ENFIELD ARCHAEOLOGICAL SOCIETY ARCHIVE REPORT

ARCHAEOLOGICAL AND GEOARCHAEOLOGICAL MONITORING AT WILBURY WAY OPEN SPACE, EDMONTON, MAY - JUNE 2023

(SITE CODE WIH23)

(SITE CENTRED TQ 328 924)

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Cover: General View of the East End of Wetland Cell 4 (photo MJD)

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ABSTRACT

- Archaeological monitoring of the cutting of four wetland cells in part of the valley of the Lea tributary Pymmes Brook identified elements of a mid twentieth century piggery, but major later twentieth century sewer and then land drain/sump installation had significantly truncated areas of the site.
- Study of Pleistocene/Holocene deposits recorded up to seven blocks of clay containing organic material indicative of a mature Oak woodland environment embedded in likely partly or wholly redeposited Kempton Park Gravel Member (=Leyton) gravels and which returned a radio carbon determination of 5,711 ± 20 BP (4,649 – 4,458 calBC). They suggested that a putative large and energetic late Mesolithic proto-Pymmes Brook may have reworked Devensian deposits.
- The monitoring also suggested a later, but probably still significant, proto-Pymmes Brook channel was present and recorded one or two contemporary or later tributary paleochannels predating the alluvial deposition of the Enfield Silts (brickearth), probably across an early/mid Holocene flood plain.

INTRODUCTION

- At the commission of Michael Shorey, Senior Engineer, Watercourses Team, Redevelopment and Environmental Works, London Borough of Enfield (LBE), the Enfield Archaeological Society (EAS) prepared an Archaeological Desktop Study for wetland creation works in Wilbury Way Open Space, Edmonton (Rear of Whitehead Close, Sterling Way London N18 1BU and Land Adjacent to Whitehead Close, Sterling Way, Hermitage Nursery, Hermitage Lane, London, N18 1BE) in September 2020 and revised the same following project development in September 2021 (Dearne 2021).
- Planning permission for the scheme was applied for by Mr Shorey (ref. 21/03724/RE4) and granted by the LBE on 8/8/22 with the following archaeological condition:

> *9 No development shall take place until arrangements have been made for an archaeological "watching brief" to monitor development groundworks and to record any archaeological evidence revealed. These arrangements are to be submitted to, and approved in writing by, the Local Planning Authority. The development shall take place in accordance with the "watching brief" so approved. The "watching brief" shall be carried out by a suitable qualified investigating body approved in writing by the Local Planning Authority.*
> *Reason - To minimise any damage to any archaeological remains that may exist on site and to ensure satisfactory recording in accordance with the guidance contained in Planning Policy Guidance Note 16, and the Council's Policies.*

- Following client consultation with Adam Single, the Greater London Archaeological Advisory Service (GLAAS) Archaeology Advisor for Enfield, an evaluation excavation to determine the archaeological potential of the site to be developed was deemed appropriate and was undertaken by Pre-Construct Archaeology between 12/12/22 and 21/12/22 (PCA project K8161; site code WWE22).
- The evaluation excavation comprised three trenches targeting the areas of deepest impact where the four new wetland cells were proposed and included a geoarchaeological test pit in each trench (PCA 2023).[1] The Excavations recorded natural London Clay, sealed by what were interpreted as Kempton Park Gravel Member deposits then a sequence of two phases of natural homogeneous alluvial clay deposits below modern deposits. The only features recorded were, cut into one of the earlier alluvial clay deposits, a possible natural paleochannel and a second paleochannel or pond and, cut into the later alluvial clay deposits, a twentieth century pit.
- At the commission of Michael Shorey the EAS then undertook the watching brief monitoring of the ground works to establish the wetland cells, reported here, between 9/5/23 and 14/6/23.
- This work was allocated site code WIH23 by the Museum of London, was project managed by Martin J. Dearne and carried out by Martin J. Dearne, Neil Pinchbeck and Judith Stones and the site archive and retained finds generated by the work will be deposited in the LBE Museums Service/EAS archive (see Appendix 1).

[1] NB WWE22 trench positions have been mapped on Figs 5, 7 and 11 from PCA (2023) Fig. 2, augmented, where possible, from on site observations, but full reconciliation of the wetland cell scheme as implemented with WWE22 report data was problematic and WWE22 trench positions relative to wetland cell outlines and some features may carry a degree of inaccuracy.

THE SITE

- The site (Fig. 1) lies in Upper Edmonton, 0.59 miles west of Edmonton Angel, the area south of the A406 and Pymmes Brook (formerly called Medesenge) where Fore Street, the main historic road around which Upper Edmonton developed, crossed the brook and now joins the A406 and Silver Street, a subsidiary focus for the development of Upper Edmonton. It is a partly wooded open space in the ownership of the LBE, bounded on the north by the A406 (Sterling Way, part of the North Circular Road), to the west by Hermitage Lane and to the south and east by modern housing in the area of Whitehead, Plowman and Adlington Closes.
- The site represents part of a tributary valley of the Lea valley, occupied by Pymmes Brook, the historic, now partly concrete wall constrained, course of which bisects the wooded land on its north west and flows from west to east towards the Lea.
- The site comprises the Pymmes Brook Archaeological Priority Area (e.g. LBE 2019, 66, No. 18).
- The wetland creation scheme (Fig. 2) involved the excavation of four up to 3.15 m deep wetland cells (Cell 1 up to 2.20 m deep; Cell 2 up to 2.55 m deep; Cell 3 up to 2.90 m deep; and Cell 4 up to 3.15 m deep) covering an area of 810 m^2, together with the regrading of areas of the margins of the cells and brook and the establishment of new embanked footpaths. Proposed land drainage south of the wetland cells was deleted from the scheme after planning consent was granted.

OBJECTIVE AND METHODS

The objective of the monitoring was:

- to record any archaeologically or geoarchaeologically significant deposits disclosed by the works and to recover any significant artifacts or ecofacts so disclosed.

The methodology of the work was:

- Flat bladed bucket machine removal of topsoil/modern deposits across the whole area which included Wetland Cells 1 – 3, and separately in the area of Wetland Cell 4 (and areas to its south and north), was monitored and any potential archaeological features visually identified, hand cleaned (and if appropriate hand sample/fully excavated) to establish their form and date and they were recorded by scale drawing and digital photography as well as by written record.
- Within the stripped areas deeper contractor cuts made to create the wetland cells were subsequently further monitored to identify/record/recover or sample any potentially significant finds/deposits/features and to record by digital photography and scale drawing the full stratigraphic succession, principally in section at selected representative points at the edges of the wetland cells.

HISTORICAL BACKGROUND

- There is no specific information about the site before the mid eighteenth century, however, it could have formed part of the Edmonton common field of Longhedge or more likely have formed part of the estate of Weir Hall which at least by the early seventeenth century held 650 acres including much land in Tanner’s End (? probably the Tavner’s End of Rocque’s map of 1754 and opposite Wilbury Way Open Space across (north of) Pymmes Brook) (VCH, 158; 170 fn 82).
- The site of the Medieval Weir (or Wyer) Hall is not established, but the Wyehale or Wyrhale family from which the name derives held land in Edmonton by 1235/6 and by 1349 the estate consisted of a house and a hundred acres of land (VCH 157f).
- However, a (later) Weir Hall, in existence by 1600, having 20 hearths in 1664 and demolished in 1818, but leaving some walls and outbuildings standing (op cit), lay on Silver Street north of Pymmes Brook (VCH, 138f; GLHER 080686/00/00; TQ 327 926).
- The first map which is detailed enough to be of use (though some seventeenth century maps of Middlesex probably mark the location of Weir Hall very approximately) is Rocque’s map of 1754. If accurate (which the present work calls into significant question), it shows the western part of the current Wilbury Way Open Space occupied at the time by ‘Edmonton Mill’ and this is presumed to be the watermill among ponds and ossiers near to Weir Hall and which belonged to its estate under Jasper Leake in 1605 (VCH, 169). Whether it should be identified with Screwsmill, known to have lain on the Medesenge (Pymmes Brook) in 1256, and or with a watermill known to have been in existence from 1086 (VCH, 168) is unclear (GLHER 080699/00/00 also notes records of a mill in 1204 and before 1224

which is allocated to TQ 334 925, north of Pymmes Brook, and one might well expect a number of watermills to have existed along the line of the brook at different dates).

- The early modern Weir Hall was replaced from 1818 by a new Weir Hall in the French chateau style within a rectangular moat fed by Pymmes Brook on the south side of the brook and immediately west of Wilbury Way Open Space (VCH, 158; Fig. 3)).
- By 1867 the Wilbury Way site held a 'Hermitage' within what was clearly a recreational landscape featuring tree groves and walks (Fig. 3). The Hermitage is likely to have been either a residence for part of the family of James George Tatem (d. 1854) who owned the Weir Hall estate from 1814 (VCH, 158) or a collection of buildings such as summer houses and conservatories forming part of the grounds of the hall and two other small buildings detached from it, one of which was a greenhouse, are marked on the 1867 OS map.
- Weir Hall was demolished and the moat filled in 1934 (VCH, 158) to make way for housing development, its estate (then known as the Huxley estate) having been partly dispersed from 1887 to 1930 (op cit). The date of the demolition of The Hermitage is unclear, but only a single structure matching one of the small buildings detached from The Hermitage is shown on OS mapping by 1958 and the rest were likely demolished in or by the inter-war period.
- WWII records for Edmonton are poor. The only known activity in the area are unspecific references to two trenches being cut in 1938 'in Wilbury Way' (pers. comm. Ian K. Jones, EAS), so only possibly in the Open Space.
- However, 1958 OS mapping (Fig. 4) shows a complex of structures towards the east end of the Wilbury Way Open Space forming a piggery and 1946/7 RAF aerial photographic evidence (not available at the time of desktop evaluation work) shows (Pl. 1) that this was established by that date. It was almost certainly (along with allotments on the periphery of the site, some known to have been cultivated by residents of the nearby St David's (formerly Millfield) residential 'sane epileptics' Hospital who also helped out at the piggery; pers. comm. John Ivens, EAS) the main use to which the site was put during and after WWII and before becoming a public open space.
- The area is known to have been overgrown with no obvious traces of the piggery by 1969 (pers. comm. John Ivens, EAS).

ARCHAEOLOGICAL BACKGROUND

- No previous archaeological work is known to have occurred on the site prior to 2022, however eight trial trenches cut in advance of house building immediately south of the site in 1993 found only nineteenth/twentieth century marsh flood deposits and possibly earlier water lain gravels (Grainger 1993; GLHER 082548/00/00; 082547/00/00; site code WML93).
- Based on GLHER and literature reviews the desk top assessment (Dearne 2021) concluded that the archaeological potential of the site was low, or perhaps low to medium, for the prehistoric period overall but medium for the early prehistoric (Pleistocene); medium to high for the Roman period (due to records of Roman finds in the general vicinity); medium for the Medieval/Early Modern period (due to the possible presence of a water mill and associated features of that date); and low for the modern period.
- The 2022 evaluation work preceding that reported here is noted above.

THE STRATIGRAPHIC SEQUENCES

<u>Wetland Cells 1 – 3</u> (Figs 5 and 7)

- Prior to excavation this area had a grassed surface at +17.66 m OD on the east to +17.92 m OD on the west in Cell 1; +17.56 m OD on the east to +17.74 m OD on the west in Cell 2; and +17.88 m OD on the east to +18.06 m OD on the west in Cell 3.
- The machine removal of topsoil [1] and a general layer of black clinker, [3] (if perhaps more intermittent than suggested by evaluation work, but likely deposited in Phase 2), showed that a number of features were (often deeply machine) cut into, or built/lain in shallow construction trenches/deep drain/sewer trenches cut into/through, the Enfield Silts (brickearth) natural, [10], and represented only two phases of twentieth century activity, the use of the site as a piggery and then, probably at the time of its decommissioning, the installation of major sewers as well as land drains.

Phase 1 (Fig. 5)

- Traces of the Phase 1 piggery which was perhaps established in WWII and is known from aerial photographs of 1946/7 (Pl. 1) and OS mapping of 1958 (Fig. 4) were limited. Its only structural features not evidently fully removed on its decommissioning or truncated/removed by the probably contemporary work associated with the installation of sewers in Phase 2 were two sties and part of a third, [6], at the west end of the most northerly block (Pl. 2). Founded on 0.30 m wide footings of mixed (?reused) deeply frogged red and yellow stock bricks and part bricks with no surviving mortar, they comprised rear (northern) 2.00 x 2.17 m cells communicating via 0.53 – 0.67 m wide gaps with 1.95 x 2.17 m front cells, their southern entrances indicated by either a 0.52 m wide gap (in the most westerly) or a 0.86 m wide block of concrete. No floor surfaces at least survived within the sties.

- Along the northern and western sides of the stie block was a 0.65 m wide surface drain cut, [8]/[9] (Pl. 2), holding a drain formed of 0.13 m diameter, extruded, yellow terracotta land drain sections with ribbed and red brown slipped surfaces (and along the west side a narrow iron pipe perhaps more likely belonging to Phase 2). The drain trench was filled with loose black clinker, but had been recommissioned/extended in Phase 2 as a land drain (see below).
- Deeply cut through the natural brickearth, [10], and into the underlaying gravel, [13] or [14], and backfilled with redeposited brickearth ([10]) so that they would not have been easily detected in evaluation trench work, were elements of a much deeper lain drainage system evidently running below the north range of sties. A main north east to south west drain, [31], comprised a 0.25 m diameter sectional terracotta drain in a yellowish fabric (sometimes with a reduced grey core).
- A downflow/monitoring point, [34], consisting of a c. 0.15 m square disrupted brick built shaft on its line would have lain within the stie block and its bricks matched those of [6]. At least two further smaller drains, [35] and [36], fed into [31] and comprised smaller diameter red terracotta pipe sections (and other redeposited brickearth filled possible cuts running off of [31] at right angles suggested that further feeder drains had been planned but never installed).
- Likely representing another element of this deeper drain system for the piggery was [28], an externally 1.20 m square, internally 0.75 m square, brick built overflow sump/soakaway, 0.80 m deep as surviving (Fig. 6; Pl. 3). Its rather rough construction of mixed deeply frogged red and yellow stock bricks and part bricks with no surviving mortar again matched that of the sties' and a 0.10 m diameter terracotta (?overflow) pipe fed into/out of it on the south. Sections of a broken 0.05 m thick stone slab laying on its base presumably represented its cover.
- The only other features probably of Phase 1 were two very shallow depressions in the surface of [10] west of the sties that might have been slightly truncated pits or scoops. Of them [2] was 0.65 x 0.70 m and under 0.01 m deep with a fill of [1]/[3]; and [4] (Pl. 4) was a 0.04 m deep, 0.89 x 0.21 m feature whose similar fill also included fragments of modern brick. It was the only feature to produce non cbm finds which comprised nineteenth/twentieth century, and probably mostly mid twentieth century, English Stoneware (ENGS), window glass and pressed or blown glass bottles (see Appendix 3).

