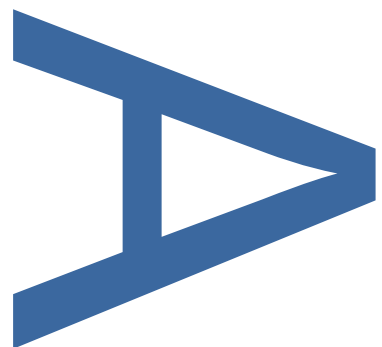
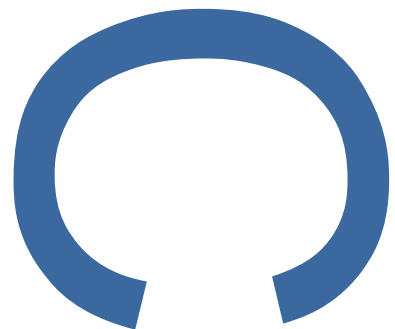


**HALE WHARF, FERRY LANE,
TOTTENHAM N17 9NE
AN ARCHAEOLOGICAL
EVALUATION AND WATCHING
BRIEF**

SITE CODE: FRR17

**LOCAL PLANNING AUTHORITY:
LONDON BOROUGH OF HARINGEY**

SEPTEMBER 2017 UPDATED JULY 2018



PRE-CONSTRUCT ARCHAEOLOGY

HALE WHARF, FERRY LANE, TOTTENHAM N17 9NE
AN ARCHAEOLOGICAL EVALUATION AND WATCHING BRIEF

LOCAL PLANNING AUTHORITY: LONDON BOROUGH OF HARINGEY

SITE CODE: FRR17

CENTRAL NGR: TQ 34782 89475

COMMISSIONING CLIENT: John F Hunt

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1 ABSTRACT

- 1.1 This report details the results and working methods of an archaeological evaluation and watching brief that was undertaken at Hale Wharf, Ferry Lane, Tottenham N17 9NE (TQ 34782 89475).
- 1.2 The evaluation comprised four evaluation trenches positioned across the southern area of the site and the watching brief comprised archaeological monitoring of obstruction removal across the site. The aim of the project was to assess the presence or absence of archaeological remains within the entire stratigraphic sequence to natural deposits.
- 1.3 Natural gravel was seen in all four trenches at a height of between 6.15m OD in the south and 5.66m OD in the north. A peat layer, radiocarbon dated to the early Saxon period (Appendix 5 Section 3.3) was seen in Trench 3 and during the archaeological monitoring, which was capped by a layer of alluvium which was also seen across Trenches 1, 3 and 4. The monolith samples taken from the peat layer contained evidence of an open, damp local environment. Reed swamp / sedge fen is indicated by high values of grasses, sedges and aquatics; the growth of alder is also indicated, possibly representing localised stands growing along the edge of the floodplain. The nearby dryland was also very open in nature, and the presence of cereals, their associated weeds, and indicators of disturbed ground (e.g. dandelions, fat hen) together with charcoal is suggestive of nearby anthropogenic activity.
- 1.4 The stratigraphic sequence was very similar in nature and thickness to that recorded at Ferry Lane Industrial Estate, as was the palaeo-ecological assemblage. However, at Ferry Lane, the complex of alluvial deposits overlying the gravel was radiocarbon dated between the late Iron Age and early Roman period, rather than the Saxon period as at Hale Wharf. The top of the gravel was c.2m deeper than at Hale Wharf.
- 1.5 To the south of the site evidence of the mill leat was seen in the form of land ties within Trench 1 and during the archaeological monitoring, whilst an accumulated deposit formed in the base of the leat was seen in Trench 1 and 2.
- 1.6 An archaeological watching brief was carried out in the south of the site in order to establish if the Tottenham Mill and tollhouse survived, in areas which could not be evaluated during the evaluation phase. The watching brief identified the remains of the mill in the south-east of the site, which was then excavated under a mitigation phase. On the south-western edge of the site, the remains of a 19th century building were observed within the watching brief area, which probably formed part of the post-medieval tollhouse.
- 1.7 The mill area was subsequently fully archaeologically excavated down to the site formation level. A post-excavation assessment for the mill is forthcoming.
- 1.8 Across the entire site were several layers of 20th and 21st century made ground relating to the industrial use of the land.

2 INTRODUCTION

- 2.1 This report presents the findings of an archaeological evaluation and monitoring at Hale Wharf, Ferry Lane, Tottenham N17 9NE (Figure 1). The work was undertaken by Pre-Construct Archaeology between 24th July and 24th August 2017 and on 9th April and May 4th 2018.
- 2.2 The site was centred on National Grid Reference TQ 34782 89475. The investigation took place across the southern half of the site which was almost level at a height of between 9.23m OD and 9.38m OD.
- 2.3 The work was preceded by detailed assessment of the archaeological background of the site, produced in the form of an Archaeological Desk-Based Assessment (DBA) (Ramboll 2016a).
- 2.4 The geotechnical investigations carried out previously on the site, which were monitored by PCA (PCA 2015) suggested that the top of the gravel terrace, where potential Lea Valley Floor geoarchaeology could be located, was generally at about 4m below ground level.
- 2.5 Trench 1 was targeted on the remains of the Tottenham Mill, Trench 2 was targeted on a possible former leat and Lea Valley Floor geoarchaeology and Trenches 3 and 4 were both designed to examine the Lea Valley Floor geoarchaeology. All four trenches were excavated to around 4m below ground level.
- 2.6 An archaeological watching brief was carried out in the south of the site in order to establish if the Tottenham Mill and tollhouse survived, in areas which could not be evaluated during the evaluation phase. The watching brief area was divided into two parts, the first of which was located in the south-eastern part of the site, monitoring the removal of obstructions. This area then extended below a sub-station which was previously located in the south east of the site. The south-eastern watching brief then became a mitigation exercise when the remains of the mill were found, and the watching brief ceased. In the south-west of the site a further watching brief was carried out beneath the new road area at the entrance to the site, in the vicinity of the former tollhouse present on the site. These two areas are noted as the south-eastern and south-western watching brief areas and are shown on Figure 2.
- 2.7 The map regression showed that during the 1600s the site was mostly open fields, with what is thought to be the mill at its southern extent. By the time of the 1844 Parish Tithe map a leat had been constructed diagonally across the southern extent of the site. The leat is no longer visible on the Ordnance Survey map of 1864, by which point the canal along the site's western boundary had been constructed, including Tottenham Lock at its south west corner. A building identified as a toll house can be seen on the 1844 Parish tithe map (Figure 8) and the 1896 Ordnance Survey map (Figure 9) and was still present until the 1971 map.
- 2.8 As outlined in the Written Scheme of Investigation (WSI) (Ramboll 2016b), the specific aims of the archaeological work were:
- to establish the presence/absence of archaeological remains within the Phase 1 area;
 - to determine the extent, condition, nature, character, quality and date of any archaeological remains present within the Phase 1 area;
 - to characterise, if possible, the full archaeological sequence down to undisturbed deposits (or to safe working depth);
 - to help predict, if possible, the archaeological potential of the Phase 2 and Phase 3 areas;
 - to assess the state of preservation of archaeological remains;
 - to establish the significance of the archaeological remains;
 - to establish the ecofactual and environmental potential of archaeological deposits and features (if appropriate);
 - to assess the nature and extent of any existing disturbance on the site and comment on the potential for archaeological deposits to survive across the Phase 1 area; and

- to make available the results of the investigation through written dissemination (such as a grey literature report and summary in the local archaeological journal).

2.9 The research aims of the work were:

- to determine the presence/absence, extent, condition, nature, character, quality and date of any mill remains associated with the use of the river systems of the Lea Valley;
- to determine the presence/absence, extent, condition, nature, character, quality and date of any former leats or other channels within the site;
- to determine the presence/absence, extent, condition, nature, character, quality and date of any archaeological remains associated with prehistoric use or settlement of the Lea Valley;
- to provide geoarchaeological information with which to help build a model of the buried landscape of the site; and
- to provide information with which to help determine the palaeoenvironmental potential of the site.

2.10 The site was supervised by Stacey Amanda Harris, Przemek Polakiewicz, Corso Dominici and Ellen Green of Pre-Construct Archaeology Ltd. The site was project managed by Helen Hawkins, also of Pre-Construct Archaeology Ltd. Laura O’Gorman and Adam Single, Historic England (GLAAS) Archaeological Advisors, monitored the fieldwork on behalf of the London Borough of Haringey. The project was commissioned by John F Hunt, and the archaeological consultant was Jacek Gruszczynski of PCA Heritage.

2.11 Following the completion of the project the site archive will be deposited with the London Archaeological Archive and Research Centre, (LAARC) under the unique code FRR17.

3 PLANNING BACKGROUND

3.1 The following planning policies are relevant to development on the site.

3.2 National Guidelines

3.2.1 The National Planning Policy Framework (NPPF) was adopted on March 27th 2012. The NPPF constitutes guidance for local planning authorities and decision-takers both in drawing up plans and as a material consideration in determining applications.

3.2.2 Chapter 12 of the NPPF concerns the conservation and enhancement of the historic environment. In considering any planning application for development, the local planning authority will be guided by the policy framework set by the NPPF.

3.3 Regional Policy

3.3.1 The relevant Strategic Development Plan framework is provided by the London Plan published 22 July 2011. Policy relevant to archaeology at the site includes *Policy 7.8; Heritage Assets and Archaeology*

3.4 Local Policy

CSV8: ARCHAEOLOGY

Planning permission will only be granted for development which would adversely affect areas of archaeological importance if the following criteria are met:

- a) applications are accompanied by an archaeological assessment and evaluation of the site, including the impact of the proposed development.
- b) development proposals will preserve in situ, protect and safeguard important archaeological remains and the settings and, where appropriate, provide for the permanent display and interpretation of the remains.

The Council will ensure the proper investigation, recording of sites and publication of the results is conducted by a suitably qualified archaeological contractor, as an integral part of a development programme where a development incorporates archaeological remains or where it is considered that preservation in situ is not appropriate.

3.5 The site had been assigned an archaeological planning condition, requiring archaeological evaluation work to take place prior to construction to assess the potential for archaeological remains of importance on the site.

4 GEOLOGY AND TOPOGRAPHY

- 4.1 The following geological and topographical information is summarised from the DBA (Ramboll 2016a):
- 4.2 The geology of the site comprises London Clay overlain by Superficial Deposits (former flood plain and river deposits) formed of a mixture of alluvial clay, silt and gravels laid down in the Quaternary period, river terrace deposits and made ground.
- 4.3 The local environment was and continues to be dominated by a river setting. The local deposits were formed by rivers depositing mainly sand and gravel detrital material in channels to form river terrace deposits, with fine silt and clay from overbank floods forming flood plain alluvium, and some bogs depositing peat.
- 4.4 While Enfield Silt, formerly known as Brickearth, was identified within the CGL desk-based study, it was not encountered by either of two boreholes sunk by Ramboll in 2015.
- 4.5 Light industrial units occupy the eastern part of the site. Whilst industrial buildings and an office building and restaurant have been recently demolished across the southern and central area of the site. Mooring takes place along the western boundary, either on the bank or a jetty accessed by a footpath beside the western boundary of the site. The canal wall appears to be constructed from sheet piles held in place by deadman anchors.
- 4.6 The site was broadly flat at a height of between 9.23m OD and 9.38m OD, except at the southern entrance where it rose to accommodate bridge abutments. The eastern edge of the site fell away into a largely silted up section of the River Lea Flood Relief Channel.

5 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

- 5.1 The site has previously been the subject of an Archaeological Desk Based Assessment (Ramboll 2016a). The following represents a summary of the archaeological and historical background to the site, as presented in that report:
- 5.2 Prehistoric
- 5.3 The application site lies within the Lee Valley Conservation Area and the Lee Valley Archaeological Priority Area (APA) where alluvial floodplains and resources have been exploited since the earliest times. Remains from the prehistoric periods, including wooden structures and a single dug-out canoe, have been discovered, as has evidence for early occupation areas. Use of the Lee as a navigation route during the Roman period, a period well represented by archaeological remains, most probably had its origins in prehistoric times, although recorded explicit evidence for this, for example in the form of boat remains, is currently limited. The waterlogged conditions of the Lee valley lead to excellent survival of organic remains, and such deposits are very important to our understanding of past environments and land conditions.
- 5.4 Evidence for prehistoric activity is limited to a single find spot of a flake from the River Lea Reservoir.
- 5.5 The Bronze Age is represented by a socketed knife, bronze leaf shaped spearhead, triangular basal looped dagger and the base of a cauldron associated with a number of timber piles from the Low Maynard Reservoir in 1868.
- 5.6 Also from the Low Maynard Reservoir works were an iron socketed and looped axe and an iron spearhead dating to the Iron Age.
- 5.7 A peat horizon was recorded during an archaeological evaluation at Ferry Lane for which the date could not be narrowed further than the prehistoric.
- 5.8 Roman
- 5.9 Tottenham High Road follows the course of Ermine Street, the Roman road that ran north from London to Lincoln and York.
- 5.10 The River Lea was used as a navigation route during the Roman period and remains along its course are common.
- 5.11 Roman pottery was discovered in association with the aforementioned timber pile structure during the construction of the Low Maynard Reservoir in 1869.
- 5.12 Early Medieval
- 5.13 Daniel Lyson's 'Environs of London' states that ancient records refer to the area as Toteham or Totham.
- 5.14 It is believed that the Saxon village known to have existed by the 11th century may have been situated either at the junction of Tottenham High Road and Lordship Lane or around the location of Tottenham High Cross. The settlement of Hale is believed to have been centred at the junction of Broad Lane and the Hale.
- 5.15 The Domesday Book provides the earliest historical mention of Tottenham which, prior to the Norman Conquest was known to be a manor in its own right. A weir, worth 3s is also reference in Domesday, within the Tottenham manor and most likely sited near the later Tottenham mill.
- 5.16 An early Viking sword found in the River Lea within the vicinity of the site.
- 5.17 Medieval
- 5.18 Medieval habitations within the Tottenham Hale area are suggested by the existence of the mill by 1254, although the name Hale first occurs in 1318 in a reference to John of Hale. The old manor of Tottenham was divided into three separate manor houses in 1254.
- 5.19 The centre of the village was marked by the high cross and the green. The cross was first mentioned in 1409. The green, known as Page Green, was mentioned as early as 1348 and stretched eastward from the High Road a short way south of Tottenham Green, along Broad

Lane towards a crossing of the Lea close to Tottenham mill. By the mid 15th century as many as six inns were recorded, all of them, it is assumed, positioned along the High Road.

5.20 Post-Medieval

5.21 From the end of the 16th century a number of large houses in the area began to be leased to Londoners as country retreats, and the village of Tottenham Hale is documented from the early post-medieval period. The Hale is documented separately from at least 1754, and had its own Inn.

5.22 The pattern of development appeared to focus on areas of the High Road already popular by the 17th century, and the marshes were described as pleasant meadows with a tendency to occasionally flood.

5.23 In close proximity to the application site, and possibly associated with Forest Road was "Mill Bridge". This was in existence from at least 1594 and was described as "one of the most useful over the Lea". In 1760 the bridge was rebuilt as a private toll road (called Ferry Bridge or Hillyers Turnpike), and replaced again in 1854 by an iron version. The bridge was finally demolished in 1915. A ferry house lay adjacent to the bridge and a ferry was documented alongside the bridge from at least 1722. The Ferry Boat Inn, a Grade II Listed building, is of a contemporary date.

5.24 Little industry, other than brick-making, is documented for Tottenham, and that which did exist was generally confined to riverside mills producing flour and leather, until the early 19th century. After 1810, other industries, including a lace factory, silk factory and tanyard, became established. By the mid 19th century no businesses of any size however are noted, except for breweries.

5.25 The opening of a railway station in 1840 and a church in Wood Green precipitated the establishment of a local board in 1848, and marked the start of a spread of building development eastwards. By 1863 Tottenham Hale was integrated with the village around the high cross via buildings along the south side of High Cross Lane.

5.26 During the mid 19th century Tottenham began to change from a select residential neighbourhood into a crowded, lower middle and working class suburb.

5.27 By the 1890s increased development meant that the former hamlets of Tottenham Hale, West Green and St. Ann's had merged together. The only open spaces remaining comprised the nursery gardens south of Tottenham Hale and to the extreme north, and the fields adjacent to the sewage works. As the population continued to increase throughout the early 20th century, land formerly undesirable for housing, such as that near the marshes or railway became utilised for factories.

5.28 Development of any remaining open ground continued throughout the 20th century, and local authorities constructed numerous estates within the wider area. Municipal building increased again after the Second World War, mostly on older sites or bombed-out premises.

6 METHODOLOGY

- 6.1 All archaeological works were carried out in accordance with the Written Scheme of Investigation (Ramboll 2016b) and Health and Safety Method Statement for an Archaeological Evaluation (Hawkins 2017), following guidelines issued by GLAAS (2015) the Chartered Institute for Archaeologists (2014) and PCA's Fieldwork Operations Manual (2009).
- 6.2 Prior to excavation each trench was located and marked, the areas were then CAT scanned by a trained individual and a permit to dig was obtained by the machine driver.
- 6.3 Tarmac and concrete layers were broken using a mechanical excavator. Excavation continued with a flat bladed ditching bucket under constant supervision from an archaeologist, in 100mm spits until the top of the archaeological sequence, natural geology or immovable modern intrusion was reached. Excavation of horizontal stratigraphy or cut archaeological features where possible with the use of box shoring continued by hand.
- 6.4 Each trench measured 4m by 4m, except Trench 4 which had to be extended to allow for the shoring to be inserted between large concrete obstructions (Figure 2). The trenches were excavated to a maximum depth of 4.65m BGL. The watching brief area depth was dictated by the depth necessary to remove the obstructions or reach formation depth. The ground reduction in the watching brief area was generally to the base of the made ground/top of the alluvium.

