

RAMBOLL

Crossrail Archaeology Framework

### C254 – Archaeology West - Event code XTL13 Archaeological Watching Brief and evaluation at Ilford Stabling Yard

### Fieldwork Report

CRL Document Number: C254-OXF-T1-RGN-CRG03-50283

Contract MDL reference CXX.XXX

#### 1. Contractor Document Submittal History:

Revision:	Date:	Prepared by:	Checked by:	Approved by:	Reason for Issue:
1.0	15-03-17	Gary Evans	Richard Brown 	Toby Martin	Acceptance

#### 2a. Stakeholder Review Required? YES NO

Stakeholder submission required: LU  RFL  Purpose of submission: For no objection   
 NR  LO  For information   
 DLR  Other: \_\_\_\_\_

~~This document has been reviewed by the following individual for coordination, compliance, integration and acceptance and is acceptable for transmission to the above stakeholder for the above stated purpose.~~

Sign: \_\_\_\_\_ Role: \_\_\_\_\_ Name: \_\_\_\_\_ Date: \_\_\_\_\_

Sign: \_\_\_\_\_ Role: \_\_\_\_\_ Name: \_\_\_\_\_ Date: \_\_\_\_\_

#### 2b. Review by Stakeholder (if required):

Stakeholder Organisation	Job Title	Name	Signature	Date	Acceptance
					<input type="checkbox"/>
					<input type="checkbox"/>
					<input type="checkbox"/>

#### 3. Acceptance by Crossrail:

Crossrail Review and Acceptance Decal			
This decal is to be used for submitted documents requiring acceptance by Crossrail.			
<input checked="" type="checkbox"/>	Code 1.	Accepted. Work May Proceed	
<input type="checkbox"/>	Code 2.	Not Accepted. Revise and resubmit. Work may proceed subject to incorporation of changes indicated	
<input type="checkbox"/>	Code 3.	Not Accepted. Revise and resubmit. Work may not proceed	
<input type="checkbox"/>	Code 4.	Received for information only. Receipt is confirmed	
Reviewed/Accepted by: (signature)	Print Name:	Position:	Date:
	NLUKER	PM	23/05/17
Acceptance by Crossrail does not relieve the designer/supplier from full compliance with their contractual obligations and does not constitute Crossrail approval of design, details, calculations, analyses, test methods or materials developed or selected by the designer/supplier.			

# CONTENTS

	Page
<b>1. INTRODUCTION .....</b>	<b>2</b>
1.1 Scope of Work .....	2
1.2 Planning Background .....	3
<b>2. SITE DESCRIPTION .....</b>	<b>4</b>
2.1 Location, Geology and Topography .....	4
2.2 Archaeological and Historical Background .....	8
<b>3. RESEARCH AIMS AND OBJECTIVES .....</b>	<b>20</b>
<b>4. METHODOLOGY .....</b>	<b>21</b>
4.1 Methodological Standards .....	21
4.2 Fieldwork Techniques .....	22
4.3 Watching Brief .....	22
4.4 Targeted Archaeological Trial Trench Excavation .....	23
4.5 Recording .....	23
4.6 Survey .....	24
4.7 Finds .....	26
4.8 Archaeological Science .....	27
<b>5. RESULTS .....</b>	<b>27</b>
5.1 Introduction .....	27
Archaeological Trial Trenches .....	27
5.2 27 .....	
5.3 General Watching Brief .....	31
5.4 Finds .....	33
5.5 Environmental Evidence .....	35
5.6 Phasing .....	36
<b>6. CONSTRAINTS .....</b>	<b>37</b>
6.2 Assessment of Results .....	37
6.3 Relative Completeness and Condition .....	37
6.4 Rarity .....	37
6.5 Group Value .....	37
<b>7. RESULTS IN RELATION TO INVESTIGATION AIMS .....</b>	<b>38</b>
<b>8. STATEMENT OF POTENTIAL OF ARCHAEOLOGY .....</b>	<b>39</b>
8.1 Stratigraphic Data .....	39
8.2 Finds Data .....	39
8.3 Primary Potential .....	39

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd. Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0

8.4	Documentary Study .....	40
<b>9.</b>	<b>CONCLUSIONS .....</b>	<b>40</b>
<b>10.</b>	<b>PUBLICATION AND DISSEMINATION .....</b>	<b>41</b>
<b>11.</b>	<b>ARCHIVE .....</b>	<b>41</b>
<b>12.</b>	<b>BIBLIOGRAPHY AND REFERENCES .....</b>	<b>43</b>
	<b>APPENDIX 1 - ARCHAEOLOGICAL CONTEXT INVENTORY .....</b>	<b>46</b>
	<b>APPENDIX 2 - SUMMARY OF SITE DETAILS .....</b>	<b>52</b>

## Figures and Plates

**Figure 1:** Site location

**Figure 2:** Projected survival of the Ilford Silt member within the Site

**Figure 3:** Site with former structures from historic sources (the location of structures is approximate only)

**Figure 4:** Location of archaeological trial trenches (proposed and actual)

**Figure 5:** North-facing section of ATT2

**Figure 6:** North-facing section of ATT9

**Figure 7:** North-facing section of ATT12

**Figure 8:** Section through bank along western edge of the Site showing Ilford Silts (22)

**Plate 1:** View of south-west-facing section of ATT2 showing River Terrace Gravels (203) and edge of silt filled “paleochannel” (20)

**Plate 2:** North-facing section of ATT9 showing the Ilford Silts (32) with sand filled ice wedge beneath modern “made ground” and above sands (36)

**Plate 3:** North-facing section of ATT12

**Plate 4:** Section revealed by the sheet piling works along the Site’s western edge

**Plate 5:** Workshop A - working shot



## Summary

*This report details programme of archaeological trial trenching and a general watching brief undertaken by Oxford Archaeology/Ramboll (OA/R) on the site of the new Crossrail stabling yard at Ilford Rail Depot, Ley Street in the London Borough of Redbridge, London IG1.*

*The archaeological works were carried out intermittently from December 2013 until September 2016 and took place during the demolition and remodelling of parts of an existing stabling and maintenance rail depot. The works are part of the project to create a maintenance depot and stabling facilities for the maintenance and servicing of Crossrail traction and rolling stock.*

*Archaeological works included the machine excavation of five archaeological trial trenches, as well as the monitoring of geotechnical pits, enabling works, general surface reduction and the excavation of foundations, attenuation tanks, substations and drainage runs. OA/R were also present during the refurbishment of the southern bay of the depot's Workshop A.*

*The works uncovered the following sequence of deposits. In the western third of the site, in the site of the new Paint Shop, the ballast track sub base and concrete hard standing of the present rail depot overlay either in situ River Terrace sands and gravel or the Eocene London Clay. These were the earliest deposits observed across the whole site. Any intermediate deposits (late prehistoric – early post-medieval) appear to have been removed during the construction of the depot in the 19th and 20th century.*

*On the site of the new Logistics/Stores and to the east of Workshop B, the track ballast/hard standing of the modern depot lay above deposits of in situ clay silts and silty sands. These silt deposits appear to have been laid down in a palaeochannel or lake which had eroded the underlying terrace gravels. Again, the earliest deposit uncovered was the London Clay.*

*The clay silts and silty sands have been identified as being parts of the Ilford Silt Membrane, areas of which produced large quantities of mammalian fossil bones in the 19th century. However, no artefactual or faunal remains were observed during the investigation and monitoring.*

*Within Workshop A, a series of 19th-century deposits were observed. These appear to be the backfills of the brick quarry (Cauliflower Pit) shown on 19th-century maps of the site. The limits of the former brick quarry were not discovered.*

*Aside from the backfilled 19th-century quarry and the track ballast surface of the rail depot no archaeological remains were observed during the works.*

# 1. INTRODUCTION

## 1.1 Scope of Work

1.1.1 Oxford Archaeology/Ramboll UK (OA/R) were commissioned by Crossrail Ltd (CRL) to undertake a programme of archaeological works on the site of the new Crossrail stabling yard at the Ilford Rail Depot, Ley Street, in the London Borough of Redbridge (henceforth 'the Site'). Ilford Rail Depot is an operational light maintenance depot, stabling yard and contract train maintenance depot owned by Network Rail and operated by Greater Anglia and Bombardier Transportation UK (Fig. 1).