Phase 2 (Fig. 5)

- Phase 2 comprised the extremely large and deep machined installation trenches for extant and functional later twentieth century sewers and the establishment of nearer surface land drains and sumps (presumably in an attempt to counteract the boggy nature of the site), probably simultaneously with the decommissioning of the piggery since its drains and pipe sections forming them appear to have been reused.
- One large, deep trench cut, [27], part of which had been identified in evaluation work, had truncated almost the whole area of Wetland Cell 2 and the east end of Cell 1 down to the surface of the natural gravel, at which depth it had been stepped back to the east/north east and the narrower and deeper cut into the gravel held the large sectional pre-fabricated cast concrete sewer pipe.
- A second cut, [7], had truncated at least the top of the Enfield Silts (brickearth; [10]) at the east end of Wetland Cell 3, including the continuation of stie block [6], though the depth of truncation approaching the edge of the cut (on the south west) was clearly far less than further to the north east, the cut was presumably again a stepped one and or access ramp cut and even its exact course west of WWE22 Evaluation Trench 3 could not be identified.
- The cuts had been backfilled with [11], a redeposited mix of [1] and [10] containing a large amount of modern brick and concrete after the deeper cuts holding the sewer itself had been backfilled with clean imported gravel.
- Probably immediately following the backfilling two large, deep soakaways, [22] and [24], had been dug. [22] was oval and 5.00 x 3.80 m and [24] was further east and 3.60 x 4.40 m. Both were machine cleared as they had been filled with large sections of concrete, amongst which in [24] was later twentieth century sewer installer's debris such as orange mesh fencing, blue plastic piping etc.

- Feeding into the sumps from the north were two land drains, [29] and [23]/[25], with a third, [5], further west running south beyond the area of the current works perhaps to another unseen sump (and another short land drain, [26], feeding sump [24] from the south). The land drains comprised the same 0.13 m diameter, extruded, yellow terracotta drain sections with ribbed and red brown slipped surfaces used in Phase 1 drain [8]/[9], strongly suggesting that they had been salvaged when the rest of the piggery was removed, but, in the case of [23]/[25], [26] and [5] (Pl. 5), in 0.17 m wide cuts back filled with loosely packed large rounded pebbles. Indeed, [29] was actually just a recut of the southern 1.30 m of Phase 1 drain [8]/[9] that then continued, to the same width as it, south to sump [22], backfilled with the same loose pebbles. It therefore must have been created while the footprint of [6] was still visible.

Natural Deposits (Fig. 7)

- Natural deposits were recorded principally by study of cleaned machined sections/part sections at the south edge of Cell 3 (Section 3; Fig. 8), at the south side of the meeting of Cells 2 and 3 (Section 4; Fig. 9) and the south edge of Cell 1 (Section 5; Fig. 10).
- The earliest deposit contacted by the works in Cells 1 – 3 was [12] (= WWE22 [23]/[24]/[25]), natural London Clay. Where site work cuts were deep enough to encounter it (only in Cell 3) it was recorded as a compacted, sterile olive brown (2.5 YR 4/4) silty clay with some gravel and a surface at +15.40 m OD in that section (compared to WWE22 Trench 3 (Cells 1 and 2) at +15.44 m OD; and Trench 2 (further east in Cell 3) at +15.78 m OD).
- It was overlain by [13] (= WWE22 [4]/[10]/[18]), presumed Kempton Park Gravel Member (=Leyton) gravel which, however, appears likely to have been partly or wholly redeposited by a large Holocene proto-Pymmes Brook channel (see further below). It was recorded as a light brownish grey (10 YR 6/2) compacted gravel (typically 0.03 – 0.07 m rounded and fewer angular stones) in a sandy, clayey silt matrix (often particularly clayey towards the base of the deposit). It was 0.64 – 0.82 m thick where, in Section 3, it was fully exposed with a surface at +16.00 – 16.28 m OD[2] (compared to WWE22 Trench 3 (Cells 1 and 2) at +16.23 m OD; and +16.63 m OD in Trench 2 (further east in Cell 3)).
- At only one point (in and just west and east of Section 3) an apparently separate gravel deposit lay above [13]. It, [14], was a sterile and compacted, less densely packed gravel than [13], comprising smaller (typically 0.03 – 0.04 m rounded and angular) stones in a variably coloured (dark yellowish brown (10 YR 4/4) to light grey (10 YR 7/2)) gritty/sandy clayey silt matrix. This deposit was more prominent in Cell 4. Here in Section 3 it was only 0.22 m thick and did not appear to be occupying an identifiable cut, its east and west ends simply appearing to die out in an ill defined way immediately beyond the limits of Section 3.
- However, within [13] in Section 3, at two other points along the south section of Cell 3, at one point in Cell 2 and at three points in Cell 1's sections blocks of silty clay containing organic material, [30]/[37], were identified in section.
- Those in Cells 3 and 2 ([30]) comprised longitudinal blocks of compacted very dark grey (5 YR 3/1) silty clay (Fig. 8) containing numerous macroscopic woody fragments with one (Cell 3, Middle Exposure) also including a pocket of pea shingle at one point. The block in Section 3 (Cell 3, West Exposure; Pl. 6) was 2.32 m long and 0.06 – 0.07 m thick; a second, 4.40 m to the east (Cell 3, Middle Exposure; Pl. 7), was 0.80 m long and 0.07 – 0.15 m thick; and a third, 2.40 m east again (Cell 3, East Exposure; Pl. 8), was 1.10 m long and 0.07 m thick. In the adjacent Cell 2 the one exposure seen in section (in a step in the machining) was less coherent, perhaps representing multiple 0.04 – 0.10 m thick clumps of material (Pl. 9) over a 1.20 m distance (or the ragged edge of a block). Environmental analysis by Kate Roberts and Marvin Demicoli of Museum of London Archaeology (Appendix 4.3) found samples of the clay blocks to contain wood including Oak (*Quercus sp.*) and seeds of species perhaps indicative of a damp environment and disturbed, nitrogen rich soils. A Carbon^{14} determination (Appendix 4.2) returned a date of 5,711 ± 20 BP (4,649 – 4,458 calBC at 95% confidence), suggesting deposition in the later Mesolithic.
- In Cell 1 (Fig. 10) the exposures ([37]) lacked any macroscopic plant material and differed in colour, being a dark grey (7.5 YR /N4) slightly silty clay, in one case (Cell 1, exposure 1; Pl. 10) with very dark grey (7.5 YR /N3) bands at the eastern end of the block. Cell 1, exposure 1 was 1.80 m long, 0.17 – 0.28 m thick and well embedded in [13]. Cell 1 exposure 2, 1.20 m to the west, was less well defined and in an area of the section which was problematic to fully interpret,[3] but in places only a narrow band

[2] The sequence and depth of site work made establishing the absolute surface level in other sections problematic.
[3] Parts of this section had been heavily scarred by machining then dried during a heatwave, precluding full cleaning.

of [13] lay above it where there was possible downcutting into [13] prior to the deposition of [10]. It was c. 2.50 m long and may have been up to 0.30 m thick, however, parts of it were difficult to define. Limited environmental analysis by Neil Pinchbeck of the EAS (Appendix 4.4) identified only fine root material and possible water plant remains in a sample.

- The third exposure of [37] (Cell 1, exposure 3) was in the north section of Cell 1, opposite exposures 1 and 2, but only the top of the block(s) present were exposed along a 4.40 m stretch of the section, it is possible that a brickearth filled channel cut through it/them (see below), it was unclear how, if at all, they related to exposures 1 and 2, and whether a single or two discrete blocks were present. The limited vertical extent of the section available here also meant that identification was based more on comparisons to the other exposures than clear stratigraphic evidence and no analysis of the material was undertaken.
- Post dating [13] a paleochannel or part of a natural pond, [33], was recorded at the junction of Cells 2 and 3 (where Phase 2 truncation of overlaying [10] by [7] was fairly minimal), probably running approximately north south with a probably rounded northern butt end seen in plan during machining just within the excavated area, though the feature could only principally be recorded in section (Fig. 9; Pl. 11) and the west end of that section was lost to machining.
- In section the feature was broad and U-shaped, cut into [13], probably 2.52 m wide (of which 2.26 m was available for study) and up to 0.36 m deep. It was filled by [32], a compacted greyish brown (2.5 Y 5/2) silty clay throughout with moderately frequent thin black horizontal streaks of organic matter which analysis by Neil Pinchbeck of the EAS suggested represented plant material which contained insect remains (see Appendix 4.1). The deposit and analysis probably suggest anaerobic deposition conditions in a low energy environment such as standing water. The upper 0.15 m of the fill though showed considerable mixing between [32] and the overlaying brickearth ([10]) and a possible separate 0.50 m wide, 0.06 – 0.08 m deep channel filled by [10] at the east side of the main feature both suggested an increased energy fluvial environment towards the end of the lifetime of [33].
- Above [14] in Section 3, and elsewhere above [13] or the paleochannel/pond fill, was what appeared to be a single homogeneous, sterile, compacted deposit, [10], of brownish yellow (10 YR 6/6 – 6/8) to very pale brown (10 YR 7/4) very clayey silt to silty clay (brickearth of the Enfield Silts deposit/Holocene alluvium representing its reworking). This natural brickearth/alluvium was 0.65 – 0.92 m thick in Section 3 and projected to have been at least 0.60 m thick in Section 4[4] (compared to 1.02 m in WWE22 Trench 2 (further east in Cell 3) and 0.82 m in WWE22 Trench 3 (Cells 1 and 2)). Its surface was at +16.18 - 16.44 m OD in Section 3 and probably c. +17.25 m OD in Section 4 (compared to WWE22 Evaluation Trench 2 (further east in Cell 3) at +17.16 m OD; and in WWE22 Trench 3 (Cells 1 and 2) at +17.39 m OD).
- The differentiation of different units within this brickearth/clay alluvium evidently possible in the evaluation excavations (WWE22 Trench 2 (Cell 3) [17] and [19]; Trench 3 (Cells 1 and 2) [9], [8] and [16]) was not possible in machine cutting of the cells and they could not be isolated in sections studied. Nor could the possible paleochannel or pond (WWE22 [12] filled by [11]) excavated in WWE22 Evaluation Trench 3 (Cells 1 and 2) cut into WWE22 [19] be identified.

<u>Wetland Cell 4</u> (Fig. 11)

- Prior to excavation this area had a grassed surface at +17.98 on the east to +18.01 m OD on the west. Topsoil, [1], and a general layer of black clinker, [3], below it, and together c. 0.26 m thick, were machine removed.
- The only features cut into the underlaying natural brickearth ([10]) in Wetland Cell 4 and its immediate environs were two modern terracotta land drains, [21], though a large modern sewer cut, [20], filled with discoloured [10] mixed with topsoil and modern cbm (as [11]) was also recorded in regrading work to the south west of the cell.

Natural Deposits

- At this depth the stratigraphy revealed by the works in Cell 4 was recorded principally by study of machined sections at the west end of the south side (Section 1; Fig. 12) and at the south side of the eastern end of the cell (Section 2; Pl. 12).

[4] The sequence and depth of site work made establishing the absolute surface levels in Section 5 problematic, but here its thickness varied considerably from c. 0.60 m to over 1.00 m, probably largely due to downcutting into [13] prior to its deposition.

- The earliest deposit contacted was [12] (= WWE22 [23]), natural London Clay. It was recorded as a compacted, sterile olive brown (2.5 YR 4/4) silty clay with some gravel with a surface at +15.38 m OD in Section 1 rising to +15.61 m OD in Section 2.
- It was overlain by [13] (= WWE22 [4]), presumed Kempton Park Gravel Member (=Leyton) gravel which, however, again could have been partly or wholly redeposited by a large Holocene proto-Pymmes Brook channel (see further below, though there was no specific evidence for this in this cell). It was recorded as a very dark greyish brown (10 YR 4/2) compacted gravel (typically 0.03 – 0.07 m rounded and fewer angular stones) in a sandy, clayey silt matrix. In Section 1, where the predominance of a west east pebble orientation was particularly clear, it was 0.24 m thick and had a surface at +15.62 m OD and in Section 2 it was 0.35 m thick with a surface at +15.96 m OD. Compared to the findings in WWE22 Evaluation Trench 1's test pit, where it was 1.01 m thick with a surface at +16.69 m OD (PCA 2023, 12), and despite the rise in level of the underlying London Clay, it therefore thinned very rapidly to the south.
- Overlaying it in the southern part of the cell was a deposit, [14], of silt and gravel. It, sterile and compacted, was a less densely packed gravel than [13] and of smaller (typically 0.03 – 0.04 m rounded and angular) stones in a variably coloured (dark yellowish brown (10 YR 4/4) to light grey (10 YR 7/2)) gritty/sandy clayey silt matrix. It was 0.40 m thick in Section 1 and perhaps 0.39 m thick (but with a basal iron panned horizon extending down into [13]) in Section 2 (Pl. 12). It was distinct from [13] and suggested natural fluvial deposition of material richer in clayey alluvium than [13] in a somewhat lower energy environment. It had a surface at +15.98 m OD in Section 1 and +16.35 m OD in Section 2, but did not appear to be present in section on the north side of the cell. To judge from the east section of the cell, though it could not be formally recorded, it probably thinned to the north and disappeared only a short distance north of the southern edge of the cell.
- Whether [14] was encountered in the WWE22 Evaluation Trench 1 north of the main sections studied in the present work, or indeed in any of the WWE22 Evaluation Trench geoarchaeological test pits, cannot be determined from PCA (2023), though the geoarchaeological test pit in Trench 1 lay towards the northern side of Cell 4 so it may be unlikely that it was encountered here at least. However, what was probably a thinner exposure of the same gravel was noted in Cells 1 – 3 Section 3 (above), so it is regrettable that no description of the 'Kempton Park Gravel Member' is given in PCA (2023).
- The rapid thinning of [13] (or even of [14] and [13] combined if they had both been present in the WWE22 Evaluation Trench 1 test pit) as it ran south seems to suggest a land surface in Cell 4 following the deposition of [14] sloping fairly steeply down to the south. That this was not a localised but general trend is implied by its comparative height in WWE22 trenches where the Trench 1 geoarchaeological test pit on the northern side of the site found its surface to be at +16.69 m OD while that in Trench 3 on the southern edge of the site found it at +16.23 m OD (PCA 2023, 12).
- It therefore seems likely that Cell 4 lay on the northern side of a large proto-Pymmes Brook channel, which channel was infilled by [14]. The absence of [14] in Cells 1 – 3, except for the thinner and poorly defined exposure in Section 3, may well suggest that such a channel broadly ran west-north-west to east-south-east, or possibly turned to the south towards the eastern end of Wetland Cell 4. It is possible that the Section 3 exposure represented an ill defined tributary of it, part of a shallower meandering element of a braided stream system or an ill defined hollow infilled by over bank flooding.
- Most Wetland Cell 4 sections showed, above [13], or, where present, above [14], what appeared to be a single homogeneous, sterile, compacted deposit, [10], of brownish yellow (10 YR 6/6 – 6/8) to very pale brown (10 YR 7/4) very clayey silt to silty clay (brickearth of the Enfield Silts deposit/Holocene alluvium representing its reworking). The surface of this natural brickearth/alluvium, which was typically 1.10 – 1.17 m thick (compared to 1.28 m in WWE22 Trench 1), rose a little from +17.52 in Section 2 to +17.71 m OD (as in WWE22 Evaluation Trench 1) in Section 1.
- The differentiation of different units within this brickearth/clay alluvium evidently possible in the evaluation excavations (WWE22 [3], [21] and [22]) was not possible in machine cutting of the cell and they could not be isolated in sections studied. Nor could the possible paleochannel (WWE22 [2] filled by [1] and [20]) excavated in WWE22 Evaluation Trench 1 cut into WWE22 [21] be identified.
- However, study of Section 1 at the west end of the cell showed the presence of a separate broadly north south paleochannel, [15], and the deposition of further (localised) deposits, stratigraphically earlier than [10]. The channel appeared to have been cut through [14] down to the surface of [13], but the full extent of the other deposits may not have been represented in the area available for study due to the machine cut nature of the side of the cell, which also prevented observations being made west of the channel.

