

POWDERMILL LANE, DARTFORD
FIELD EVALUATION REPORT (PALAEO LITHIC)

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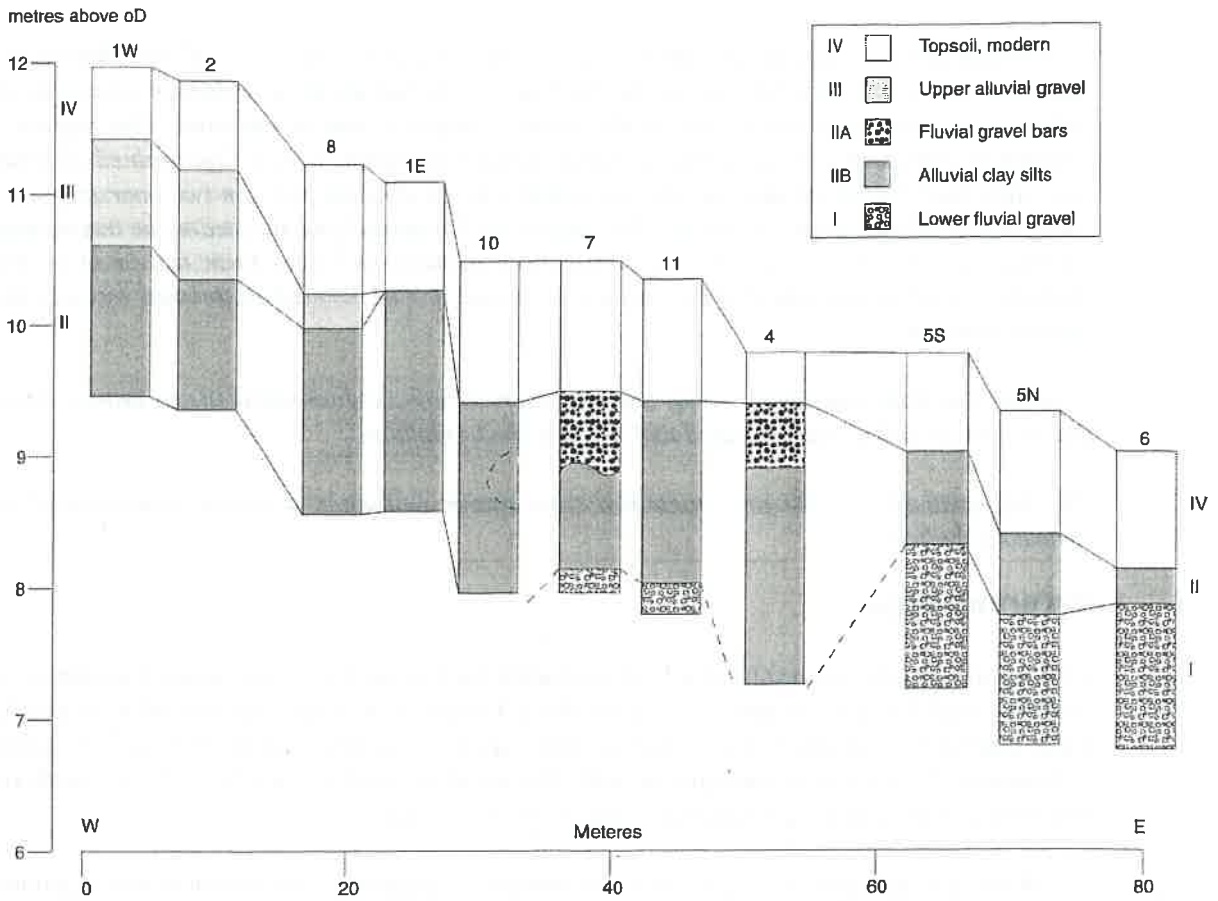


Fig. 1 Summary geological cross section

SUMMARY

Pleistocene fluvial deposits are present in all the trial pits. The base of the Pleistocene sequence was not reached in any of the trial pits, so its full depth, any deeper variations in sedimentary facies and the nature of the Tertiary bedrock remain unknown. The sequence appears to represent a single cycle of fluvial terrace formation with a fine-grained clay-silt unit, deposited during warmer interglacial conditions, sandwiched between two coarser gravel units, deposited during the end of the cold stages which preceded and succeeded the intervening interglacial. The Pleistocene units are broadly horizontal, and have been truncated by the modern ground surface which slopes down west to east across the evaluation area, towards the current Darent.

A single flint flake was found within the fine-grained clay-silt. It constituted the broken distal end of a blade and was unpatinated and in fairly fresh condition.

The fine-grained clay-silt unit contained very sparse molluscan evidence concentrated in restricted horizons.

1 INTRODUCTION

- 1.1 This report concerns the results of a field evaluation for Palaeolithic archaeological evidence on land proposed for housing development by Bovis Homes west of the Darent off Powdermill Lane, Dartford (main report, Figs 1 and 2). Two sites are proposed: Site A (TQ 542 728) south of Powdermill Lane and at the junction with Hawley Road, and Site B (TQ 543 730) north of Powdermill Lane adjoining Greenbanks and Brooklands Lake.
- 1.2 Site A has not been subject to previous development or quarrying. Geotechnical investigations (ENSR International 2000) have shown that Site A contains undisturbed Pleistocene sediments between 0.5m and 1.0m below the current ground surface. Site A was evaluated by excavation of 11 trial pits.
- 1.3 Geotechnical investigations (*ibid.*) have shown that Site B has been subject to previous quarrying, and contains modern made ground over most of its area to a depth of at least c. 3m and so was not subject to field evaluation at this stage.
- 1.4 The field evaluation of the Palaeolithic potential of Site A was carried out between 13 and 19 February by the Oxford Archaeological Unit under the supervision of Francis Wenban-Smith and Philip Rye as Palaeolithic specialists, and with Martin Bates attending on one day as a Quaternary geological specialist.

2 PALAEOLOGICAL ARCHAEOLOGICAL BACKGROUND

- 2.1 The evaluation area lies about 1km south of the Dartford town centre and immediately west of the River Darent, at the junction of Hawley Road and Powdermill Lane (main report, Figs 1 and 2). The ground surface of the evaluation area slopes down west towards the Darent, from c. 12.5-13m OD along its western side to c. 8.5m OD along its eastern side. The evaluation area is situated near the western fringe of a north-south trending Darent terrace deposit mapped as Taplow Gravel by the most recent British Geological Survey mapping (BGS 1998) [equivalent to Mucking Gravel in Bridgland's (1994) re-assessment of the nomenclature and correlations of Lower Thames deposits]. The higher ground immediately to the west is also a Darent terrace deposit, mapped as Lynch Hill Gravel [Corbets Tey Gravel for Lower Thames (Bridgland 1994)]. These north-south trending deposits incise into the higher east-west trending Thames deposits mapped as Boyn Hill Gravel [Orsett Heath Gravel for Lower Thames (Bridgland

1994)] c. 150m southeast of the western margin of the evaluation site.