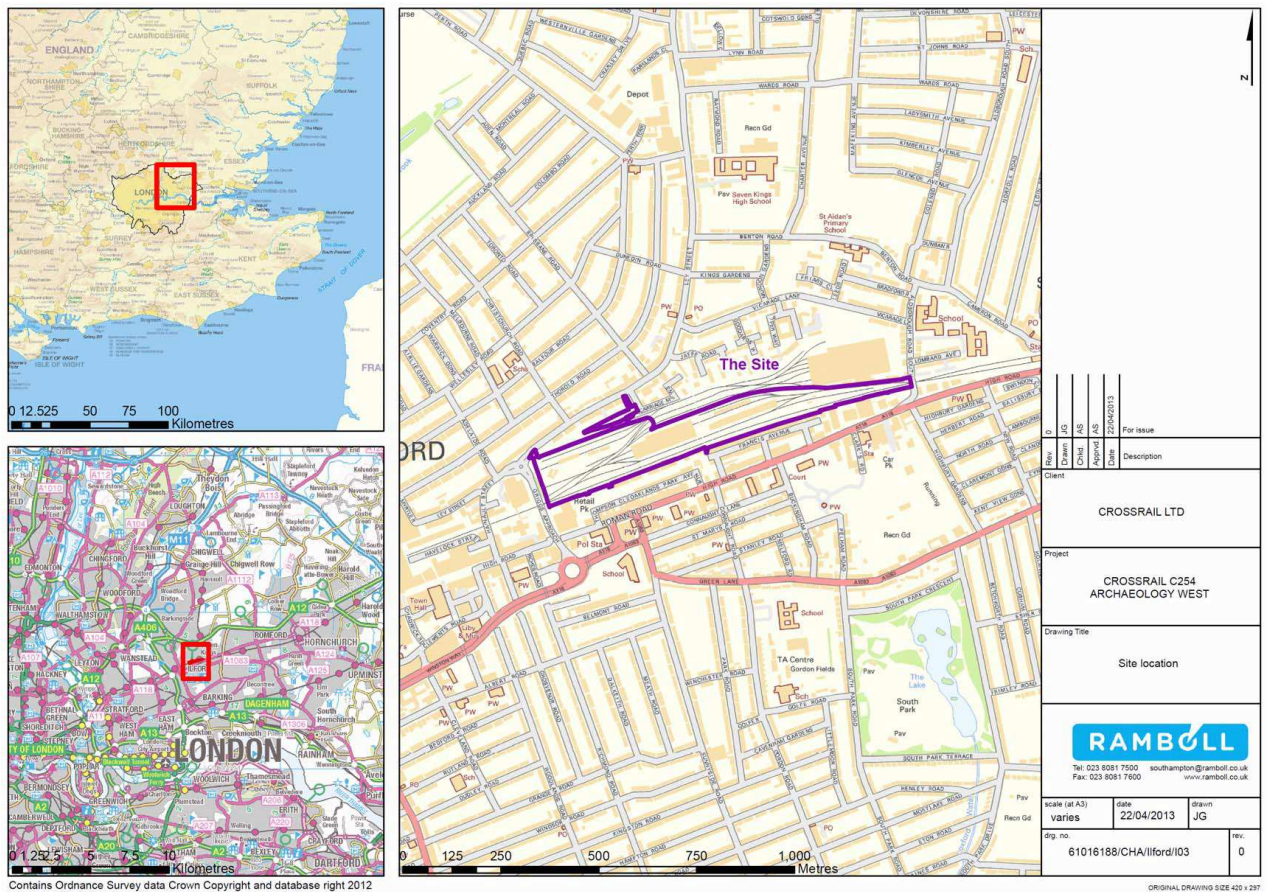


Figure 1 Site location

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd. Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0

- 1.1.2 This report details the results of this fieldwork, which took place intermittently between December 2013 and September 2016, and represents a full Fieldwork Report in line with Section 8F of the Specification for Evaluation and Mitigation (CR-PN\_LWS\_EN\_SP\_0001 (revised as CRL1-XRL-T1-RSP-CRG03-50001 (2012))).
- 1.1.3 The archaeological fieldwork consisted of archaeological trial trench (ATT) evaluations and a general watching brief (GWB) on enabling and construction works, which were carried out as part of the remodelling of the Site as a new maintenance depot and stabling sidings to be used by Bombardier for the care and maintenance of Crossrail's fleet of trains. The Ilford Depot will provide stabling for up to 12 trains from Crossrail rolling stock along the north-east section of the Crossrail network.
- 1.1.4 In summary, on-site works necessitated the demolition of several existing buildings. These included Bombardier Transportation's Training Centre and Stores, Greater Anglia's Training Centre on the Site's western edge, a pre-existing Paint Shop and Workshop B on the Site's north-east corner and a brick-built Shunters Cabin.
- 1.1.5 The construction works included the rearrangement and realignment of permanent way track to provide ten new stabling sidings and two stabling / bypass roads. The project's major works included the construction of a new Paint Shop and Logistics and Stores in the south-western corner of the Site as well as a Crossrail operations and control centre, new accommodation facilities for maintenance staff and train crews, and a new sub-surface electrical substation built in the north-west corner of the Site.
- 1.1.6 As part of the scheme the southern bay of an existing building (Workshop A) was modified to provide new maintenance facilities, with the construction of new below-ground 'swimming pool' type inspection pits and turntables for two rail lines. The work included the construction of a maintenance area for Roads 3, 4 and 5, the extension of Roads 6 and 7 at the east end and the installation of a new corrosion/welding booth.
- 1.1.7 The works included site-wide infrastructure upgrades and utilities connections and provision of traction power throughout via new 25kV Overhead Line Equipment (OHLE). Other new facilities included lighting gantries, new access roads and general landscaping.

## 1.2 Planning Background

- 1.2.1 The overall framework within which the archaeological work took place is set out in the Environmental Minimum Requirements (EMR) for Crossrail (3rd Draft November 2007, see <http://www.crossrail.co.uk/the-railway/getting-approval/parliamentary-Bill/environmentalminimum-requirements-including-crossrail-construction-code>).
- 1.2.2 The requirements being progressed follow the principles of Planning Policy Guidance Note 16 on archaeology and planning (1990), superseded by PPS5 as of 23 March 2010,. Accordingly: "*The nominated undertaker or any contractors were required to implement certain control measures in relation to archaeology before construction work begins*".
- 1.2.3 The strategy for archaeological works is set out in the Crossrail Generic Written Scheme of Investigation (WSI) (CR-PN-LWS-EN-SY-00001 (2009) revised as CR-XRL-T1-GSTCR001-00003 (2012)). The Generic WSI presents the strategy for archaeology design, evaluation, mitigation, analysis, dissemination and archive deposition that were adopted for the design and construction of Crossrail and provides a general statement of objectives, standards, and structure for the planning and implementation of archaeological works.

- 1.2.4 OA/R on behalf of Crossrail produced a specification for the archaeological works. This was set out in a Site-Specific Written Scheme of Investigation (SSWSI-C254-OXF-T1-GMS-CRG03-50007 Rev.2.0-6.0) which sought to identify where the construction activities described above would affect areas of potential archaeological significance. It then specified a series of mitigation measures designed to address the impacts.
- 1.2.5 Subsequent to this OA/R produced an Archaeology Method Statement (AMS - C254-OXF-T1-GMS-CRG03-50008 Rev.4.0). Both documents were approved in advance of the works by Crossrail's Project Archaeologist.

## **2. SITE DESCRIPTION**

### **2.1 Location, Geology and Topography**

- 2.1.1 The Site is located within the historic parish of Great Ilford (formerly Essex), now within the London Borough of Redbridge. It lies c 200m to the east of the historic centre of Ilford, and is centred on National Grid Reference TQ 44506 86889 (Fig. 1).
- 2.1.2 The Ilford Depot lies within a terraced Victorian railway cutting to the north of the London-Norwich Main Line railway and is situated between Ilford and Seven Kings railway stations. It is bounded to the west by Griggs Approach that runs north-south from the junction of Hainault Road and Ley Street to the A118 via a modern railway bridge that crosses the Main Line railway. To the north residential and commercial premises bound the Site on the south side of Ley Street. To the east the Site is bounded by Aldborough Road South.
- 2.1.3 The Site is located 1km to the east of the River Roding, a major north-west to south-east running north Thames tributary, the base of which is filled by alluvium.
- 2.1.4 The Site lies in an area of complex geology where fine-grained deposits of the Ilford Silt Member (termed "brickearth") overly the junction of Hackney and Taplow Gravel terraces, which in turn overly the solid geology of London Clay (British Geological Survey, 1974, Drift Geology, Romford, Sheet 257).
- 2.1.5 The Hackney and Taplow Gravel terraces are representative of former floodplain deposits, and are broadly correlated with the Wolstonian Stage (c 352,000-130,000 BP), the Hackney Gravels (MIS<sup>1</sup> 10-9-8) with the predating the Taplow Gravels (MIS 8-7-6).
- 2.1.6 The Ilford Silt Member deposits were initially believed (Gibbard 1994) to have formed during the moderate climatic conditions of the Ipswichian Interglacial (c 130,000-114,000 BP, MIS 5). However, a recent study of the lithostratigraphic and palaeoenvironmental data from Ilford (Juby 2011) indicated that the Ilford Silt Member deposits are more likely to be correlated with the Corbets Tey Formation (MIS 10-9-8) and therefore the Hackney Gravel terrace. Based on the lithostratigraphic, mollusc, pollen and faunal remains analysed from 19th-century work at the Site (a former quarry called Cauliflower Pit which will be described later), the Ilford Silt Member probably formed during MIS 9 (c 334,000-301,000 BP).

---

<sup>1</sup> Marine Isotope Stage - alternating warm and cool periods in the Earth's palaeoclimate, deduced from oxygen isotope data reflecting changes in temperature derived from data from deep-sea core samples.

- 2.1.7 This interpretation is at odds with some of the information in the model of deposits provided by the C161 Ground Investigation Report (C161-MMD-G-RGN-CR112-50003), which suggests that the Ilford Silt Member, where found within the Site, rests on Taplow Gravel terrace. Although the Ilford Silt Member deposits were found overlying Taplow Gravel terrace to the south-west of the Site (at Uphall Pit), studies by Green (2006) and Jubby (2011) provide strong evidence that the Ilford Silt Member within the Site formed during MIS 9, and should therefore be associated with the Hackney Gravel terrace.
- 2.1.8 This apparent discrepancy may be partially explained by the fact that the topographic difference between the Hackney and Taplow Gravel terraces is not large, due to the Taplow Gravels representing the back edge of the lower (later) terrace and the Hackney Gravels representing the leading edge of the upper (earlier) terrace (Bridgland 1994).
- 2.1.9 The results of intrusive ground investigation work on the Site (C161-MMD-G-RGN-CR112- 50003) indicated significant variations in the ground conditions between the western and eastern parts of the depot, principally due to historic brickearth extraction.
- 2.1.10 During the analysis of the data from the previous ground investigation the SSWSI presented a geological model in order to predict an indicative extent of the Ilford Silt Member within the Site (Fig. 2).