- The channel was 2.10 m wide, of slightly asymmetrically U-shaped profile and 0.40 m deep. It was almost filled by [16], a greyish brown (10 YR 8/2) (silty) clay which had also spread out across the top of [14] to its east to form a 0.10 m thick layer.
- Above this layer was what was probably the east side of a small gravel ridge (though observation conditions prevented certainty) which had been deposited on the slightly rising surface just east of the former channel. It was represented by [17], up to 0.20 m of light yellowish brown (10 YR 6/4) to yellow (10 YR 7/6) fine (0.02 m or less) gravel in a gritty, silty clay matrix. Overlaying it was [18], 0.10 m of brownish yellow (10 YR 6/6) silty clay with occasional charcoal fragments and above that [19], up to 0.13 m of light yellowish brown (10 YR 6/4) silty clay mixed with fine (0.01 m or less) gravel which thinned but continued west across the surface of [16] where it filled the channel.
- It therefore appeared that the paleochannel had been cut and filled before these later deposits suggested a phase of (conceivably seasonal) alternating higher and lower energy fluvial depositions had occurred along roughly the same line prior to the beginning of the accumulation of [10].

DISCUSSION

- The extensive modern truncation not withstanding, the absence of any evidence for pre twentieth century human activity on the site in the present work or earlier evaluation indicates that any Roman activity along this part of Pymmes Brook, which has been suggested by casual finds (Dearne *et al* 2017, 301 and fns 99 and 100), did not include this section of its southern margin. Similarly, Medieval use of this part of the south bank of the brook by watermills can now be ruled out (and emphasises that the eighteenth century cartographic evidence on which it was suggested needs now to be treated with even greater caution).
- Rather the significant aspect of the site findings is for the geoarchaeology of the Lea Valley and, in this case, one of its tributaries. Opportunities to study open sections, as opposed to borehole evidence, for the development of the valley system are now much rarer than in the earlier twentieth century when a number of pioneering figures, most notably Samuel Hazledine Warren, were active in recording Pleistocene and later deposits in the numerous gravel and brickearth quarries then in operation in the middle Lea valley. Such opportunities are now confined to occasional major infrastructure projects and wetland/flood alleviation initiatives such as, in Enfield, that at Albany Park (Dearne and Pinchbeck 2020) and the present site.
- Above the London Clay, the valley of the Pymmes Brook (Corcoran *et al* 2011, Terrain 6, LZ4.15, p 106f) has generally been considered to contain gravels and clays eroded from the proto-Lea river terraces to the west and the potential for Pleistocene ecofactual finds here was highlighted in Dearne (2021). Thus, though on the side slope of, not within, the valley (Corcoran *et al* 2011, 147 and Fig. 94), earlier twentieth century finds from Lea Valley Arctic Beds[5] in a former gravel pit at Hedge Lane (now within Tatem Park Recreation Ground; GLHER 080588/00/00), c. 400 m to the north west of the site included recently re-appraised remains of woolly mammoth (*Mammuthus primigenius*) (Pinchbeck 2020) which have now returned a C^{14} determination of 39,200 ± 1,100 BP (OxA- 39092; Lister 2022, 20).
- It was therefore hypothesised on site that context [13] represented Kempton Park Gravel Member (=Leyton) gravels in a primary depositional position and that [30] and [37] within them were exposures of the Arctic Beds.
- However, environmental analysis of samples of [30] (Appendix 4.3) clearly suggests that these clay blocks derived from an environment characterised by mature Oak woodland, with Hazel, ?Lime and Alder also evidenced, and the C^{14} determination of 5,711 ± 20 BP (4,649 – 4,458 calBC at 95%

[5] The Lea Valley (Ponders End) Arctic Beds are postulated to be rafts and lenses of permafrozen water lain clays and sandy clays belonging to cold stages ('Mammoth steppe') of the Pleistocene and which were broken up by meltwater and tumbled downstream to be redeposited in later Pleistocene fluvial gravels such as the 'Ponders End Gravel' unit (e.g. Corcoran *et al* 2011, 133) of the Kempton Park Gravel Member (=Leyton) gravel). They were first recognised at Pickets Lock, Ponders End and then at Angel Road, Edmonton by Warren (1910; 1911; 1912; 1914). It is now considered that they may represent either formation over a protracted period or several episodes of formation (Corcoran *et al* 2011, 148) based on the (fairly limited) range of C^{14} determinations so far obtained. As well as Hedge Lane (above) in the middle Lea Valley these include Deephams sewage works at 21,530 ± 480 BP; Nazeing or Inn's Pit at 28,000 ± 1,500 BP; and possibly Rikof's Pit at 24,630 ± 1,500 BP. Another possible date from outside the immediate area at the Eastway Cycle Circuit of 19,620 ± 250 BP (Corcoran *et al* 2011, 147f) may further emphasise the chronological range of the Artic Beds.

confidence) obtained from a sample of Oak from [30] (Appendix 4.2) places them in the later Mesolithic.

- There was no evidence for any process that might have intruded the clay blocks into pre-existing deposits and they must be seen as deposited as part of the same process that deposited at least the upper levels of gravel [13]. It therefore seems that at least these upper levels of [13], and possibly the entire deposit, at least in Cells 1 – 3, did not represent primary deposition of Kempton Park Gravel Member (=Leyton) gravels. This seems to imply that much or all of [13] represented reworking/redeposition of (presumably these) gravels by a mechanism which also dislodged blocks of clay which were deposited with the gravel.
- The most obvious interpretation then seems to be that an Early Holocene proto-Pymmes Brook with a sufficiently energetic flow to at least locally rework existing Devensian gravel deposits and carry substantial blocks of clay existed. However, this begs the question of what, even if temporally or geographically localised, circumstances may have led to the existence of such an energetically flowing water course at this time.
- In any event, it appears that two slightly different types of material were represented by the clay blocks. [30], comprising the exposures in Cells 3 and 2, demonstrably included significant amounts of woody material in a darker clay than that forming most of [37] and appears more likely to have derived from a more wooded (?stream bank) environment. The blocks contexted [37] from Cell 1 by contrast produced only fine root material and possibly some fragments of stems of water plants which were not more closely identifiable (Appendix 4.4). This may tend to suggest clay deposition in conditions such as in a boggy/shallow pool environment ?on a flood plain.
- A later stage in the development of the proto-Pymmes Brook is presumably represented by [14] and may indicate that a new/rejuvenated channel might have come to occupy a more restricted line within the valley, the site studied perhaps laying just on the south sloping margin of it, with the south side of Cell 4 intersecting the northern edge of the channel itself. If so [14] suggests a lower, but still significant, energy flow sufficient to carry a load of (smaller and less concentrated) gravel in what may have been a narrower, perhaps sometimes braided, stream, at some later point in the Holocene. The absence of [14] other than in the southern part of Cell 4 (except for a small exposure in the south of Cell 3) tends to suggest that on the east of the site the northern edge of any such channel ran further south than on the west so the channel likely either ran west-north-west to east-south-east or incorporated a turn/meander to the south between Cells 4 and 1. In any event though, if this interpretation is accepted, it strongly suggests that the proto-Pymmes Brook may have been a more significant water course at least at some point in the Holocene than might previously have been assumed.
- However, it may well be that this proto-Pymmes Brook subsequently migrated further south or decreased in width as at least one paleochannel ([15]) and perhaps a second ([33]) cutting into [13], or, where it was present, through [14], were recorded running north south, [15] at least likely forming a south flowing tributary of the main stream.
- Whether the main part of [33] was a paleochannel or a more isolated feature was uncertain, but it may well be that it was (? a relic channel section that had become) an isolated pond which slowly silted and into which analysis of its fill (Appendix 4.1) suggests lenses of finely divided organic material (?perhaps well decomposed leaf litter) containing insects including Springtails were periodically washed/blown.
- But there was what appeared to be a separate small brickearth/alluvium filled channel on its east and there were possible signs in the northern section of Cell 1 that some form of ?brickearth/alluvium filled channel may have cut the exposure of [37] here.[6] Opposite this in the south section (Section 5; Fig. 10) there were also some indications in the profile of the boundary between [13] and [10] that some downcutting into the former had occurred over a wider area prior to the deposition of [10] (however, the circumstances of recording at this level in Cell 1 especially mean that any conclusions were very tentative).
- Given the dating of [30], it seems that the fills of [15] and the main part of [33], predominantly of clayey silts, are very unlikely to have belonged to the part of the Later Devensian, when the loessic but probably polygenetic, Enfield Silts (brickearth) were initially being deposited (c. 28,000 – c. 15,000 BP and

[6] As noted above only a small vertical extent of this section was available for study following machining and there was considerable uncertainty about how far deposits other than [37] were present in it. However, at one point a block of ?brickearth did appear to interrupt [37] and might have been consistent with the fill of a small channel running approximately north south.

perhaps most likely c. 17,000 BP (e.g. Corcoran *et al* 2011, 43, 104, 133)).[7] Their downcutting into [13]/[14] and the apparent distinctiveness of their fills from [10] suggests that they represent ?tributary stream development at an early stage of, or before, the deposition of [10], which itself must have occurred in the Holocene.

- That one at least of these paleochannels, the main part of [33], may have filled in stagnant water conditions before both showed some evidence for a rejuvenation of fluvial, perhaps variable, flow along their lines, in the case of [33]'s smaller channel evidently at the beginning of the deposition of [10], probably in fact suggests that a more complex sequence of fluvial activity and silting occurred during the Holocene development of the proto-Pymmes Brook than was fully apparent from the deposits and features available for study.
- In any event though the main phase of deposition of [10] followed these features becoming fully choked and it seems that what was represented by [10] was Holocene alluvium (which will essentially have represented fluvial reworking of the Enfield Silts and presumably deposition across a broad flood plain) which the dating of [30] implies should have accrued after the Later Mesolithic and perhaps over a protracted period within the Holocene.
- At what point the current (though historically modified) course of the Pymmes Brook was established further north than it seems the proto brook may have run is unknown and the possible paleochannel and ?pond recorded within the brickearth sequence in evaluation trenches could not be further isolated in the present work so their implications for that specific question, if any, are unclear. But they probably underline that in this tributary valley brickearth deposition is likely to have been mainly due to Holocene alluviation across a reasonably broad flood plain with shifting channels rather than primary deposition of the Enfield Silts; and that the course and nature of Pymmes Brook has probably changed considerably within the last 6,000 years.

CONSERVATION AND RESEARCH IMPLICATIONS

- There are no significant conservation issues raised by this work and its implications for strictly archaeological research into the area are negative ones.
- However, the work has contributed to the study of the geomorphological development and sedimentational history of part of the Lea Valley system, including by demonstrating the degree to which Devensian deposits may potentially in fact have been reworked by Holocene fluvial processes. Thus, the implied likely size and (at least perhaps in spate) flow rate of a putative Early Holocene Lea tributary is suggestive of significant run off from the west occurring in this period and raises further questions about the hydrological history of the area.
- The complexity of the Holocene development of such tributary streams and their associated flood plains in general is also highlighted by the work, which in addition has, relatively unusually, demonstrated how far the Enfield Silts within active tributary valley systems represent alluviation probably in the early/mid to later prehistoric and even historic periods not Later Devensian primary deposition.
- It thus shows that there remains considerable potential for geoarchaeological research in the tributary valleys of the R. Lea which may inform our understanding of the prehistoric if not early historic environment and have implications for the possibilities and constraints upon landscape utilisation, settlement and communications in these periods. In a Mesolithic context the potential for activity along tributary valleys has been emphasised (Corcoran *et al* 2011, 173) and an Early Mesolithic site is known at Glover Drive near the confluence of the Pymmes Brook with the Lea (op cit, 172) so that the nature of the upper reaches of the brook is likely to be relevant to the study of resource utilisation patterns during the period.
- More broadly, the evidence here for the existence of a perhaps much larger water course than at present, and likelihood that a fairly broad flood plain existed, at least in the early to mid Holocene have implications for questions of how likely it is that the valley saw at least later prehistoric settlement and potentially even for how significant an obstacle it might have been e.g. to the routing of Ermine Street in the early Roman period.

[7] Insufficient organic material from the lenses in [32] could be isolated to allow a radio carbon determination.