- 2.2 No Palaeolithic archaeological material is known from the evaluation area itself. However over 30 handaxes (plus a few flakes), some in fresh condition indicating a lack of post-depositional disturbance, have been recovered from old gravel quarries (Smith's Pit, Brotherwood's Pit) exploiting the Lynch Hill/Corbets Tey Gravel on the higher ground the other side of Hawley Road from the evaluation area, in the area of Churchill Copse and Mitchell Close (Wessex Archaeology 1993). Detailed information on the stratigraphy in these quarries and the contexts of the archaeological material was not recorded. These deposits are mapped as continuing right up to the western boundary of the evaluation area, and it is likely that they are present in the higher ground along its western side.
- 2.3 Further to the north, at the mouth of the Darent where it joins the main Thames c. 5km northeast of the evaluation area, the Taplow Gravel is overlain by a substantial spread of "brickearth" [sandy clay-silt], newly christened the "Crayford Silt" in the recent British Geological Survey mapping (BGS 1998). The Crayford brickearth reaches 7.5m thick at its western boundary, thinning and disappearing eastwards over a distance of almost 1km. It rests on the surface of the Taplow Gravel which slopes down eastward from c. 7.5m OD where the brickearth is thickest to c. 4m OD where the brickearth disappears. The Crayford brickearth is famous for having contained substantial spreads of undisturbed Palaeolithic knapping scatters in association with large faunal remains such as mammoth and woolly rhinoceros (Spurrell 1880; Chandler 1914 & 1916; Roe 1981). These were mostly found at the base of the brickearth, at its junction with the underlying Taplow Gravel, although archaeological material has also been recovered from horizons within the main body of the brickearth. The Crayford brickearth also contained prolific supplementary biological palaeo-environmental evidence such as small vertebrates and molluscs, making it a Palaeolithic archaeological resource of international significance. Although Crayford brickearths have not been mapped at the evaluation site, pockets overlying the Taplow Gravel may well be present, particularly towards its western fringe, and if so are likely to contain significant Palaeolithic archaeological evidence.

3 AIMS AND OBJECTIVES

- 3.1 The aims and objectives of the Palaeolithic field evaluation were laid down in the specification produced by the Heritage Conservation Group from the Strategic Planning Directorate of Kent County Council (KCC 2000). The aim of the Palaeolithic field evaluation was to assess the distribution, nature and Palaeolithic archaeological significance of these Pleistocene deposits in respect of:
- 3.2
- The potential presence of primary context archaeological material
 - The presence and potential for analysis of any environmental/biological evidence in the sediments
 - The horizontal and vertical extent and sedimentological character of Pleistocene deposits at the site
 - The depositional and post-depositional history of any archaeological material as inferred from its condition and context
 - The local, regional or national archaeological and geological importance of any Pleistocene sediments encountered and their potential to address current research objectives

4 METHODS

- 4.1 In order to assess the distribution and nature of the Pleistocene deposits in the evaluation area and their Palaeolithic archaeological significance eleven trial pits (1E, 1W, 2, 4, 5N, 5S, 6, 7, 8,

10 and 11) were excavated. The trial pits were evenly distributed across the evaluation area so far as possible within the restrictions of i) avoiding proposed housing plots, and ii) being placed at the ends of the 10m or 20m trial trenches dug to evaluate for recent archaeological evidence, and given the same numbers (see Figs 3-13, main report).

- 4.2 Each trial pit was dug by mechanical excavator with a toothless ditching bucket and was c. 1.5m x 2.5m in plan and c. 2.5m deep. Sediment was removed in horizontal spits of c. 100mm thickness taking care not to cross stratigraphic boundaries. The depth of each spit and the sedimentary sequence revealed in each trial pit were recorded following standard descriptive practices. Once undisturbed Pleistocene deposits were reached, and if the sediments were suitable for sieving, a 100 litre sample from each 25cm depth of sediment was taken and sieved through a mesh of 1cm x 1cm for lithic artefacts and faunal remains. When sediments were not suitable for sieving, mechanical excavation continued in shallower spits of 50-100mm with a close watch kept for Palaeolithic evidence both in the freshly excavated spoil and in the base and sections of the trench as excavation progressed.
- 4.3 Each trial pit was entered after it had been excavated to a depth of c. 1.2m, a drawing made of one representative section at a scale of 1:20 and the sequence of deposits exposed given unique context numbers and described. Trial pits were then excavated to their full depth and the lower stratigraphy recorded without entering.
- 4.4 When fine-grained deposits potentially containing palaeo-environmental evidence such as molluscs and small vertebrates were exposed, samples of 10 litres were taken for off-site processing by wet-sieving through a graded nest of sieves of mesh-sizes 10mm, 4mm, 2mm, 1mm and 0.5mm. The dried residues were examined by the Palaeolithic specialist to see if any significant palaeo-environmental evidence was present.

5 RESULTS

Overview

Stratigraphy and interpretation

- 5.1 Pleistocene fluvial deposits are present in all the trial pits, underlying the topsoil and modern made ground which reaches to between 0.5m and 1m beneath the ground surface. The base of the Pleistocene sequence was not reached in any of the trial pits, so its full depth, any deeper variations in sedimentary facies and the nature of the Tertiary bedrock remain unknown. The deposits in each trial pit can be correlated with each other to model the overall sequence across the site (Fig. 1). The sequence appears to represent a single cycle of fluvial terrace formation, following Bridgland's model (1994), with a fine-grained clay-silt dominated unit, deposited during warmer interglacial conditions, sandwiched between two coarser gravel units, deposited during the onset of climatic amelioration at the end of the cold glacial stages which preceded and succeeded the intervening interglacial. The Pleistocene units are broadly horizontal, and have been truncated by the modern ground surface which slopes down west to east across the evaluation area, towards the current Darent.

- 5.2 Four main groups of deposits were recognised (Table 1).

<i>Group</i>	<i>Name</i>
IV	Topsoil, modern made ground
III	Upper fluvial gravel
II	Alluvial clay-silt and gravel
I	Lower fluvial gravel

Table 1: major groups of deposit in Palaeolithic trial pits

I Lower fluvial gravel

- 5.3 The lower fluvial gravel was present in most of the trial pits in the lower eastern half of the evaluation area (5S, 5N, 6, 7, 10 and 11). The deposit consists of a sub-horizontally bedded, moderately to poorly sorted, medium-coarse flint gravel in a medium-coarse, occasionally slightly silty, sand matrix. The top of the deposit is at c. 8m OD. Its base was not reached in any of the trial pits, and the gravel could extend several metres downwards. The local water table was also present at c. 7.5-8m OD, and the bases of trial pits dug to beneath this depth filled with water. This deposit is interpreted as having been laid down by fluvial action under fairly high energy aggradational conditions following the initial downcutting accompanying the climatic amelioration at the end of a cold stage.

II Alluvial clay-silt and gravel

- 5.4 These deposits were present in all of the trial pits. The trial pits were sufficiently close, and the sedimentary characteristics sufficiently similar to be confident that these deposits are directly equivalent, and not divided by a geological unconformity. These deposits were divided into two facies: IIA and IIB. Facies IIA, which was generally stratigraphically lower, consists of moderately to well compacted slightly sandy clay-silts with variable proportions of fine-medium sand and occasional fine gravel clasts. Occasional horizons of calcareous sedimentary concretions were present. The deposits of this facies form an abrupt contact with the underlying gravel at c. 8m OD in the lower trial pits where the lower gravel was present; otherwise this was the lowermost deposit. This fine-grained facies reached a maximum thickness of almost 1.5m in trial pits 1E and 4, and a maximum height of 10.5m in trial pit 1W. This facies is interpreted as floodplain alluvium, deposited during periodic overbank flooding during a period of climatic warmth.