Area	Maximum Depth (m BGL)	Height At Base (m OD)
T1	4.06	5.17
T2	4.65	4.64
T3	4.04	5.35
T4	4.38	5.20
Watching Brief: south-eastern part of site	3.20	6.39
Watching Brief: south-western part of site	4.00	5.23

- 6.5 Levels were obtained from Temporary Bench Marks established by PCA's surveyor through the use of a Leica GPS. Levels on archaeologically relevant structures and strata were taken from these. The locations of the TBMs can be found in the site archive.
- 6.6 Trenches were planned at a scale of 1:20, and sections from the trenches and archaeological monitoring were drawn at a scale of 1:10. The deposits that they contained were recorded on pro forma context sheets and a full photographic record was compiled.
- 6.7 Once confirmation has been received from the Local Planning Authority (LPA) that all necessary work has been satisfactorily completed, and when all post-excavation reports have been approved, the site archive, comprising artefactual, written, drawn and photographic records, will be transferred to the London Archaeological Archive and Research Centre (LAARC) under the unique code FRR17.

7 THE ARCHAEOLOGICAL SEQUENCE

7.1 Trench 1

- 7.1.1 The earliest deposit uncovered was a well compacted layer of natural pale grey brown gravelly sand [79] recorded at a height of 6.15m OD and continuing beyond the limit of excavation at a height of 5.17m OD (Plate 3). This layer was also recorded in Trench 2 [72], Trench 3 [76] and Trench 4 [61], such deposits, along with the later alluvial material consisted of waterlain deposits associated with being within such close proximity to the river Lea.
- 7.1.2 Overlying the gravel was a natural layer of mid blue grey clay alluvium [73] at a height of 6.72 m OD. This 0.60m thick layer extended beyond the limits of excavation to the north, south and east, but was truncated by the leat construction cut [20] to the west. This layer appeared to be the same alluvium layer as was also seen in Trench 3 [77] and Trench 4 [58]. Within the upper surface of this layer [73] were two artefacts, a fragment of pottery (spot dated c. 1830) and a fragment of struck flint. The flint, despite its fresh condition was most likely residual and appeared along with the pottery fragment to have been deposited during the installation of the land tie.
- 7.1.3 Whilst the leat wall did not survive within this trench, its construction cut [20] and two associated land ties had survived (Figures 3 and 8). The lower of the land ties consisted of a 3.60m long horizontal east-west beam [64] (Plate 1), in the eastern end of which a north-south 1.15m long cross beam [63] was nailed, with two vertical driven planks [65] and [67] (Plate 2) to the west of [63]. This land tie (Plates 3 and 4) was built into the top of the alluvium layer [73] and was backfilled in place by a 1.14m thick layer of mid brown made ground [17] in which were occasional CBM fragments and the upper of the land ties [18]. The upper land tie was in a considerably poorer condition than the lower and only survived as a heavily decayed 3m long horizontal beam with heavily oxidised iron bolts/nails at its eastern end and was seen at a height of between 7.66m and 7.44m OD.
- 7.1.4 Capping layer [17], was a 0.07m thick layer of pale crushed chalk material [16] possibly suggesting a ground surface at a height of 7.91m OD. This may be the same layer as [35] seen in Trench 3.
- 7.1.5 Overlying layer [17] were layers [14] and [15], which consisted of what appeared to be redeposited natural sandy gravels, and may represent two dumps of the same ground raising activity.
- 7.1.6 Within the leat cut [20] a 0.68m thick fill of dark yellow grey sandy silty clay [78] was seen from a height of 6.83m OD. This layer contained frequent brick fragments (spot dated 1480-1900), occasional mortar flecking, occasional mussel shells and a fragment of CTP (spot dated 1730 – 1910) and appeared as an accumulated layer of material at the base of the leat, from during its use. This is most likely the same as layer [71] seen within Trench 2.
- 7.1.7 Two fills of deliberate backfill were seen above layer [78], a mid brownish yellow sandy silt [19] from a height of 8.57m OD and a dark brown sandy silt [12] from a height of 8.84m OD.
- 7.1.8 A number of modern shallow cuts and several modern layers were seen between a height of 8.22m and 9.23m OD

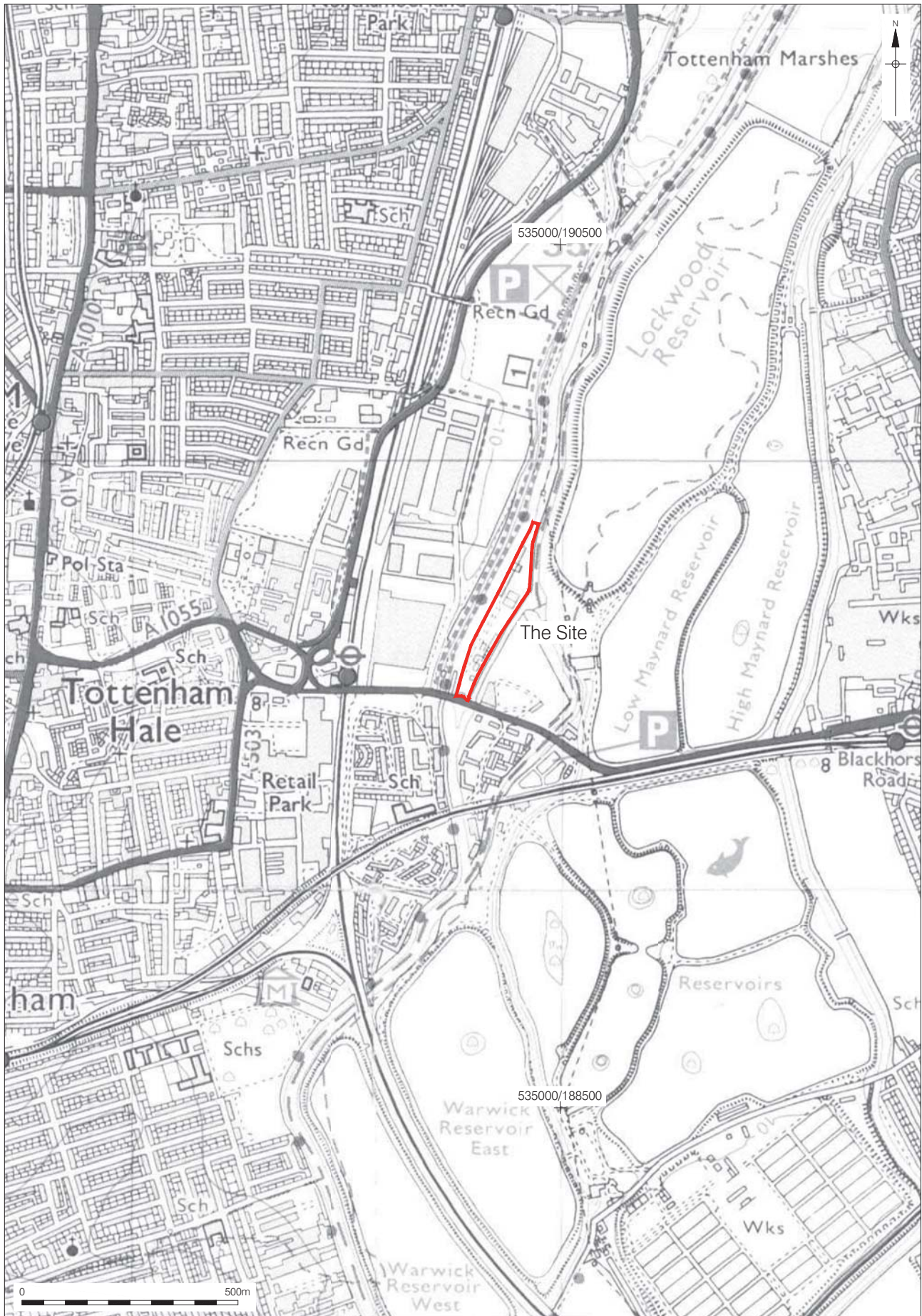
7.2 Trench 2

- 7.2.1 Trench 2 was excavated to a depth of 4.64m OD, where the natural mid grey sandy gravels [72] extended from a height of 5.89m OD beyond all limits of excavation (LOE).
- 7.2.2 The natural gravel was overlain by a 0.30m thick layer of mid brown grey chalky, sandy silt [71] (Plate 5) containing occasional building rubble bricks which have been spot dated to 1700-1850. This layer appeared to be the same layer of accumulated material within the base of the leat as layer [78] within Trench 1.
- 7.2.3 Redeposited alluvium was recorded above the level of 7.50m OD (Plate 6), layer [70] a 1.02m thick mid brown yellow layer, and [57] a 0.50m thick mid to dark grey blue layer. The layers were devoid of cultural material, and it was only clear from the building rubble found below them that they were not naturally formed. Overlying these layers was a 0.04m thick layer of mid brown sandy silt [56] and a dark blue brown silty sandy gravel [55] identified from a height of

- 8.08m OD. These were most likely deposits of deliberate backfill of the leat. The edges of the leat were not seen, and the trench appeared to be located entirely within the fill of the leat.
- 7.2.4 Sealing these layers of backfill was a 0.03m thick layer of dark brown sandy gravel levelling for tarmac layer [52] at a height of 8.45m OD. This was in turn overlain by several layers of modern made ground including a further external tarmac surface [48] relating to the use of this area for industrial purposes.
- 7.3 Trench 3
- 7.3.1 Well compacted mid grey natural sand gravel [76] was recorded within Trench 3 at a height of 5.72m OD. This layer was the same as layer [79] in Trench 1, [72] in Trench 2 and [61] in Trench 4.
- 7.3.2 Sealing the gravel was a 0.65m thick natural layer of mid brown peat [75] (Plate 7) at a height of 6.24m OD. The only artefact seen and recovered was an animal bone deemed to be an equine radius most likely that of a pony. A column sample was taken in this trench through the archaeological sequence from the gravel to the top of the alluvium. A full discussion of the results of the column sample analysis is given at Appendix 5 Section 3.3. The radiocarbon date from the peat was 540-645 cal AD, or early medieval.
- 7.3.3 A layer of mid blue grey clay alluvium [77] was seen across the entire trench at a height of 7.24m OD. Over this layer was [35], a layer of dark grey silt with frequent white crushed chalk, chalk fragments and a cattle femur. This could be the same as layer [16] seen in Trench 1, and may represent a former surface.
- 7.3.4 Several layers of made ground were seen overlying layer [35], these were [34], [33], [32], [30], [29] and [28] to a height of 8.55m OD and appeared to be layers of made ground. These layers were truncated to a height of 7.98m OD by a modern construction cut [37] for a wall [25] and soak away/drain [36].
- 7.3.5 To the north and west of the modern wall was a 0.20m thick levelling layer [28] and 0.11m thick external tarmac surface [22] to a height of 8.65m OD.
- 7.3.6 Modern layers of made ground were seen along these features from a height of 8.65m OD to 9.38m OD.
- 7.4 Trench 4
- 7.4.1 The earliest deposit uncovered was a well compacted layer of natural pale grey brown gravelly sand [61] (Plate 8) recorded at a height of 5.66m OD and continuing beyond the limit of excavation at a height of 5.20m OD.
- 7.4.2 Overlying the gravel was an interface layer of mid brown clay sand at a height of 5.85 m OD. This 0.21m thick layer appeared to be an interface layer between the natural gravels [61] below and peaty layer [59] above. The interface layer was only 0.11m thick and it appeared to be the edge of the peat deposit seen in Trench 3 [75].
- 7.4.3 Sealing the peat was a 0.95m thick layer of dark blue grey clay alluvium [58] (Plate 9) as seen in Trench 1 [73] and Trench 3 [77].
- 7.4.4 Overlying the alluvium were several layers of modern deposits including a surface of concrete [46] relating to the modern industrial activity on the site.
- 7.5 Watching Brief/Archaeological Monitoring: south-eastern area
- 7.5.1 The watching brief in the south-eastern area identified only made ground and the top of the alluvium, until the mill buildings were encountered and the watching brief became an archaeological mitigation excavation. The extent of this mitigation area can be seen in the excavation report (PCA forthcoming). Prior to the discovery of the mill, across the monitored area the deepest excavation extended to a height of 6.39m OD.
- 7.5.2 Towards the southern extent of the site a layer of mid grey silty gravel [110] was seen which extended below the LOE. This layer was not seen elsewhere during the monitored works outside of the evaluation trenches, as the groundworks did not need to go to this depth elsewhere in the watching brief area.

- 7.5.3 At a height of 6.98m OD the peat deposit [107] was seen to extend from where it had been encountered previously within Trench 3 [75] towards the west and thinned towards Trench 4 where it had been seen as a 0.10m thick layer [59]. The layer continued below the limit of excavation in all directions at a height of 6.38m OD.
- 7.5.4 Between the location of Trench 4 and Trench 2 a timber land tie [95] [96] was discovered (Plate 10). This land tie was within layer [94] and appeared to be very similar to the lower land tie [63] [64] seen within T1, and most likely represents the construction of the northwestern side of the Mill leat.
- 7.5.5 Several layers from the late 19th century to the modern day were seen across the entire monitored area. These correlated to the layers seen within the four evaluation trenches and represented the continued development of the land and later construction and modification of the recently demolished industrial units and associated land use.
- 7.6 Watching Brief/Archaeological Monitoring: south-western area
- 7.6.1 The watching brief in the south-western area was carried out on two separate days on two consecutive areas. In the eastern part of the area, carried out on the first day of attendance, extensive truncation from a large drainage and manhole insertion was noted, and there was no evidence for the tollhouse which appeared to have been wholly truncated (Figure 2).
- 7.6.2 On the western side of this watching brief area, carried out on the second day of attendance, the earliest deposit encountered was a layer of redeposited alluvium [420] recorded at the height of 5.23m OD and stretching beyond the LOE on all sides. This was overlain by a layer of brown clay gravel [419].
- 7.6.3 Cut into the gravel layer was construction cut [421] for wall [410]. This wall was made up of a mix of unfrogged and shallowly frogged bricks. The brick fabrics were a mix of yellow, orange, brown and maroon with a yellowish outside. The bricks measured 230mm by 110mm by 65 mm. The bricks were bonded with two types of mortar, a hard light grey mortar and a sandy yellow brown mortar. The wall measured 3.58m east west and 2.40m north south and was T shaped, forming two rooms within the monitored area. The wall extended outside of the trench boundaries to the south, east and west. An iron tie was keyed into the wall, running east-west at 7.53m OD and ran outside the western boundary of the trench. This tie likely represents support for the floor of the building, which is no longer extant. The highest point of the wall was recorded at 8.13m OD. The bricks were spot dated to between 1800-1900. It is probable that this wall and associated contexts made up part of the 19th century tollhouse that was standing on the site into the 20th century. Figure 9 shows the tollhouse remains overlaid on the 1896 Ordnance Survey map. This indicates that the remains found in the watching brief fit perfectly within the tollhouse.
- 7.6.4 Within the rooms defined by wall [410] there was a layer of sandy demolition rubble [417] overlain by a thin dark layer [416] containing brick fragments which likely represented a floor surface. This surface was located at 7.53m OD.
- 7.6.5 A series of small buttresses [412], [413] and [414] abutted wall [410]. These buttresses were square in shape and measured between 0.20 to 0.25m on all sides. They were made of shallowly frogged bricks with a mix of yellow, orange, brown fabrics. The bricks measured 230mm by 110mm by 65mm and were bonded with a hard light grey mortar. These buttresses were all located at 8.13m OD.
- 7.6.6 A single course of half bat bricks [411] ran north-south from wall [410] in the north to the southern extent of the trench. This masonry measured 2.40m in length and 0.11m in width. The bricks were identical to those seen in buttresses [412], [413], [414] and wall [410] and the half bats measured 150mm by 110mm by 75mm. They were bonded together with a soft brown sandy mortar. The highest recorded point of the masonry was 8.13m OD.
- 7.6.7 A thick layer of demolition rubble [415] was present over [416] and banked up against masonry structures [412], [413] and [414]. The highest recorded point of layer [415] was 8.13m OD and it was 0.60m thick. This layer likely represents the demolition of the structure.
- 7.6.8 Banked up against wall [410] to the north was a layer of moderately compacted made ground [418]. This layer stretched over the entire northern part of the trench.

Overlaying [418] and [415] were several layers of modern activity, similar to those seen in the other trenches across the site.