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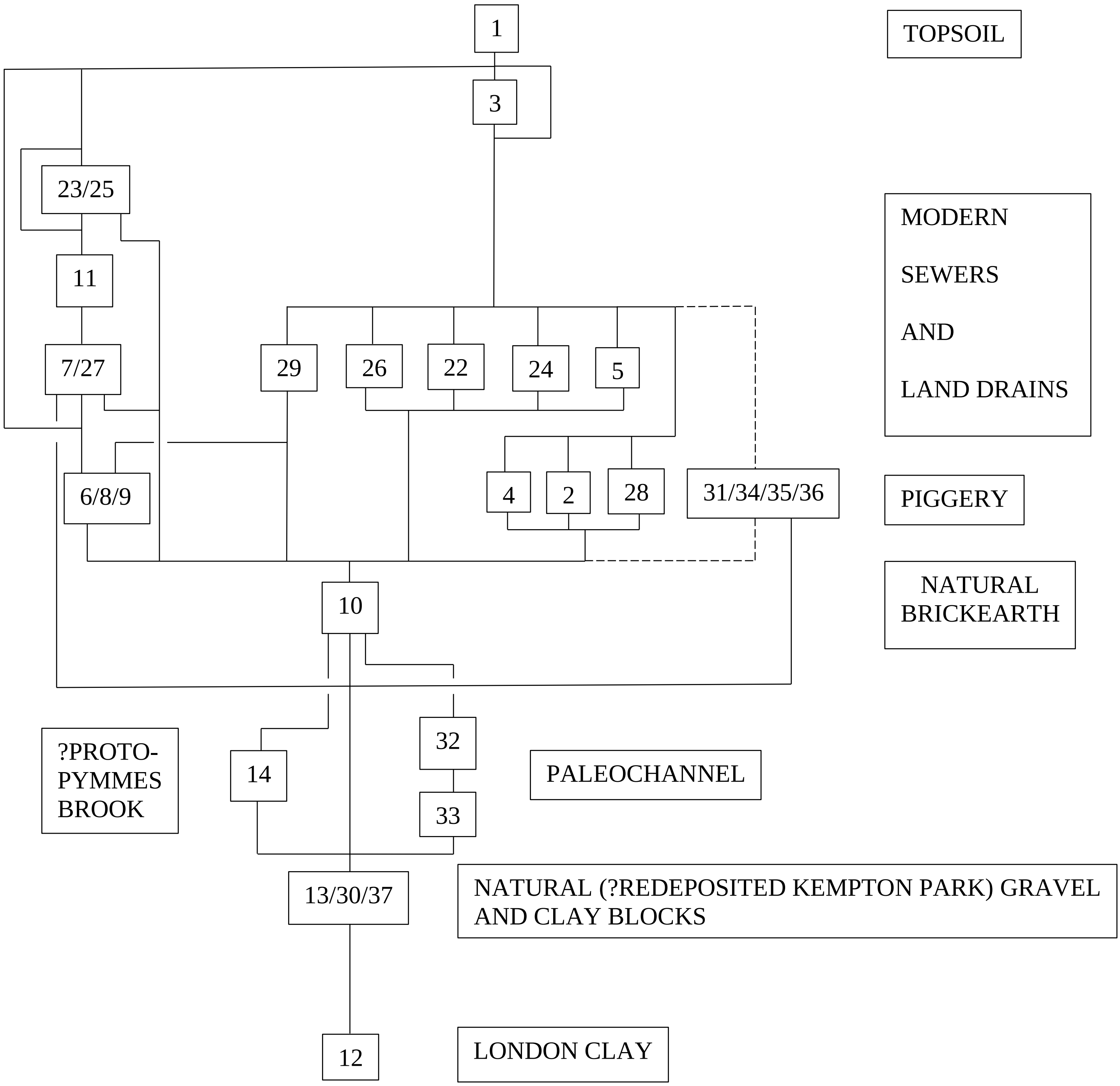
APPENDIX 1: ARCHIVE NOTE

- The archive for WIH23 is held at the London Borough of Enfield Museum Service/EAS archive and includes:
- inked copies of all plans and sections; context register and original context sheets; section, plan and sample registers; photographic image register; digital image archive; finds report; specialist reports; this report; and retained environmental samples/finds.

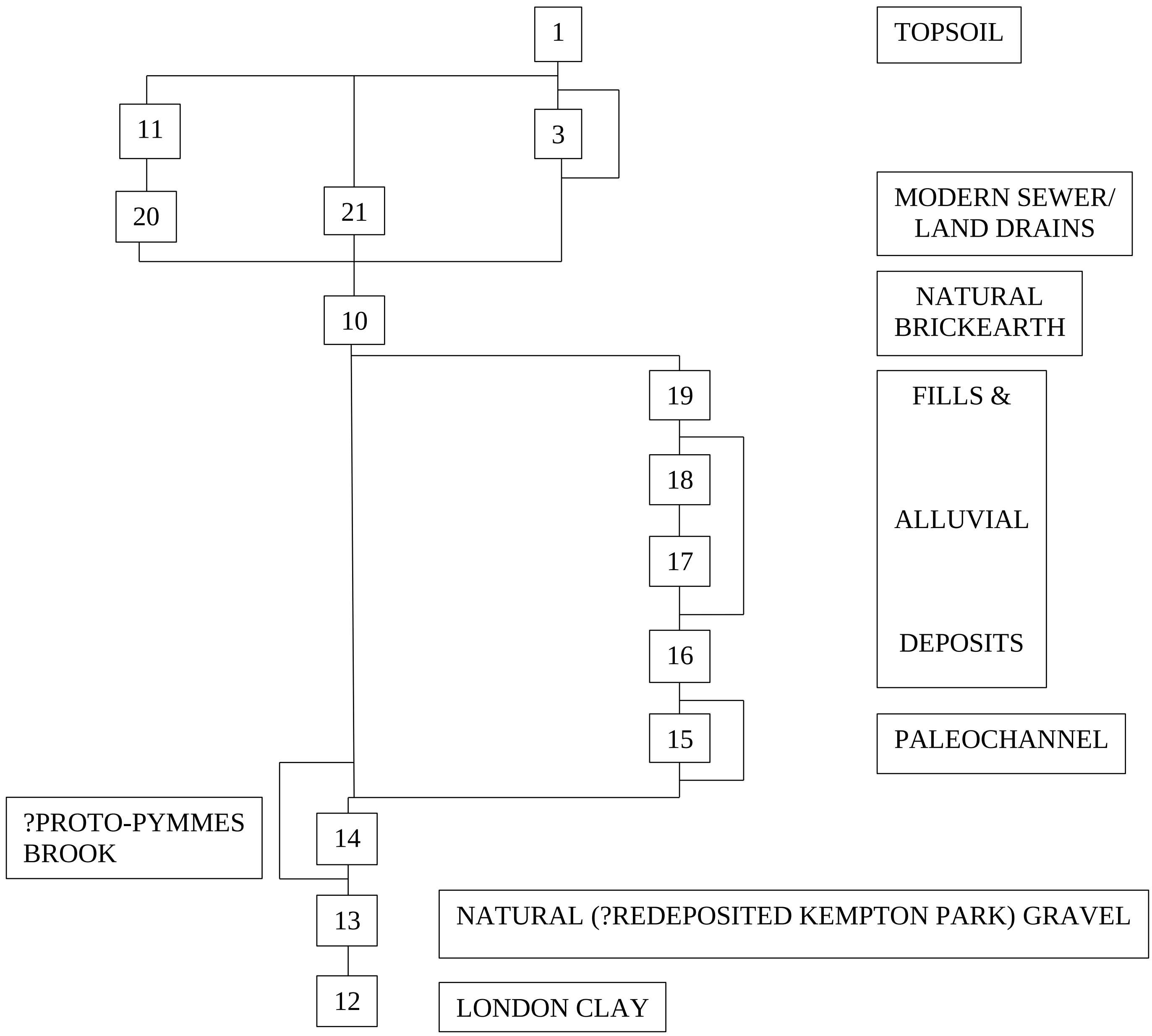
APPENDIX 2: CONTEXT INDEX AND SITE MATRICES

Context	Type	Description
1	Layer	Topsoil
2	Cut	Minor Scoop
3	Layer	Clinker
4	Cut	?Pit
5	Feature	Land Drain
6	Feature	Pig Sties
7	Cut	Sewer Trench
8	Feature	Drain
9	Feature	Drain
10	Layer	Natural Brickearth
11	Fill	Of 7, 20 and 27
12	Layer	Natural London Clay
13	Layer	Natural Kempton Park Gravel
14	Layer/Fill	? Proto-Pymmes Brook Channel Fill
15	Cut	Paleochannel
16	Layer/Fill	Natural Fill of 15
17	Layer	Natural
18	Layer	Natural
19	Layer/Fill	Natural inc. Fill of 15
20	Cut	Sewer Trench
21	Feature	Land Drains
22	Cut	Sump
23	Feature	Land Drain = 25
24	Cut	Sump
25	Feature	Land Drain = 23
26	Feature	Land Drain
27	Cut	Sewer Trench
28	Feature	Sump/Soakaway
29	Feature	Land Drain
30	Layer	Clay Blocks
31	Feature	Drain
32	Fill	Of 33
33	Cut	Paleochannel
34	Feature	Drain Inflow
35	Feature	Drain
36	Feature	Drain
37	Layer	Clay Blocks

CELLS 1 - 3


1
3
23/25
11
7/27
6/8/9
29
26
22
24
5
4
2
28
31/34/35/36
10
14
32
33
13/30/37
12
TOPSOIL
MODERN
SEWERS
AND
LAND DRAINS
PIGGERY
NATURAL BRICKEARTH
?PROTO-PYMMES BROOK
PALEOCHANNEL
NATURAL (?REDEPOSITED KEMPTON PARK) GRAVEL AND CLAY BLOCKS
LONDON CLAY

CELL 4


1
TOPSOIL
11
3
20
21
MODERN SEWER/ LAND DRAINS
10
NATURAL BRICKEARTH
19
FILLS &
18
ALLUVIAL
17
DEPOSITS
16
15
PALEOCHANNEL
?PROTO-PYMMES BROOK
14
13
NATURAL (?REDEPOSITED KEMPTON PARK) GRAVEL
12
LONDON CLAY

APPENDIX 3: FINDS SUMMARY
(MJD with a contribution by Neil Pinchbeck)

- The following summarises the main points of a fuller report available in the site archive. * denotes an item illustrated on Fig. 13. Contexts appear at the end of catalogue entries thus: [7].

1 Struck Lithics
by Neil Pinchbeck
*1.1 A side scraper (L. 5.30; W. 3.40; Th. 1.00 cm), formed on a crude ?core reduction flake of opaque strong brown flint with dark grey/pinkish white mottled cortex. Rolled. ?Upper Palaeolithic. [U/S]

2 Pottery
The only ceramic material was 21 body, handle and base sherds from a probably post 1950 int. and ext. white glazed handled large jug in English Stoneware (ENGS) with a printed style code and the maker's mark W^M ADAMS & SONS ENGLAND from [4].

3 Glass
Sherds of four vessels came from [4] including two C19th/C20th blown blue green bottles, a sherd of an opaque white vessel and nine sherds from a 'fancy' clear, pressed glass prismatic bottle probably of C20th date. The same context produced sherds of blue green window glass and thick frosted window glass, likely to have been of C20th date.

APPENDIX 4: SPECIALIST REPORTS

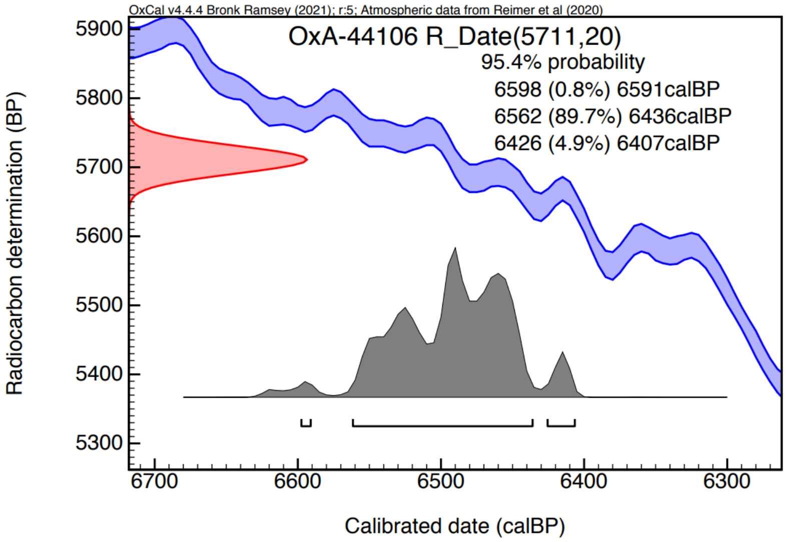
4.1 ANALYSIS OF INCLUSIONS IN [32]
by Neil Pinchbeck

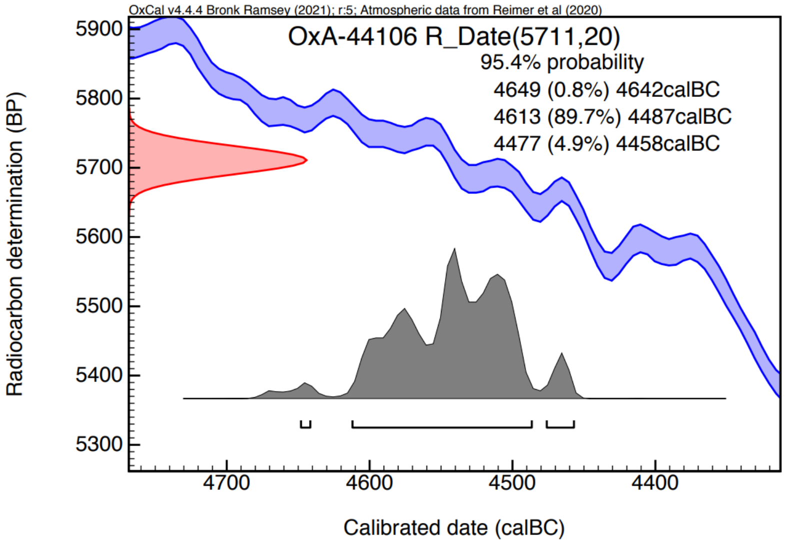
- Targeted sampling of the horizontal black streaks within paleochannel/pond fill [32] produced 50 grams of material which was immersed in a bath of filtered water, gently agitated and flotation separated with any separated organic matter collected. The material was then wet sieved through a sieve mesh of 1.0 mm and the material which passed through sieved again through a mesh of 0.3 mm. The resultant filtrate from both sievings was allowed to dry and examined under x2 and x10 magnification.
- The final sieving produced a filtrate composed of fine crystalline sand containing very small fragments of unidentifiable plant material, but also insect remains.
- The insects included a complete Homopteran, possibly of the *Aphididae,* as well as the substantially complete body of a Hexapod of sub-class *Collembola,* order *Entombryomorpha* (Springtail) and several fragmentary insect remains, probably of further Springtails, but too fragmented for detailed identification. *Diptera* (true flies) suborder *Cyclorrhapha* were additionally represented by a small (L. 2.25 mm) empty exarate coarctate pupal case.

