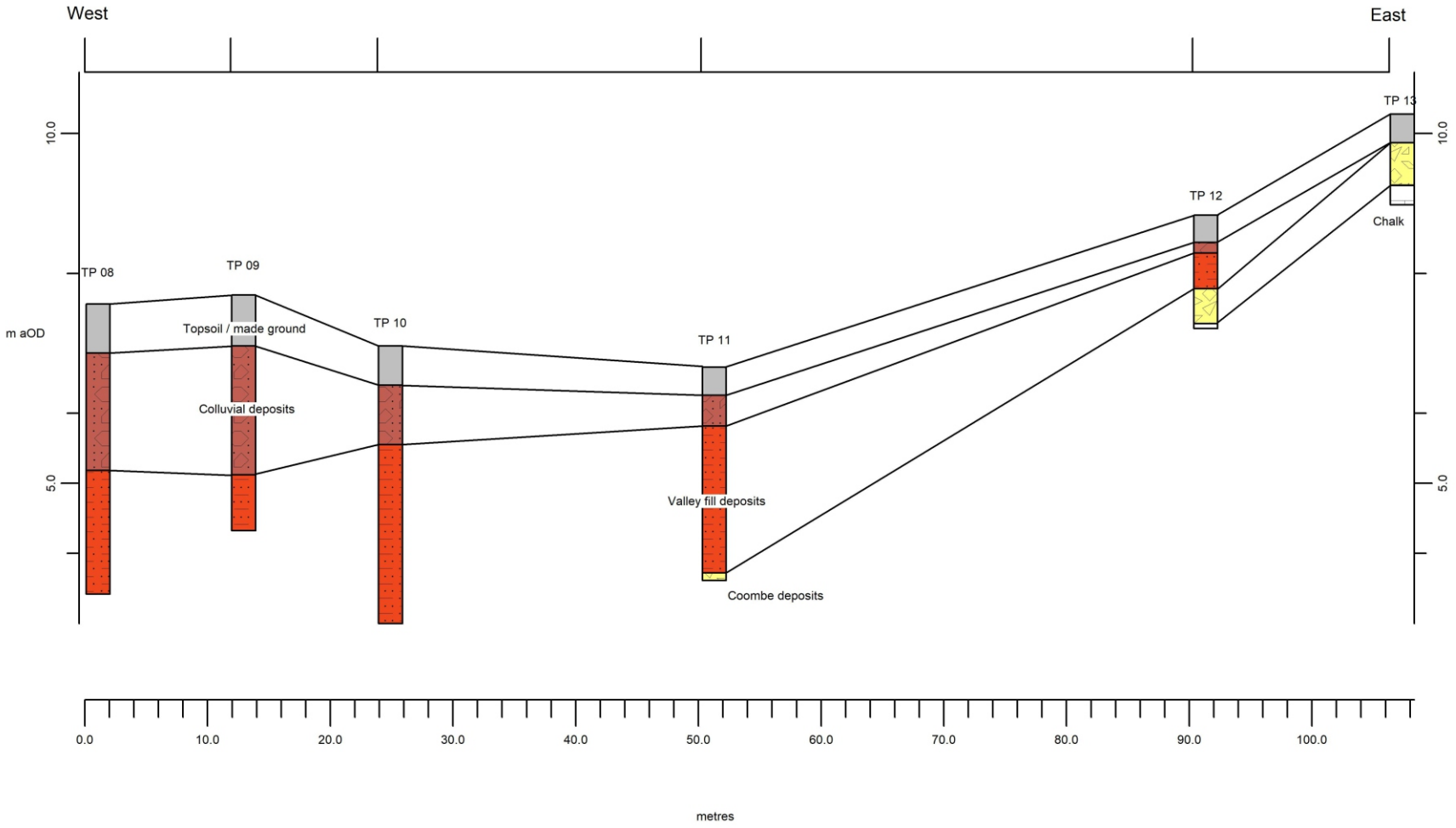
Site location and test pit plan

Figure 1

East-West Cross-Section



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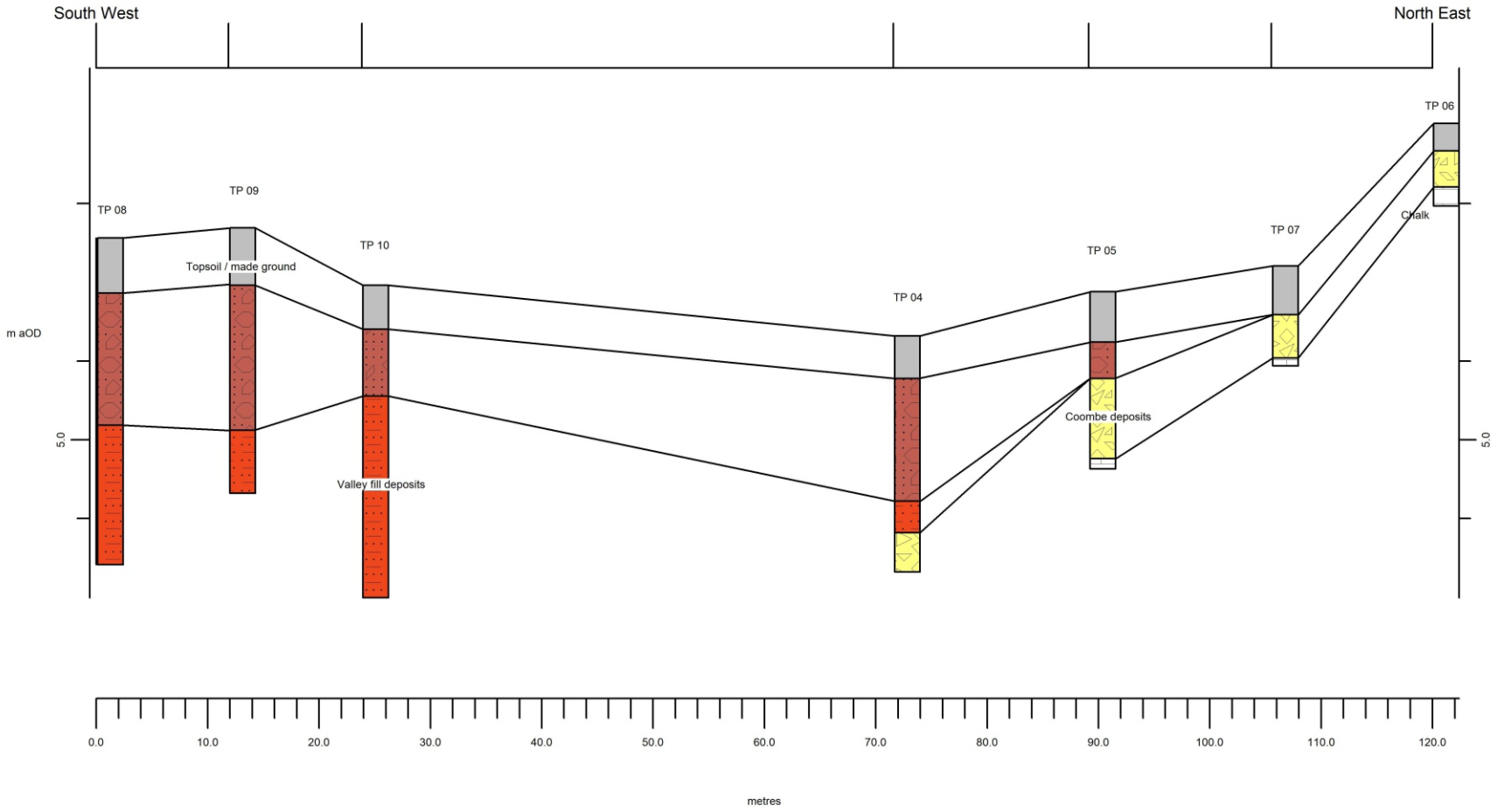
Projected east-west cross section through deposits

Figure 2

North East- South West Cross-Section



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Projected north east-south west cross section through deposits

Figure 3

Plate 1: Test Pit 12, north facing section through Coombe deposits

Plate 2: Test Pit 10, south-west facing section through alluvial and valley fill deposits

Date:	24/05/2018	Revision Number:	0
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