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Figure 1
Site Location
1:12,500 at A4



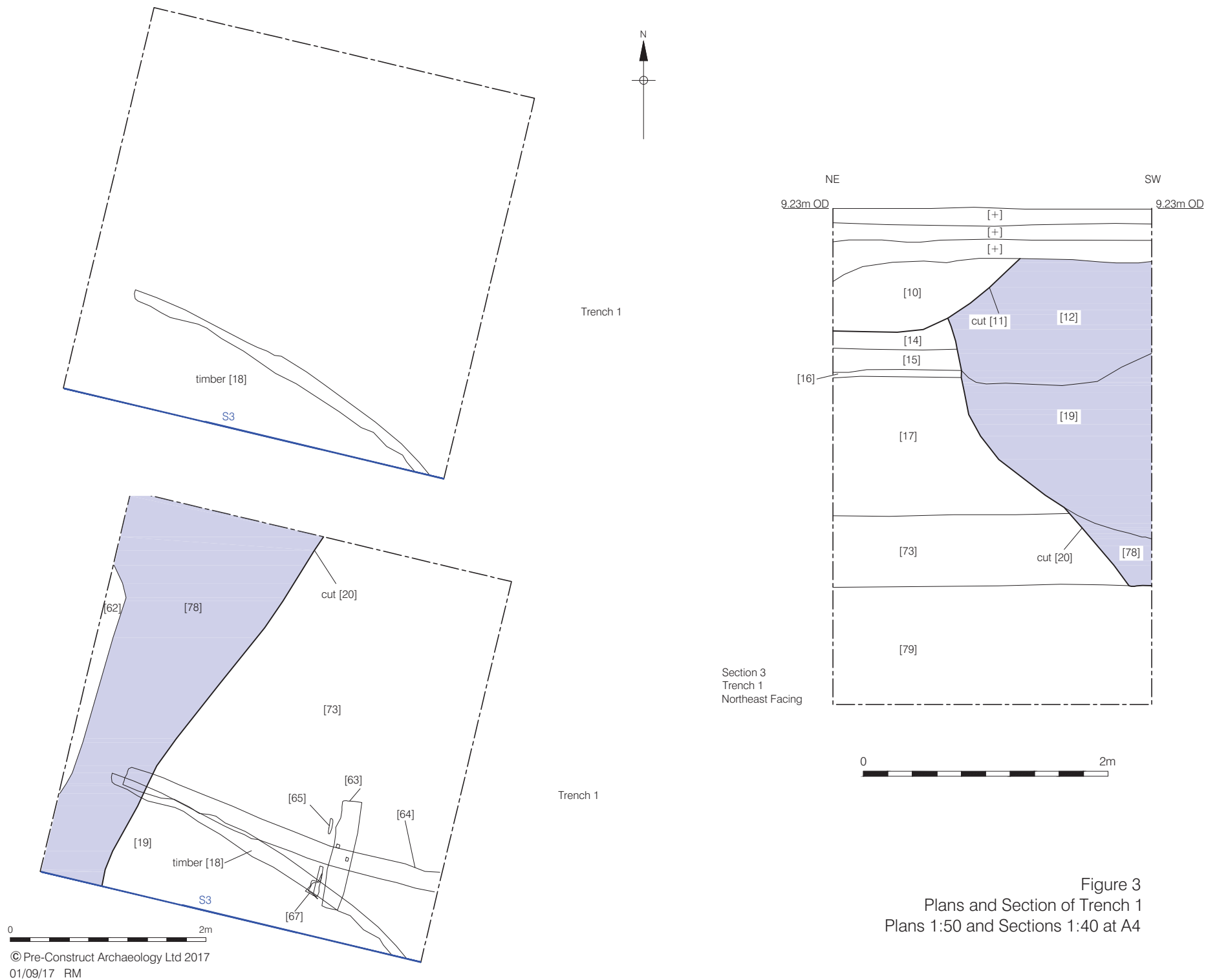


Figure 3
Plans and Section of Trench 1
Plans 1:50 and Sections 1:40 at A4

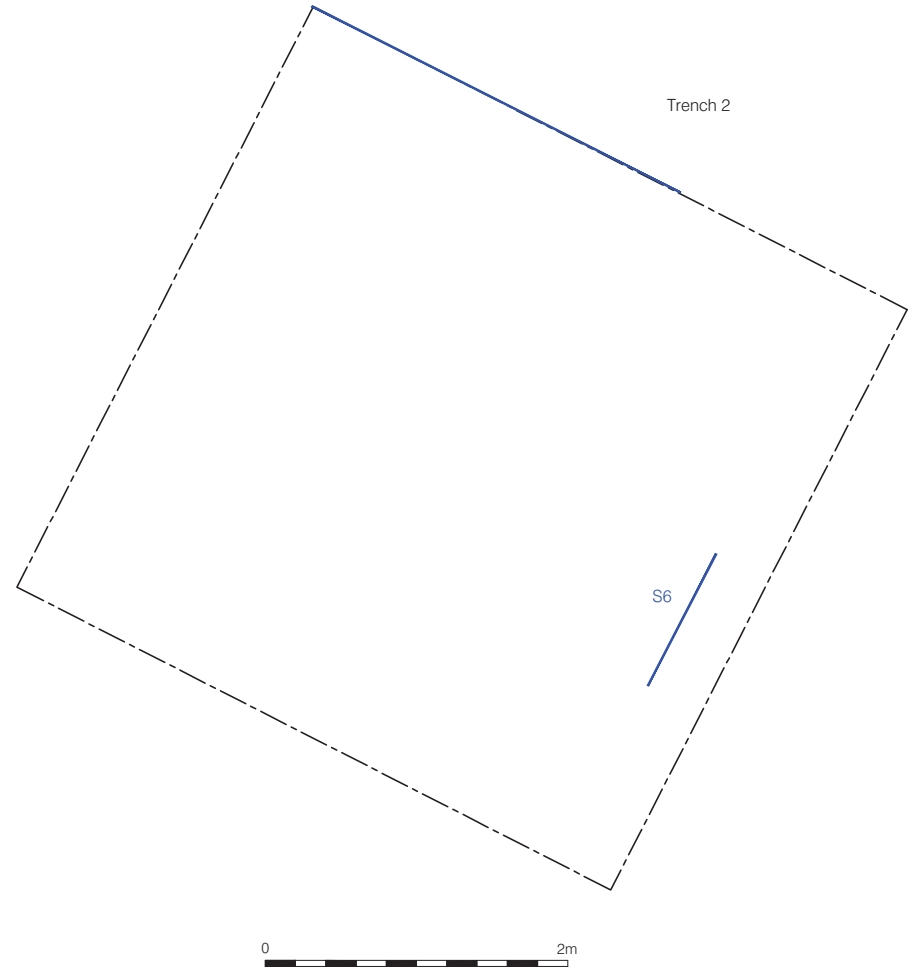
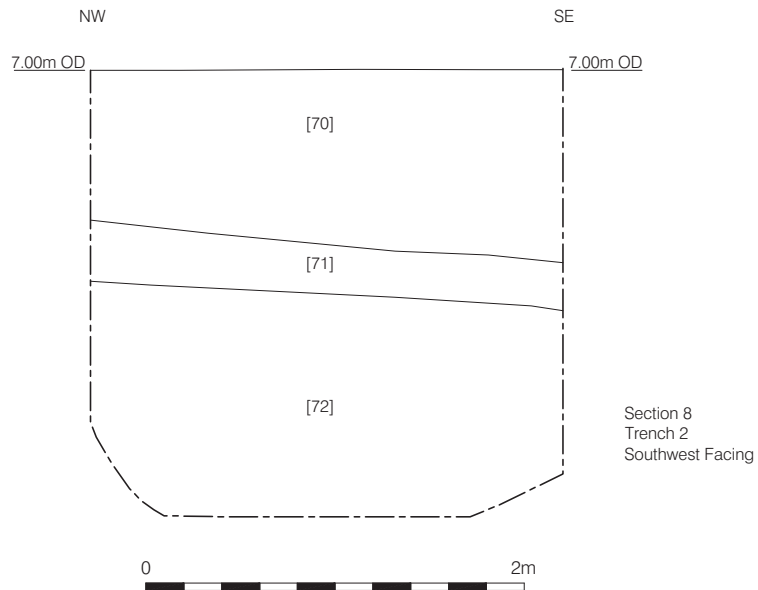
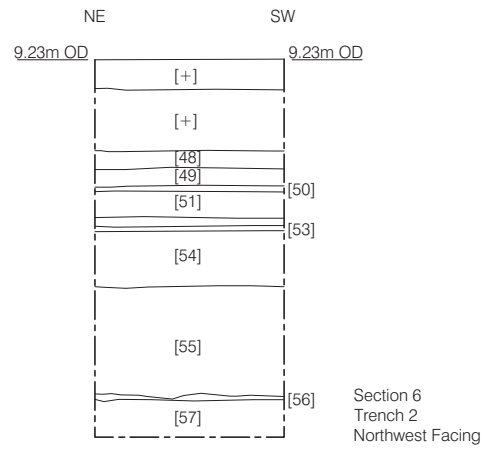


Figure 4
Plan and Section of Trench 2
Plan 1:50 and Sections 1:40 at A4

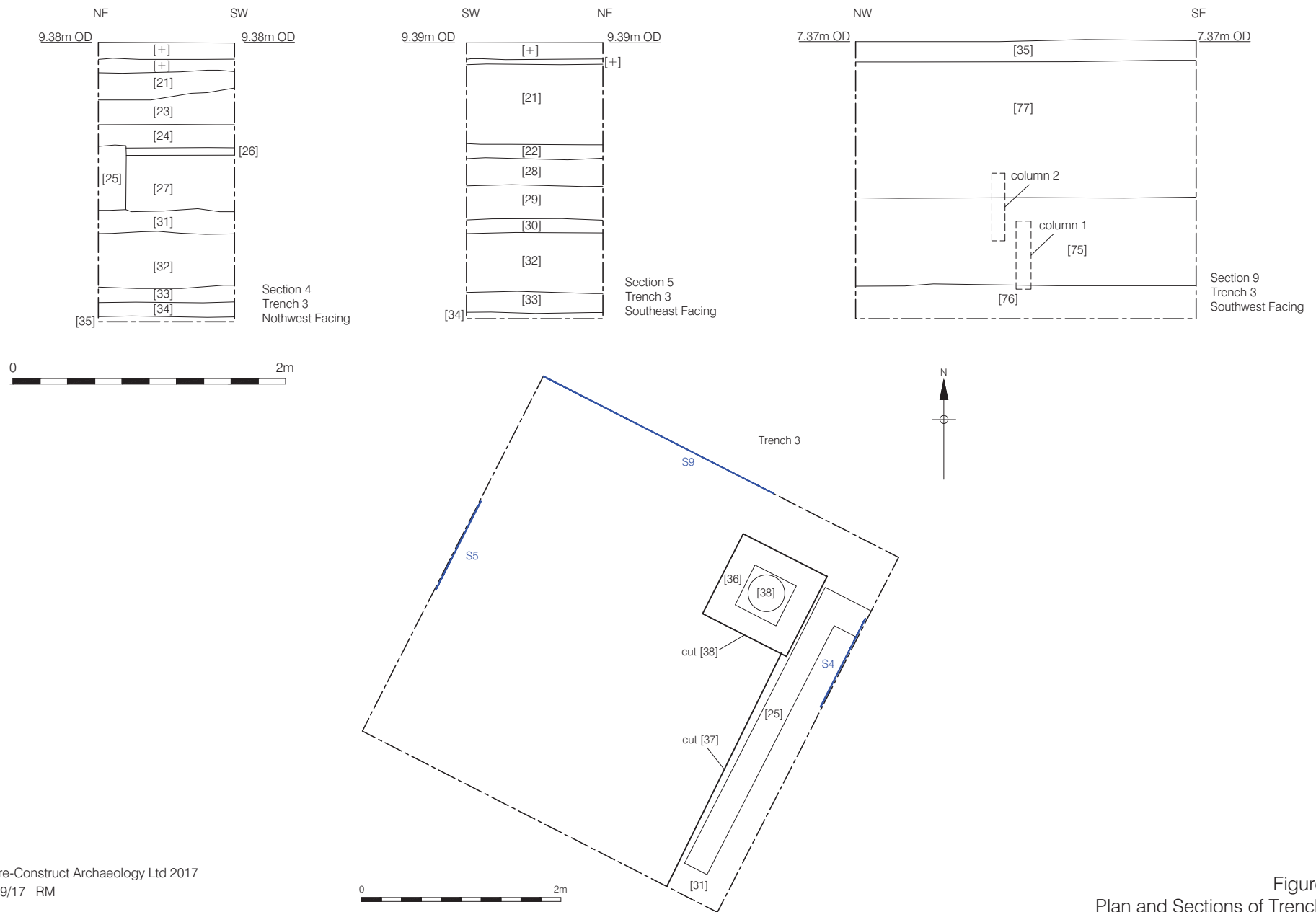
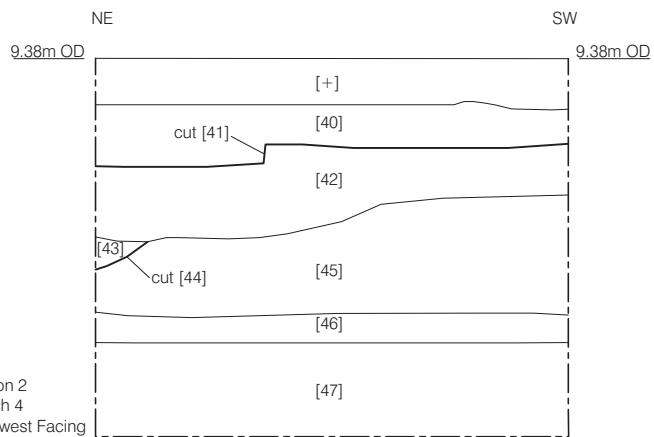
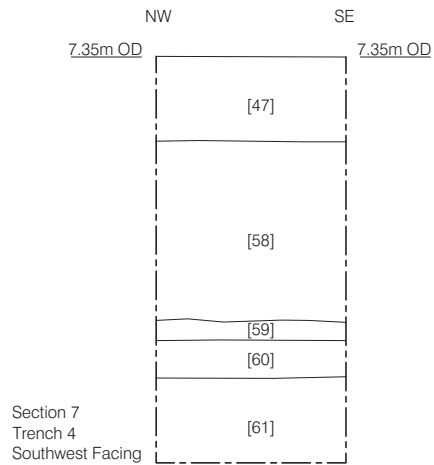


Figure 5
Plan and Sections of Trench 3
Plan 1:50 and Sections 1:40 at A4



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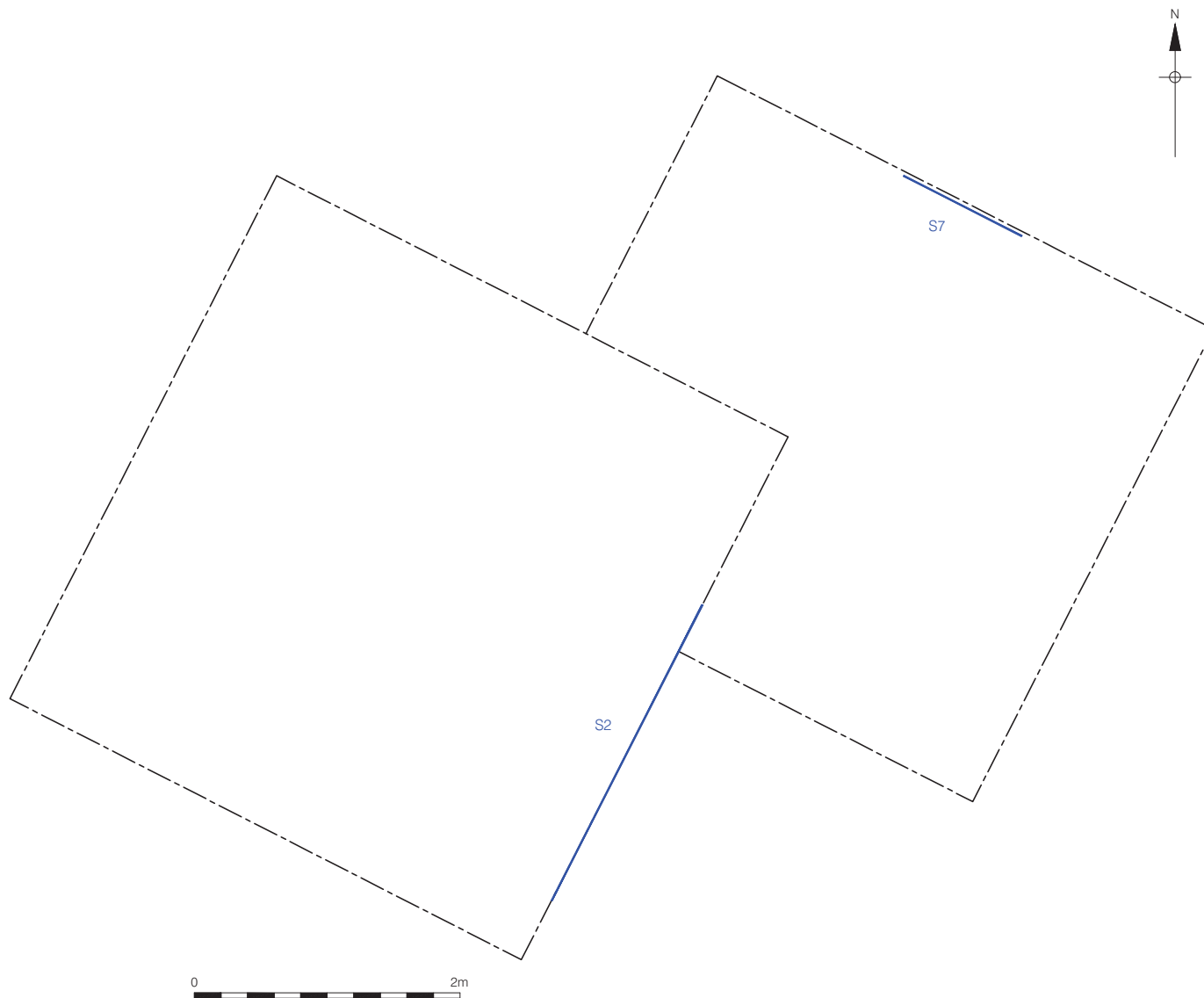
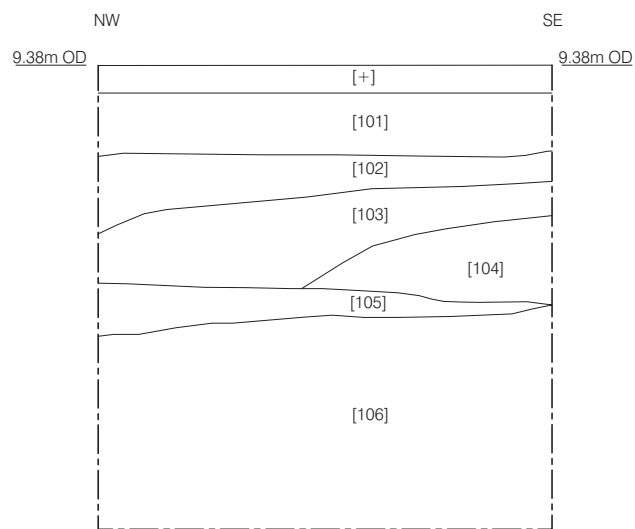