- 5.5 Facies IIB, which was stratigraphically higher, was present in trial pits in the central part of the site (4, 7 and 10). It consists of moderately to well compacted sandy clay-silts with a higher gravel content, and occasionally medium to very coarse gravel clasts. The deposits of this facies form a diffuse and irregular contact with those of the underlying finer-grained facies IIA, and this junction occurs between c. 8.5m and 9.0m OD, their upper surface being truncated at c. 9.5m OD by modern activity. This facies is interpreted as gravel bars formed by short-lived streams migrating across the floodplain environment during the same period of climatic warmth during which the main body of facies IIA was deposited. A possible alternative interpretation is that facies IIB represents a colluvial or solifluction deposit, in which gravel clasts from higher deposits have become mobilised downslope, and have become mixed with the upper part of the underlying fine-grained facies IIA.

III Upper fluvial gravel

- 5.6 The upper fluvial gravel was only present in the trial pits in the highest part of the evaluation area along its western side (1W, 2 and 8). It consists of a poorly sorted, sub-horizontally bedded, moderate to very coarse flint gravel with some larger cobbles, with clasts varying in condition from sub-angular to well-rounded. The matrix, where present, is a clay-silty sand, although the gravel is clast supported in trial pit 1W. Its surface lies at c. 11.5m OD and its base lies at c. 10.5m OD, with an abrupt boundary with the underlying alluvial clay-silt. This gravel is interpreted as having been laid down by fluvial action under fairly high energy aggradational conditions at the onset of climatic amelioration at the end of a cold stage, preceding downcutting and further aggradation at a lower level.

IV Topsoil, modern made ground

- 5.7 Topsoil is present in all the trial pits, although truncated and disturbed by recent ground clearance with heavy plant which had left a deeply rutted and muddy ground surface over the

extent of the site. The topsoil is generally a dark greyish brown sandy clay-silt with varying proportions of flint pebbles and moderate to frequent root presence. It is underlain in all the trial pits by varying thickness of made ground, generally a variably compacted sandy clay silt with some flint pebbles and occasional fragments of modern ceramic building materials (cbm) such as tile, brick and pipeline.

Palaeolithic archaeological evidence

- 5.8 In total 4,100 litres (41 samples) of Pleistocene fluvial sediment were sieved for artefacts and larger faunal remains through a 1cm mesh on-site, with between 700 and 1,500 litres sieved for each of the main depositional groups identified (Table 2). Fifteen samples (150 litres), mostly from the fine-grained deposits of group IIA, but including single samples from deposits of groups I and IIB were processed by wet-sieving through a 0.5mm mesh off-site for smaller biological palaeo-environmental evidence (Table 2).

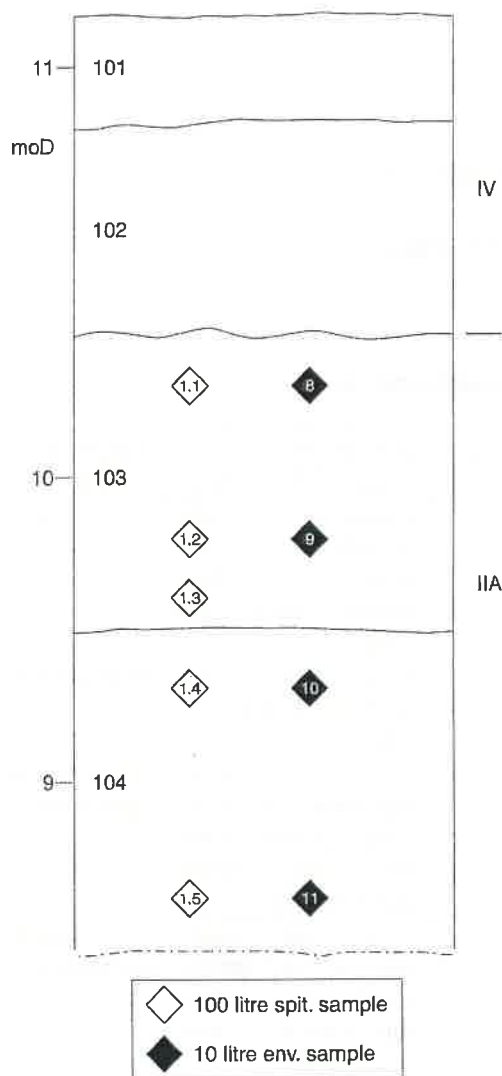
<i>Group</i>	<i>100 litre spit samples</i>	<i>10 litre environmental samples</i>
III	1,200	None
IIA	1,500	130
IIB	700	10
I	700	10

Table 2: total volumes (litres) of sediment processed for each depositional group

- 5.9 A flint waste flake was recovered from the group II deposits in trial pit 10 (context 1003, sample 10.2), at the junction between more gravelly deposits relating to a facies IIB depositional environment and the finer-grained group IIA facies. The flake was the broken distal end of a fairly broad and thin blade, and was in generally fresh condition, although the sharp edges were slightly abraded. No other artefacts or larger faunal remains were found.
- 5.10 Molluscs were present in the group IIA deposits in trial pits 1E (samples 10 and 11), 2 (sample 6) and 8 (sample 1). The molluscan evidence was very fragmentary, and whole specimens are very scarce, one being noted on site in trial pit 8 at the horizon of sample 1, and one being present in sample 10 from trial pit 1E. The molluscan evidence seems to be concentrated in narrow bands within the group IIA clay-silts in the higher western half of the evaluation area. No other biological palaeo-environmental evidence, such as plant macro-fossils or small vertebrates was found — occasional pieces of woody material found quite deep within the group IIA sediments in trial pit 8 were interpreted as intrusive modern roots, the sieved residues of the environmental samples having been quite full of small rootlets.

TRIAL PIT 1 (E)

Sedimentary sequence and interpreted depositional environment



<i>Context</i>	<i>Description</i>	<i>Interpretation</i>
101	Loose to mod. compacted, dark grey LOAM, occ. flint pebbles and freq. roots	Topsoil
102	Mod. compacted, greyish brown LOAM, freq. roots, occ. cbm	Made ground
103	Mod. compacted to firm, mottled dark gray/orange-brown sandy CLAY-SILT with occ. fine flint pebbles	Alluvial floodplain
104	Mod. compacted to firm, mottled orange/grey CLAY-SILT with calcareous concretions decreasing downward	Floodplain alluvium

Fig. 2 Trench 1 (east): section through geology

Palaeolithic archaeological evidence

5.11 No larger artefactual or faunal evidence was recovered by on-site sieving.

<i>Context</i>	<i>Sample</i>	<i>Volume l</i>	<i>Finds</i>
103	1.1	100	None
	1.2	100	None
	1.3	100	None
104	1.4	100	None
	1.5	100	None