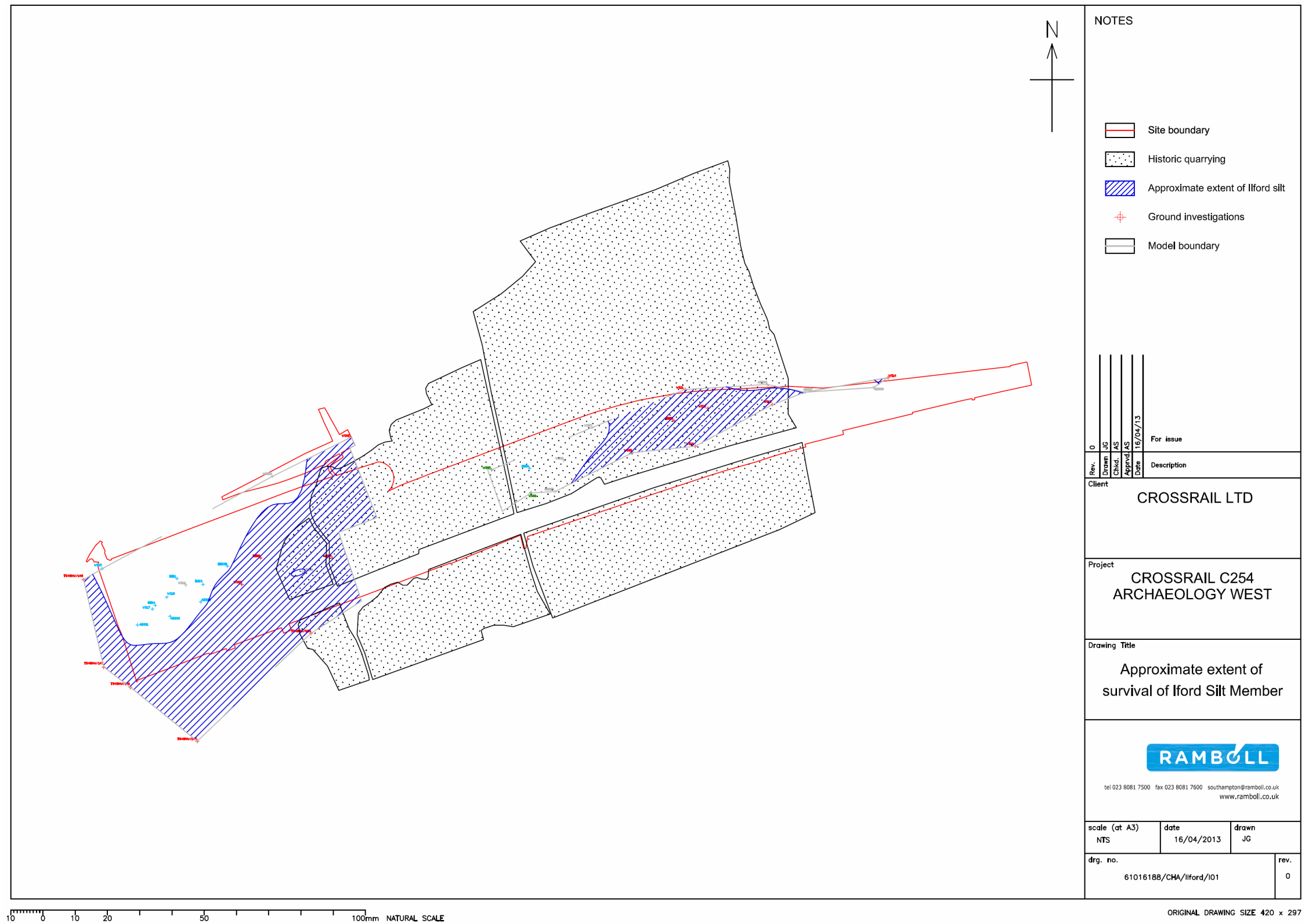


Figure 2 Iford Silts predictive model

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd. Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0



This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd.  
Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0

- 2.1.11 The present topography of the Ilford Depot is generally flat although there is some variation across the Site. In the south the mainline railway enters the Site at 111.20m ATD (above Tunnel Datum where the Tunnel Datum is calculated as being 100m above Ordnance Datum e.g. 1m aOD = 101m ATD) and leaves the Site to the east at 110.45m ATD.
- 2.1.12 Between the Greater Anglia Training Centre and the Main Line, two disused sidings lie at approximately 111.45m ATD. The Training Centre itself lies at c 112.50m ATD (the bund to the south is up to 2m high, peaking at 114.50m ATD). The sidings to the north of the Greater Anglia Training Centre are at c 112.05m ATD at their western end and 111.80m ATD at their eastern end. The builders' yard (Academy Roofing Supplies) fronting on to Ley Street to the north of these sidings lies at approximately 114m ATD. The top of the slope which forms the depot's western boundary is c 113m ATD, whilst to the south of the London-Norwich Main Line railway the southern end of Aldborough Road South lies at 113m ATD.
- 2.1.13 The roads east of Workshop A (Structure 15) and all the sidings to the north lie at 111.70m ATD. The foot of the northern landing of the footbridge crossing the London-Norwich Main Line railway lies at 112.74m ATD.
- 2.1.14 The original topography of the Site has been radically altered by the removal of deposits through quarrying followed by the construction of the Great Eastern Railway depot at the beginning of the 20th century. Further reduction, embankment and earth moving took place in association with subsequent enlargement of the railway depot in the 1920s and 1950s.

## 2.2 Archaeological and Historical Background

### Introduction

- 2.2.1 A summary of the archaeological and historical development of the Site is set out below and draws on the information provided in the documents listed in the SSWSI. For full background to the site reference should be made to the SSWSI.
- 2.2.2 There are no World Heritage Sites, Scheduled Monuments or Registered Battlefields within 1km of the Site. Nor does it lie within a Conservation Area (CA). The closest, Mayfield CA, lies c 780m to the south-east of the Site.
- 2.2.3 Although it is not within one of the London Borough of Redbridge's Archaeological Priority Areas (APA). It does lie immediately to the north of the APA which follows the route of the known Roman road linking *Londinium* (London) with *Camulodunum* (Colchester). Another APA lies within the grounds of the Grade II Listed Valentines Park (List entry 1000843) c 630m to the north-west of the Site.
- 2.2.4 There are no designated buildings within the Site. However, within 1km there are eight Statutorily Listed buildings, of which one, the chapel at Ilford Hospital of St. Mary and St. Thomas of Canterbury, is Grade II\* and seven are Grade II.
- 2.2.5 The Greater London Historic Environment Record (GLHER) contains 59 entries for archaeological sites and find spots within 1km of the Site. However, only two are located within the Site:
- MLO102907 - Palaeolithic artefacts and 19 mammalian fossil remains found during the 19th century in a brickearth pit (Cauliflower Pit)

- MLO63597 - an archaeological evaluation undertaken by the Passmore Edwards Museum in 1992 (site code IG-PS 92). This uncovered evidence for Pleistocene ice-wedges and layers of tufa, but no pre-20th-century archaeological deposits.

2.2.6 None of 36 other archaeological investigations or 'events' in the GLHER lie within the site.

### **Prehistoric (500,000 BC–AD 43)**

2.2.7 Generally, the landscape of the Site and its environs during the prehistoric period would have been dominated by the valley of the River Roding which provided a landscape ideal for hunter-gatherer activity and occupation.

2.2.8 The fossiliferous nature of the brickearths exploited commercially for brick production in the Ilford area in the 19th century was at the time recognised by local amateur collectors and geologists, chiefly by J. Morris and Dr R. P. Cotton, who first undertook the description of stratigraphy and mammalian fossils uncovered in Cauliflower Pit located within the Site.

2.2.9 The exact extent and location of Cauliflower Pit (also known as the Curtis' Pit, Sam's Green or Page's Pit) is not clear. However, the 1864 OS map depicts the central part of the Site as being quarried and is annotated: 'Fossil remains of various large animals found in different parts of this field'. The 1897 OS map also suggests that the quarrying took place to the east, within a field labelled as 'Brick Field', bounded to the north by Cauliflower Lane (now Vicarage Lane) (OA/R 2013b, fig. 7).

2.2.10 Antiquarian records (interpreted by Jubly 2011) indicated that these remains were found at the level where the interface between Ilford Silt and underlying gravels occurs. Excavations in 1957 at nearby 1 Gordon Road appear to confirm this position within the geological sequence.

2.2.11 Over 1600 Pleistocene mammalian fossil bone fragments are known from Ilford, including the skull of the 'Ilford Mammoth' – the largest found in Britain. However, a recent study has identified only 19 bone fragments which can be provenanced to Cauliflower Pit with any certainty (Jubly 2011). These include the remains of *Panthera leo* (lion), *Equus ferus* (wild horse), *Stephanorhinus hemitoechus* (narrow-nosed rhinoceros), *Stephanorhinus kirchbergensis* (Merck's rhinoceros), *Cervus elaphus* (red deer) and undetermined remains of a large bovid, probably *Bos primigenius* (aurochs). Other Pleistocene mammalian fossil remains known from the study area (but not the site) include *Canis lupus* (wolf), *Ursus arctos* (brown bear), *Palaeoloxodon antiquus* (straight-tusked elephant), *Mammuthus primigenius* (woolly mammoth), *Megaloceros giganteus* (giant deer), *Capreolus capreolus* (roe deer) and *Bison priscus* (bison).

2.2.12 The analysis of molluscs recorded from Cauliflower Pit indicates a presence of a slow-flowing river, probably a tributary to the palaeo-Thames. These results are corroborated by the analysis of pollen retrieved from a 1964 borehole located to the east of the Site, in the Seven Kings area of Ilford (TQ 452 871), which revealed an organic horizon beneath the brickearth with abundant freshwater molluscs and plant remains including fruits, seeds and pollen (West 1969; Jubly 2011). The earliest recorded palynological sequence, which could be broadly correlated with MIS 10-9-8 (c 364,000-244,000 BP), confirms open environments were present, with low tree pollen and high levels of grasses and sedges. Marsh and aquatic habitats were well represented, suggesting the presence of a small pond or slowly flowing water.