Figure 6
Plan and Sections of Trench 4
Plan 1:50 and Sections 1:40 at A4



Section 14
Southwest Facing





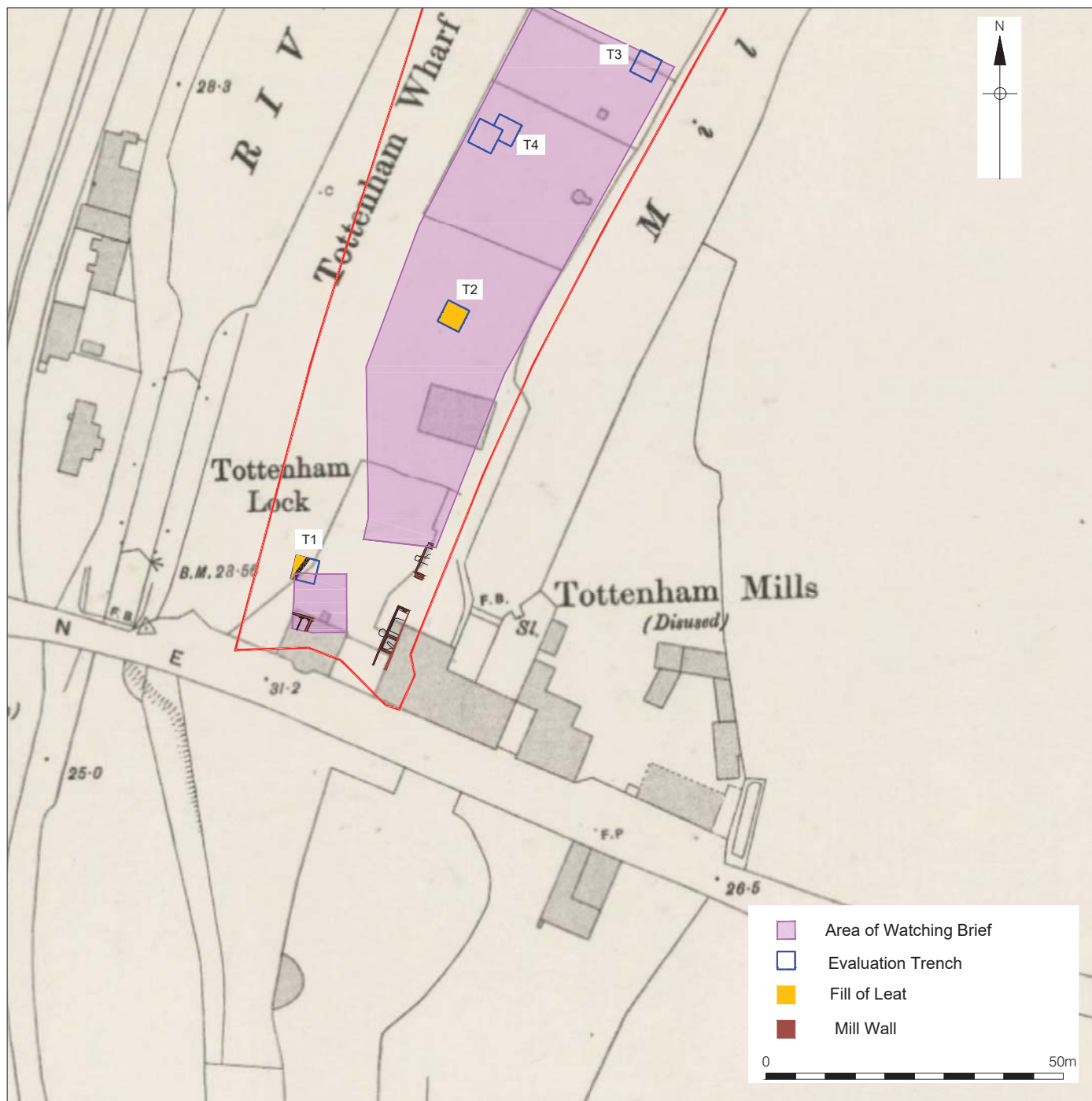


Figure 9
Trench Location Plan overlain on Ordnance Survey Map 1896
1:1,000 at A4

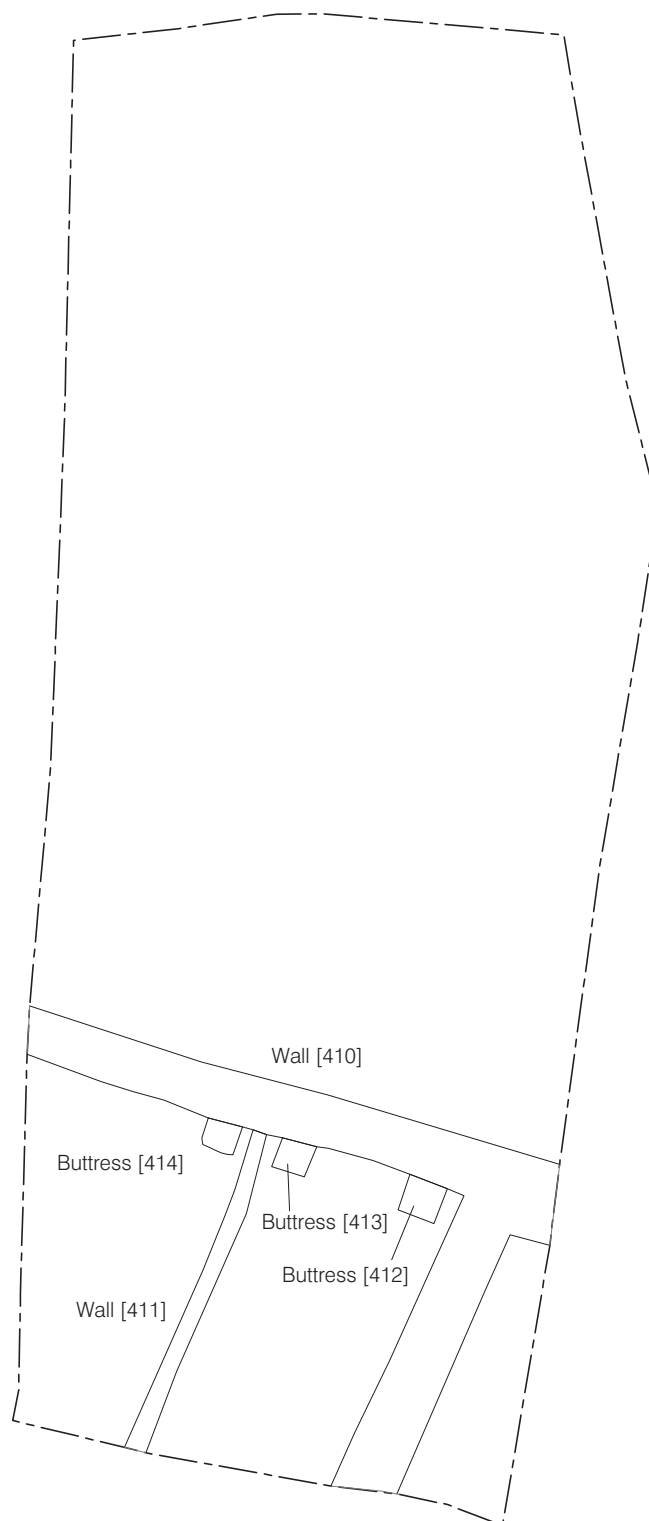




Plate 1: Looking east, natural gravels [79], Trench 1



Plate 2: Looking west, driven planks [65] and [67] of mill leat lower land tie, Trench 1



Plate 3: Beam [64] of leat land tie from Trench 1



Plate 4: Looking southeast, lower timber land tie [63] – [67] relating to the mill leat, Trench 1



Plate 5: Looking north, Accumulated deposit at base of leat [71], Trench 2



Plate 6: Looking east, Layer of redeposited alluvium [70], Trench 2



Plate 7: Looking west, Peat layer [75], Trench 3



Plate 8: Looking north, Natural sandy gravels [61] truncated by modern borehole, Trench 4



Plate 9: Looking north, Clay alluvium layer [58], Trench 4



Plate 10: Looking north, Land tie [95] [96] within layer [94], watching brief in south-eastern area



Plate 11: Looking west, Wall [410] and buttresses [412], [413], [414], Watching Brief south-western area



Plate 12: Watching brief south western area, showing area truncated by modern drainage

8 INTERPRETATIONS AND CONCLUSIONS

8.1 The results of this evaluation and watching brief have enabled the research questions that were set out in the Written Scheme of Investigation to be addressed:

- to determine the presence/absence, extent, condition, nature, character, quality and date of any mill remains associated with the use of the river systems of the Lea Valley;

8.1.1 The watching brief in the south-eastern part of the site identified the remains of the mill, beneath the former sub-station. The remains were located along the south-eastern boundary of the site, aligned north-east south-west. The remains comprised two buildings of brick construction and of several phases, dating back to at least the 17th century. A circular brick feature may represent the remains of a machine base for power coming in from the leat located just outside the site in what is now the flood relief channel. The mill will be excavated during the mitigation phase and will be the subject of a separate post-excavation assessment report and publication.

8.1.2 The south-western watching brief, carried out in April and May 2018, identified the remains of the tollhouse on the southern portion edge of the site. The remains were located on along the central southern edge of the site and comprised of walls running north-south and east west. The building dated to the 19th century based on the analysis of the bricks and probably represented a former cellar. Extensive truncation was noted to the east of the tollhouse remains, which probably took place in the 1960s when the tollhouse was demolished.



Plate 13: showing the tollhouse in situ in 1938 (bottom right)

- to determine the presence/absence, extent, condition, nature, character, quality and date of any former leats or other channels within the site;

- 8.1.3 Evidence of the former leat was seen during the evaluation and the archaeologically monitored works. Three land ties were encountered, two within Trench 1 along what would have been the south-eastern side of the leat, and the third that would have been attached to the north-west side of the leat. Associated with the installation of one of the land ties a fragment of pottery was dated c. 1830.
- 8.1.4 Within the leat channel a lower fill was encountered in Trenches 1 and 2. Within this fill a fragment of CTP was found, spot dated to between 1730 and 1910. This lower fill was made of material which would have found its way into the leat during its use. From the cartographic sources (ie the Duke of Dorset's survey of 1619 shown in the desk based assessment) it is clear that the leat was not present on the site in the 17th century. This seems to be supported by the earlier spot date and would suggest the construction of the leat at some point in the 18th Century or later. The later pottery may be representative of maintenance works rather than construction. Figure 8 shows the location of the trenches overlain on the layout of the leat shown on the tithe map of 1844. Trench 2 was located wholly within the fill of the leat, and therefore the edge of the leat was not identified. Subsequent to the formation of the lower fill of the leat, it appears to have been deliberately backfilled with redeposited clean alluvial clay, presumably at the point when the current canal was constructed. Based on the map evidence, the leat was backfilled between 1844 and 1864, when the new canal layout is first shown on the Ordnance Survey map.
- to determine the presence/absence, extent, condition, nature, character, quality and date of any archaeological remains associated with prehistoric use or settlement of the Lea Valley;
- 8.1.5 No prehistoric features were seen during the evaluation, although a fragment of worked flint was retrieved from the upper surface of an alluvium layer associated with the installation of a leat land tie.
- 8.1.6 An equid bone deemed to be most likely that of a pony was found within the peat layer (see Appendix 3). The peat layer was radiocarbon dated to the early medieval period (Appendix 5 Section 3.3). Whilst no Saxon settlement remains are known nearby, a Saxon log boat was found at Springfield Park in Clapton, c. 2 km to the south of the site, in an alluvial layer. The peat suggests that for a time this part of the site was particularly wet, prior to the site being subjected to flooding episodes sealing the peat below alluvium layers. Further analysis of the alluvial and peat sequence is given at Appendix 5.
- to provide geoarchaeological information with which to help build a model of the buried landscape of the site; and to provide information with which to help determine the palaeo-environmental potential of the site.
- 8.1.7 Natural sandy gravel was seen in all four trenches at a height of between 6.15m OD in the south and 5.66m OD in the north.
- 8.1.8 A layer of peat was discovered at 6.24m OD in Trench 3 and seen to extend across the site during the archaeologically monitored works, and alluvial deposits were found in Trenches 1, 3 and 4, at levels of 6.72m OD, 7.24m OD and 7.12m OD respectively, showing the previous extent of the River Lea. The peat seen in Trench 3 was of early medieval date which is different to the prehistoric peat found at most other nearby sites. The gravel, peat and alluvial layers were all located c. 2m higher than those found at Ferry Lane to the east of the site, suggesting they probably relate to later channels or floodplain hollows that have infilled at a later date with peat. The formation of the peat c. 1000 years later than Ferry Lane is also indicative of the Hale Wharf site becoming drier at a later date.