4.2 RADIOCARBON DATING OF MATERIAL FROM [30]
by The University of Oxford Radiocarbon Accelerator Unit

- The following radiocarbon measurement has been made on a sample from this project:

OxA Sample	Material (species)	$\delta^{13}C$	Date
Wilbury Way Open Space, NGR TQ328924, UK OxA-44106 WIH23 Context 30	wood (*Quercus* sp.)	-25.23	5711 ± 20 BP





4.3 ENVIRONMENTAL ANALYSIS OF SAMPLES OF [30]

by Kate Roberts (Archaeobotany) and Marvin Demicoli (Wood), Museum of London Archaeology

(Edited by MJD from individual reports available in archive)

Methodology

- Four environmental samples were processed for the retrieval of archaeobotanical and other organic remains. Samples <2>, <3> and <4> were taken from Cell 3 and sample <6> from Cell 2.

Context	**Cell**	**Sample**	**Description**	**Processed Sample size (l)**	**Residue volume (l)**
30	3	2	West Exposure	0.25	0.2
30	3	3	Middle Exposure	0.25	0.2
30	3	4	East Exposure	0.5	0.3
30	2	6	Exposure	0.25	0.1

- Bulk soil samples ranging from 0.25 to 0.50 litres were processed by flotation, using meshes of 0.25 mm and 1.00 mm to catch the flot and residue respectively. All of the samples produced residues and flots. The flots, except one, were kept wet. One flot and the residues were air dried. The residues were sorted by eye for any finds or environmental material. All flots and sorted botanical materials from the residue were then scanned briefly, using a low-powered binocular microscope.
- Seed identifications were made using the MoLA reference collection and the Digital Seed Atlas of the Netherlands (Cappers *et al* 2012). The abundance, diversity and general nature of plant macrofossils and faunal remains were recorded.
- A sub-sample of 10 wood fragments was randomly selected for assessment from each sample. Initial assessment of the wood pieces larger than 5 mm was made using a Leica compound stereo-microscope with magnifications of 10x to 60x. Taxonomic identifications were then made via thin sections analysed under reflected light. The thin sections were made using a sharp razor blade and temporarily mounted in water onto microscope glass slides. Transverse sections were made across the axis of the wood in several parts of the cross section. Tangential longitudinal sections and radial longitudinal sections along the axis of the wood were also made to reach a taxonomic identification and to observe any eco-anatomical features. The thin sections were viewed under a Brunel reflected light microscope at magnifications of x50, x100, x200, x400 and x600. Identifications were made using anatomical guides (Hather 2000; Schweingruber 1990), online wood anatomy databases (*http://insidewood.lib.ncsu.edu/search*) and modern reference material held at the MOLA laboratories. Apart from taxonomic identifications, any visible dendroecological features were noted and recorded if present. These included, number of growth rings, any variations in ring widths, the presence/absence of bark, the presence/absence of traumatic growth, the presence/absence of suppressed growth, the presence/absence of reaction wood (compression or tension wood), the presence/absence of collapsed cells or fungal decay, the presence/absence of insect degradation, and any other anatomical features that could aid the interpretation of the growing environment from which the wood came.
- When available a sub-sample of up to 10 anthracological (charred wood charcoal) fragments was randomly selected for assessment from each sample. Charred wood remains larger than 2 mm in size, were identified using a transmitted light microscope at magnifications of x50 to x600 times. Charcoal fragments were fractured by hand to expose clean diagnostic sections, in accordance with standardised procedures (Gale and Cutler 2000; Hather 2000; Leney and Casteel 1975). Taxonomic identifications were assigned by comparing suites of anatomical characteristics visible with those documented in reference atlases (Hather 2000; Schweingruber 1990), online databases (*http://insidewood.lib.ncsu.edu/search*) as well as reference material in the MOLA archaeobotany collection. Apart from taxonomic identifications, any other characteristics and features were briefly noted when visible. These included ring curvature, eco-anatomical features and taphonomical features.
- No faunal remains were observed in the flots or residue. Waterlogged wood was present in all four samples, in larger quantities in sample <2> from Cell 3 and sample <6> from Cell 2; charcoal was the only charred plant remain found in samples.

Archaeobotanical remains

- Single Alder (*Alnus sp.*) seeds were present in samples <2> and <4> from Cell 3 and a single Buttercup (*Ranunculus acris/repens/bulbosus*) seed and Goosefoot (*Chenopodium sp.*) seeds were observed in sample <4>.[8] A Violet (*Viola sp.*) seed was present in sample <2>, however this appeared to be modern and intrusive.
- The single Alder and Buttercup seeds could be indicative of a damp environment, whilst Goosefoot tends to grow on disturbed, nitrogen rich soils. The presence of such a small assemblage could be due to the small sample size, but may also be due to the drying out of the context, prior to excavation. This can be seen when formerly waterlogged assemblages deteriorate after periods of drying out, with only woodier, more robust seeds surviving. Both Alder and Buttercup are quite woody seeds, and more likely to survive than other, more delicate remains.
- Making overt comparisons to local sites based on such a small seed assemblage is difficult, however both Alder and Goosefoot were seen in the pollen record from the middle Bronze Age pollen cores at Innova Park (Ritchie *et al* 2008).

Wood and Anthracological Remains

- Diagnostic wood remains (Table 1) were only present in sample <2>. In general, most wood fragments had average to bad preservation although an identification was generally possible. Most of the identified wood pieces were of Oak (*Quercus sp.*); all assessed fragments had vessels filled with tyloses which is indicative of heartwood formation. Most of the fragments had medium to narrow annual ring widths and had a weak growth ring curvature. All of the wood fragments had collapsed cell structures. One of the Oak samples had evidence of insect bores.
- Two fragments were possibly of conifer wood. However the preservation of these fragments was extremely poor and therefore this identification is not secure.
- Several of the larger wood fragments had structures of rythidome and cortex cells, suggesting that these are bark fragments form dicotyledonous trees, possibly also of Oak, although an identification of bark was not attempted.
- Diagnostic anthracological remains (Table 2) were very sparse and were present only in samples <4> and <6>. In general, the condition of the charcoal was good to average. One charred wood fragment of Oak (*Quercus sp.*) was present in sample <6>. It had a wide growth ring pattern, a weak ring curvature, and tyloses were not noted on it.
- In sample <4> charred wood fragments of Hazel (*Corylus avellana*) and possibly Lime (*Tilia sp.*) were identified. The single Hazel fragment had medium ring curvature, suggesting branch wood or a smaller tree. The two Lime fragments had weak ring curvature suggesting larger trunk wood.
- The observed narrow annual ring widths in wood fragments indicate a slow but constant tree growth pattern, while the prevalence of weak growth ring curvature suggests wood of larger trunks or very large branches. These features are indicative of old growth trees suggesting a mature woodland. The presence of collapsed structures can be indicative of decay but, in these contexts, they are more likely to have been caused by sedimentary taphonomic pressure and possible episodes of drying (including during processing for some of the samples).
- The quantity of the recovered charcoal is very low and therefore it is not possible to make any significant interpretations of it.
- In general, the identified taxa from the wood and charred wood remains in the assessed samples are indicative of a mature Oak woodland environment, possibly with Hazel and Lime. This woodland type is not indicative of an arctic-type environment. Rather it suggests a warmer environment and well developed soils that allow for the formation of such woodlands. The identified wood and charcoal taxa and associated dendro-ecological characteristics are more indicative of an environment and climate similar to that of the mid-Holocene.

[8] Three further probable Goosefoot (*Chenopodium sp.*) seeds were identified by Neil Pinchbeck of the EAS in a 120 gram sub-sample of [30] (from Cell 3, Western Exposure) during a preliminary evaluation to isolate material for C^{14} determination and prior to the submission of the remaining material to MoLA. Processing of this sample recovered 10 fragments of wood or bark up to 70 mm x 25 mm and c. 20 typically 15 mm x 7.5 mm fragments.

Context	Sample	Cell	TS width mm	TS depth mm	Number of growth rings	Bark present	Ring types (narrow/wide/ fluctuate)	Ring curvature degree	Tyloses	knots	Collapsed structures	Insect degradation	Condition		comments	Identification
30	2	Cell 3 W. exposure				1					1		bad	rehydrated dried waterlogged	Bark - rythidome and cortex structures noted although very badly preserved	Bark cf. dicot
30	2	Cell 3 W. exposure								1	1		bad	rehydrated dried waterlogged	knot	cf. conifer
30	2	Cell 3 W. exposure	8	12	21		narrow	1	1		1		bad	rehydrated dried waterlogged		Quercus
30	2	Cell 3 W. exposure	8	8	13		medium	2	1		1		bad	rehydrated dried waterlogged		Quercus
30	2	Cell 3 W. exposure				1					1		bad	rehydrated dried waterlogged	Bark - rythidome and cortex structures noted although very badly preserved	Bark cf. dicot
30	2	Cell 3 W. exposure	6	18	11		wide	1	1		1		average	rehydrated dried waterlogged		Quercus
30	2	Cell 3 W. exposure									1		bad	rehydrated dried waterlogged		cf. conifer
30	2	Cell 3 W. exposure	5	11	11		medium	1	1		1		bad	rehydrated dried waterlogged		Quercus
30	2	Cell 3 W. exposure	2	10	9		medium	1	1		1		bad	rehydrated dried waterlogged		Quercus
30	2	Cell 3 W. exposure	5	18	24		narrow	3	1		1		bad	rehydrated dried waterlogged		cf. Quercus
30	2	Cell 3 W. exposure	5	9	16		narrow	2	1		1		average			Quercus
30	2	Cell 3 W. exposure	4	10	7		medium	1	1		1		average			Quercus
30	2	Cell 3 W. exposure	4	9	9		medium	2	1		1	1	average			Quercus
30	2	Cell 3 W. exposure	4	12	13		medium	1	1		1		average			Quercus
30	2	Cell 3 W. exposure	3	10	5		wide	1	1		1		average			Quercus
30	2	Cell 3 W. exposure	2	8	11		medium	1	1		1		average			Quercus
30	2	Cell 3 W. exposure	2	11	15		narrow	1	1		1		average			Quercus
30	2	Cell 3 W. exposure	3	4	4		medium	1	1		1		average			Quercus
30	2	Cell 3 W. exposure	4	8	11		narrow	1	1		1		average			Quercus
30	2	Cell 3 W. exposure	3	9	12		narrow	1	1		1		average			Quercus
30	2	Cell 3 W. exposure				1					1		bad	rehydrated dried waterlogged	Bark - rythidome and cortex structures noted although very badly preserved	Bark cf. dicot
30	2	Cell 3 W. exposure				1					1		bad	rehydrated dried waterlogged	Bark - rythidome and cortex structures noted although very badly preserved	Bark cf. dicot
30	2	Cell 3 W. exposure				1					1		bad	rehydrated dried waterlogged	Bark - rythidome and cortex structures noted although very badly preserved	Bark cf. dicot

Table 1: Wood assessment data from samples (ring curvature degree after Marguerie and Hunot 2007).

				Structural features			Ecological features		Pre-combustion	Combustion		Deposition	
Context	**Sample**	**Cell**	**Frag #**	**Tangential Width TS (mm)**	**Radial Depth TS (mm)**	**Number of full growth rings**	**Ring curvature degree**	**Ring type wide/narrow/varies**	**Collapsed structures**	**Vitrification**	**Radial Cracks**	**Post depositional sediments**	**Taxonomic Identification**
30	6	Cell 2	1	2	4	2	1	wide		1	1	1	Quercus
30	4	Cell 3 E. Exposure	1	6	4	6	2	medium					Corylus avellana
30	4	Cell 3 E. Exposure	2	1	4	0	1		1				cf. Tilia
30	4	Cell 3 E. Exposure	3	2	1	0	1		1				cf. Tilia

Table 2: Anthracological (charcoal) assessment data from samples (ring curvature degree after Marguerie and Hunot 2007)

4.4 ENVIRONMENTAL ANALYSIS OF SAMPLES OF [37]

by Neil Pinchbeck

- Limited sampling of the main deposit comprising [37] (Cell 1, exposure 1) provided 100 grams of sample which was immersed in a bath of filtered water, gently agitated and flotation separated with any separated organic matter collected. The material was then wet sieved through a sieve mesh of 1.0 mm and the material which passed through sieved again through a mesh of 0.3mm. The resultant filtrate from both sievings was allowed to dry and examined under x2 and x10 magnification.
- The main component of the deposit was a sediment of dark grey (10 YR 4/1 when wet) clay. The filtrate contained abundant fragments of fine roots and possibly some stems of water plants which were not more closely identifiable.
- Separate sampling of darker bands in the same deposit provided 25 grams of sample which was processed as above.
- The main component of the deposit was a sediment of very dark grey (10 YR 3/1 when wet) clay and the filtrate contained only a few small fragments of roots as above.