- 2.2.13 Since the early part of the 20th century, most of the fossil-bearing deposits in the area (for example Cauliflower Pit, London Pit and Uphall Pit) have disappeared under housing. However occasional temporary exposures during trenching or other developments have provided opportunities for the collection of further material, for example to the south of the Site between Green Lane and Ilford High Road (Rolfe 1957).
- 2.2.14 During March 1984, the Natural History Museum in London and the former Passmore Edwards Museum in Stratford conducted a series of excavations before the construction of the Ilford Southern Relief Road (Winston Way). These uncovered the remains of mammoth, giant ox and rhinoceros during construction of the Richmond Road pedestrian subway (TQ 442 865). A series of narrow sand-filled vertical cracks, regularly spaced every 1.2m, were also recorded at the Richmond Road site (Redknap and Currant 1985). A similar polygonal pattern of cracks was recorded in the Ilford brick pits by Victorian collectors and interpreted as ‘suncracks’. Such features have since been interpreted as cryoturbation features which commonly form in permafrost.
- 2.2.15 Few of these faunal remains have been found in association with Palaeolithic artefacts, but scatters of flint implements, mostly hand axes, have been found elsewhere in the Roding valley. Many of these artefactual remains are likely to have been reworked in the River Terrace gravels, or are from the lower part of the brickearth.
- 2.2.16 Only one confirmed Palaeolithic flint tool is known to have originated from Cauliflower Pit. However, many more were described by the Victorian antiquarians Hinton and Johnson (Juby 2011). Approximately 22 Palaeolithic items are known to have been discovered from the part of Cauliflower Pit to the north of the Main Line railway. These include eight Lower Palaeolithic flint bifaces, flint flakes (two of which were retouched), five Lower to Middle Palaeolithic Levallois flakes and one core. All Palaeolithic finds identified in the proximity, or within, Cauliflower Pit were abraded, suggesting that none were *in situ* deposits.
- 2.2.17 A Lower Palaeolithic bifacial handaxe is known from the area of Seven Kings, c 180m to the east of the Site. Another handaxe and a flake were recovered during 19th-century clay extraction at Wanstead Pit in the Buckingham Road Cemetery, c 100m to the south of the site. A broken biface and a core were also found at Station Road, c 670m to the west of the Site (Nixon *et al.* 2003, 43). The presence of these bifaces which are probably Acheulian in date indicates the area had been at least sporadically occupied during the Lower Palaeolithic period (c 2,600,000–300,000 BP).
- 2.2.18 The evidence for flakes of Levalloisian technology, which was first introduced in the latter stages of the Lower Palaeolithic but is most commonly associated with the Neanderthal Moustierian industries, suggests that the occupation of the area continued into the Middle Palaeolithic (c 300,000–30,000 BP).
- 2.2.19 To date, research has not located any evidence of later prehistoric deposits within the immediate vicinity of the Crossrail Ilford worksite. Although several worked flint artefacts dating to this period were recovered at Dudley Road c 720m to the south-west of the Site.
- 2.2.20 No archaeological evidence of the early farming communities of the Neolithic period has been found in the area.

- 2.2.21 Archaeological evidence of Bronze Age activity is relatively poor in this part of London. A single barbed and tanged early Bronze Age arrowhead was discovered nearby, at Windsor Road in 1959 (Nixon *et al.* 2000, 99). Aerial photographs close to Eastern Avenue have shown a field system (Nixon *et al.* 2000, 117). However, this is some way to the north-east of the Site and no evidence of Bronze Age settlement, cultivation or industrial activity has been identified within the immediate vicinity of the Crossrail worksite.
- 2.2.22 The Iron Age is poorly represented in the archaeological record of Greater London and despite the existence of a large (the largest in the region) pre-Roman Iron Age hillfort type enclosure at Uphall Camp, the Borough of Redbridge and the town of Ilford is no exception.
- 2.2.23 Uphall Camp, which is situated adjacent to the historically navigable River Roding some 1.2km to the south of the Crossrail route, was a substantial settlement. A number of structures, including roundhouses, post-built granaries, stock compounds and smaller rectangular sleeper-beam sheds were excavated within the Uphall site. This has been interpreted as a possible *Oppidum* which acted as an important political and mercantile centre for much of the lower and middle Thames valley (Greenwood 1989, 94-101; Nixon *et al.* 2000, 107, 117; Crossrail 2005).
- 2.2.24 No evidence of Iron Age activity has been identified within the Site. However, traces of an Iron Age settlement, including a boundary ditch enclosing at least two structures with postholes, slots and pits, has been found at Goodmayes Hospital to the east of the site.

#### **Roman (AD 43–c 410)**

- 2.2.25 The Site is located close to the Roman Road from London to *Camulodunum* (Colchester), now shadowed by Ilford High Road. A probable inhumation and cremation cemetery was found in the 18th-century in Valentines Park, some 1km to the north of the Site. To the south of the Site the occupation of Uphall Camp continued into the Roman period with an enclosure, field boundaries and a possible cremation. Excavations at St Mary's Church, Little Ilford produced some Roman material redeposited in later contexts, and Roman tile or brick can be seen incorporated into the structure of the church itself. This may imply that a Roman farm or larger villa estate once stood in the area. However, no evidence has yet emerged of Romano-British settlement or cultivation on or close to the Site.

#### **Early medieval to medieval (AD 410-1550)**

- 2.2.26 Much of the area east of Stratford and north of the old Roman road to Colchester was a royal hunting forest from the later part of the Anglo-Saxon period. The principal late Anglo-Saxon and medieval settlements in the area were along the main road, generally where it crossed rivers, with forest and heath to the north and more agricultural land to the south.
- 2.2.27 The forest had two forests gates, Forest Gate in the west and Marks Gate in the east. In the east lay the settlement at Ilford, on the old Roman road beside the River Roding. Originally the settlement was on the west side of the river valley at Little Ilford (now Manor Park).
- 2.2.28 The early medieval village of Ilford is first recorded in Domesday Book as *Ilfort* which in Old English means '*ford over the Hyle*'. Hyle, which means 'trickling stream', was the historic name for the River Roding.

- 2.2.29 Domesday notes that the hamlet covered 133 hectares requiring two plough teams and had a population of 10 households. It had woodland for 20 swine and 20 acres (8 hectares) of meadow.
- 2.2.30 The evidence for medieval occupation appears to be concentrated to the west of the Site, where the road to Colchester crossed the River Roding. The first evidence for a bridge in Ilford dates to 1321. One of the earliest documentary sources for the medieval development of Ilford refers to the foundation of the Ilford leper Hospital of St Mary and St Thomas of Canterbury in c 1140 by Adelicia, Abbess of Barking. Later, it became a hospice for aged and infirm men. It was initially built for the accommodation of a prior, a warden, two priests and thirteen lepers and was endowed with 120 acres of forest land, a mill and tithes of all the mills in Barking. The 1959-1960 excavations in the forecourt of the hospital and a 2005 evaluation revealed the remains of a cemetery used continuously from the medieval to post-medieval period (Nixon *et al.* 2000, 249).
- 2.2.31 To the east of the Site lay the medieval village of Seven Kings, first referred to in 1285 as *Sevekyngg* or *Sevekyngges*, meaning 'settlement of the family or followers of a man called Seafoca'.

#### **Post-medieval (AD 1550-1800)**

- 2.2.32 During the post-medieval period Ilford remained a small rural settlement straddling the ancient road from London to Colchester which from 1721 was controlled and maintained by the Middlesex and Essex Turnpike Trust. The River Roding was made navigable for barges as far as Ilford Bridge from 1737.
- 2.2.33 Until the arrival of the railways, the area remained largely rural, with scattered villages, estates and country houses, often the homes of wealthy London merchants. In present day Valentines Park, Valentine Mansion was built in 1696 by Lady Tillotson the widow of the Archbishop of Canterbury, whilst Ilford Lodge stood to the northwest of the Site.

#### **Modern (AD 1800-present)**

- 2.2.34 The 19th century saw a gradual expansion of Ilford, which brought brickworks, cement works, and coal yards to service the new buildings, these were largely centred on the River Roding.
- 2.2.35 In 1801 the population of Ilford was 1724 and by 1841 it had grown to 3742 inhabitants.
- 2.2.36 In 1839 a railway station was opened at Ilford on the East Counties Railway line from Romford to Mile End. After the construction of the railways, the character of the town changed. Early businesses gave way to new industries, such as paper making, and services such as steam laundries and collar making to provide for the new commuting class created by the railway.
- 2.2.37 A map drawn in 1835 just prior to the construction of the railway shows the Eastern Counties Railway proposal route (O/R 2013b, fig. 6). On this map the Site was covered in large enclosed fields, as was most of the surrounding area, with a small cluster of buildings to the north of the Site at Sam's Green. The present-day Ley Street and Hainault Street were already in place. The tithe map of the Parish of Barking of 1846 shows more or less the same situation (O/R 2013b, fig. 7).