9 ACKNOWLEDGEMENTS

- 9.1 Pre-Construct Archaeology Ltd. would like to thank John F Hunt for commissioning the work on behalf of Ramboll and Laura O’Gorman and Adam Single, GLAAS Archaeological Advisors to the London Borough of Haringey for monitoring the fieldwork.
- 9.2 The supervisor would like to thank John F Hunt for facilitating the work, and to Przemek Polakiewicz and Fay Slater for their hard work.
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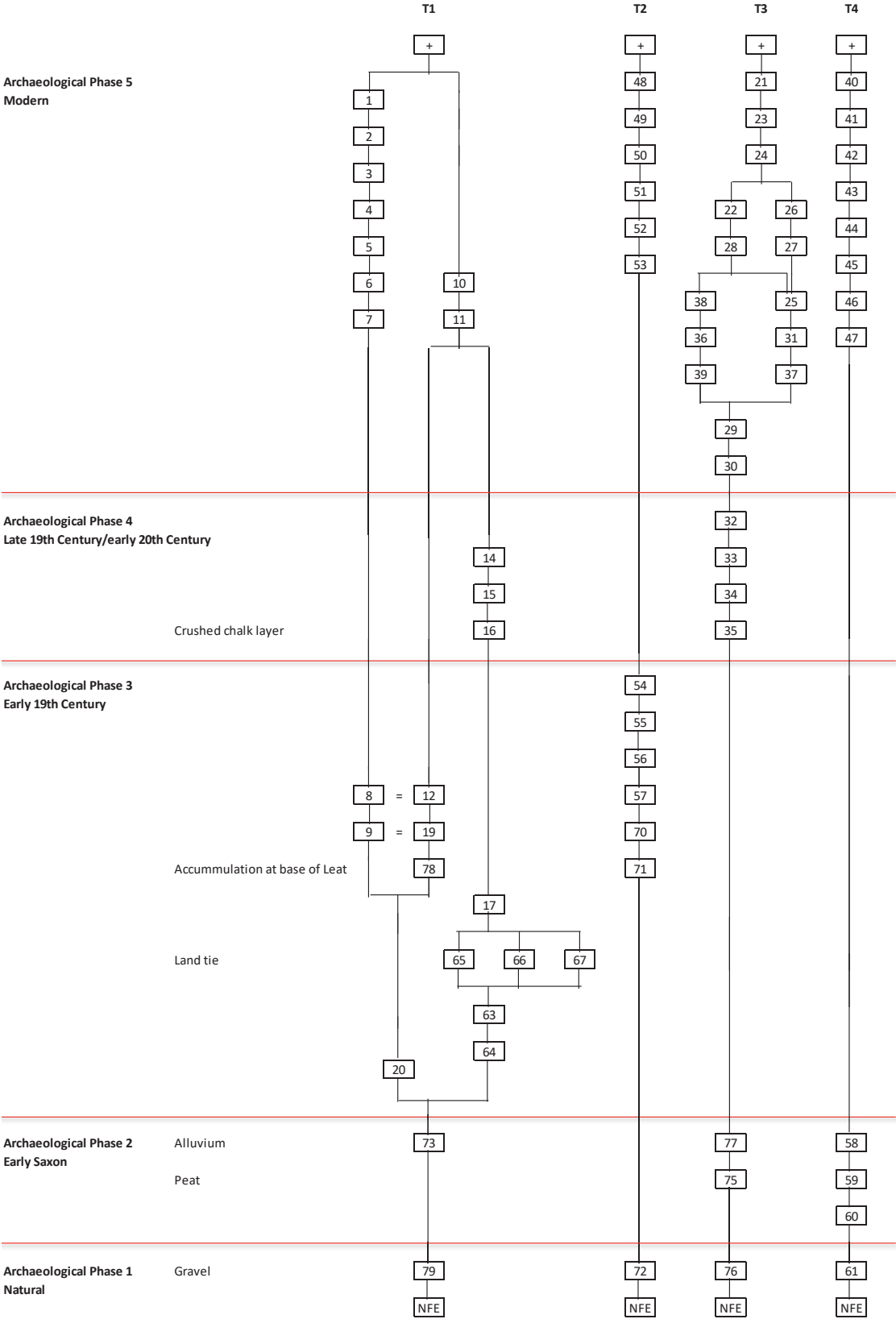
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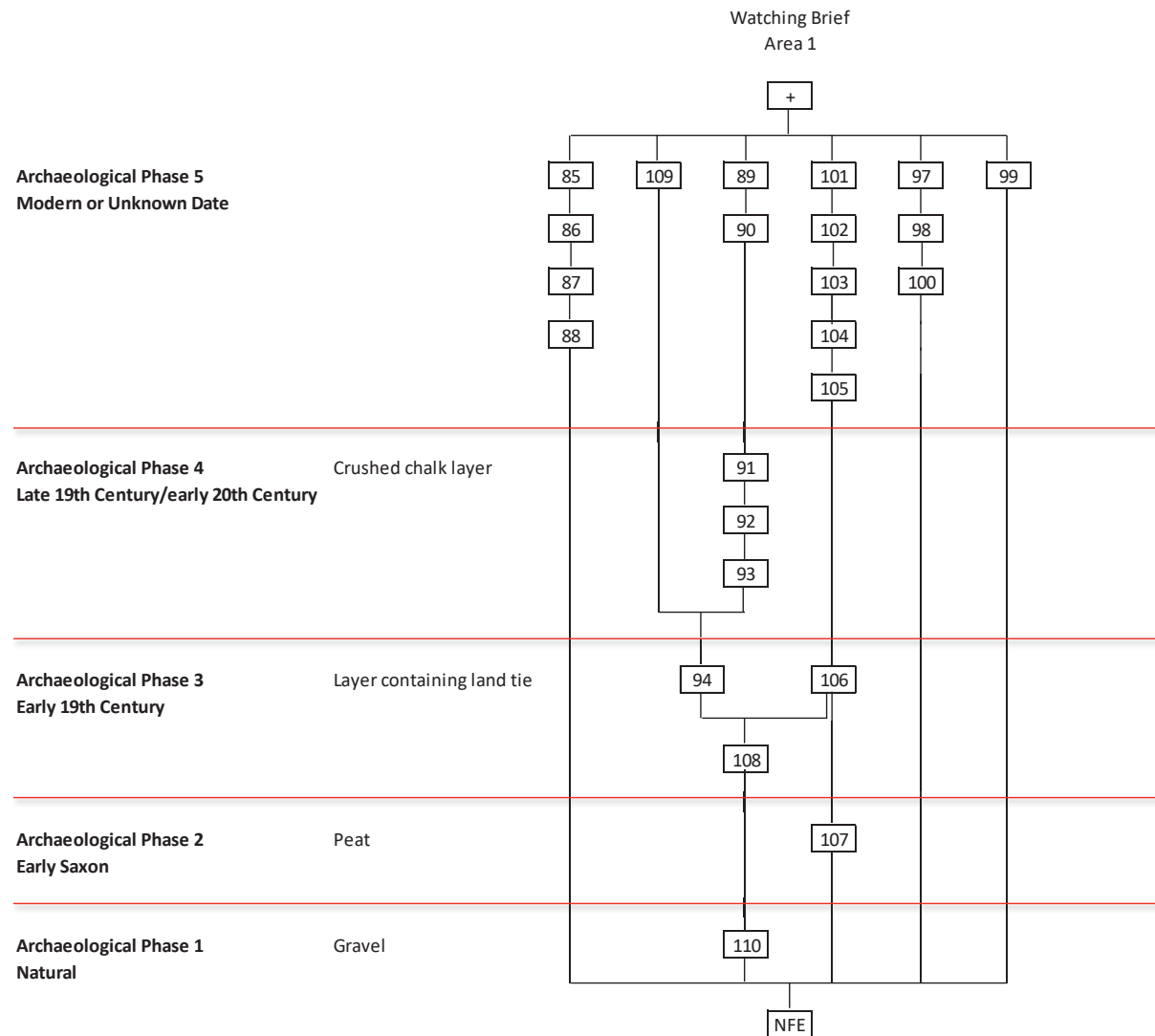
APPENDIX 1: CONTEXT INDEX

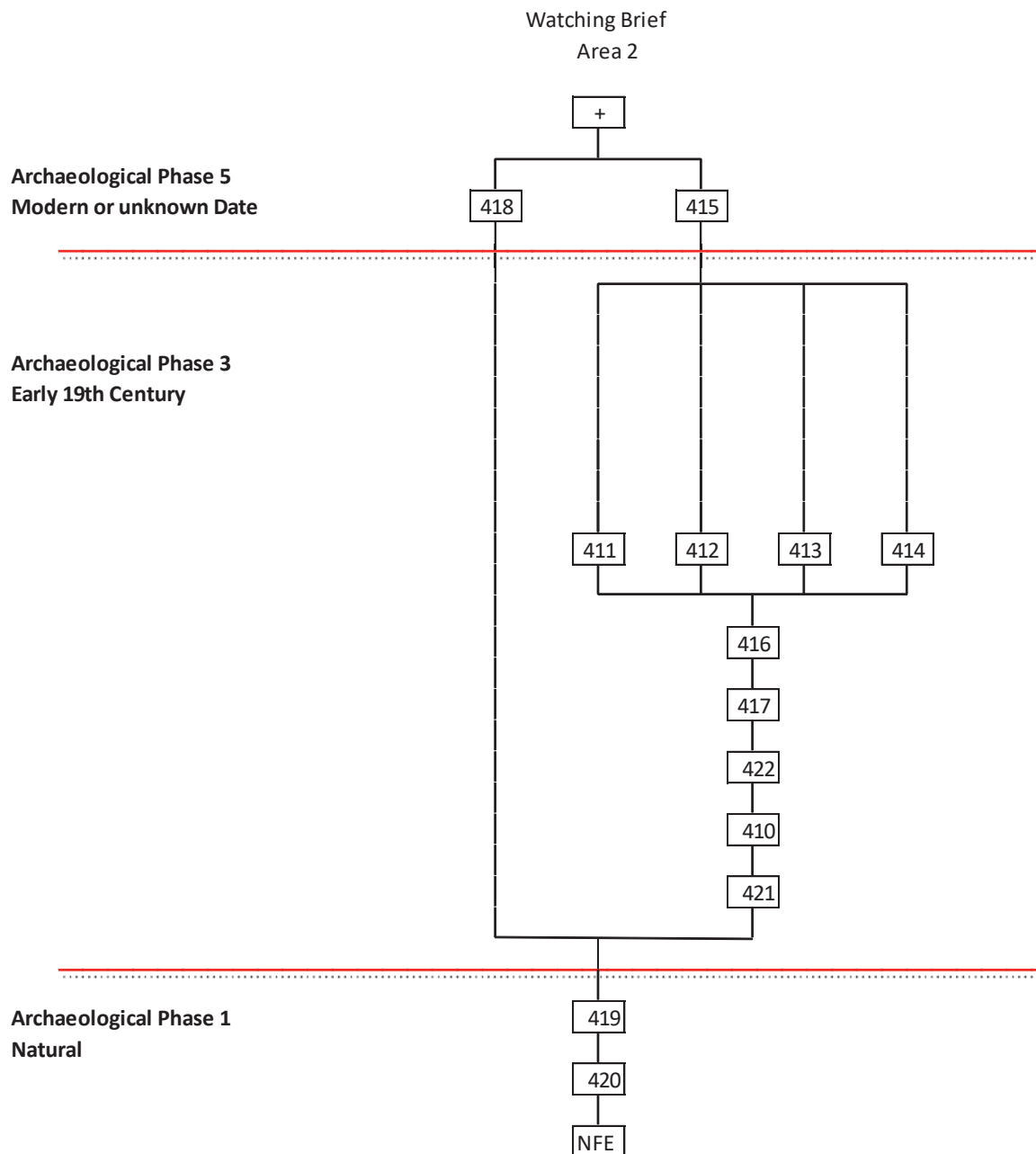
Site_Code	Context	CTX_Type	Trench	CTX_Levels_high	CTX_Levels_low	CTX_ Interpretation
FRR17	1	Fill	T1	9.24		Modern fill of window sample cut
FRR17	2	Cut	T1	9.24	7.24	Cut of modern window sample
FRR17	3	Layer	T1	9.13		Leveling layer for modern concrete
FRR17	4	Layer	T1	8.85		modern layer
FRR17	5	Layer	T1	8.97		modern layer
FRR17	6	Fill	T1	8.97	8.77	fill of modern shallow feature
FRR17	7	Cut	T1	8.97	8.77	cut of shallow modern feature
FRR17	8	Fill	T1	8.96		Uppermost backfill of leat cut
FRR17	9	Fill	T1	8.57		Backfill of leat cut
FRR17	10	Fill	T1	8.84		Fill of modern cut
FRR17	11	Cut	T1	8.84	8.22	Cut of modern feature
FRR17	12	Fill	T1	8.84	8.22	Upper backfill of leat cut
FRR17	13	Void	T1			
FRR17	14	Layer	T1	8.22	8.22	Layer leveling for Leat edge
FRR17	15	Layer	T1	8.08		Redeposited natural layer leveling for Leat edge
FRR17	16	Layer	T1	7.91		Chalk crush layer.
FRR17	17	Layer	T1	7.86		Make up layer linked to construction of Leat
FRR17	18	Timber	T1	7.66	7.44	timber within layer 17
FRR17	19	Fill	T1	8.57		Backfill of leat cut
FRR17	20	Cut	T1	8.33	6.16	Cut of leat
FRR17	21	Layer	T3	9.23	9.16	Made ground leveling for modern ground surface
FRR17	22	Layer	T3	8.65		Buried Tarmac surface
FRR17	23	Layer	T3	9.04	8.96	Leveling layer
FRR17	24	Layer	T3	8.78		Leveling layer
FRR17	25	Masonry	T3	8.62	8.43	N-S brick wall without foundation
FRR17	26	Layer	T3	8.61		Layer within wall [25]
FRR17	27	Layer	T3	8.55		Layer within wall [25]
FRR17	28	Layer	T3	8.55		Layer within wall [25]
FRR17	29	Layer	T3	8.34		Made ground
FRR17	30	Layer	T3	8.09		Redeposited Alluvium
FRR17	31	Fill	T3	8.15		Leveling fill within construction cut [37]
FRR17	32	Layer	T3	7.99	7.98	Laer of dirty, redeposited alluvial
FRR17	33	Layer	T3	7.59	7.56	Contaminated sandy gravel layer
FRR17	34	Layer	T3	7.48	7.4	Redeposited sandy layer
FRR17	35	Layer	T3	7.37		Crushed chalk and silt layer
FRR17	36	Masonry	T3	8.64	8.44	Brick drain
FRR17	37	Cut	T3	8.62	7.98	Brick drain
FRR17	38	Fill	T3	8.64	8.44	Fill of masonry [36]
FRR17	39	Cut	T3	8.64		Fill of masonry [36]
FRR17	40	Layer	T4	9.15	9.13	Fill of masonry [36]
FRR17	41	Cut	T4	8.93	8.81	Fill of masonry [36]
FRR17	42	Cut	T4	8.93	8.81	Fill of masonry [36]
FRR17	43	Fill	T4	8.38		Fill of masonry [36]
FRR17	44	Cut	T4	8.38	8.23	Cut of shallow pit
FRR17	45	Layer	T4	8.67	8.43	Cut of shallow pit
FRR17	46	Layer	T4	8.03		Layer of concrete
FRR17	47	Layer	T4	7.58		Layer of concrete
FRR17	48	Layer	T2	8.81		Tarmac road surface
FRR17	49	Layer	T2	8.72		Leveling layer below tarmac surface
FRR17	50	Layer	T2	8.62		bedding layer for tarmac
FRR17	51	Layer	T2	8.59		Humic layer of built up material over tarmac surface
FRR17	52	Layer	T2	8.45		Tarmac layer
FRR17	53	Layer	T2	8.4		Tarmac layer
FRR17	54	Layer	T2	8.37		Dark silty and chalky layer
FRR17	55	Layer	T2	8.08		Made ground layer
FRR17	56	Layer	T2	7.49		Made ground layer
FRR17	57	Layer	T2	7.5		Alluvium layer
FRR17	58	Layer	T4	6.9		Alluvium layer
FRR17	59	Layer	T4	5.95		Thin peat layer presumably edge of peat deposit
FRR17	60	Layer	T4	5.85		Interface between natural gravels and thin peaty layer above
FRR17	61	Layer	T4	5.66		Natural gravels
FRR17	62	Masonry	T1	7.35		Concrete deposit from 1800s
FRR17	63	Timber	T1	6.99	6.93	N-S crosspiece to Leat land tie
FRR17	64	Timber	T1	6.94	6.89	E-W beam to Leat land tie
FRR17	65	Timber	T1	6.92		Northernmost driven plank of Leat land tie
FRR17	66	Timber	T1	7.04		Northernmost driven plank of leat land tie
FRR17	67	Timber	T1	7.04		Southernmost driven plank of leat land tie

Site_Code	Context	CTX_Type	Trench	CTX_Levels_high	CTX_Levels_low	CTX_ Interpretation
FRR17	68	Void	T1			
FRR17	69	Void	T1			
FRR17	70	Layer	T2	7.02		Layer of redeposited alluvium
FRR17	71	Fill	T2	6.2	5.58	Accumulated material at base of leat
FRR17	72	Natural	T2	5.89	5.74	natural gravel
FRR17	73	Natural	T2	6.83		Alluvium
FRR17	74	Other	T2			Structure number for Leat Land Tie
FRR17	75	Layer	T3	6.24		Peat Layer
FRR17	76	Natural	T3	5.72		Natural Gravels
FRR17	77	Natural	T3	7.24		Natural alluvium
FRR17	78	Fill	T1	6.83	6.53	Accumulation at base of Leat
FRR17	79	Natural	T1	6.15		Natural Gravels
FRR17	80	Void	T1			
FRR17	81	Void	T1			
FRR17	82	Void	T1			
FRR17	83	Void	T1			
FRR17	84	Void	T1			
FRR17	85	Layer	WB 1			Made ground
FRR17	86	Layer	WB 1			Post-Med layer
FRR17	87	Layer	WB 1			Demolition layer
FRR17	88	Layer	WB 1			Demolition layer
FRR17	89	Layer	WB 1			Gravel layer
FRR17	90	Layer	WB 1			Gravel layer
FRR17	91	Layer	WB 1			Crushed chalk and silt layer
FRR17	92	Cut	WB 1			Possible pit
FRR17	93	Layer	WB 1			redeposited natural
FRR17	94	Layer	WB 1			redeposited natural
FRR17	95	Timber	WB 1			Part of a wooden land tie
FRR17	96	Timber	WB 1			Part of a wooden land tie
FRR17	97	Fill	WB 1			Part of a wooden land tie
FRR17	98	Cut	WB 1			Cut of Leet
FRR17	99	Layer	WB 1			Made Ground
FRR17	100	Natural	WB 1			Naturally formed alluvium deposit
FRR17	101	Natural	WB 1			Demolition deposit
FRR17	102	Layer	WB 1			Tarmac surface
FRR17	103	Layer	WB 1			Tarmac surface
FRR17	104	Layer	WB 1			Modern made ground
FRR17	105	Layer	WB 1			Modern made ground
FRR17	106	Layer	WB 1			Natural alluvium
FRR17	107	Natural	WB 1			Peat
FRR17	108	Other	WB 1			Peat
FRR17	109	Layer	WB 1			Modern layer
FRR17	110	Layer	WB 1			Modern layer
FRR17	410	Masonry	WB 2	8.13		T shaped wall
FRR17	411	Masonry	WB 2	8.13		Single skin wall
FRR17	412	Masonry	WB 2	8.13		Butress
FRR17	413	Masonry	WB 2	8.13		Butress
FRR17	414	Masonry	WB 2	8.13		Butress
FRR17	415	Fill	WB 2			Building backfill. Demolition rubble.
FRR17	416	Layer	WB 2	7.53		Possible floor surface
FRR17	417	Fill	WB 2			Backfill of building [410]
FRR17	418	Layer	WB 2			Layer of made ground
FRR17	419	Layer	WB 2			Layer of reddish gravel.
FRR17	420	Layer	WB 2	5.23		Layer of redeposited alluvium
FRR17	421	Cut	WB 2			Construction cut for wall [410]
FRR17	422	Fill	WB 2			Construction backfill

APPENDIX 2: SITE MATRIX







APPENDIX 3: FINDS REPORTS

Pottery spot dating (FRR17)

Chris Jarrett

A single sherd of pottery (1g) was recorded and found in context [73]. The sherd consists of refined white earthenware with under-glaze polychrome-painted decoration in 'chrome' colours (REFW CHROM), dated from c. 1830, although the decoration, consisting of a pink band and line, dates to the late 19th-early 20th century. The sherd is derived from an open form, perhaps a saucer, and the exterior of the vessel is laminated.

The pottery has no significance, as it occurs as a single sherd with no meaning and additionally as a frequent pottery type archaeologically recorded in London. The only potential of the pottery is to date the context it occurred in. There are no recommendations for further work on the pottery and the sherd can be discarded as it is fully recorded.