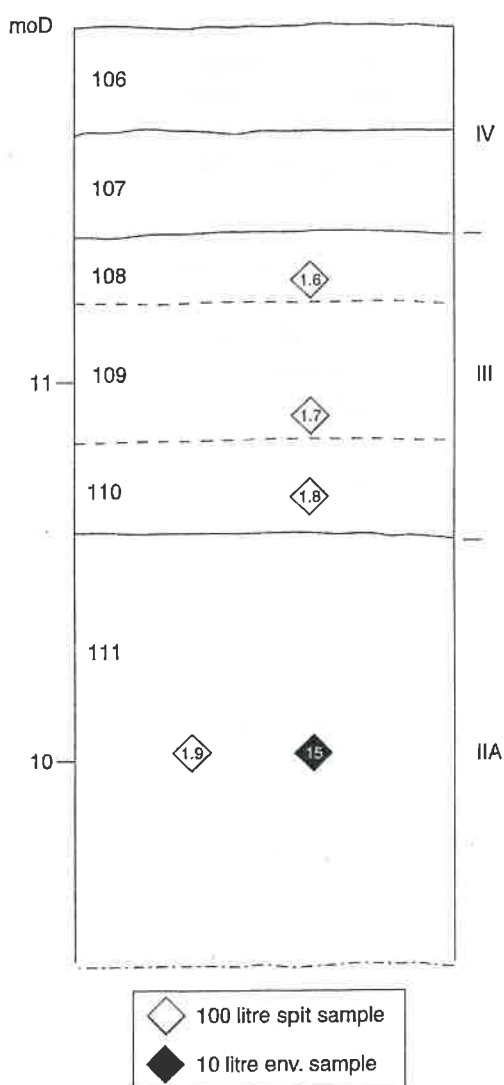
Environmental evidence

5.12 Scarce molluscan remains, generally fragmentary, were present in context 104, samples 10 and 11.

Context	Sample	Volume l	Find's
103	8	10	None
	9	10	None
104	10	10	Occasional molluscs and frag's
	11	10	Occasional mollusc frag's

TRIAL PIT 1 (W)

Sedimentary sequence and interpreted depositional environment



Context	Description	Interpretation
106	Loose to mod. compacted, dark greyish brown LOAM, occ. flint pebbles and freq. roots	Topsoil
107	Loose, reddish brown sandy SILT with occ. cbm	Made ground
108	Loose, matrix-supported and mod. sorted, greyish brown med.-coarse sandy flint GRAVEL	Fluvial channel aggradation
109	Very loose, clast-supported and poorly sorted, fine-v. coarse flint GRAVEL with occ. cobbles	Fluvial channel aggradation
110	Mod. loose, matrix supported and poorly sorted, reddish brown sandy flint GRAVEL	Fluvial channel aggradation
111	Mod. compacted, structureless, yellowish brown sandy CLAY-SILT; band of calcareous concretions c. 2m below g-surface	Floodplain alluvium

Fig. 3 Trench 1 (west): section through geology

Palaeolithic archaeological evidence

5.13 No larger artefactual or faunal evidence was recovered.

<i>Context</i>	<i>Sample</i>	<i>Volume l</i>	<i>Finds</i>
108	1.6	100	None
109	1.7	100	None
110	1.8	100	None
111	1.9	100	None

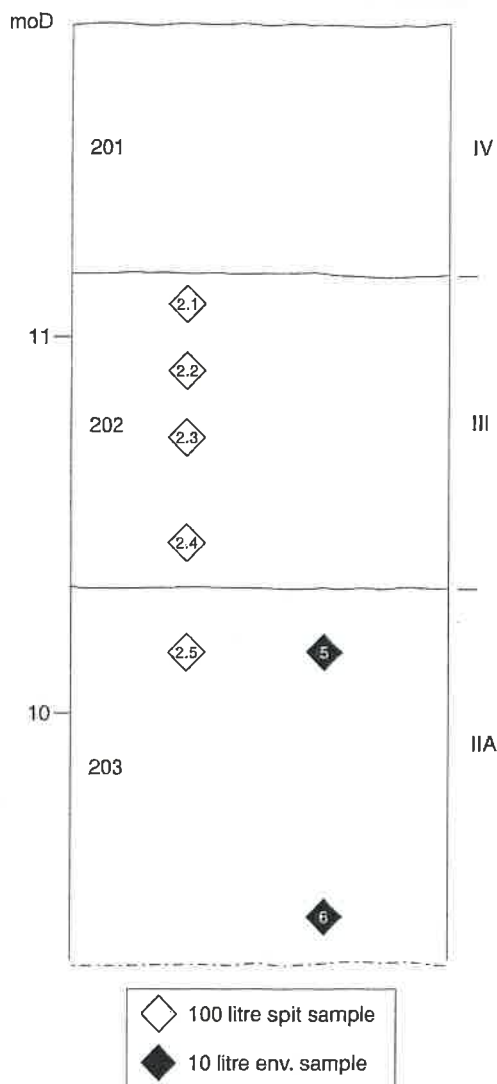
Environmental evidence

5.14 No environmental evidence was recovered.

<i>Context</i>	<i>Sample</i>	<i>Volume l</i>	<i>Finds</i>
111	15	10	None

TRIAL PIT 2

Sedimentary sequence and interpreted depositional environment



<i>Context</i>	<i>Description</i>	<i>Interpretation</i>
201	Mod. loose, dark grayish-brown LOAM with roots and cbm	Topsoil
202	Mod. compacted to firm, matrix supported and moderately sorted, GRAVEL in orange-brown clay-silty sand matrix	Fluvial channel aggradation
203	Mod. compacted to firm, structureless orange-brown CLAY-SILT with occ. sub-angular fine flint pebbles	Floodplain alluvium

Fig. 3 Trench 2: section through geology

Palaeolithic archaeological evidence

5.15 No larger artefactual or faunal evidence was recovered.

<i>Context</i>	<i>Sample</i>	<i>Volume l</i>	<i>Finds</i>
202	2.1	100	None
	2.2	100	None
	2.3	100	None
	2.4	100	None
203	2.5	100	None

Environmental evidence

5.16 A few fragments of mollusc shell were present in context 203, sample 6.

<i>Context</i>	<i>Sample</i>	<i>Volume l</i>	<i>Finds</i>
203	5	10	None
	6	10	Occasional mollusc fragments