- 2.2.38 Several major businesses were founded in the town in the 19th century, including the photographic film and chemicals manufacturer Ilford Photo, founded in Cranbrooke Road in 1879 as the Britannia Works by Alfred H. Harman (Ilford Photo moved from Ilford to Cheshire in 1983).
- 2.2.39 Despite the Victorian development of Ilford, a study of the historic maps indicates that the area covered by the Site comprised open fields and clay pits well into the late 19th century. The 1846-1875 1st edition OS map (OA/R 2013b, fig. 8) showed the twin-track Great Eastern Railway set within the cutting of its predecessor, the East Counties Railway (ECR, 1839-1862). The cutting intersected open fields, field boundaries and the remains of brickearth quarries. Groups of cottages lined the northern side of the London to Colchester road and to the north of the Site terraced villas had appeared beside Ley Street. Where Ley Street veered to the north-east and formed a junction with Cauliflower Lane a building, possibly a farm, labelled Sams Green was also shown. Cauliflower Lane was undeveloped and at the east of the Site and formed a junction with a north-south aligned lane which met the London Road by Cauliflower Cottage. This lane passed over the railway on Cauliflower Bridge. At this time a north-south aligned lane occupied the western part of the Site. Ley Street Cottages lined its western edge and its southern end was formed by an unnamed building. This building was joined to the quarry by a lane and so was possibly part of the brickworks.
- 2.2.40 Cauliflower Pit was still in operation in the late 1890s, long after the other Ilford pits, including Uphall (TQ 4371 8609), Clements Estate (TQ 438 861) and London Road (TQ 450 867), had closed.
- 2.2.41 When the 1897 OS map (not shown here) was surveyed the layout of the Site had changed little, although Leystreet Cottages, their lane and the brickworks had disappeared since the 1875-1882 OS maps were published. However, the railway cutting had been enlarged to accommodate siding to the north and to the south of the Main Line, with ancillary sidings feeding further south to service a goods yard and goods shed (Structure 1 on Fig. 3). A further short spur to the south led to a cattle pen (Structure 3 on Fig. 3) (these are all outside the site boundary or within the main line corridor). A junction on the north side of the Main Line (the up line) is also shown on the 1897 map. This appears to be the start of the coal depot and stabling facilities that later developed to the north of the Main Line (and became the Ilford Depot). A short footbridge (Structure 2 on Fig. 3) spanning the railway corridor had been constructed to provide a link between Sam's Green and the High Road to the south. Both the sidings and footbridge are shown on a photograph taken on 11 May 1911 (OA/R 2013b, fig. 9). By this time the parts of the brickearth quarry to the south of the railway appears to have fallen out of use. However, it is unclear if the northern part of the clay pit had had been abandoned as well, although given that the Leystreet works had disappeared, it is likely that this part of the quarry had also fallen out of use.



- 2.2.42 The Ordnance Survey map of 1919 (OA/R 2013b, fig. 10) shows that the area around the Site had become further built up, perhaps a consequence of the increased rail connections associated with the opening of the Fairlop Loop in April 1903, which was designed by Great Eastern Railway to foster suburban growth in Edwardian Ilford and Chigwell. The Loop's southernmost triangular junction, named Seven Kings Curve, was located in the eastern part of the Site. The northwest part of the Site, hitherto gardens or fields, had by this time developed into an extensive stabling yard made up of nine sidings. A further set of sidings to the north of the stabling yard served the newly built coal depot (Structure 10 on Fig. 3). The vehicular entrance to the coal depot was situated at the northwest corner of the yard. A rectangular three-road engine shed (Structure 7 on Fig. 3) associated well (Structure 8 on Fig. 3) and a rectangular water tower (Structure 9 on Fig. 3) stood to the east of the coal depot, all being to the west of the footbridge which had been extended northwards (Structure 5 Fig. 3) to span the increased number of tracks.
- 2.2.43 The area between the engine shed and the triangular junction was occupied by allotment gardens located within an irregular depression on an aerial photograph, dated 18 May 1932, shown in the SWSI. The triangular junction can be clearly seen in the upper right corner with the allotment gardens in the background (OA/R 2003, fig. 11; English Heritage ref. EPW037930). The depression lay in an area of the former 'Brick Field' shown on the 1897 OS map and probably originated as the clay pit, although no such depression had been represented on earlier maps in this location. Alternatively, the depression may have been the result of a cut and fill exercise associated with the construction of the new railway junction, stabling yard and the coal depot. In 1923, London and North Eastern Railway (LNER) appropriated the Site.
- 2.2.44 As suggested by the 1939 OS map (not shown here), beyond small extensions to the engine shed (Structure 12 on Fig. 3) the change of ownership had little impact on the layout of the depot. More land within and to the east of the triangular junction had been appropriated as allotment gardens, presumably as a consequence of the national campaign to reduce the pressure on the food supply.
- 2.2.45 A complex of engineering and printing works located to the north of the Site had appeared by the outbreak of the Second World War, and these suffered bomb damage during the Blitz. The engine shed (Structure 12 on Fig. 3) was destroyed by a high-explosive bomb between 7 October 1940 and 6 June 1941. The main railway, stabling sidings and the goods depot (Structure 11 on Fig. 3) also suffered direct hits. Ground investigations within the Site recorded significant magnetometer readings. Indicative of unexploded ordnance in the area to the south (BH3) and to the north (WS1) of the coal yard, and in the south-west corner of the triangular junction (WS13) (C161-MMD-G-RGNCR112- 50003).
- 2.2.46 In 1948 the railways were nationalised to form British Railways (which later traded as 'British Rail') and the depot became part of the Great Eastern Mainline. This change of ownership was manifested in the new layout of the Site which was dominated by a new engine repair shed (Structure 15 on Fig. 3). A new carriage cleaning shed (Structure 16 Fig. 3) and a new washing plant (Structure 17 on Fig. 3).
- 2.2.47 Passenger services through the Fairlop Loop were closed on 19 March 1956 and the triangular junction of the Seven Kings Curve was dismantled ahead of the expansion of Ilford Carriage sheds in 1959.

- 2.2.48 The Essex Record Office holds a plan from 1953 entitled the British Rail Ilford Electric Maintenance Unit (EMU) (OA/R 2013b, Fig. 11). This shows the depot in detail, and the layout is not a great deal different from the present layout. In the north-west corner lay the coal yard, which sat in a cutting marked by hachures. The road entrance was to the north-west, which led into the coal stacking area. To the north were three main sidings, the northern one with loops and spurs and to the south one further line, with two sidings in the middle. To the south of the coal yard was a long, rectangular strip of allotments, and to the south of this another cutting which had several sidings and a junction onto the main line. The northern edge of this cutting housed several store buildings (Structures 31 and 32 on Fig. 3) and two buried air raid shelters (Structures 39 and 40 on Fig. 3).
- 2.2.49 The coal yard and sidings to the south joined to the east, where there was a fire station (Structure 30 on Fig. 3) built on the location of an earlier garage (Structure 19 on Fig. 3) and cycle sheds (Structure 20 on Fig. 3). Further to the east the northern part of the site housed a 12-road siding, and to the south of this was a large rectangular carriage repair shed (Structure 15, now Workshop A on Fig. 3), with a set of steps wrapped around the southern side. A car park (this was not large, there being little requirement for car parking in these early post-war years) was situated on the higher ground to the north above the cutting. To the east of Structure 15 the footbridge (labelled Footbridge No. B1, Structure 14 on Fig. 3) is shown in detail, as are various huts, points levers and the like. To the east of this again the cleaning shed (Structure 16 on Fig. 3) with ancillary structures is marked. By the time of the 1963 OS map (not shown) the layout of the Site is confirmed as that which is recognisable today (and is little changed from the 1953 map). The allotments are still shown in the central strip of the western part of the Site, and the two long, thin rectangular stores buildings lining the south-east part of this strip are still shown. The throat of this strip still housed the fire station and cycle sheds. The well is no longer shown. The southern goods depot, coal store and cattle pen also remain. A second, much larger rectangular carriage repair shed (Structure 43 on Fig. 3) had been built in the area formerly occupied by the triangular junction in the eastern part of the site. A water tower (Structure 45 on Fig. 3) had been added to the south-east corner of the Site.
- 2.2.50 Development after the 1963 OS map included the Greater Anglia Training Centre, constructed at some point between 1977 and 1990, in the former allotments. The goods shed, coal store, cattle dock and their associated sidings that were situated to the south of the main line, were swept away. A wheel lathe building to the north of the former allotments was added as was a paint shop to the north.
- 2.2.51 The buildings, structures and elements of infrastructure discussed in the preceding sections are listed here, each being given a Structure Number and dates when they are either known to have been constructed and demolished or as they first appear on cartographic sources. A level of significance is given to each entry. This is based upon a system developed by Ramboll for Environmental Impact Assessment, which draws on guidance provided by DCMS, English Heritage, the Department for Transport, and the Department of Arts, Heritage and the Gaeltacht in Ireland, amongst others. The gazetteer may be revised in the light of new information becoming available.
- 2.2.52 Very few buildings or structures of historic interest survived on the Site. However, of immediate notice when visiting the depot was the surface treatment of the entrance in the north-west corner of the Site (beside the roundabout on Ley Street), which leads south into the Site before turning east and running to the south of the northernmost two roads. This road (Structure 10 on Fig. 3) formerly provided access to the coal stacking area. The road is formed from granite setts.

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd.  
Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0

- 2.2.53 The earliest known date for the footbridge (Structure 14 on Fig. 3) that now straddles the entire site is 1897. This was lengthened on several occasions, most recently in the years between World War II and 1953. Neither asset is affected by the development proposals shown on drawing C161-MMD-T-DDACR112\_SD007\_1-40001.
- 2.2.54 All other buildings and structures appear to be post-war. Workshops A and B (Structures 15 and 16 on Fig. 3) both appear on 1948 and 1953 British Railways plans. All other buildings are more recent and are of functional design and construction.