Clay tobacco pipes spot dating (FRR17)

Chris Jarrett

A single fragment of a clay tobacco pipe stem was recovered from context [78]. The stem is of a medium-thin thickness and has a fine bore and it can therefore be broadly dated c. 1730–1910. The item has no significance, as it occurs as a single, plain fragment with very little meaning. The only potential of the clay tobacco pipe stem is to date the context it occurred in. There are no recommendations for further work on the material, which can be discarded as it is fully recorded.

Animal bone analysis (FRR17)

Karen Deighton and Kevin Rielly

Two animal bones were recovered during test pitting as follows:

Context 75 trench 3

Equid radius with fused ulna fragment. Both epiphyses are fused suggest an animal of over 3.5 years old. Calculations based on a lateral length of 300mm and using Kiesewalter's conversion factor (1888) suggest a height of 1302mm (just over 13 hands), which maybe suggests a pony rather than a donkey. No butchery evidence was observed.

The associated carbon date of 540-645 cal AD (1410-1305 cal BP) for this peaty deposit places the equid fragments within the Early Saxon period. It can be assumed that this individual is well within the size range of equids present in this part of England at this time, here based on a review of Roman

through to post-medieval equid measurements from numerous London sites (in Rackham 1995). It would fit into the modern definition of a pony, as under 14.5 hands, this same size also at the lowermost range of riding horses (Clark 1995, 23). At 13 hands, it is unlikely to represent a donkey, although it could possibly be a mule. However, the identification of this hybrid is generally obtained by certain dental traits rather than an examination of the post-cranial skeleton (see Armitage and Chapman 1979; Baxter 1988, 15).

A comparison with other similarly dated equids from London may be useful, following the framework labelled under Research Agenda: Major themes, Production, TE1 Framework objectives 'Examining breeding programmes and wildlife management, and marine and riverine exploitation, to understand the strategies used, their success or otherwise, and their consequences' within '*A research framework for London archaeology*' p83. Any such research work falls beyond the scope of the project, but the bone will be retained as part of the archive and as such will be available for future research.

Context 35 trench 3

Cattle femur. Both epiphyses are unfused suggesting an animal of less than 3.5 to 4 years old. Although no measurements were taken to the specimen being immature, visual inspection suggested a large "improved" (i.e. bred to increase meat yield) animal. No butchery evidence was noted

Reference

Armitage, P.L. and Chapman, H. 1979. *Roman mules. London Archaeologist* 3(13). 339-46.

Clark, J. (ed) 1995. *The Medieval Horse and its Equipment c 1150-c.1450*. Medieval Finds from Excavations in London: 5. Museum of London.

Kiesewalter, L. 1888. *Skelettmessungen an Pferden als Beitrag zur theoretischen Grundlage der Beurteilungslehre des Pferdes. Dissertation*. Leipzig

Rackham, D.J. 1995. Appendix: skeletal evidence of medieval horses from London sites In: Clark, J. (ed) *The medieval horse and its equipment c1150-1450*. Medieval finds from excavations in London: 5, 169-174

Ceramic building material spot dating (FRR17)

Amparo Valcarcel

Context	Fabric	Form	Size	Date range of material	Latest dated material		Spot date	Spot date with mortar
71	3035	Post great fire bricks	2	1666-1900	1666	1900	1700-1850	No mortar
78	3065;2276	Abraded post medieval sandy red brick and peg tile	2	1450-1900	1480	1900	1480-1900	No mortar
410	3032	Post great fire frogged bricks	2	1666-1900	1666	1900	1800-1900	1800-1900
411	3032	Post great fire frogged bricks	2	1666-1900	1666	1900	1800-1900	1800-1900

The small assemblage from the evaluation (4 examples, 3.40 kg), consists of pieces of fragmentary post medieval ceramic building material (sandy red brick, peg tile and post Great fire bricks). Two abraded fragments of sandy red brick and a peg tile were recovered from [78]. Two post Great fire bricks from [71] were collected. The bricks were narrow and unfrogged, indicating an early 18th or mid 19th century date.

The small assemblage from the watching brief on the tollhouse consists of complete post Great fire bricks (4 examples, 8.65 kg). The machine-made deep-frogged post great fire bricks from structures [410] [411] are characteristic in form of the beginning of the 19th century until the 20th century as the fabric 3032 is only produced up until 1900. Both structures had been bonded with concrete.

Recommendations

Other than as a dating tool for the post medieval structures the bricks themselves are common enough for London. No further work is recommended.

Iron nails analysis (FRR17)

Märit Gaimster

Three iron nails provided the only metal finds from the excavations. They are listed below. One of the nails, from Timber [18] came from a layer associated with the construction of the leat. The nail is substantial in size, but the head and upper 2/3 are heavily encrusted with iron corrosion and possibly mineralised wood. Remains of two possible iron roves can be seen just below the head and further down the shaft, likely with the function to fix a separate piece of timber, lost or decayed in antiquity, of c. 70mm width. The tip end of this nail is straight and well-preserved; this end would have until recently been still *in situ* in the timber. A further nail is still *in-situ* in Timber [18]; this nail, too, appears to pass through at least one rove, indicating a now lost timber component. The third nail was found *in-situ* in

Timber [63]. The nail is straight and well-preserved, with a small square and slightly domed head. Both nails appear to be hand-wrought.

Significance and recommendations for further work

Nails are frequent finds from timber constructions, showing relatively little change in time from the Roman period onwards. In the case of the nail from Timber [18], the remains of possible roves are of some interest as an indication of now-lost timber components. No further work is recommended for these two objects; however, it would be useful to obtain x-rays for documentation and archive purposes. The nails may then be discarded.

context	description	pot date	recommendations
18	Iron nail; complete but upper part heavily corroded and encrusted; straight with small solid head; remains of two ?iron roves c. 25 and 110mm below the head; full L 190mm; from timber	n/a	discard
	Iron nail; <i>in-situ</i> in timber; head heavily corroded with ?iron rove 35mm below; L from timber 110mm	n/a	discard
63	Iron nail; straight with small square, slightly domed head; well-preserved with some decay at mid-shaft; full L 150mm	n/a	discard

Lithic assessment (FRR17)

Ella Egberts

The struck flint recovered from layer [73] is 20.5mm long, 18.5mm wide, 3mm thick and weighs 1.2g. The flake is in fresh condition with some minor damage or possible debitage on both the ventral and dorsal faces at the distal end of the flake (towards the right). Some cortex remains along a small part of the left side of the distal margin. The ventral side shows a bulb of percussion and bulbar (errailure) scar. The dorsal side is characterised by negative flake scars in opposing directions.

APPENDIX 4: OASIS REPORT

OASIS ID: preconst1-293418

Project details

Project name	Hale Wharf, Ferry Lane, Tottenham N17 9NE
Short description of the project	The evaluation comprised four test pits positioned across the southern area of the site and the watching brief comprised archaeological monitoring of ground works and obstruction removal. The aim of the project was to assess the presence or absence of archaeological remains within the entire stratigraphic sequence to natural deposits. Natural gravel was seen in all four trenches at a height of between 6.15m OD in the south and 5.66m OD in the north. A peat layer, dating to the early Saxon period was seen in Trench 3 and during the monitored works, which was capped by a layer of alluvium which was seen across Trenches 1, 3 and 4. To the south of the site evidence of the mill leat was seen in the form of land ties within Trench 1, whilst an accumulated deposit formed in the base of the leat was seen in Trench 1 and 2. Across the entire site were several layers of 20th and 21st century made ground relating to the industrial use of the land.
Project dates	Start: 24-07-2017 End: 24-08-2017
Previous/future work	Not known / Not known
Type of project	Field evaluation
Site status	Local Authority Designated Archaeological Area
Current Land use	Industry and Commerce 4 - Storage and warehousing
Monument type	LAND TIE Post Medieval
Monument type	LEAT Post Medieval
Significant Finds	TIMBER LAND TIE Post Medieval
Significant Finds	POTTERY Post Medieval
Significant Finds	BONE Uncertain
Significant Finds	CTP Post Medieval
Significant Finds	STRUCK FLINT Uncertain
Methods techniques	& "Targeted Trenches"
Development type	Urban residential (e.g. flats, houses, etc.)
Prompt	Planning condition
Position in the planning process	Not known / Not recorded

Project location

Country	England
---------	---------

Site location	GREATER LONDON HARINGEY TOTTENHAM Hale Wharf, Ferry Lane, Tottenham
Postcode	N17 9NE
Study area	2 Hectares
Site coordinates	TQ 34782 89475 51.587496825355 -0.054252102198 51 35 14 N 000 03 15 W Point
Height OD / Depth	Min: 5.66m Max: 6.15m

Project creators

Name of Pre-Construct Archaeology Limited
Organisation

Project brief Ramboll
originator

Project design Helen Hawkins
originator

Project Helen Hawkins
director/manager

Project supervisor Stacey Amanda Harris

Type of Developer
sponsor/funding
body

Name of Muse Developments and the Canal and River Trust
sponsor/funding
body

Project archives

Physical Archive LAARC
recipient

Physical Archive ID FRR17

Physical Contents "Animal Bones","Ceramics","Wood"

Digital Archive LAARC
recipient

Digital Archive ID FRR17

Digital Media "Database","Images raster / digital photography","Text"
available

Paper Archive LAARC
recipient

Paper Archive ID FRR17

Paper Media "Context sheet","Plan","Section"
available

**Project
bibliography 1**

Publication type	Grey literature (unpublished document/manuscript)
Title	Hale Wharf, Ferry Lane, Tottenham N17 9NE
Author(s)/Editor(s)	Harris, S. A.
Date	2017
Issuer or publisher	Pre-Construct Archaeology
Place of issue or publication	London
Description	A4 client document with PCA covers
Entered by	archive (archive@pre-construct.com)
Entered on	31 August 2017

Appendix 5: QUEST REPORT

HALE WHARF, TOTTENHAM LONDON BOROUGH OF HARINGEY

Geoarchaeological and Palaeoenvironmental Assessment Report

NGR: TQ 34782 89475

Site Code: FRR17

Date: 30th July 2018

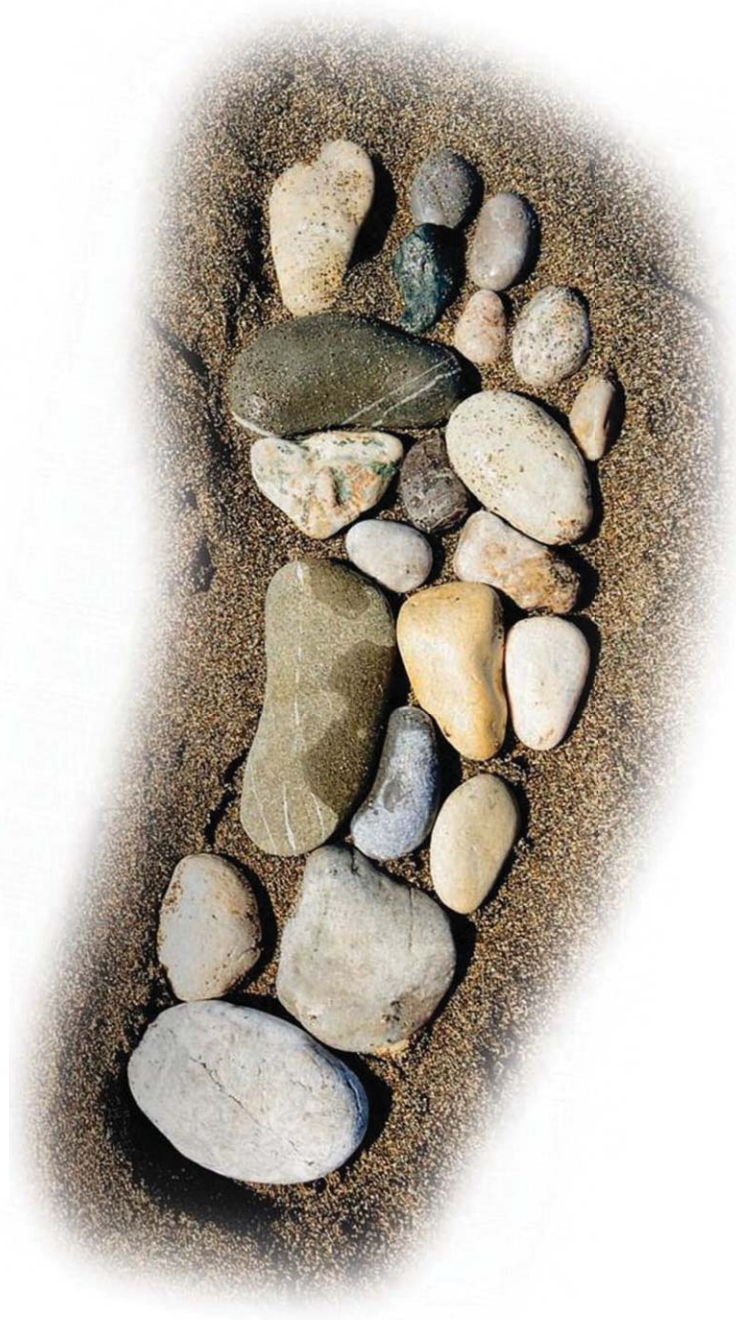
Written by: C.R. Batchelor & D.S. Young

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v1	14/02/18	C.R. Batchelor		C.R. Batchelor		First edition
v2	12/07/18	D.S. Young		C.R. Batchelor		Addition of radiocarbon dating results
v3	30/07/18	D.S. Young		C.R. Batchelor		Amendments to text/figures

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NON-TECHNICAL SUMMARY

A programme of geoarchaeological and palaeoenvironmental assessment (including radiocarbon dating) was undertaken on monolith samples taken from the Hale Wharf site. This work was undertaken in order to: (1) establish the nature of the deposits preserved on site; (2) assess the palaeoenvironmental potential of the sequence; (3) highlight any indications of nearby human activity, and (4) provide recommendations for further analysis.

The monolith samples contain a sequence of Lea Valley Gravels overlain by a combination of inorganic and organic fine-grained deposits, capped by inorganic clay. The pollen and plant macrofossil assemblage is indicative of an open, damp local environment. Reed swamp / sedge fen is indicated by high values of grasses, sedges and aquatics; the growth of alder is also indicated, possibly representing localised stands growing along the edge of the floodplain. The nearby dryland was also very open in nature, and the presence of cereals, their associated weeds, and indicators of disturbed ground (e.g. dandelions, fat hen) together with charcoal is suggestive of nearby anthropogenic activity. As above, the presence of *Cereale* type pollen alone, within a coastal floodplain environment might represent either cereal cultivation, or the growth of coastal grasses, which produce pollen with a similar morphology and size to that of cereal pollen grains.

The stratigraphic sequence is very similar in nature, elevation and thickness to that recorded at Ferry Lane Industrial Estate, as is the palaeoecological assemblage. However, at Ferry Lane, the complex of alluvial deposits overlying the gravel was radiocarbon dated between the late Iron Age and early Roman period (2350-2150 to 2000-1860 cal BP), around a thousand years earlier than that the organic unit at the present site. Further analysis is therefore recommended on those pollen samples that are suitable for further work, in order to investigate the nature of the vegetation history and human activity at the site in more detail.

INTRODUCTION

2.1 Site context

This report summarises the findings arising out of the geoarchaeological and palaeoenvironmental assessment undertaken by Quaternary Scientific (University of Reading) in connection with the proposed development of land at Hale Wharf, Tottenham, London Borough of Haringey (site code: FRR17; NGR: TQ 34782 89475; Figures 1 & 2). Quaternary Scientific were commissioned by Pre-Construct Archaeology to undertake the investigations. The site is in the lower valley of the River Lea, approximately 10km from its confluence with the River Thames. It is around this point that the Lea Valley changes its orientation from flowing in a south-west to south easterly direction. The site is bordered by the River Lea to the east and River Lea Navigation to the west. To the east of the River Lea are a complex of man-made reservoirs.

The British Geological Survey (1:50,000 Sheet 257 Romford 1996) shows the site underlain by London Clay bedrock overlain by Alluvium, described as comprising clay, silt, sand and peat. In fact, the alluvial deposits of the Lower Thames and its tributaries are almost everywhere underlain by Late Devensian Late Glacial Gravels (in the Thames valley, the Shepperton Gravel of Gibbard, 1985, 1994; in the Lea valley, the Lea Valley Gravel of Gibbard, 1994), and this gravel is widely recorded in boreholes in the vicinity of the site.

The site lies within the area investigated as part of the Lea Valley Mapping Project (Corcoran *et al.*, 2011). In this project the Lea Valley has been divided into Landscape Zones characterised by their Quaternary landscape history, based largely on sedimentary evidence derived from borehole records. The Hale Wharf site is located in 'Map 3: Tottenham to Leyton' towards the north-eastern margins of Landscape Zone LZ3.3 (Terrain 3), which is described as containing sandy-clay 'brickearth' overlying river terrace gravels. In actual fact, on the basis of the alluvium and peat recorded during the archaeological evaluation (PCA, 2017) the site is more likely located on the western margin of LZ3.5 (Terrain 1; Figure 1) which is described as containing the deposits of the central floodplain valley. The site is projected as being located towards the northern part of Landscape Zone 3.5. Here, the Corcoran *et al.* model projects the bedrock surface at around 2-3m OD, and is overlain by Pleistocene gravel to 5-7m OD; the surface of the alluvial deposits generally lie at ca. 7.5m OD. However, the number of sedimentary records are sparse across the valley floor of Map 3, and in particular towards the north, in the vicinity of the site. This is largely a consequence of reservoir construction leading to truncation and/or made ground infilling. Thus, as recognised by Corcoran *et al.* (2011), the sedimentary sequence is not that well understood in the area of the site, and the reconstructed models are not as robust as those from other parts of the Lower Lea Valley Mapping Project.