TRIAL PIT 4

Sedimentary sequence and interpreted depositional environment

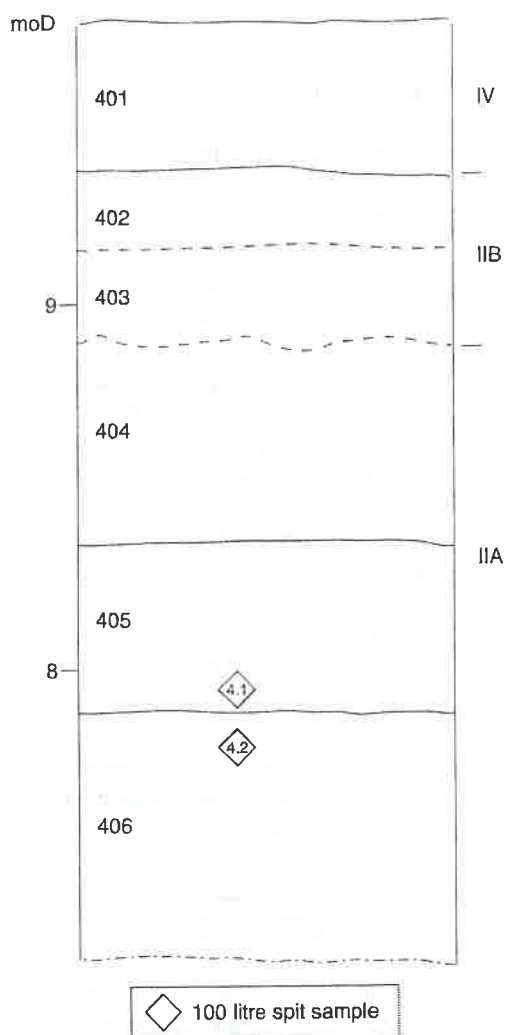


Fig. 4 Trench 4: section through geology

<i>Context</i>	<i>Description</i>	<i>Interpretation</i>
401	Mod. loose, dark grayish brown LOAM with freq. flint pebbles, roots, glass and cbm	Topsoil
402	Mod. compacted to loose, brown, sandy (m-f) LOAM/CLAY-SILT with flint pebbles and occ. roots	Floodplain alluvium, gravel bar
403	Mod. compacted, mottled brown/grey clayey LOAM containing flint pebbles	Floodplain alluvium, gravel bar
404	Mod. compacted to firm, mottled orange brown/light grey sandy (f) CLAY-SILT; contains occ. paler lenses sand and fine gravel	Floodplain alluvium
405	Mod. compacted to firm, structureless, slightly clayey, mottled orange-brown/light grey coarse SAND with freq. sub-angular to mod. rounded fine-coarse flint pebbles	Floodplain alluvium
406	Mod. compacted to firm, fine silty SAND/sandy (f) SILT with occ. flint nodules 10-30cm; gen. colour mottled orange/brownish yellow	Floodplain alluvium

Palaeolithic archaeological evidence

5.17 No larger artefactual or faunal evidence was recovered.

<i>Context</i>	<i>Sample</i>	<i>Volume l</i>	<i>Finds</i>
405	4.1	100	None
406	4.2	100	None

Environmental evidence

5.18 No samples were taken for environmental evidence.

TRIAL PIT 5 (S)

Sedimentary sequence and interpreted depositional environment

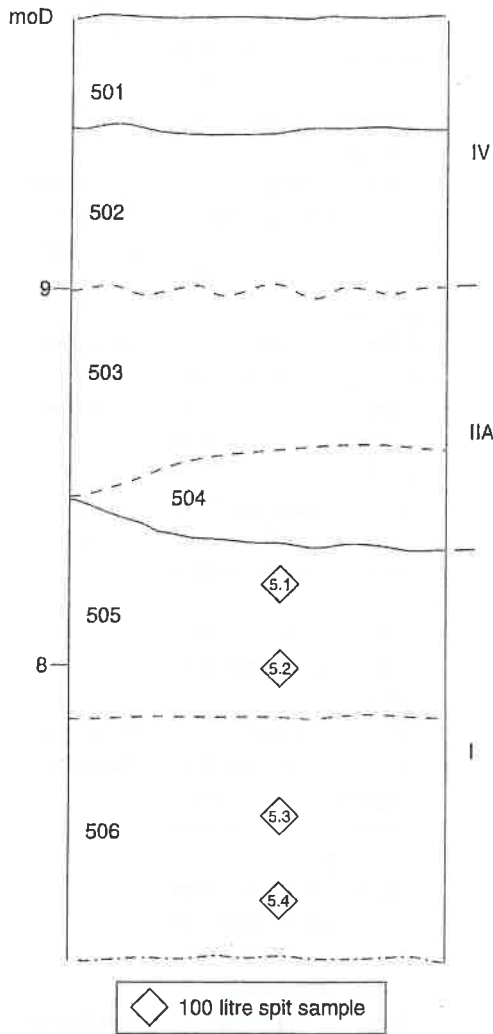


Fig. 5 Trench 5 (south): section through geology

Context	Description	Interpretation
501	Dark grayish brown LOAM; loose to mod. compacted with frq. roots, cbm and flint pebbles	Topsoil
502	Brown LOAM; mod. compacted, contains roots, cbm and flint pebbles	
503	Mottled orange-brown/grey sandy CLAY-SILT; firm and structureless, contains freq. sub-angular f-fractured flint pebbles and cobbles	Floodplain alluvium, gravel bar
504	Mottled orange-brown/grey CLAY-SILT; stiff and structureless	Floodplain alluvium
505	Mod. sorted coarse, matrix supported (sticky, gray, clay-silty) flint GRAVEL; pebbles gen. sub-angular, occ. rounded, matrix sandier towards base	Fluvial channel aggradation
506	Strong brown coarse SANDS and sandy GRAVEL, loose to mod. compacted, pebbles gen. mod. rounded, horizontally stratified with concreted horizons and bands of v. dark Mn staining; saturated with groundwater	Fluvial channel aggradation

Palaeolithic archaeological evidence

5.19 No larger artefactual or faunal evidence was recovered.

Context	Sample	Volume l	Finds
505	5.1	100	None
	5.2	100	None
506	5.3	100	None
	5.4	100	None

Environmental evidence

5.20 No samples were taken for environmental evidence.

TRIAL PIT 5 (N)

Sedimentary sequence and interpreted depositional environment

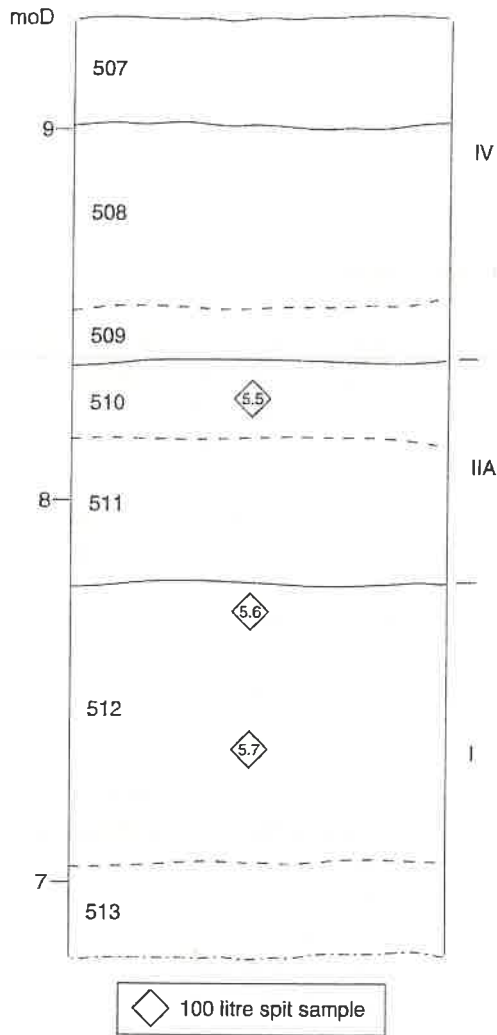


Fig.6 Trench 5 (north): section through geology

Context	Description	Interpretation
507	Dark grayish brown silty LOAM containing occ. flint pebbles, roots and cbm	Topsoil
508	Dark reddish brown/strong brown sandy CLAY-SILT with occ. flint pebbles and cbm	Modern, made ground
509	Dark grayish brown sandy CLAY-SILT with occ. flint pebbles, charcoal frag's and cbm	Modern, made ground
510	Soft and pliable, structureless and massive, pale olive/grey sandy (f) CLAY-SILT with occ. v. coarse sub-angular flint pebbles at upper surface	Floodplain alluvium
511	Mod. compacted, structureless/massive, slightly sandy CLAY-SILT, mottled pale olive-grey/reddish brown with occ. medium to v. coarse sub-angular flint pebbles	Floodplain alluvium
512	Moderately-poorly sorted, structureless, matrix supported, m-c flint GRAVEL in yellowish-brown, silty sandy matrix	Fluvial channel aggradation
513	Bedded (southward dipping?), poorly sorted m-c flint GRAVEL in coarse orange-brown sandy matrix	Fluvial channel aggradation