OASIS Summary for enfielda1-521597

OASIS ID (UID)	enfielda1-521597
Project Name	Watching Brief at Wilbury Way
Sitename	Wilbury Way
Sitecode	WIH23
Project Identifier(s)	Wilbury Way
Activity type	Watching Brief
Planning Id	21/03724/RE4
Reason For Investigation	Planning: Post determination
Organisation Responsible for work	Enfield Archaeological Society
Project Dates	09-May-2023 - 14-Jun-2023
Location	Wilbury Way NGR : TQ 32800 92400 LL : 51.61477119776392, -0.083356228107016 12 Fig : 532800,192400
Administrative Areas	Country : England County/Local Authority : Enfield Local Authority District : Enfield Parish : Enfield, unparished area
Project Methodology	Monitoring of stripping to natural/investigation and recording of features revealed. Study and sampling of machined sections for geoarchaeological information
Project Results	•Archaeological monitoring of the cutting of four wetland cells in part of the valley of the Lea tributary Pymmes Brook identified elements of a mid twentieth century piggery, but major later twentieth century sewer and then land drain/sump installation had significantly truncated areas of the site. •Study of Pleistocene/Holocene deposits recorded up to seven blocks of clay containing organic material indicative of a mature Oak woodland environment embedded in likely partly or wholly redeposited Kempton Park Gravel Member (=Leyton) gravels and which returned a radio carbon determination of 5,711 ± 20 BP (4,649 – 4,458 calBC). They suggested that a putative large and energetic late Mesolithic proto-Pymmes Brook may have reworked Devensian deposits. •The monitoring also suggested a later, but probably still significant, proto-Pymmes Brook channel was present and recorded one or two contemporary or later tributary paleochannels predating the alluvial deposition of the Enfield Silts (brickearth), probably across an early/mid Holocene flood plain.
Keywords	
Funder	District, borough or city council London Borough of Enfield
HER	Greater London HER - unRev - STANDARD
Person Responsible for work	Martin Dearne
HER Identifiers	
Archives	Physical Archive, Documentary Archive, Digital Archive - to be deposited with London Borough of Enfield Museum Service;

FIGURES

Fig. 1: Site Location

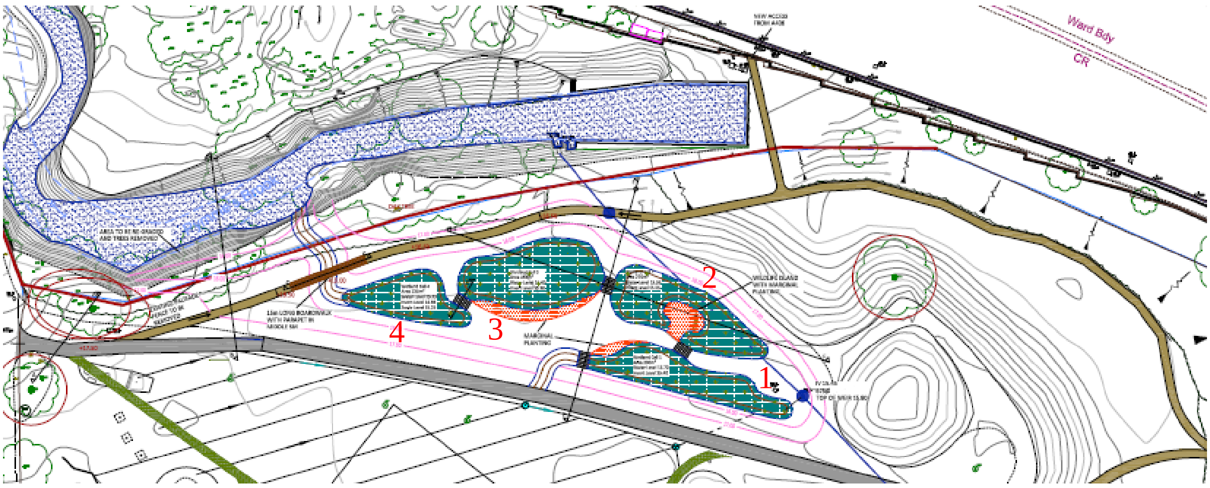


Fig. 2: The Wetland Creation Scheme (Cell Numbers in Red)

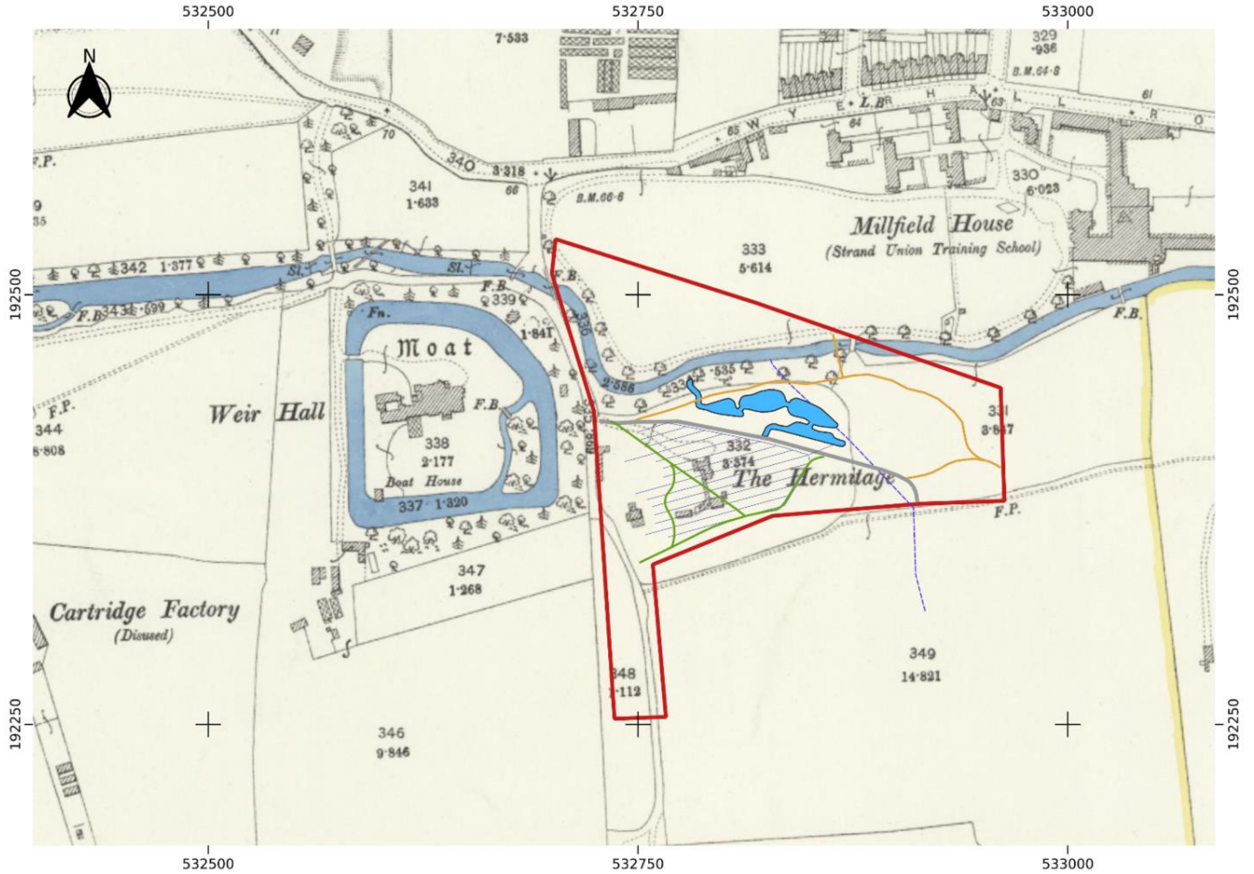


Fig. 3: Extract from the 1894 OS 25 inch Map with the Wilbury Way Site Outlined in Red and the Wetland Scheme Overlain.

Fig. 4: Extract from the 1958 1:1,250 OS Map with the Wetland Scheme Overlain

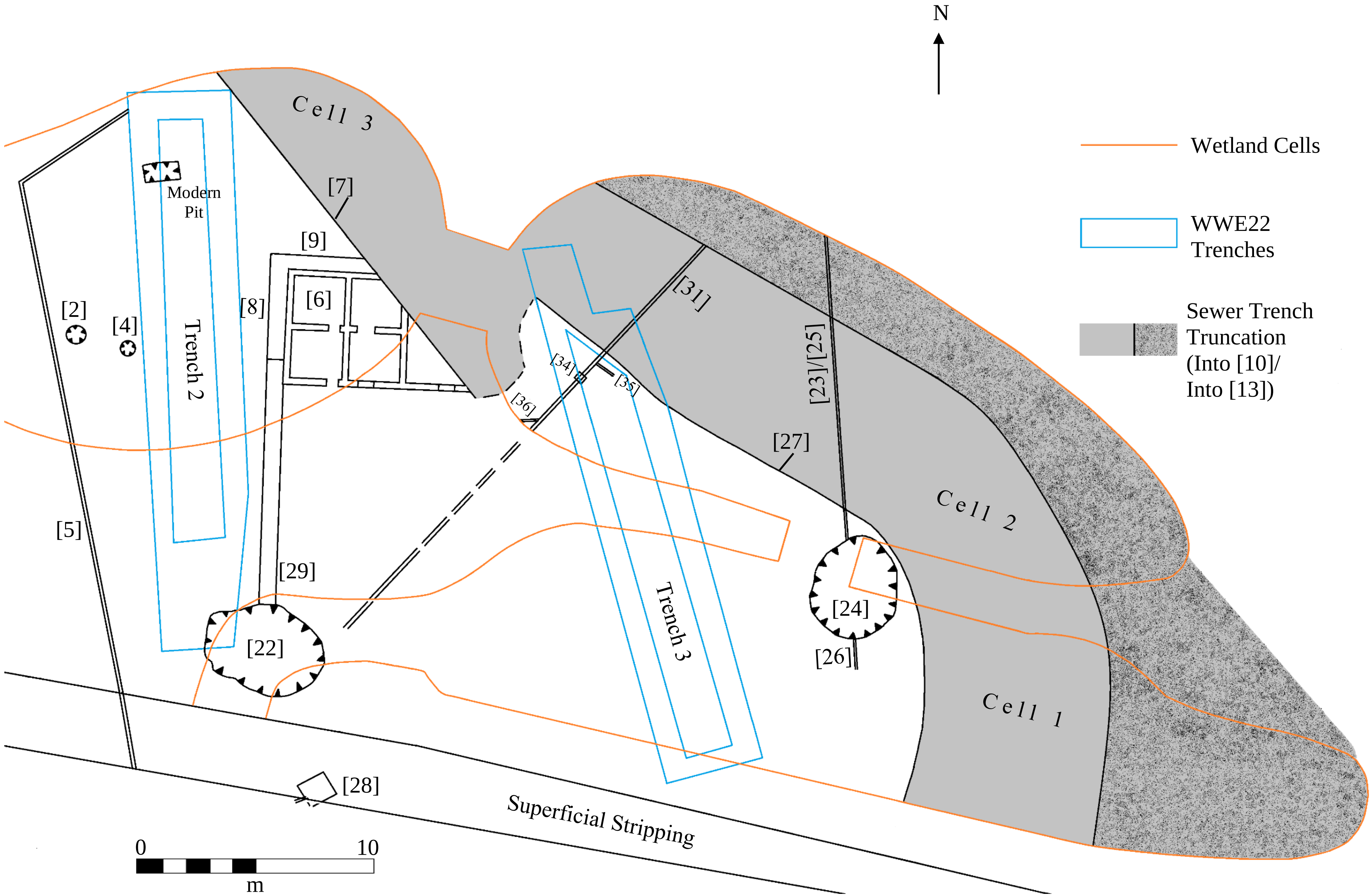


Fig. 5: Phase 1 and 2 Features in the Area of Cells 1 - 3

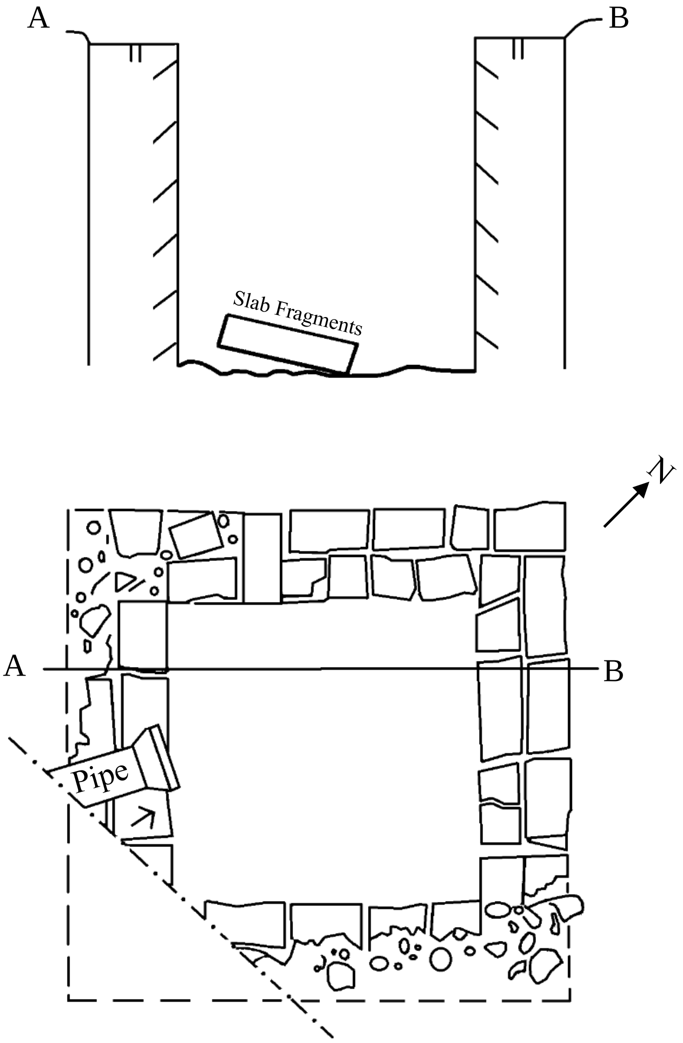


Fig. 6: Cells 1 – 3, Phase 1 Sump/Soakaway [28] (1:20)