2.2 Geoarchaeological, palaeoenvironmental and archaeological significance

As outlined above, on the basis of the alluvium and peat recorded during the archaeological evaluation, the site appears more likely to rest on the edge of the central valley of Landscape Zone LZ3.5, rather than the low terrace of LZ3.3. Alluvium, lake marl, peat and tufa deposits were recorded in the same zone during description of sedimentary sequences in the late 19th / early 20th century (e.g. Woodward, 1869; Holmes, 1901-2a, 1901-2b). The characteristics of the mammal bone and snail assemblages within these deposits may suggest they spanned the Late Glacial and Early-Middle Holocene Periods. In addition, archaeological remains were recovered during construction of the Victorian Low Maynard reservoir to the east of the site. Here, a pile dwelling or crannog was recorded in association with Bronze Age and Iron Age finds including a spearhead, dagger, axe, cauldron fragments and ceramic vessels. Since the exact context was not recorded, it is not possible to make any interpretation of the remains or determine whether they were contemporaneous. On the basis of this and other finds along the course of LZ3.5, there is potential for recording significant archaeological remains of wetland and dryland occupation, structures and artefacts within the alluvial deposits; furthermore, the organic-rich alluvial deposits have high potential for providing detailed reconstructions of landscape change (Corcoran *et al.*, 2011).

Areas of high gravel topography and Peat deposits represent potential areas that might have been utilised or even occupied by prehistoric and historic people, evidence of which may be preserved in the archaeological record (e.g. features and structures). As outlined above, such archaeological evidence was recorded during construction of the nearby Low Maynard reservoir, demonstrating this potential (Corcoran *et al.*, 2011). Even in the absence of the archaeological remains, the sediments have the potential to contain a wealth of further information on the past landscape, through the

assessment/analysis of palaeoenvironmental remains (e.g. pollen, plant macrofossils and insects) and radiocarbon dating. So called environmental archaeological or palaeoenvironmental investigations can identify the nature and timing of changes in the landscape, and the interaction of different processes (e.g. vegetation change, human activity, climate change, hydrological change) thereby increasing our knowledge and understanding of the site and nearby area. In the case of human activity, palaeoenvironmental evidence can include: (1) decreases in tree and shrub pollen suggestive of woodland clearance; (2) the presence of herbs indicative of disturbed ground, pastoral and/or arable agriculture; (3) charcoal/microcharcoal suggestive of anthropogenic or natural burning, and (4) insect taxa indicative of domesticated animals. Recent work undertaken in a similar setting on the opposite side of LZ3.5 at Ferry Lane Industrial Estate revealed a sequence dating to the Iron Age (Batchelor *et al.*, 2017). This provided indications of a very open and damp environment, together with evidence for disturbed ground and nearby human activity. Overall however, the limited number and potential to uncover such sequences in this area of the Lea Valley, and increased knowledge/understanding of the historic/prehistoric environment that they could provide, highlights the importance of undertaking such work (see Corcoran *et al.*, 2011).

2.3 Aims and objectives

A programme of geoarchaeological and palaeoenvironmental assessment is to be undertaken on monolith samples taken from the Hale Wharf site. The aims of this work are as follows: (1) to establish the nature of the deposits preserved on site; (2) to assess the palaeoenvironmental potential of the sequence; (3) to highlight any indications of nearby human activity, and (4) to provide recommendations for further analysis.

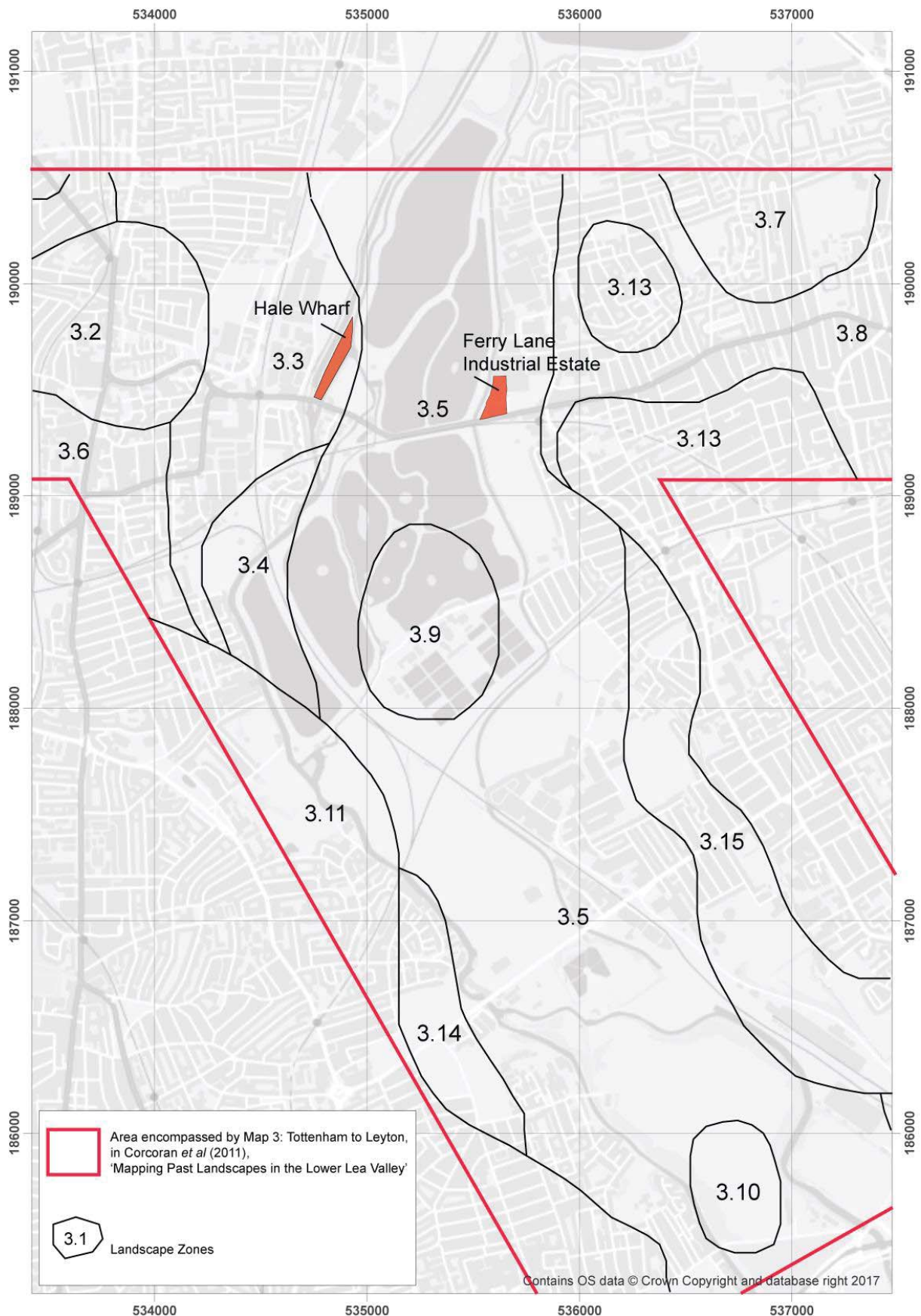


Figure 1: Location of Hale Wharf, Tottenham, London Borough of Haringey, and the interpreted landscape zones and borehole transects investigated as part of the Lower Lea Valley Valley Mapping Project (Corcoran *et al.*, 2011).



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 01/09/17 RM

Figure 2: Trench locations (reproduced from PCA, 2017)

Trench Location Plan
 1:500 at A4

METHODS

3.1 Lithostratigraphic descriptions

Laboratory-based lithostratigraphic descriptions of the monolith samples from Trench T3 was carried out using standard procedures for recording unconsolidated sediment and peat, noting the physical properties (colour), composition (gravel, sand, clay, silt and organic matter) and inclusions (e.g. artefacts). The procedure involved: (1) cleaning the samples with a spatula or scalpel blade and distilled water to remove surface contaminants; (2) recording the physical properties, most notably colour; (3) recording the composition e.g. gravel, fine sand, silt and clay; (4) recording the degree of peat humification, and (5) recording the unit boundaries e.g. sharp or diffuse. The results are displayed in Table 1.

3.2 Organic matter determinations

A total of 14 subsamples from Trenches T3 were taken for determination of the organic matter content (Table 2; Figure 3). These records were important as they can identify increases in organic matter possibly associated with more terrestrial conditions. The organic matter content was determined by standard procedures involving: (1) drying the sub-sample at 110°C for 12 hours to remove excess moisture; (2) placing the sub-sample in a muffle furnace at 550°C for 2 hours to remove organic matter (thermal oxidation), and (3) re-weighing the sub-sample obtain the 'loss-on-ignition' value. The samples were then re-weighed after 2 hours at 950°C for determination of the calcium carbonate content (see Bengtsson & Enell, 1986).

3.3 Radiocarbon dating

A sample of terrestrial seeds (*Ranunculus repens* and *Rumex* sp.) was extracted for radiocarbon dating from the base of the organic unit in Trench T3 (5.94-5.96m OD) . The sample was submitted for AMS radiocarbon dating to the BETA Analytic Radiocarbon Dating Facility, Miami, Florida. The results have been calibrated using OxCal v4.2 (Bronk Ramsey, 1995; 2001) and the IntCal13 atmospheric curve (Reimer *et al.*, 2013). The results are displayed in Figure 3 and in Table 3.

3.4 Pollen assessment

Ten subsamples from Trench T3 were extracted for an assessment of pollen content. The pollen was extracted as follows: (1) sampling a standard volume of sediment (1ml); (2) adding two tablets of the exotic clubmoss *Lycopodium clavatum* to provide a measure of pollen concentration in each sample; (3) deflocculation of the sample in 1% Sodium pyrophosphate; (4) sieving of the sample to remove coarse mineral and organic fractions (>125µ); (5) acetolysis; (6) removal of finer minerogenic fraction using Sodium polytungstate (specific gravity of 2.0g/cm³); (7) mounting of the sample in glycerol jelly. Each stage of the procedure was preceded and followed by thorough sample cleaning in filtered distilled water. Quality control is maintained by periodic checking of residues, and assembling sample batches from various depths to test for systematic laboratory effects. Pollen grains and spores were identified using the University of Reading pollen type collection and the following sources of keys and photographs: Moore *et al* (1991); Reille (1992). The assessment procedure consisted of scanning the prepared slides, and recording the concentration and preservation of pollen grains and spores, and the principal taxa on four transects (10% of the slide) (Table 4).

3.5 Diatom assessment

A total of four samples from Trench T3 were submitted for an assessment of diatom presence. 0.5g of sediment was required for the diatom sample preparation. All samples were first treated with sodium hexametaphosphate and left overnight, to assist in minerogenic deflocculation. Samples were then treated with hydrogen peroxide (30% solution) to remove organic material. Samples were finally sieved using a 10µm mesh to remove fine minerogenic sediments. The residue was transferred to a plastic vial, from which a slide was prepared for subsequent assessment. A minimum of four slide traverses were undertaken across each slide sample. The concentration, preservation and diversity of diatoms was assessed along four transects; the results are displayed in Table 5.

3.6 Macrofossil assessment

A total of three bulk samples from Trench T3 were extracted for the recovery of macrofossil remains including waterlogged plant macrofossils, wood, insects and Mollusca. The extraction process involved the following procedures: (1) removing a sample of 5cm in thickness from the monolith samples and 1 litre from the bulk samples; (2) measuring the sample volume by water displacement, and (3) processing the sample by wet sieving using 300µm and 1mm mesh sizes. Each sample was scanned under a stereozoom microscope at x7-45 magnifications, and sorted into the different macrofossil classes. The concentration and preservation of remains was estimated for each class of macrofossil (Table 6). Preliminary identifications of the waterlogged seeds (Table 7) have been made using modern comparative material and reference atlases (e.g. Cappers *et al.*, 2006; NIAB, 2004). Nomenclature used follows Stace (2005).

RESULTS, INTERPRETATION & DISCUSSION OF THE LITHOSTRATIGRAPHIC DESCRIPTIONS & ORGANIC MATTER DETERMINATIONS

The lithostratigraphic descriptions and organic-matter content values are displayed in Tables 1 to 2 and Figure 3. The lowermost unit recorded within the monolith samples, consisted of a clayey sandy silt with traces of gravel between 5.59 and 5.67m OD. This corresponds to the surface of natural sands and gravels [76] recorded in Trench 3 below 5.72m OD, most likely representing the Lea Valley Gravels. The surface of the Gravels are overlain by a variable sequence of clays, silts and sands to 6.11m OD, including occasional fragments of charcoal and Mollusca remains. A more organic-rich silty clay with unidentifiable peat remains is recorded between 5.94 and 6.00m OD (up to 40% organic-rich). Combined, this complex of deposits is representative of mid-brown peat [75] recorded in Trench 3. The results of radiocarbon dating indicate that this organic unit began accumulating at around 540-645 cal AD (1410-1305 cal BP; Early Medieval), representing a relatively late organic deposit in comparison other similar units in the Lower Lea Valley. The clays, silts, sands and organic-rich deposits are overlain by a sterile inorganic-clay alluvium (context [77]). These deposits are typical of those recorded in a marginal floodplain environment.

This sequence is very similar both in composition and elevation to those recorded on the opposite side of the Lea Valley floodplain at Ferry Lane Industrial Estate (Batchelor & Young, 2017; Batchelor *et al.*, 2017). Here, the surface of the Lea Valley Gravel was recorded at 4.40m OD, and was overlain to 4.89m OD by silty clay with sand lenses, charcoal and Mollusca that became increasingly organic down profile (up to 20%). These deposits were radiocarbon dated from 2350-2150 to 2000-1860 cal BP (late Iron Age to early Roman period), up to ca. 1000 years earlier than the organic units recorded at the present site.

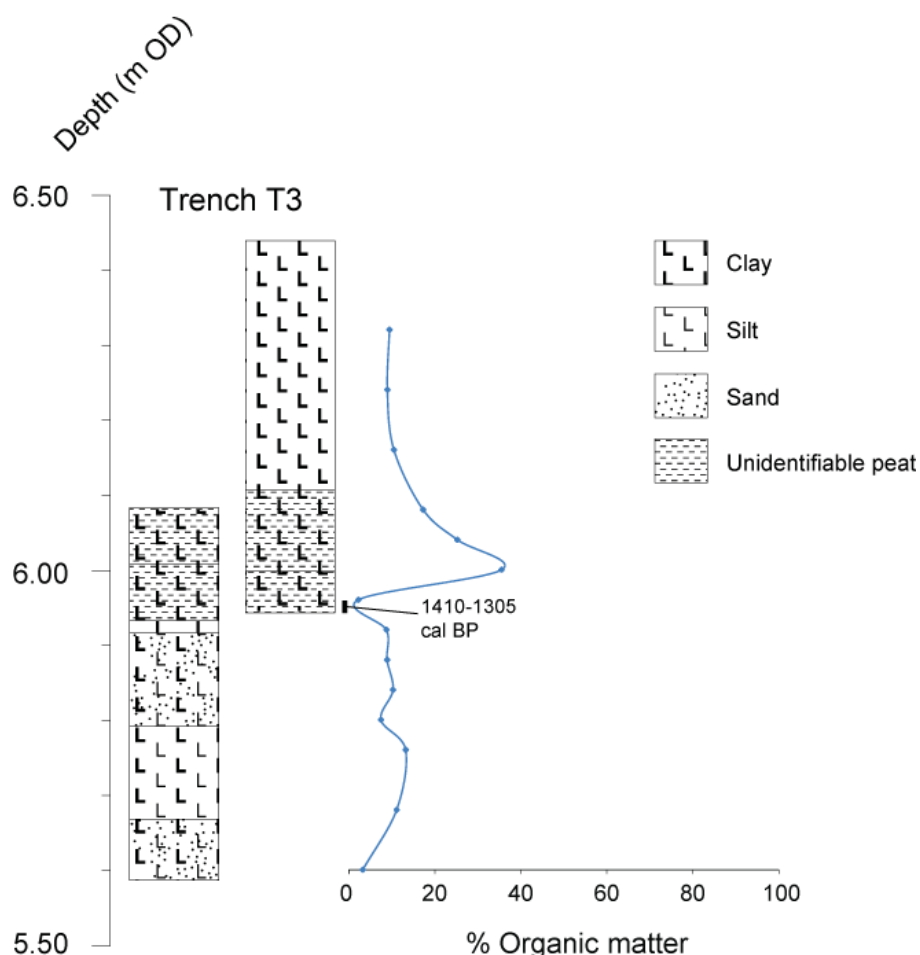


Figure 3: Lithostratigraphy of monolith samples taken from Trench T3, Hale Wharf

Table 1: Lithostratigraphic description of Trench T3, Hale Wharf, Tottenham, London Borough of Haringey

Depth (m OD)	Depth (m bgl)	Context number	Description
Upper Tin			
6.44 to 6.11	0 to 0.33	[77]	10YR 5/1 to 10YY 5/2; As4; Grey to greyish brown clay; diffuse contact into:
6.11 to 6.00	0.33 to 0.44	[75]	10YR 5/2 to 10YR 4/1; As4, Sh+ becoming As3, Sh1, DI/TI+; Greyish brown clay with traces of organic remains, becoming dark grey organic-rich clay with traces of wood remains; diffuse contact into:
6.00 to 5.94	0.44 to 0.50		10YR 3/1; Sh3, As1; Humo 4; Very dark grey very-well humified unidentifiable peat with clay.
Lower Tin			
6.09 to 6.01	0 to 0.08	[75]	10YR 4/1; As3, Sh1, DI/TI+; Dark grey organic-rich clay with traces of wood remains; diffuse contact into:
6.01 to 5.94	0.08 to 0.15		10YR 3/1; Sh3, As1; Humo 4; Very dark grey very-well humified unidentifiable peat with clay; sharp contact into:
5.94 to 5.92	0.15 to 0.17		10YR 5/2; As4; Greyish brown clay; sharp contact into:
5.92 to 5.79	0.17 to 0.30		10YR 5/2 to 10YR 7/2; As2, Ag1, Ga1, DI+; Greyish brown to very light greyish brown silty sandy clay with traces of detrital wood, charcoal, Mollusca and possible calcareous remains; sharp and uneven contact into:
5.79 to 5.67	0.30 to 0.42		10YR 4/2; Ag2, As2, Ga+; Dark greyish brown silty clay with traces of sand, wood/charcoal; sharp contact into:
5.67 to 5.59	0.42 to 0.50	[76]	10YR 4/2; Ag2, As1, Ga1, Gg+; Dark greyish brown clayey sandy silt with traces of gravel and possible Mollusca fragments.