Palaeolithic archaeological evidence

5.21 No larger artefactual or faunal evidence was recovered.

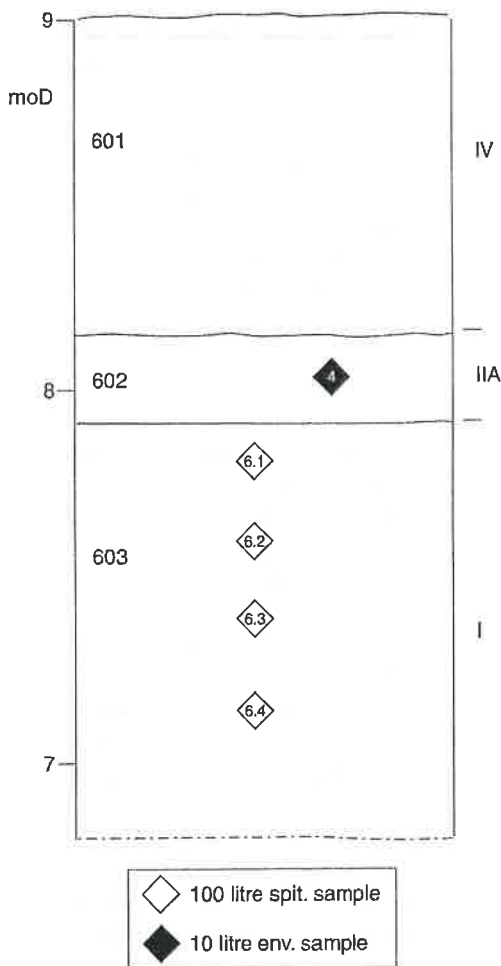
Context	Sample	Volume l	Finds
510	5.5	100	None
512	5.6	100	None
	5.7	100	None

Environmental evidence

5.22 No samples were taken for environmental evidence.

TRIAL PIT 6

Sedimentary sequence and interpreted depositional environment



Context	Description	Interpretation
601	Dark grayish brown LOAM with cbm and roots	Topsoil
602	Mod. compacted to firm, clayey fine SAND, orange-brown, with occ. rounded fine-medium flint pebbles	Floodplain alluvium
603	Loose, poorly sorted, structureless coarse flint GRAVEL (clasts sub-angular to mod. rounded), with matrix of yellowish brown sandy clay-silt; water table at c. 8m OD	Fluvial channel aggradation

Fig. 7 Trench 6: section through geology

Palaeolithic archaeological evidence

5.23 No larger artefactual or faunal evidence was recovered.

<i>Context</i>	<i>Sample</i>	<i>Volume l</i>	<i>Finds</i>
603	6.1	100	None
	6.2	100	None
	6.3	100	None
	6.4	100	None

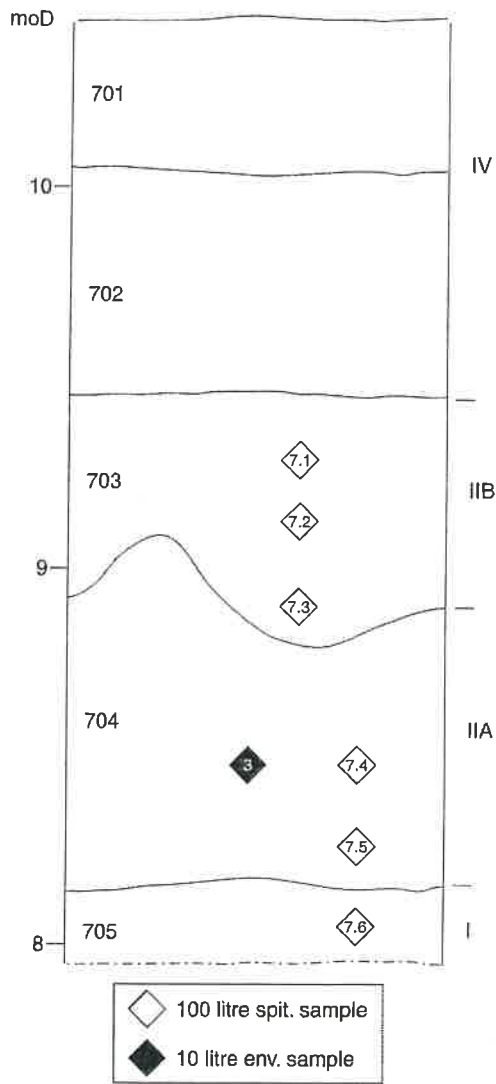
Environmental evidence

5.24 No environmental evidence was recovered.

<i>Context</i>	<i>Sample</i>	<i>Volume l</i>	<i>Finds</i>
602	4	10	None

TRIAL PIT 7

Sedimentary sequence and interpreted depositional environment



Context	Description	Interpretation
701	Loose, dark grayish brown LOAM with roots and cbm	Topsoil
702	Mod. compacted sandy LOAM with occ. mod. rounded flint pebbles and cbm	Modern, made ground
703	Mod. compacted to firm, matrix-supported, mod. sorted f-m flint GRAVEL (sub-angular to rounded) in yellowish brown (mottled strong brown) silty sand matrix	Alluvial floodplain, gravel bar
704	Mod. compacted to firm, yellowish brown (mottled orange/grey) clay-silty SAND with occ. m-c flint pebbles (mod. to well-rounded); sandier towards base with coarser flint pebbles and horiz. pale brownish and yellowish bands	Alluvial floodplain
705	Mod. loose, mod. sorted, medium-v. coarse flint GRAVEL (mod. to well-rounded) in slightly silty yellowish brown sand matrix; occ. small flint cobbles and flint nodules 15-20cm size	Fluvial channel aggradation

Fig. 9 Trench 7: section through geology

Palaeolithic archaeological evidence

5.25 No larger artefactual or faunal evidence was recovered.

<i>Context</i>	<i>Sample</i>	<i>Volume l</i>	<i>Finds</i>
703	7.1	100	None
	7.2	100	None
	7.3	100	None
704	7.4	100	None
	7.5	100	None
705	7.6	100	None