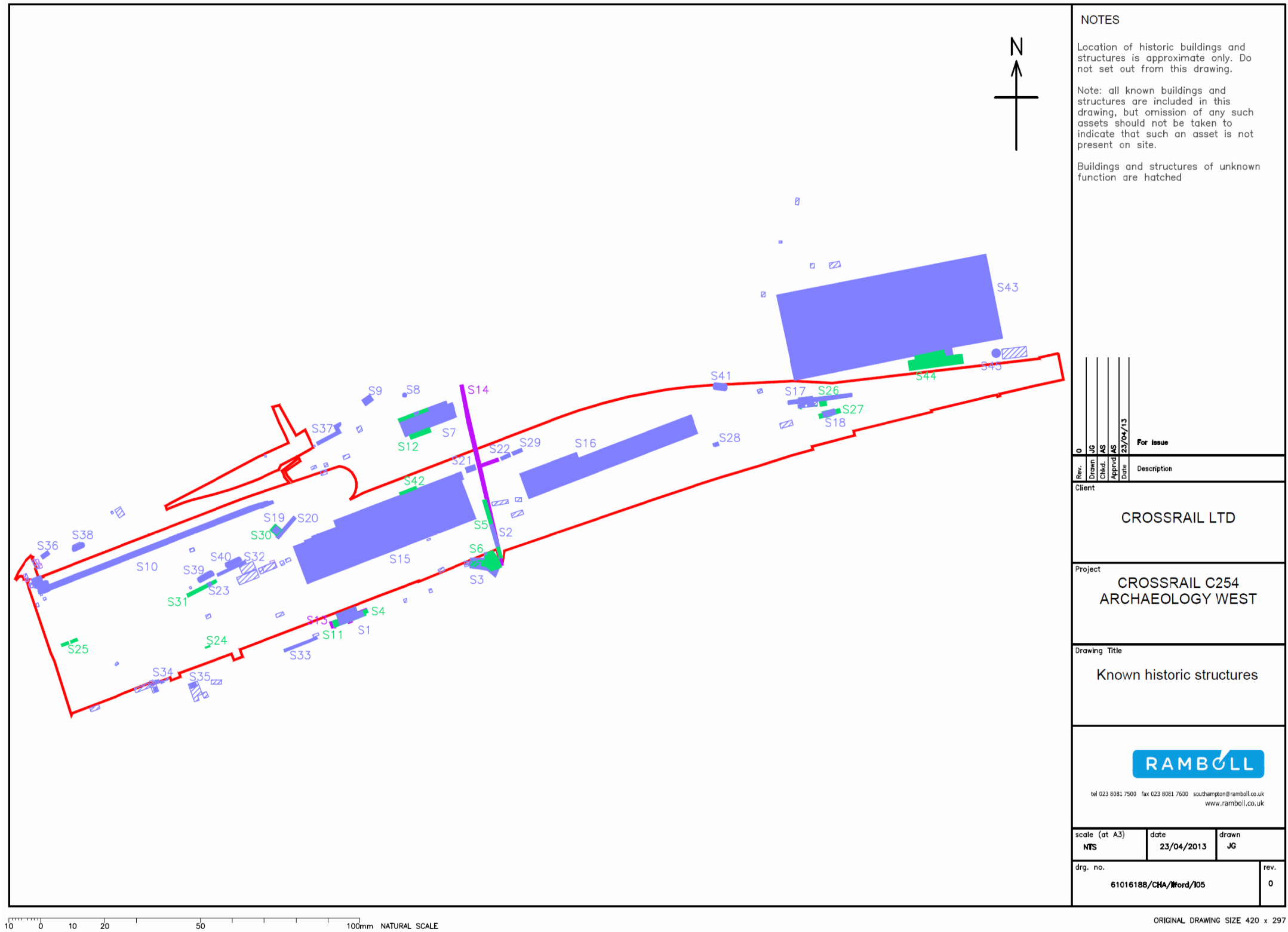


Figure 3 Location of historic buildings and structures

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd.  
Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd.  
Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0

Table 1: Gazetteer of historic buildings

<b>Structure Number</b>	<b>Description</b>	<b>Earliest known date</b>
1	Goods shed	1897
2	Footbridge	1897
3	Cattle pen	1897
4	Goods shed extension	1919
5	Footbridge extension	1919
6	Cattle pen rebuild	1919
7	Engine shed	1919
8	Circular well	1919
9	Water tower	1919
10	Cobbled surface associated with coal depot	1919?
11	Goods shed extension	1939
12	Engine shed extension	1939
13	Goods shed extension	1948
14	Footbridge enlargement	1948
15	Engine repair shed	1948
16	Carriage cleaning shed	1948
17	Washing plant	1948
18	Signal box	1948
19	Garage	1948
20	Cycle shed	1948
21	Sand dryer and substation	1948
22	Lengthman's hut	1948
23	Shunters' hut	1948
24	Fog hut	1948
25	Petrol tanks	1948
26	Washing plant extension	1953
27	Signal box extension	1953
28	Permanent way hut	1953
29	Permanent way hut	1953
30	Fire station	1953
31	Store	1953
32	Store	1953

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd. Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0

33	Coach canteen	1953
34	Shunters' cabins	1953
35	Store	1953
36	Charrington's coal office	1953
37	Cycle shed	1953
38	Air raid shelter	1953
39	Air raid shelter	1953
40	Air raid shelter	1953
41	Air raid shelter	1953
42	Air raid shelter	1953
43	Workshop A platform extension	1963
44	Carriage repair shed	
45	Office block	1963
46	Water tower	1963

### 3. RESEARCH AIMS AND OBJECTIVES

3.1.1 The overall objective of the investigations was to establish the character, nature and date of potential archaeological remains that could or would be impacted by the development.

3.1.2 Selected research themes derived from the Regional Research Aims outlined in; *A Research Framework for London Archaeology 2002* (Nixon *et al.* 2003) were included in the Assessment of Archaeology Impacts Technical Report, Part 2 (Crossrail 2005), and the SSWSI (Crossrail 2011). The below-ground archaeological remains predicted to survive on the Site were seen to have the potential to contribute to the following research themes:

- *Confirm if possible the presence, and assess the extent of, survival of Palaeolithic archaeological, faunal and palaeoenvironmental remains associated with the Ilford Silt Member and gravel terraces within the site;*
- *Confirm if possible the absolute dating of the sequence of geological deposits within the site through the use of OSL and radiocarbon dating;*
- *Further our understanding of the gravel terrace sequence in Ilford, in particular the relationship between the Taplow and Hackney gravels;*
- *Confirm the presence/absence of any Mesolithic, Neolithic, Bronze Age and Iron Age activity within the site;*
- *Confirm the presence/absence of Roman activity associated with the Roman road to Colchester located to the south of the site;*
- *Assess the character of the medieval activity within the site and its relationship with medieval settlements to the west and east of the site;*
- *Assess and record the nature and extent of post-medieval and early modern field boundaries and quarrying in relation to the layout recorded by historic maps;*

- *Assess and record the levels of truncation of surface deposits resulting from the development of the Great Eastern Railway and the Ilford Depot;*
- *Assess and record any evidence for built heritage assets associated with the development of the Ilford Depot. These are taken to include the site's workshops, coal depot, huts, stores, earlier track and siding layouts and also the remains of any associated railway infrastructure; and*
- *Assess and record any remains of WWII air raid shelters within the site.*

## **4. METHODOLOGY**

### **4.1 Methodological Standards**

4.1.1 All works were undertaken, and the preparation of this report was carried out in accordance a Site Specific Written Scheme of Investigation (SSWSI - C254-OXF-T1-GMS-CRG03-50002 Rev.2.0-6.0) and the subsequent Archaeology Method Statement (AMS - C254-OXF-T1-GMS-CRG03-0004 Rev.5.0), which was submitted to and approved by Crossrail Project Archaeologist before the commencement of the works.

4.1.2 It was also carried out in accordance with OA best practice and accepted professional standards and as outlined in:

- Crossrail Archaeological Generic Written Scheme of Investigation (CR-PN-LWS-EN-SY-00001, 7 July 2009 (AWSI); revised as CR-XRL-T1-GSTCR001-00003 (2012)
- Crossrail Archaeology Specification for Evaluation and Mitigation (including Watching Brief), Document No: CR-PN-LWS-EN-SP-00001, 26 June 2009, (ASEM); (revised as CRL1 XRL-T1-RSP-CRG03-50001 (2012))
- Institute for Archaeologists – Standard and Guidance for archaeological excavation, 2008 (revised);
- Institute for Archaeologists – Standard and Guidance for an archaeological watching brief, 2008 (revised);
- Museum of London collections and archive policies and guidance;
- English Heritage – Geoarchaeology, 2007;
- English Heritage - Archaeological Science at PPG16 interventions: Best Practice Guidance for Curators and Commissioning Archaeologists, 2003;
- GLAAS Archaeological Guidance Papers 1999;
- Corporation of London archaeology guidance – Planning Advice Note 3, 2004;
- Museum of London Archaeology Service site recording manual (MOLA 1994);
- OA Fieldwork Manual 1992.



## 4.2 Fieldwork Techniques

4.2.1 The archaeological fieldwork conducted by OA/R consisted of the two following elements.

- A general watching brief during groundworks associated with landscaping and car parking provision; the construction of sidings and associated infrastructure within the Crossrail stabling area and Workshop A; the construction of a substation and below ground service diversions; and attenuation tanks and installations (as appropriate). Additionally, a general watching brief was required during ground investigation works and piling operations (if appropriate)
- A combined geoarchaeological and archaeological trial trench evaluation centred on areas of the Site where construction impacts coincide with the predicted survival of Ilford Silt Member and/or historic structures

## 4.3 Watching Brief

4.3.1 A watching brief, as defined in the generic WSI, is a programme of archaeological monitoring (that is observation, investigation and recording) which is carried out by a suitably qualified archaeologist during site investigations and construction works.

4.3.2 The purpose of a watching brief is to identify the potential as far as is reasonably practicable. The watching brief results in the preparation of an ordered archive which will be incorporated into the post-excavation works and into the publication of the project results.