Table 2: Results of the Trench T3, Hale Wharf, Tottenham, London Borough of Haringey

Depth (m OD)		Organic matter content (%)
From	To	
6.31	6.32	9.46
6.23	6.24	8.96
6.15	6.16	10.48
6.07	6.08	17.29
6.03	6.04	25.21
5.99	6	35.50
5.95	5.96	2.23
5.91	5.92	8.71
5.87	5.88	8.89
5.83	5.84	10.28
5.79	5.8	7.47
5.75	5.76	13.21
5.67	5.68	11.11
5.59	5.60	3.23

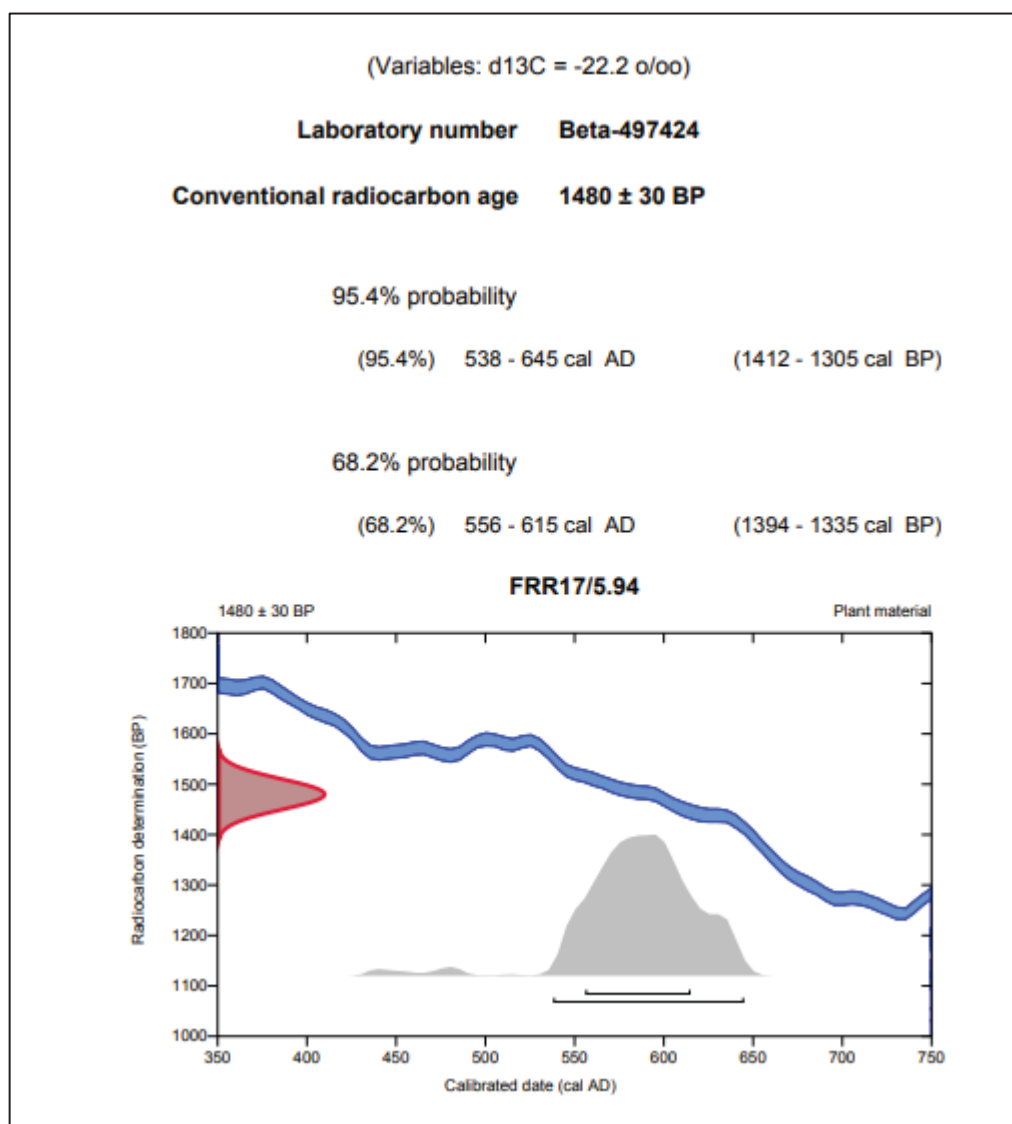


Figure 4: Results of the Trench T3 radiocarbon dating, Hale Wharf, Tottenham, London Borough of Haringey (figure provided by Beta Analytic Radiocarbon Dating Laboratory).

Table 3: Results of the Trench T3 radiocarbon dating, Hale Wharf, Tottenham, London Borough of Haringey.

Laboratory code / Method	Material and location	Depth (m OD)	Uncalibrated radiocarbon years before present (yr BP)	Calibrated age BC/AD (BP) (2-sigma, 95.4% probability)	$\delta^{13}\text{C}$ (‰)
BETA-497424 AMS	<i>Ranunculus repens</i> and <i>Rumex</i> sp. seeds; base of organic unit	5.94 to 5.96	1480 ± 30	540-645 cal AD (1410-1305 cal BP)	-22.2

RESULTS, INTERPRETATION & DISCUSSION OF THE POLLEN ASSESSMENT

The results of the assessment (Table 4) indicate a moderate to high concentration of pollen in a moderate state of preservation throughout the sequence. The assemblages are characterised by high values of herbaceous taxa, including sedges (Cyperaceae), grasses (Poaceae), dandelions (Lactuceae), daisies (Asteraceae), buttercup / water crowfoot (*Ranunculus* type), sorrel (*Rumex acetosa/acetosella*) and sporadic occurrences including cereals (*Cereale* type), black knapweed (*Centaurea nigra*), ribwort plantain (*Plantago lanceolata*), mint (*Mentha* type) and fat hen (*Chenopodium* type). Aquatic taxa were occasionally present in the form of bur-reed (*Sparganium* type), bulrush (*Typha latifolia*) and pondweed (*Potamogeton* type). Spores were low in value, dominated by ferns (Filicales) and polypody (*Polypodium vulgare*). Low values of tree and shrub pollen were also recorded, including oak (*Quercus*), pine (*Pinus*) and alder (*Alnus*). Microcharcoal fragments were recorded occasionally throughout the sequence.

This assemblage is indicative of a very open environment and damp environment. The presence of reed swamp / sedge fen is indicated by the high values of grasses and sedges, bur-reed, bulrush and pondweed; the growth of alder is also indicated, possibly as localised stands growing along the edge of the floodplain. The sporadic occurrence of cereals, their associated weeds, and indicators of disturbed ground (e.g. dandelions, fat hen) together with occasional values of microcharcoal is suggestive of nearby anthropogenic activity. However, the presence of *Cereale* type pollen within a coastal floodplain environment might represent either cereal cultivation, or the growth of coastal grasses, which produce pollen with a similar morphology and size to that of cereal pollen grains.

The pollen assemblage is very similar in nature to that recorded at Ferry Lane Industrial Estate (Batchelor & Young, 2017; Batchelor et al., 2017), providing supporting evidence for a late prehistoric / early historic date for the sequence. At Ferry Lane, the analysis of non-pollen palynomorphs also provided evidence for herbivores (most likely livestock).

Table 4: Results of the pollen assessment of samples from Trench T3, Hale Wharf, Tottenham, London Borough of Haringey

	Depth (m OD)	6.16	6.08	6.04	6.00	5.96	5.88	5.84	5.76	5.68	5.60
Latin name	Common name										
Trees											
<i>Alnus</i>	alder	3	1					4		1	
<i>Quercus</i>	oak	5	3	2	3	2		1			2
<i>Pinus</i>	pine	1						1		1	2
<i>Ulmus</i>	elm									1	
<i>Tilia</i>	lime							1			
<i>Betula</i>	birch				2			1			
<i>cf Carpinus</i>	hornbeam							1			
Shrubs											
<i>Corylus</i> type	e.g. hazel	4	1		1		2	1			2
<i>Salix</i>	willow				1	1	1				1
Herbs											
Cyperaceae	sedge family	8	26	17	6	3	2	7	3	1	5
Poaceae	grass family	15	4	7	1	7	5	6	1	4	8
<i>cf Cereale</i> type	e.g. barley					1				1	
Asteraceae	daisy family	1		1	1						4
<i>cf Ambrosia</i> type	ragweed								1		
Lactuceae	dandelion family	1	1			1	1	1	1		1
Apiaceae	carrot family	2	3	1	1	1	1		1		
<i>Ranunculus</i> type	e.g. buttercup	1	2		1		1				1
<i>Chenopodium</i> type	goosefoot family	1									
Caryophyllaceae	pink family				1						1
<i>Plantago lanceolata</i>	ribwort plantain				1	3		2			2
<i>Rumex acetosa/acetosella</i>	sorrel						1		1		
<i>Rumex obtusifolius</i>	dock								1		
<i>Centaurea nigra</i>	black knapweed		1								
<i>Polygonum persicaria</i>	lady's thumb							1			
<i>Mentha</i> type	mint										1
Aquatics											
<i>Potamogeton</i> type	pondweed								1	1	2
<i>Typha latifolia</i>	bulrush		2	1				1		2	2
<i>Sparganium</i> type	bur-reed	6	7	5	6	1					
Spores											
<i>Sphagnum</i>	moss		1								

	Depth (m OD)	6.16	6.08	6.04	6.00	5.96	5.88	5.84	5.76	5.68	5.60
Latin name	Common name										
<i>Dryopteris</i>	buckler fern									3	2
<i>Polypodium vulgare</i>	polypody							1			
Total Land Pollen (grains counted)		42	41	28	19	19	14	27	9	9	30
Concentration*		5	5	4	3	3	2	4	2	2	4
Preservation**		4	4	3	4	4	3	4	3-4	3	4
Microcharcoal Concentration***		2	2	1	1	1	2	2	2	1	2
Suitable for further analysis		YES	YES	YES	YES	YES	YES	YES	NO	NO	YES

Key: *Concentration: 0 = 0 grains; 1 = 1-75 grains, 2 = 76-150 grains, 3 = 151-225 grains, 4 = 226-300, 5 = 300+ grains per slide; **Preservation: 0 = absent; 1 = very poor; 2 = poor; 3 = moderate; 4 = good; 5 = excellent; ***Microcharcoal Concentration: 0 = none, 1 = negligible, 2 = occasional, 3 = moderate, 4 = frequent, 5 = abundant

RESULTS & INTERPRETATION OF THE DIATOM ASSESSMENT

A total of four samples were extracted for an assessment of diatoms through the alluvial deposits. Only sporadic to low numbers of remains were recorded (Table 5).

Table 5: Results of the pollen assessment of samples from Trench T3, Hale Wharf, Tottenham, London Borough of Haringey

Depth (m OD)	Diatom concentration	Diatom preservation	Diversity
6.16	1	3	Low
6.05	1	3	Low
5.96	1	3	Low
5.92	1	3	Low

RESULTS & INTERPRETATION OF THE MACROFOSSIL ASSESSMENT

Three small bulk samples were processed for the recovery of macrofossil remains, including waterlogged plant macrofossils, waterlogged wood, insects, bone and Mollusca (Tables 6 and 7). The results of the macrofossil rapid assessment of the samples indicate that low to moderate quantities of waterlogged seeds are present throughout the sequence. Waterlogged wood is present in low quantities in all three samples, although this is poorly preserved and present largely as unidentifiable fragments (less than 2mm length on all axes). No charred seeds were recorded in the samples, although charcoal was present in low concentrations in the sample from 5.80-5.84m OD (fragments <2mm in diameter). Sedge remains, generally limited to specimens lacking the diagnostic epidermal tissue necessary for identification, were recorded in low to moderate quantities in all three samples. Insects were present in low to moderate quantities in the samples from 5.80-5.84 and 5.98-6.02m OD. No Mollusca or bone were recorded in the three samples assessed.

The waterlogged seed assemblage in the three samples was relatively consistent throughout the sequence, although the aquatic taxon *Sparganium erectum* (bur-reed) was recorded only in the uppermost sample (5.98-6.02m OD). In this sample and the remainder of the sequence the assemblage is typical of that in a sedge fen or reed swamp dominated by aquatic and herbaceous taxa, including *Ranunculus repens* (creeping buttercup), *Ranunculus aquatilis/fluitans* (common water crowfoot), *Rumex/Polygonum* sp. (dock/sorrel/knotweed), *Carex* sp. (sedge), *Scirpus* sp. (bulrush), Apiaceae (carrot family) and *Lycopus europaeus* (gypsywort).

Table 6: Results of the macrofossil assessment of samples from Trench T3, Hale Wharf, Tottenham, London Borough of Haringey

Depth (m OD)	Volume processed (ml)	Fraction	Charred					Waterlogged			Mollusca		Bone		
			Charcoal (>4mm)	Charcoal (2-4mm)	Charcoal (<2mm)	Seeds	Chaff	Wood	Seeds	Sedge remains (e.g. stems/roots)	Whole	Fragments	Large	Small	Fragments
5.98-6.02	120	>300µm	-	-	-	-	-	-	-	2	-	-	-	-	-
		>1mm	-	-	-	-	-	1	2	1	-	-	-	-	-
5.94-5.98	100	>300µm	-	-	-	-	-	-	1	2	-	-	-	-	-
		>1mm	-	-	-	-	-	1	1	1	-	-	-	-	-
5.80-5.84	100	>300µm	-	-	1	-	-	-	-	2	-	-	-	-	1
		>1mm	-	-	-	-	-	1	3	2	-	-	-	-	-

Table 7: Results of the seed identifications from Trench T3, Hale Wharf, Tottenham, London Borough of Haringey

Depth (m OD)	Seed identification		Quantity
	Latin name	Common name	
5.98-6.02	<i>Sparganium erectum</i>	bur-reed	9
	<i>Ranunculus repens</i>	creeping buttercup	3
	<i>Rumex/Polygonum</i> sp.	dock/sorrel/knotweed	4
5.94-5.98	<i>Rumex/Polygonum</i> sp.	dock/sorrel/knotweed	2
	<i>Lycopus europaeus</i>	gypsywort	2
5.80-5.84	<i>Ranunculus repens</i>	creeping buttercup	1
	<i>Ranunculus aquatilis/fluitans</i>	common water crowfoot	2
	<i>Rumex/Polygonum</i> sp.	dock/sorrel/knotweed	13
	<i>Carex</i> sp.	sedge	1
	<i>Scirpus</i> sp.	bulrush	7
	Apiaceae	carrot family	1

CONCLUSIONS & RECOMMENDATIONS

A programme of geoarchaeological and palaeoenvironmental assessment was undertaken on monolith samples taken from the Hale Wharf site. This work was undertaken in order to: (1) establish the nature of the deposits preserved on site; (2) assess the palaeoenvironmental potential of the sequence; (3) highlight any indications of nearby human activity, and (4) provide recommendations for further analysis.

The monolith samples contain a sequence of Lea Valley Gravels overlain by a combination of inorganic and organic fine-grained deposits, capped by inorganic clay. The results of the radiocarbon dating indicate that the organic unit within the sequence began accumulating at around 540-645 cal AD (1410-1305 cal BP; Early Medieval), representing a relatively late organic deposit in comparison other similar units in the Lower Lea Valley. The pollen and plant macrofossil assemblage is indicative of an open, damp local environment. Reed swamp/sedge fen is indicated by high values of grasses, sedges and aquatics; the growth of alder is also indicated, possibly representing localised stands growing along the edge of the floodplain. The nearby dryland was also very open in nature, and the presence of cereals, their associated weeds, and indicators of disturbed ground (e.g. dandelions, fat hen) together with charcoal is suggestive of nearby anthropogenic activity. As above, the presence of *Cereale* type pollen alone, within a coastal floodplain environment might represent either cereal cultivation, or the growth of coastal grasses, which produce pollen with a similar morphology and size to that of cereal pollen grains.

The stratigraphic sequence is very similar in nature, elevation and thickness to that recorded at Ferry Lane Industrial Estate, as is the palaeoecological assemblage. However, at Ferry Lane, the complex of alluvial deposits overlying the gravel was radiocarbon dated between the late Iron Age and early Roman period (2350-2150 to 2000-1860 cal BP), around a thousand years earlier than that the organic unit at the present site.

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