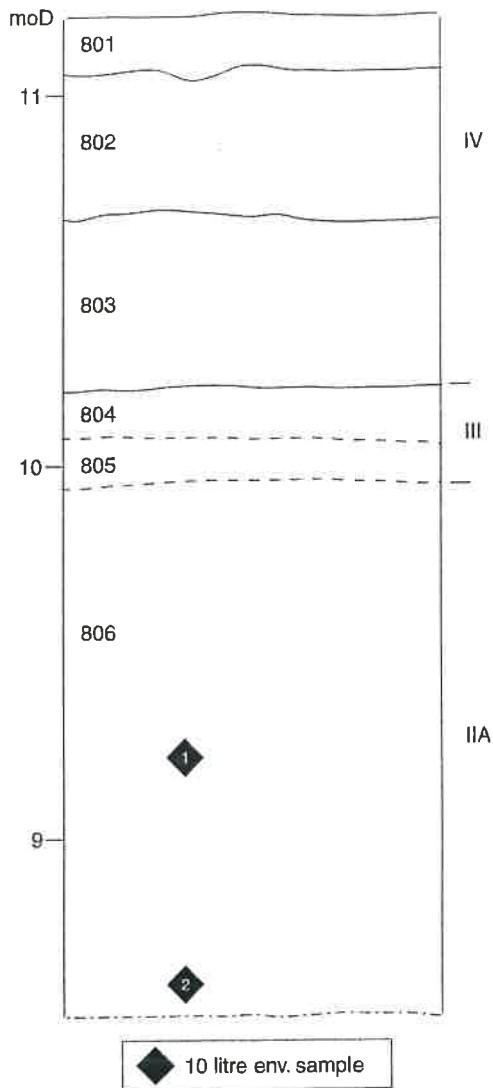
Environmental evidence

5.26 No environmental evidence was recovered.

<i>Context</i>	<i>Sample</i>	<i>Volume l</i>	<i>Finds</i>
704	3	10	None

TRIAL PIT 8

Sedimentary sequence and interpreted depositional environment



<i>Context</i>	<i>Description</i>	<i>Interpretation</i>
801	Loose, dark grayish brown silty LOAM with roots and cbm	Topsoil
802	Loose, dark yellowish brown stony and silty LOAM	Modern made ground
803	Mod. compacted, yellowish brown sandy LOAM with occ. fine-medium flint pebbles	Modern made ground
804	Soft, structureless, grayish brown SAND with mod. frequent fine-coarse flint pebbles	Fluvial channel aggradation
805	Mod. consolidated, matrix supported fine-medium sandy flint GRAVEL; gen. colour yellowish brown	Fluvial channel aggradation
806	Firm, olive yellowish brown clay-silty fine-medium SAND with clay-silty lenses towards top; increasingly pale and sandy downward	Floodplain alluvium
807	Mod. consolidated, mottled pale brown and light yellowish brown, slightly silty fine-medium SAND	Floodplain alluvium

Fig. 10 Trench 8: section through geology

Palaeolithic archaeological evidence

- 5.27 No suitable deposits for sieving were present, and no larger artefactual or faunal evidence was recovered during machine excavation.

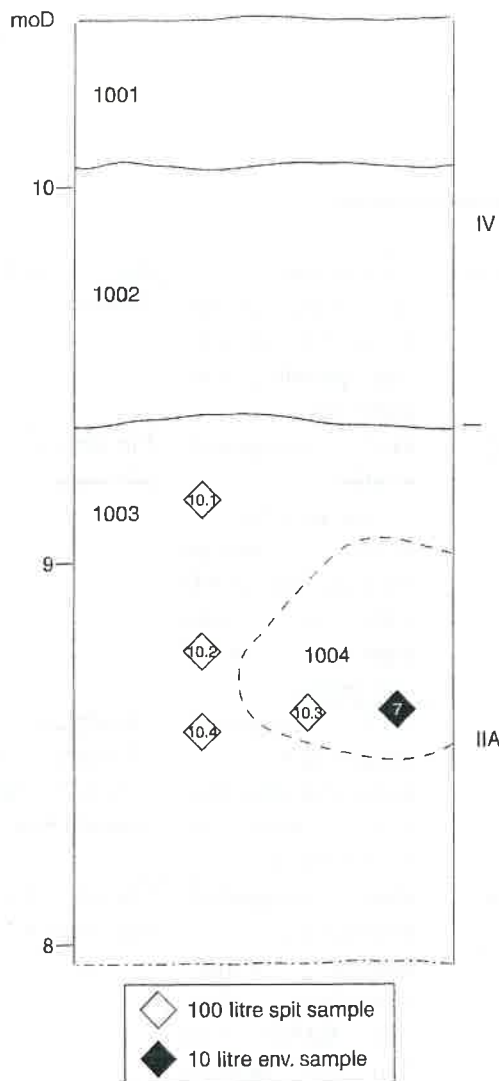
Environmental evidence

- 5.28 A few fragments of mollusc shell were present in context 806, sample 1.

<i>Context</i>	<i>Sample</i>	<i>Volume l</i>	<i> Finds</i>
806	1	10	Occasional mollusc fragments
807	2	10	None

TRIAL PIT 10

Sedimentary sequence and interpreted depositional environment



<i>Context</i>	<i>Description</i>	<i>Interpretation</i>
1001	Soft and loose, dark grayish brown silty LOAM with roots and cbm	Topsoil
1002	Mod. compacted dark grayish brown LOAM with flint pebbles, roots and cbm	Modern, made ground
1003	Mod. firm, structureless, mottled gray and orange-brown, clay-silty SAND/sandy CLAY-SILT with freq. flint pebbles and cobbles; becomes increasingly clayey downward	Floodplain alluvium, gravel bar
1004	Very firm, structureless, mottled orange/grey sandy CLAY-SILT with occasional fine-coarse flint pebbles	Floodplain alluvium

Fig. 11 Trench 10: section through geology

Palaeolithic archaeological evidence

- 5.29 The broken distal end of an unpatinated waste flake was found in context 1003, sample 10.2. The artefact came from a laminar reduction sequence, and was in generally fresh condition, although the sharp edges were slightly abraded.

<i>Context</i>	<i>Sample</i>	<i>Volume l</i>	<i>Finds</i>
1003	10.1	100	None
	10.2	100	Flint blade
	10.4	100	None
1004	10.3	100	None

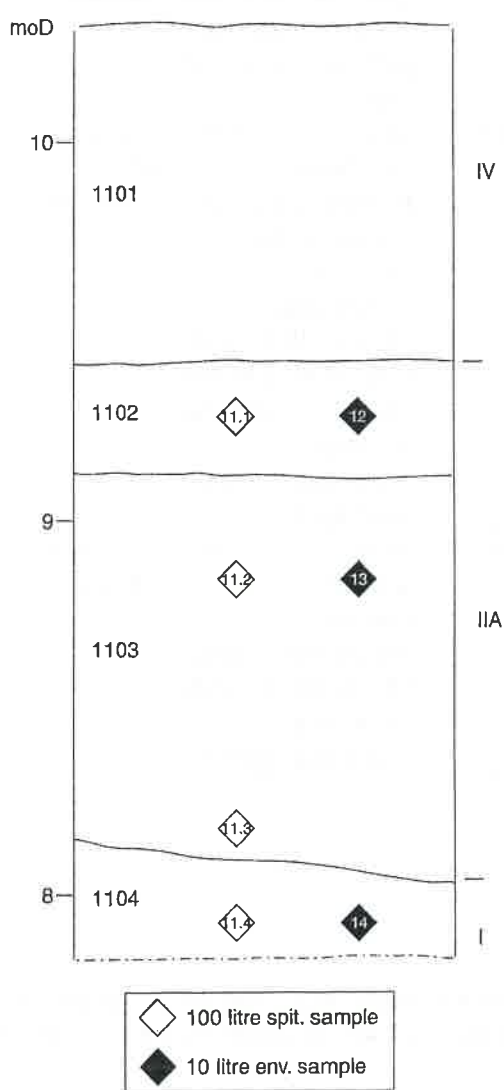
Environmental evidence

5.30 No environmental evidence was recovered.

Context	Sample	Volume l	Finds
1004	7	10	None

TRIAL PIT 11

Sedimentary sequence and interpreted depositional environment



Context	Description	Interpretation
1101	Mod. loose, greyish brown LOAM with flint pebbles, cbm and roots	Topsoil
1102	Mod. compacted, mottled orange/grey/dark brown clay-silty medium-fine SAND with occ. sub-angular to rounded flint pebbles	Floodplain alluvium
1103	Well compacted, structureless, mottled orange/pale grey sandy (f) CLAY-SILT	Floodplain alluvium; pale (Chalk?) flecks towards base
1104	Mod. compacted, structureless, mottled orange-brown/grey clay-silty SAND with freq. flint pebbles and cobbles	Fluvial channel aggradation