4.3.3 The following observations were recorded daily:

- The event code and location of the area observed
- The date of the observation
- Personnel employed on site
- A description of the construction works observed
- Any relevant works sub-contractor and personnel undertaking and supervising the construction activity
- Depths and extents of excavation works observed of any archaeological remains that are uncovered during the works and record them appropriately
- A measure of confidence that any archaeological remains would have been observed and reasons
- The areas and horizons (both those containing archaeological or remains of quaternary geological importance and those which do not) unaffected by construction activity (with special reference to archaeological sites identified for preservation in situ)
- The reasons why any particular area of the works was not observed, and noting those areas not subject to disturbance from construction
- Location and description of any archaeological remains
- Location and description of any modern remains

## **4.4 Targeted Archaeological Trial Trench Excavation**

- 4.4.1 Archaeological mitigation in the form of trial trench evaluation by OA/R, with enablement by the Principal Contractor, was required across the Site. The location of the archaeological trial trenches is shown in Figure 4.
- 4.4.2 The archaeological trial trenches were designed to test the geological model shown on Figure 3, and to assess the level of survival (if any) of the Ilford Silt Member in the areas where construction impact was likely. In addition to these geoarchaeological aims, a number of the trenches were positioned to evaluate the level of survival of historic assets identified in the gazetteer.
- 4.4.3 The trial trenches were excavated to the base of archaeological remains. Machine excavation ceased at the level where archaeological or palaeoenvironmental levels were reached at which point hand excavation and the sampling of geoarchaeological deposits for scientific purposes commenced.
- 4.4.4 Health and safety considerations were of paramount importance in conducting all fieldwork. Safe working practices always overrode archaeological considerations. When it was considered necessary to excavate deeper than 1m the trenches were stepped to allow safe access up to 2m depth below current ground level.
- 4.4.5 The trenches were excavated under continuous archaeological supervision using a 7.5 or 12 ton 360° excavator equipped with a toothless machine bucket. The machine and its operation including; breaking out, banking, all temporary works and any hand investigation required to address below ground hazards were the responsibility of the Principal Contractor.
- 4.4.6 The machine reduced the ground level progressively, in spits of 200mm to 500mm (dependent on specific site conditions). OA/R personnel used their professional judgement to determine the appropriate depth of each spit and advised the Principal Contractor accordingly. However, in general the trial trenches were excavated to the base of potential faunal-bearing deposits, which on this site are assumed to be at the interface between the Ilford Silt Member and Gravels. Each spit was examined carefully to assist the recovery of any archaeologically significant artefacts and thus to determine when to cease machining. All spoil and upcast from the excavations were scanned visually for artefacts and ecofacts.
- 4.4.7 Machine excavation ceased at the level where archaeological levels were reached, at which point hand excavation commenced. All revealed deposits and features were investigated by hand.

## **4.5 Recording**

- 4.5.1 All observations were undertaken against a unique Event Site Code (XTL13). A continuous unique numbering system was used.
- 4.5.2 All archaeological deposits and features were recorded by means of Oxford Archaeology (OA) pro-forma recording sheets.
- 4.5.3 OA/R supervised the excavation of each trial trench in such a manner as to allow a cumulative or continuous section to be recorded. Planning and section drawing of appropriate structures, single contexts and features were undertaken at a variety of scales. Usually at 1:20 scale for plans and 1:10 scale for sections.
- 4.5.4 Section drawings were located on the relevant plan and both London Grid and OS coordinates recorded.

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd.  
Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0

- 4.5.5 A record of the full extent in plan of all archaeological structures and deposits as revealed in the investigation was made; these plans were on polyester-based drawing film. Single context recording was as used as appropriate.
- 4.5.6 A 'Harris matrix' stratification diagram was employed to record stratigraphic relationships. This record was compiled and fully checked during the excavations.
- 4.5.7 The photographic record consisting of monochrome prints/negatives and digital imagery and included photographs of archaeological features and structures, as well as record photographs taken to illustrate work in progress.
- 4.5.8 Upon the completion of the archaeological work and with the agreement of the Crossrail Principle Archaeologist, the trenches were backfilled and levelled with the excavated material in the approximate order in which it was excavated.

## **4.6 Survey**

- 4.6.1 The aim of the methodology was to provide comprehensive survey cover of the investigation area. It provided scaled digital data of all required elements of the project and located them within London Survey Grid Standard and Ordnance Survey grid and height systems.
- 4.6.2 It also maintained all necessary survey data and it has been ensured that the relevant information was copied into the primary record, to ensure the integrity of the project archive. Furthermore, it ensured that all core data was securely stored and backed up. It established accurate project reference systems that utilised a series of control stations and permanent base lines. It also allowed archaeological information to be shared with other members of the project team and for the accurate and timely submission of the relevant deliverables/reports.
- 4.6.3 The relevant procedures set out in Crossrail document CR-PN-LWS-EN-SP-00001, in particular Sections 8C and 8E, were followed.

### **Archaeological trial trenches**

- 4.6.4 All archaeological trial trench setting out was undertaken by the Principle Contractors' site engineers, in accordance with the setting out co-ordinates supplied by the Project Archaeologist. The set outs were conducted using an approved and calibrated Total Station Theodolite or other suitable automated equipment referenced from approved Crossrail Permanent Ground Marker (PGM) data and in accordance with the London Survey Grid Standard (formerly Crossrail Survey Grid, see Crossrail standard CR-SATD-010).
- 4.6.5 The positions of the trenches were verified by the O/A/R on-site archaeologist through discussion and observation. In this way, it was possible to ensure that all trench or excavation limits and significant archaeology detail were surveyed 'as dug', before leaving the site. A repetition of surveying the interventions was deemed redundant. This meant that the management of raw survey data was not necessary.

### **Watching brief**

- 4.6.6 As befits a general watching brief, the nature of the works was entirely observational. All setting out and required interventions, i.e. the drainage and foundation trenches, were under the control of the Volker Fitzpatrick approved surveyor.

- 4.6.7 The location, position and depth of the interventions were predetermined and in accordance with various approved design drawings. Where data were required this was surveyed and supplied by the principal contractor, adhering to the client specifications.
- 4.6.8 The location, position and depth of the interventions was predetermined and in accordance with the current design drawings (Document Ref C815-VLK-D-DDA-CRT00\_MS002-50001, (Drawing number NK016564\_0300 (Nov 2010))).
- 4.6.9 The set outs were usually conducted using a Total Station Theodolite (TST) or other suitable automated equipment referenced from approved Crossrail Permanent Ground Marker (PGM) data.
- 4.6.10 Any archaeological drawing points and baselines were surveyed in by the on-site surveyor. In this instance the survey was done using approved and calibrated equipment.
- 4.6.11 Where survey was not possible, significant features were measured and drawn onto reproduced Crossrail issued scaled drawings, with integral Ordnance Survey references. A comprehensive digital site plan was provided by the contractor for use by OA/R. This showed all structural features in the area, including present buildings and site limits.
- 4.6.12 Excavated archaeological interventions and areas of complex stratigraphy were hand-drawn. At least two drawing points (DPs) were set in as a baseline and measurements taken off this by tape and offset. The hand drawn plans were referenced to the digitally captured pre-site plan by measuring in the DPs with a TST or GPS. These hand-drawn elements were then scanned in, geo-referenced using the DPs as reference points, and digitised following OA's digitising protocols. For further details on hand planning procedure please refer to the fieldwork guidelines.
- 4.6.13 Surface heights were recorded and related to PGMs (Permanent Ground Marker) or approved Ordnance Survey Bench Marks (OSBM) where reasonably accessible. Levelling accuracy between OSBMs/PGMs and site Temporary Bench Marks (TBMs) were within 10 mm/k: where 'k' is, the total distance levelled in kilometres. All drawings have been composed of closed polygons, polylines or points in accordance with the requirements of GIS construction and OA

#### **Data capture and curation**

- 4.6.14 In all instances, CAD work has, and will, follow the guidelines set out in Crossrail's CAD Standards (CR-STD-005 CAD Standards v2) and Crossrail's Archaeology Specification for Evaluation and Mitigation (including Watching Brief) (Document CR-PN-LWS-EN-SP-00001). Two main drawings are maintained: one consists of the compiled survey data, digitised features and raster images in the Crossrail co-ordinates system. The other has the same information but has been inserted to a certified Ordnance Survey mapping system and uses the OS co-ordinates. This second drawing will be a requirement for archiving in London.

- 4.6.15 All drawings are composed of closed polygons, polylines or points in accordance with the requirements of GIS construction and OA Geomatics protocols. The aim of the GIS/CAD work is to produce workable draft plans that can be produced as stand-alone products, or can be readily converted to GIS format. Subsequent data and plans will be added to the main drawing as it develops.
- 4.6.16 All plan scans have been numbered as per their plan Site number. Digital plans will be given a standard new plan number from the Site plan index at the time of archiving.
- 4.6.17 All digital data were backed up incrementally on CD or DVD.
- 4.6.18 Each CAD drawing contained an information layout, which included all the relevant details appertaining to that drawing. Information (metadata) on all other digital files were created and stored as appropriate.
- 4.6.19 At the end of the survey, all raw measurements were made available as hard copy for archiving purposes.

## **4.7 Finds**

- 4.7.1 Any artefacts recovered during the archaeological work are the property of Crossrail Ltd. Arrangements were made via the Crossrail Principle Archaeologist to organise legal deposition with the receiving museum or appropriate heritage body.
- 4.7.2 All artefacts recovered from hand-excavated contexts were retained unless they were of recent origin. In these cases, sufficient quantities of the material was usually retained to validate the date and establish the function of the deposit from which the finds have been recovered.
- 4.7.3 Finds retrieval policies of the Museum of London was adopted. Some categories of finds of limited intrinsic interest may be sampled and recorded on site where their retention was not considered to contribute to the archaeological aims and objectives (e.g. burnt stone or undifferentiated post-medieval tile fragments). Exact retention and disposal policies, as specified by the Museum of London, was set out in subsequent revisions of this method statement.
- 4.7.4 Unstratified objects from modern made ground or other modern deposits were not normally retained except where they were collected for a specific purpose or were of intrinsic interest either in their own right or in contributing to an understanding of the Site.
- 4.7.5 Recovery was normally by hand, except where bulk samples were taken for other purposes or for special recovery of small items. Where possible all upcast/spoil was scanned by hand and any finds retrieved.
- 4.7.6 All finds and samples were treated in an appropriate manner and to standards agreed in advance with the Museum of London.
- 4.7.7 Artefacts collected during the excavation were identified by context. The artefacts were exposed, lifted, cleaned, stabilised, marked, bagged and boxed in appropriate materials and conditions to ensure that no deterioration occurred.

- 4.7.8 All artefact/ecofact processing/storage was carried out in accordance with UKIC (United Kingdom Institute for Conservation) Archaeology Section Guidelines for the Preparation and Storage of Excavation Archives for long-term Storage (1990). As well as the Standards and Guidelines for the collection, documentation, conservation and research of archaeological materials (Institute for Archaeologists 2001), and any specific guidelines provided by the recipient organisation identified as the repository for the above.