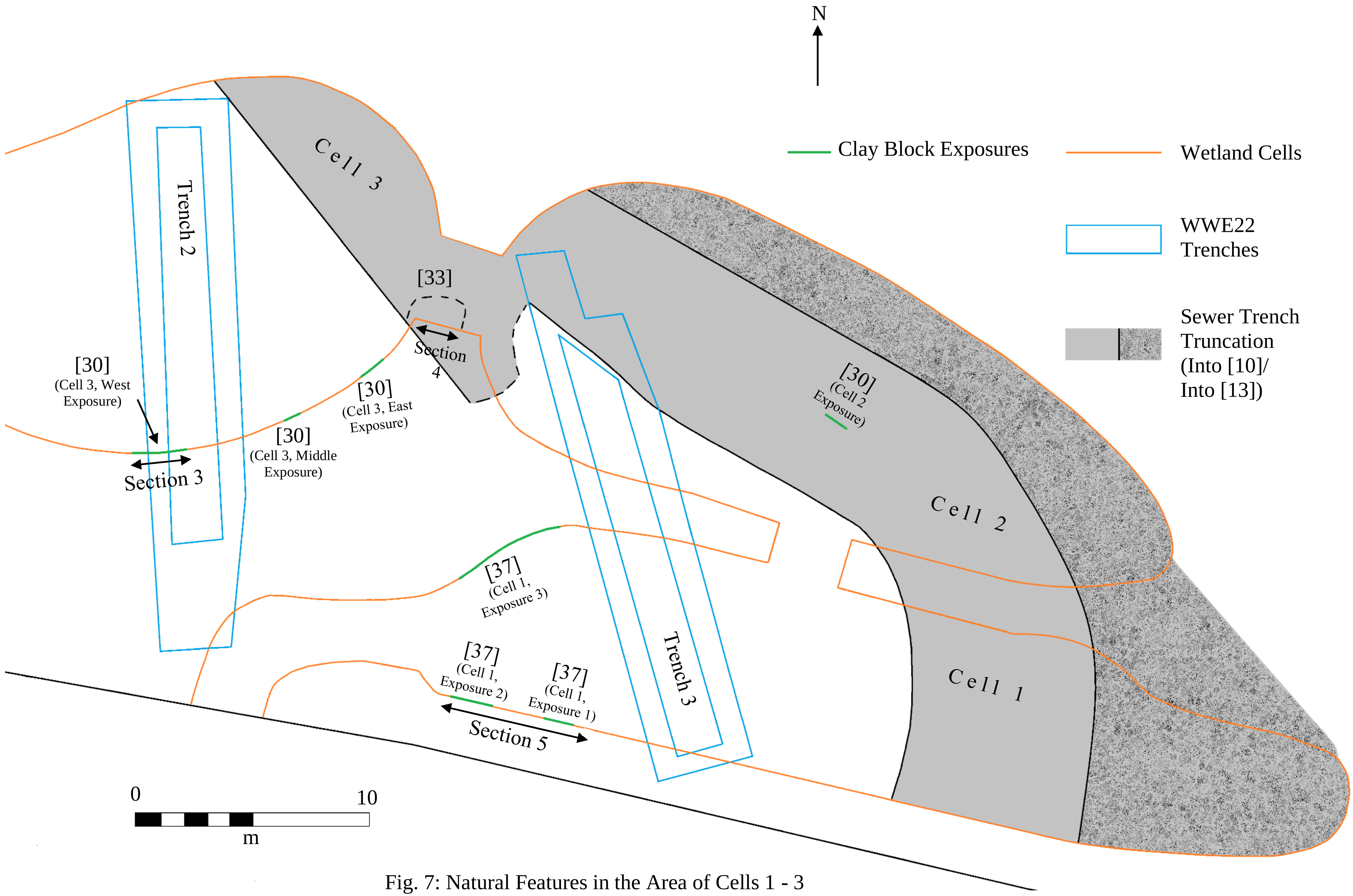


Fig. 7: Natural Features in the Area of Cells 1 - 3

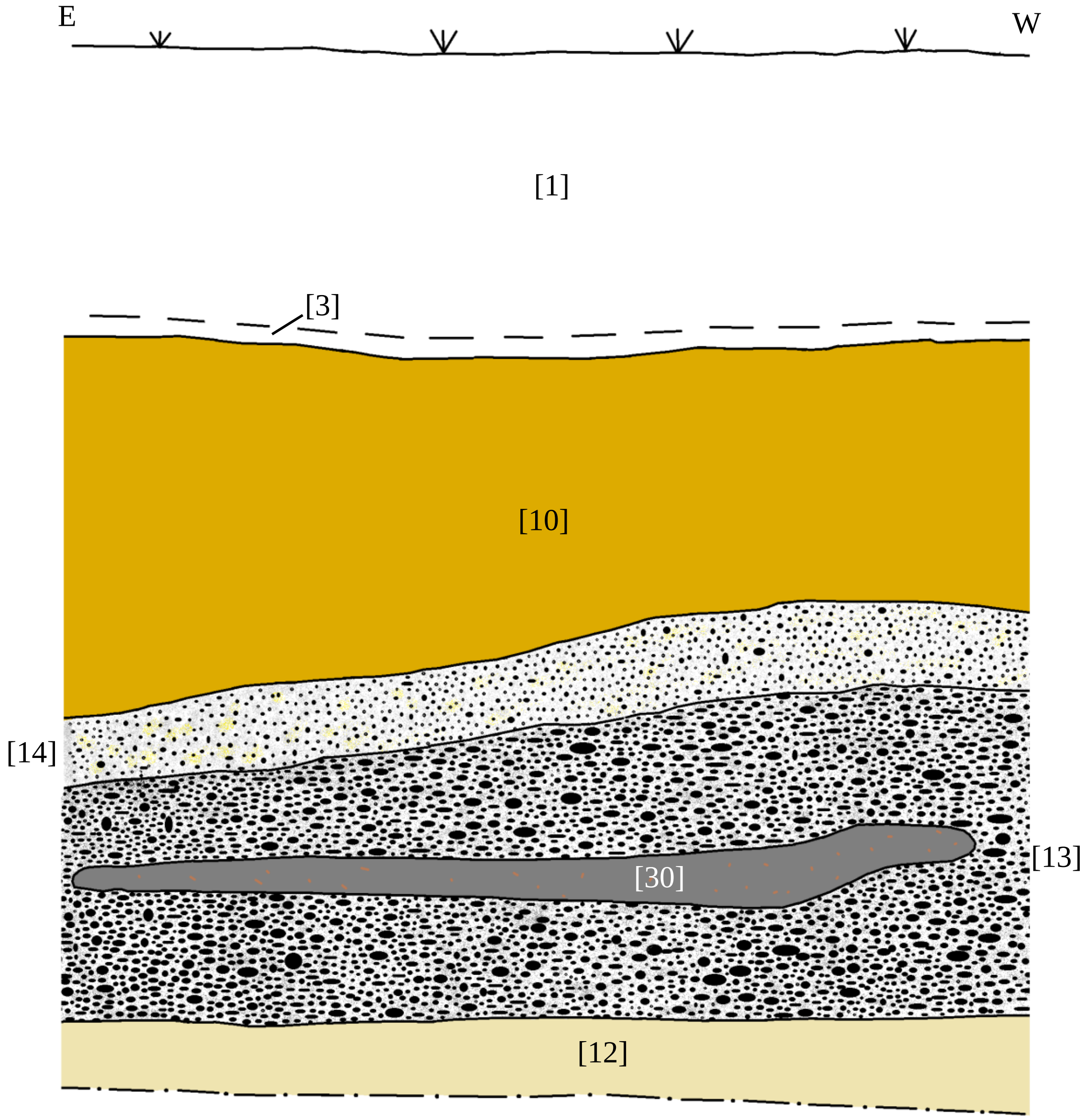


Fig. 8: Section 3 (1:20)

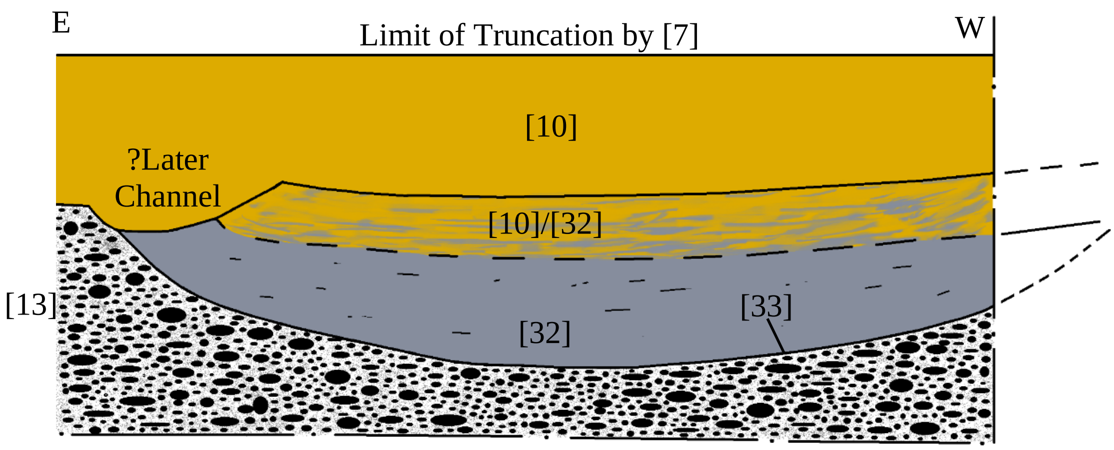


Fig. 9: Section 4 (1:20)

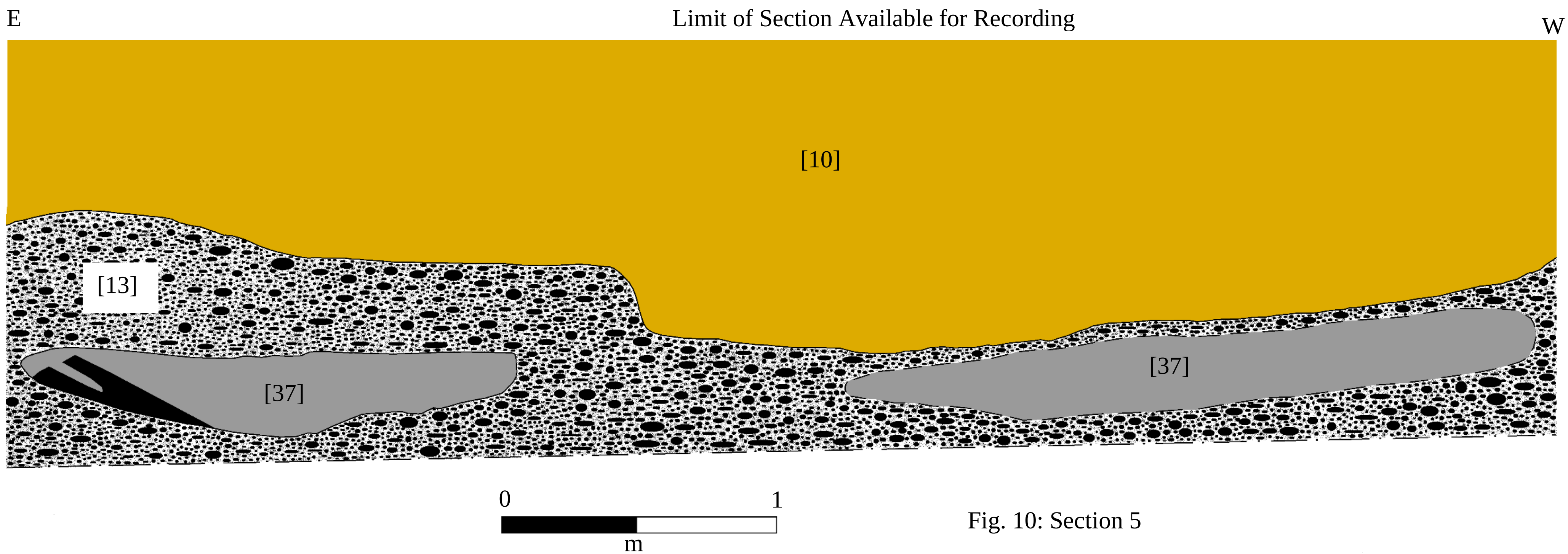
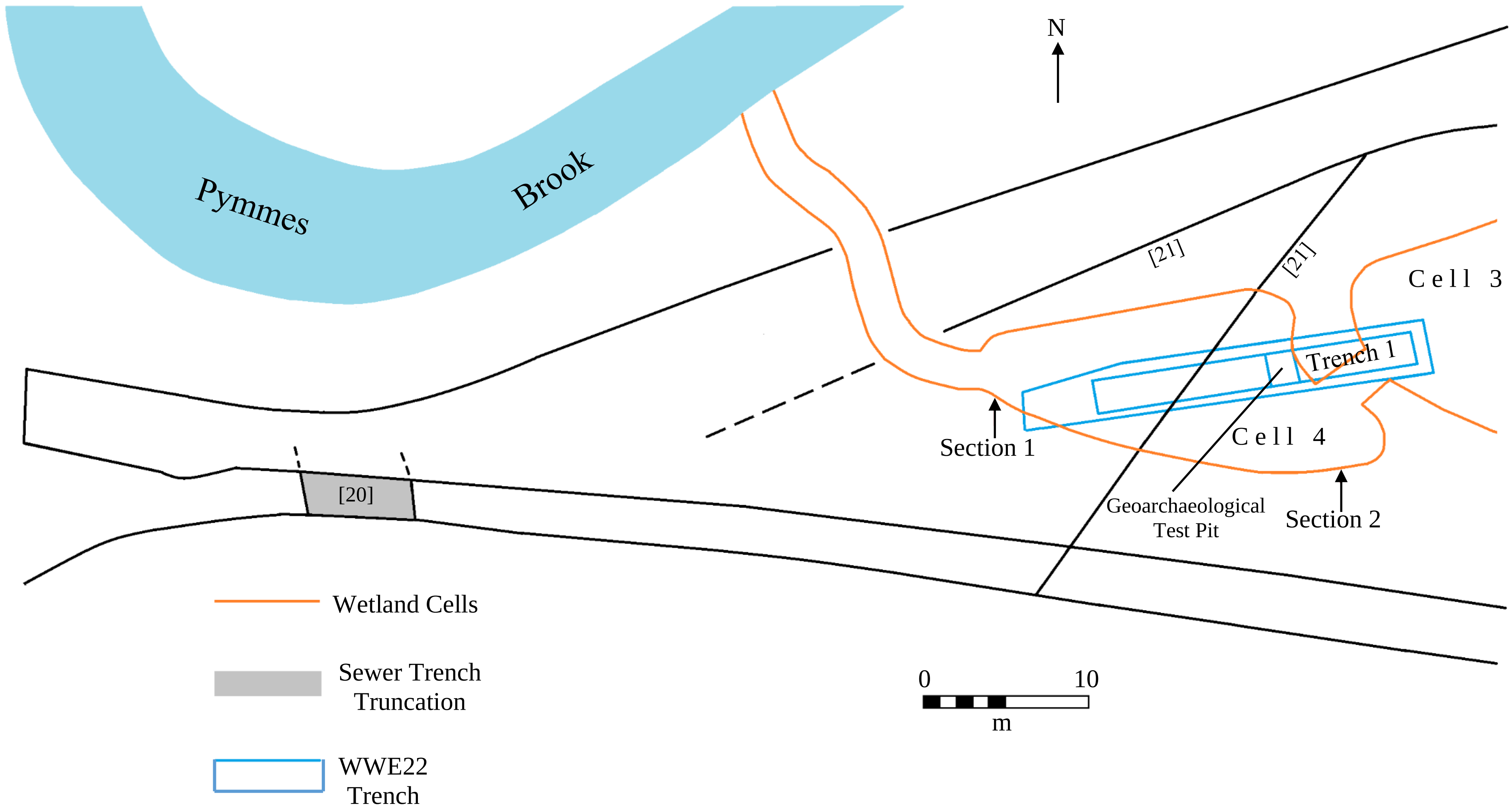