Fig. 12 Trench 11: section through geology

Palaeolithic archaeological evidence

5.31 No larger artefactual or faunal evidence was recovered.

Context	Sample	Volume l	Finds
1102	11.1	100	None
1103	11.2	100	None
	11.3	100	None
1104	11.4	100	None

Environmental evidence

5.32 No environmental evidence was recovered.

<i>Context</i>	<i>Sample</i>	<i>Volume l</i>	<i>Finds</i>
1102	12	10	None
1103	13	10	None
1104	14	10	None

6 DISCUSSION AND CONCLUSIONS

Summary

- 6.1 Pleistocene fluvial deposits are present in all the trial pits. The base of the Pleistocene sequence was not reached in any of the trial pits, so its full depth, any deeper variations in sedimentary facies and the nature of the Tertiary bedrock remain unknown. The sequence appears to represent a single cycle of fluvial terrace formation with a fine-grained clay-silt unit, deposited during warmer interglacial conditions, sandwiched between two coarser gravel units, deposited during the end of the cold stages which preceded and succeeded the intervening interglacial. The Pleistocene units are broadly horizontal, and have been truncated by the modern ground surface which slopes down west to east across the evaluation area, towards the current Darent.
- 6.2 A single flint flake was found within the fine-grained clay-silt. It constituted the broken distal end of a blade and was unpatinated and in fairly fresh condition.
- 6.3 The fine-grained clay-silt also contained very sparse molluscan evidence concentrated in restricted horizons.

Consideration and confidence rating of methodology

- 6.4 The methodology was highly appropriate for investigation of the presence, nature and Palaeolithic archaeological significance of Pleistocene deposits at the site. The quantity of Palaeolithic trial pits dug was sufficient to build a complete picture of Pleistocene deposits across the site, at least to the depth investigated, and to relate the main Pleistocene units to each other stratigraphically.

Potential for encountering undisturbed Palaeolithic evidence

- 6.5 Given the demonstrated presence of archaeological material in the fine-grained clay-silt which is present across the whole evaluation area (sedimentary group II), and its likely equivalence to the Crayford brickearths, there is a moderate-high chance of encountering undisturbed Palaeolithic evidence within it or at its base. The location of highest potential is probably between the depths of c. 8m and 9m OD at the western side of side, nearer the bank of the ancient channel. There is a very low chance of encountering such evidence in any of the other deposits.

Presence and potential for analysis of environmental/biological evidence

- 6.6 Molluscan evidence was demonstrated to be present in the fine-grained clay-silt deposit (group IIA). This evidence was, however, scarce and generally fragmentary. It is possible that isolated horizons with richer presence of molluscan remains in better condition are present in certain

locations. The presence of molluscan remains indicates the calcareous nature of the sediments, and demonstrates that small vertebrate evidence may also be present, although none has been found in the samples examined to date. The fact that none was found in the 130 litres processed from the fine-grained clay-silt suggests that any such evidence, if present, is also scarce. Ostracods may also be present in small quantities, but other forms of evidence such as pollen and insect remains are not likely to be present, given the preservational conditions of the sediment. No plant macro-fossils were present in the samples processed.

- 6.7 Molluscan and small vertebrate evidence would be of high potential for analysis, if even moderately rich horizons were found. Their analysis can help in the reconstruction of environmental and climatic conditions during formation of the sedimentary sequence, and in dating.

Horizontal and vertical extent and sedimentological character of deposits

- 6.8 Pleistocene fluvial deposits extend across the evaluation area, underlying the topsoil and modern made ground which reaches to between 0.5m and 1m beneath the ground surface. The base of the Pleistocene sequence was not reached in any of the trial pits, so its full depth, any deeper variations in sedimentary facies and the nature of the Tertiary bedrock remain unknown. The deposits in each trial pit can be correlated with each other to model the overall sequence across the site (Fig. 1). Three main groups of sedimentary units are present: group I — lower fluvial gravel, group II— alluvial clay-silt and gravel and group III — upper fluvial gravel.
- 6.9 The lower fluvial gravel occurs in the central and eastern part of the site with its surface at *c.* 8m OD. The alluvial clay-silt and gravel extends across the whole site area between *c.* 8m and 10m OD. The upper fluvial gravel is only present above *c.* 10m OD in the higher western part of the site. The Pleistocene units are broadly horizontal, and have been truncated by the modern ground surface which slopes down west to east across the evaluation area, towards the current Darent.
- 6.10 The sequence appears to represent a single cycle of fluvial terrace formation, following Bridgland's model (1994), with a fine-grained clay-silt dominated unit, deposited during warmer interglacial conditions, sandwiched between two coarser gravel units, deposited during the onset of climatic amelioration at the end of the cold glacial stages which preceded and succeeded the intervening interglacial.

Depositional and post-depositional history of finds

- 6.11 The single broken flake came from a more gravelly horizon within the fluvial clay-silt and gravel complex (group II), interpreted as a gravel bar formed by a minor migrating stream channel within the floodplain environment. It was in generally fresh condition, but its sharp edges were slightly abraded. Given the small size of the artefact (*c.* 30mm) it has most likely been transported a short distance by fluvial action, so is not *in situ*.

Correlations and dating

- 6.12 The Pleistocene sequence at the site has been interpreted as a single cycle of fluvial terrace formation, formed by a previous level of the Darent, corresponding with a cold-warm-cold climatic cycle. The deposits at the site are already mapped by the BGS as Taplow Gravel, as are the gravels and the overlying Crayford brickearths at the mouth of the Darent. The height of the alluvial clay-silt/lower fluvial gravel junction at the site (8m OD) corresponds well with the height of the Crayford brickearth/Taplow Gravel junction at the mouth of the Darent (7.5m OD at its western side), suggesting these sets of deposits are likely to be equivalent. The

brickearth at Crayford contains interglacial sediments dated to Oxygen Isotope Stage 7, a warm period dating to between c. 240,000 and 190,000 years ago. It is likely that the sequence at the evaluation site dates to the same period, with the group I and group III fluvial gravels dating to the cold OI Stages 8 and 6 either side of OI Stage 7, or that the whole sequence dates to within OI Stage 7, with the gravels overlying and underlying the clay-silt complex relating to colder climatic oscillations within OI Stage 7.

Significance and potential for current research objectives

- 6.13 The evidence recovered to date from the site is not of high significance in itself, but it suggests that the site still has reasonable potential (30-50%?) for containing undisturbed or little disturbed archaeological evidence in association with environmental evidence, such as molluscs, ostracods and small vertebrate remains. Such evidence would most likely occur between c. 8m and 9m OD at the base, and in the lower part, of the fine-grained clay-silt complex (group IIA), and at the western edge of the evaluation area. If such evidence were to be found, the site would be of national significance for its potential to address a range of questions concerning early human behaviour and lifestyle, the interpretation of material cultural change, and the distribution of early human settlement in relation to environmental and climatic conditions.

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