Fig. 10: Section 5

Fig. 11: Features in Cell 4 and Environs



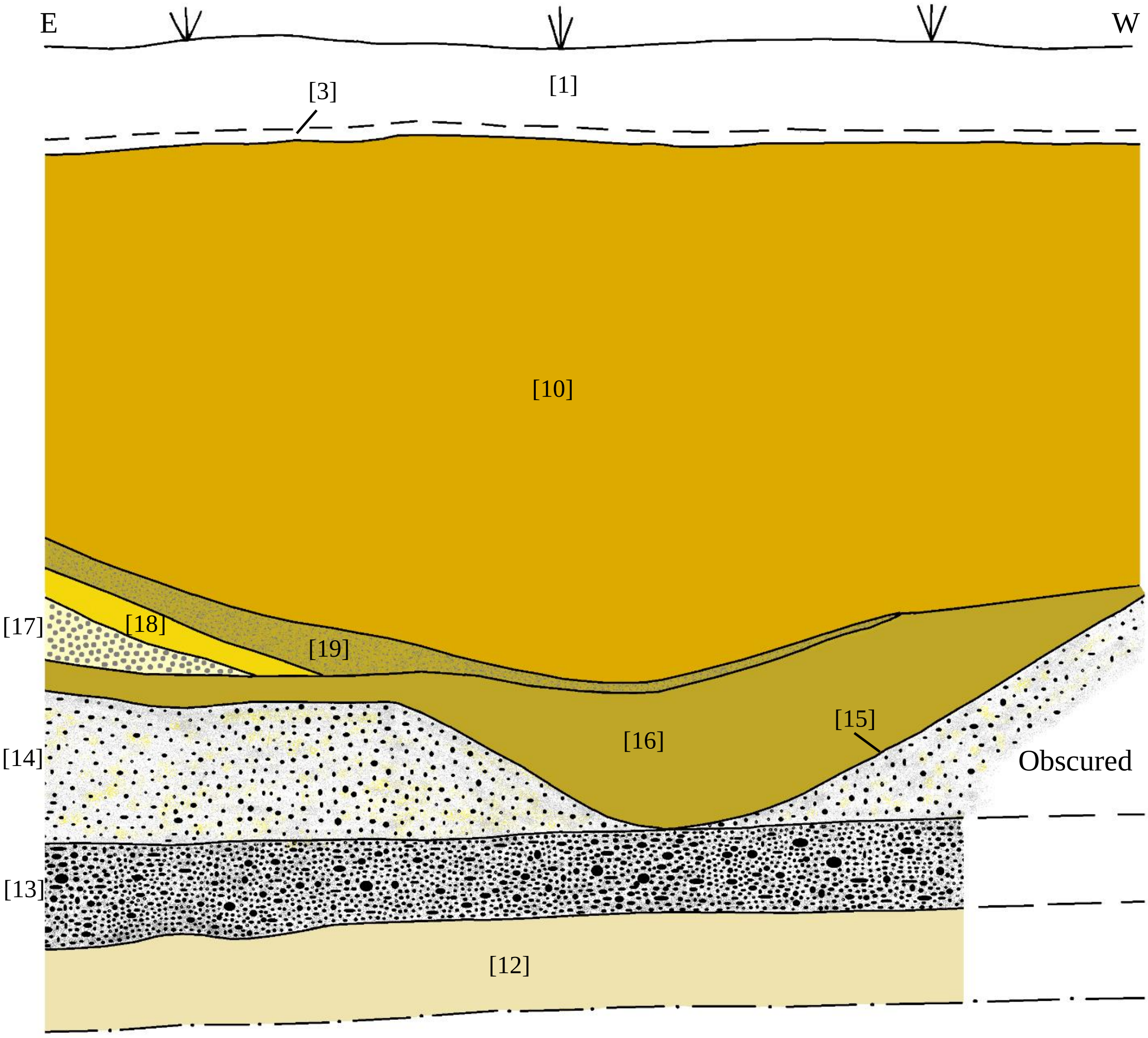


Fig. 12: Section 1 (1:20)

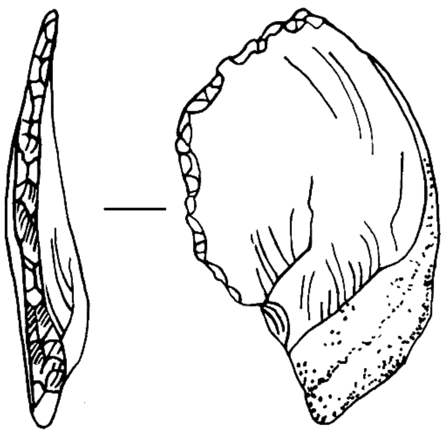
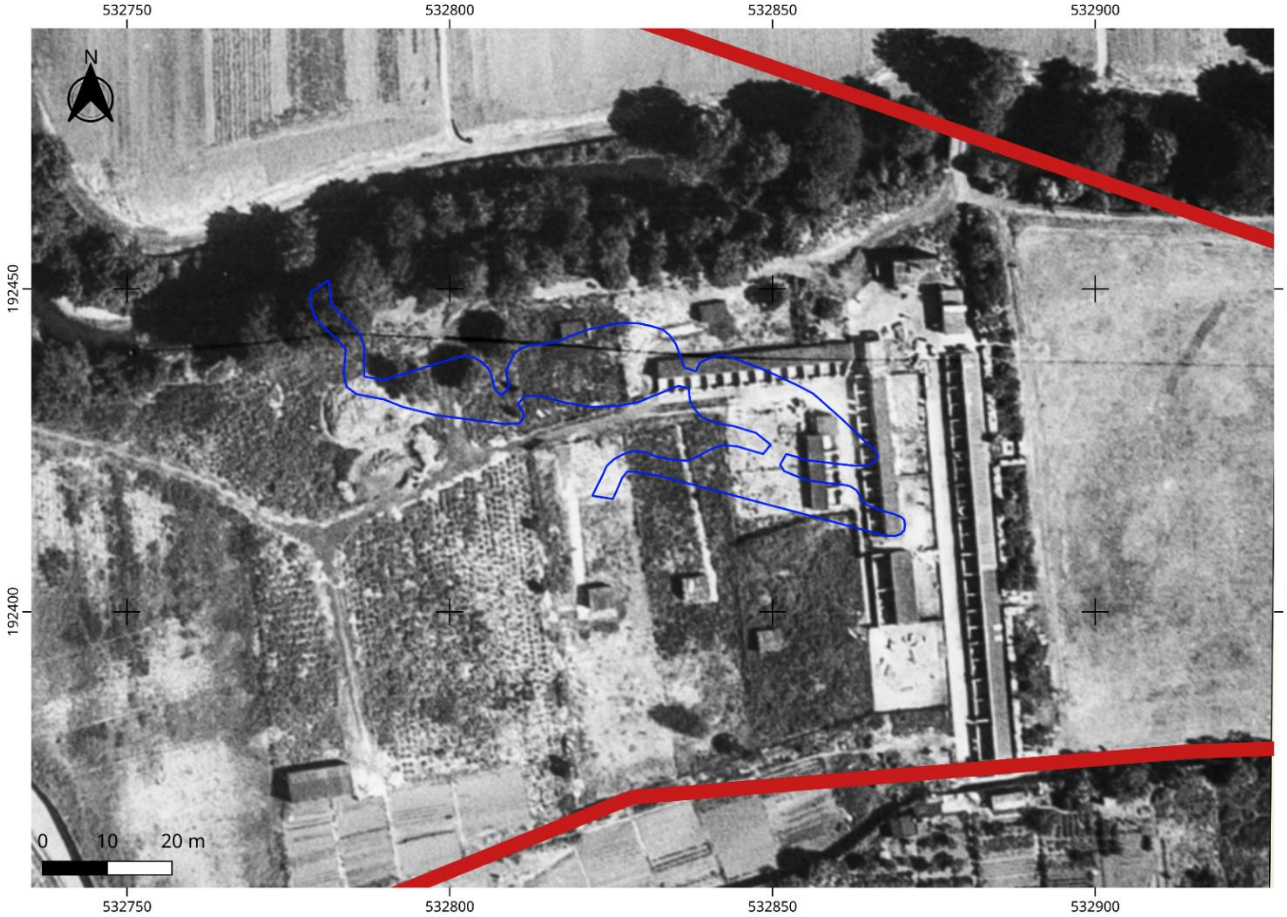


Fig. 13: Lithic 1.1 (1:1)

PLATES

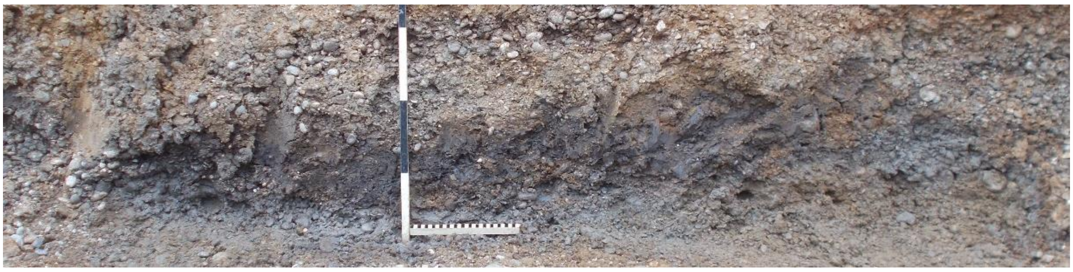


Pl. 1: 1947 Aerial Photo (13_06_1947_raf_cpe_uk_2155_rvpl_6100) with the Wetland Scheme Overlain

Pl. 2: Cells 1 – 3, Phase 1 Pig Sties [6] and Drain [8]/[9] Looking South East

Pl. 3: Cells 1 – 3, Phase 1 Sump/Soakaway [28] Looking North West

Pls 4 and 5: Cells 1 – 3, Phase 1 Pit/Scoop [4] and Phase 2 Land Drain [5] Looking South

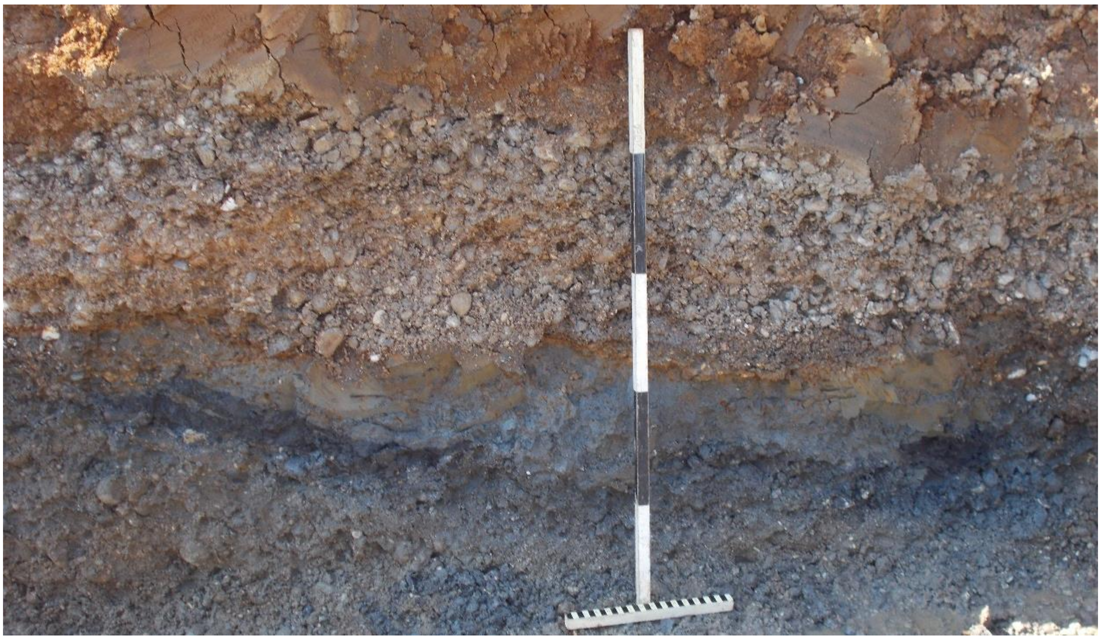


Pl. 6: Clay Block [30] Within [13], Cell 3, West Exposure,
Looking South (Vertical Scale in 20 cm Divisions)

Pl. 7: Clay Block [30] Within [13], Cell 3, Middle Exposure,
Looking South (Vertical Scale in 20 cm Divisions)

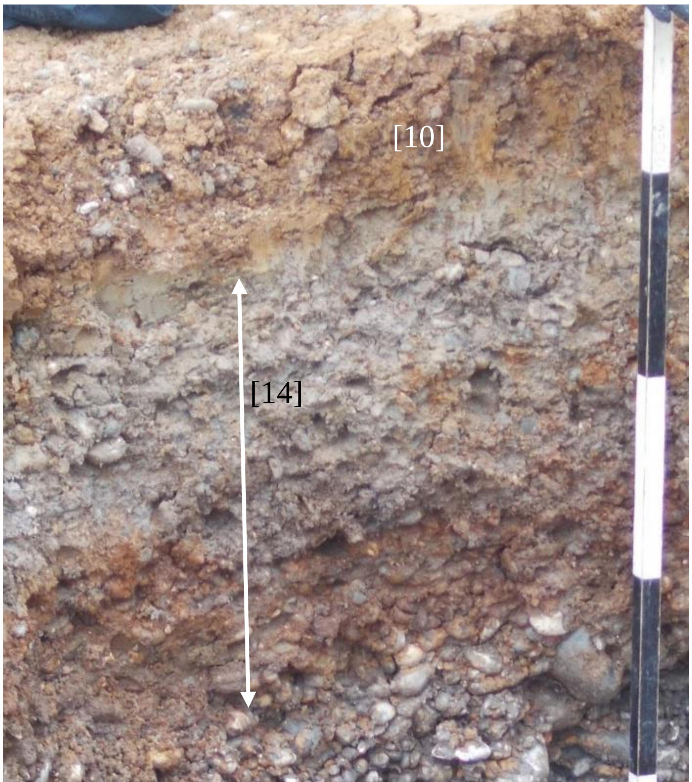
Pl. 8: Clay Block [30] Within [13] (and Supervening Enfield Silts [10]), Cell 3, East Exposure, Looking South (Vertical Scale in 20 cm Divisions)

Pl. 9: Clay Block [30] Within [13], Cell 2 Exposure, Looking South (Vertical Scale in 20 cm Divisions)



Pl. 10: Clay Block [37] in [13], Cell 1, Exposure 1 (and Supervening Enfield Silts [10]), Looking South (Vertical Scale in 20 cm Divisions)

Pl. 11: Cells 2/3, Natural Paleochannel [33] Looking South (Vertical Scale in 20 cm Divisions)



Pl. 12: Cell 4, Section 2 (Scale in 20 cm Divisions)