## **4.8 Archaeological Science**

- 4.8.1 The archaeological science methods, including the strategy for sampling archaeological and environmental deposits, geoarchaeological recording of sediment sequences, soil micromorphology and scientific dating were developed in consultation with OA's environmental and geoarchaeology managers and were set out in the AMS (OA/R 2014). In all cases, the archaeological science methods followed the specifications set out in the SSWSI, Crossrail document CR-PN-LWS-EN-SP-00001 and guidelines from English Heritage and the Institute for Archaeologists.

# **5. RESULTS**

## **5.1 Introduction**

- 5.1.1 This section summarises the results of the archaeological investigation integrated with selected specialist material. For clarity, the work is summarised by investigation for the archaeological trial trenches and by area for the GWB (i.e. archaeological trial trenches 6,12. GWB-Paint-shop, Workshop A).
- 5.1.2 Within each individual archaeological trial trench and Area, the results are presented as a single chronological narrative describing its chronological development with the earliest first and the most recent last.
- 5.1.3 Although most the features and deposits uncovered on site did not contain dating material they have been phased based on their stratigraphic and spatial associations.
- 5.1.4 Detailed summaries of the archaeological deposits and any features are presented in Appendix 1 and full details are available in the fully cross-checkable project archive.

## **5.2 Archaeological Trial Trenches**

### **Archaeological trial trench 1**

- 5.2.1 Trial trench 1 was situated on the site of a proposed new substation building and hardstanding. It was in order to test the extent of surviving Ilford Silt and to potentially locate a cluster of unknown buildings shown on a map from 1919.
- 5.2.2 This trench was not excavated after the construction of a substation some 10m to the south-west was monitored by OA/R during the project. These excavations revealed that beneath the modern surface of the depot a 4m-thick sequence of coarse sands and gravels overlay London Clay. These River Terrace deposits did not contain artefacts or ecofacts and no archaeological features or structures were uncovered in this trench.

## **Archaeological trial trench 2**

- 5.2.3 Trial trench 2 was 4m long, 4m wide and 0.8m deep (Fig. 5; Plate 1). The trench was located in an area to be affected by new track reconfiguration. The trench position was designed to test the extent of any surviving Ilford Silt and to determine the edge of the clay pits shown on an 1864 plan. It was also intended to assess the survival of historic assets S19, S20 and S30.
- 5.2.4 Aside from the uppermost deposit, which was modern, all the deposits observed in this trench were geological in nature. The earliest deposit was a sandy gravel (204). This River Terrace deposit whose upper surface was seen at 110.4m ATD sloped down from the north-west to the south-east and contained a 20mm-thick lens of fibrous black organic material (205). This was covered by a 0.5m-thick layer of weakly laminated coarse sand (203). Layer 203 was cut by a north-west to south slope (21) which inclined down from 111.1 to 110.2m ATD. This was seen elsewhere on the Site during the general watching brief, where it was provisionally interpreted as the northern edge of a large palaeochannel or lake/embayment of the River Thames. This was filled with a light bluish grey, well-sorted clay-silt which was mottled with orange brown (202). This 'brickearth' deposit contained large pockets of orange-brown sand and rare pebbles, the fills of which have been interpreted as cryoturbation hollows. Layer 202, which was up to 0.8m thick, was in turn sealed by a brown weakly laminated sand (201) which was only seen in the south-west corner of the trench. Both deposits sloped down from north-east to south-west. These were sealed by the modern track ballast of the present depot's surface.
- 5.2.5 No archaeological artefacts, ecofacts, features or structures were uncovered in this trench, and no remains of the historic assets S19 (Garage), S20 (Cycle Shed) and S30 (Fire Station) were present.

## **Archaeological trial trench 3**

- 5.2.6 This trench was initially proposed to test the extent of any surviving Ilford Silt and the truncation caused by the 'Brick Field' shown on the 1897 OS map in an area to be affected by track and siding footway work.
- 5.2.7 Following the initial results of the first trenches excavated and archaeological monitoring of the site this trench was descope by Crossrail.

## **Archaeological trial trench 4**

- 5.2.8 This trench was proposed in an area to be affected by track and siding footway work. The trench was designed to test the extent of any surviving Ilford Silt and the truncation caused by the 'Brick Field' shown on the 1897 OS map. It was also intended to assess the survival of historic asset S41.
- 5.2.9 Following the initial results of the first trenches excavated and archaeological monitoring of the site this trench was descope by Crossrail.

## **Archaeological trial trench 5**

- 5.2.10 This trench location was designed to test for the survival of the Ilford Silt Member, on the edge of 1864 clay pits but was also intended to assess the survival of historic assets S19, S20 and S30.

5.2.11 Following the initial results of the first trenches excavated and archaeological monitoring of the site this trench was descope by Crossrail.

#### **Archaeological trial trench 6**

5.2.12 Trial trench 6 was 4m long, 4m wide and 3m deep. The trench was positioned within the site of proposed new Logistics/Stores building in the projected area of surviving Ilford Silt deposits, and was also intended to assess the survival of historic assets S32 and S39.

5.2.13 Aside from the uppermost deposit, which was modern, all the deposits observed in this trench were geological in nature. The earliest deposit uncovered was a stiff blue-grey unoxidised London Clay (603) seen at a depth of 108.3m ATD and a weathered oxidized London Clay at 108.5m ATD. The London Clay was sealed by a 1.3m-thick deposit of yellowish brown mottled sandy clay silt (602) which contained rare small sub-rounded pebbles. The upper surface of this deposit was seen at 109.8m ATD. This deposit was overlain by a 1m-thick layer of reddish brown mottled cryoturbated, slightly clayey, fluvial sand (601) which had wavy lenses of brown and light blue-grey throughout. This deposit, whose upper surface was seen at 110.8m ATD, was in turn overlain by a 0.6m-thick layer of modern crushed tarmac and ballast (600) which acted as the surface of the present railway depot and was covered with a concrete hardstanding.

5.2.14 No artefacts, ecofacts, archaeological features or structures were uncovered in this trench, and no traces of historical assets S32 (Store) and S39 (Air raid Shelter) were uncovered.

#### **Archaeological trial trench 7**

5.2.15 Trial trench 7 was proposed to be located within the 'Brick Field' shown on the 1870 OS map in an area to be affected by track, siding, and footway work and intended to assess the survival of an unknown structure on the 1919 OS map.

5.2.16 Following the initial results of the first trenches excavated and archaeological monitoring of the site this trench was descope by Crossrail.

#### **Archaeological trial trench 8**

5.2.17 Trial trench 8 was located in an area affected by proposed track and siding footway work. It was situated within the projected area of surviving Ilford Silt within the 'Brick Field' shown on the 1897 OS map.

5.2.18 Following the initial results of the first trenches excavated and archaeological monitoring of the site this trench was descope by Crossrail.

#### **Archaeological trial trench 9**

5.2.19 Trial Trench 9 was 4m long, 4m wide and 5.5m deep (Fig. 6; Plate 2). The trench was excavated in an area to be affected by new track, siding and footway works. The trench was located in order to assess the survival of Ilford Silt, within the 'Brick Field' shown on the 1870 OS map.



- 5.2.20 Aside from the uppermost deposit, which was modern, all the deposits observed in this trench were geological in nature. The earliest deposit uncovered was a sandy fine angular gravel (39) whose upper surface was seen at a height of 105.7m ATD. This layer, was interpreted as being part of the River Terrace Gravels, was overlain by a medium to fine light greyish yellow sand (38) which contained silty lenses and wavy veins of brown iron staining. This deposit, which was up to 2.75m thick, was sealed by a 0.45m thick layer of light yellow coarse sand containing no inclusions (37) seen at 110m ATD. Layer 37 was overlain by a light orange-brown clayey silty sand (36) whose upper surface was seen at a height of 110.55m ATD. These sandy deposits were covered by a 0.8m-thick layer of mid orange-brown silty clay (32) whose upper surface was seen at a height of 111.2m ATD. This deposit, which represents the Ilford Silt Member, was in turn overlain by a 1.2m-thick layer of modern crushed tarmac and ballast (31) which acted as the surface of the present railway depot and was in turn covered with a hard standing of concrete.
- 5.2.21 No artefacts, ecofacts, archaeological features or structures were uncovered in this trench.
- 5.2.22 Despite the absence of visual indicators for environmental indicators a suite of samples was retrieved from the section (see below). These were assessed for micro-fauna. However, the results were negative.

#### **Archaeological trial trench 10**

- 5.2.23 This trench was 4m long, 4m wide and 2.95m deep. The trench was located within the projected area of surviving Ilford Silt deposits in the proposed new Paint Shop building.
- 5.2.24 Aside from the uppermost deposit, which was modern, all the deposits observed in this trench were geological in nature. The earliest deposit uncovered in this trench was London Clay (1006/1005) whose undulating upper surface was seen at a height of 109.8m ATD. The London Clay was sealed by a yellowish-brown fine to medium sand (1003). This deposit contained rare lenses of small sub-angular pebbles light grey clayey sand and was 0.7m thick (its upper surface was seen at 110.5 m ATD). Layer 1003 was overlain by a pale greenish grey clayey sand (1002) which was mottled with wavy veins of reddish brown and contained frequent very thin lenses of gravel rich sandy clay. This deposit was in turn overlain by layer 1001 which was a pale greenish grey mottled clayey silt which contained frequent lenses of fine to medium sand. The upper surface of this brickearth, which represents the Ilford Silt Member, was seen at a height of 111m ATD. Layer 1001 was sealed by the modern granite track ballast of the present depot's surface (1000).
- 5.2.25 No artefacts, ecofacts, archaeological features or structures were uncovered in this trench.

#### **Archaeological trial trench 11**

- 5.2.26 This trench was 4m long, 4m wide and 1.4m deep. This trench was excavated to test the presence or absence of the Ilford Silts on the site of the future Paint Shop's Traverser Pit.

- 5.2.27 Aside from the uppermost deposit, which was modern, all the deposits observed in this trench were geological in nature. The earliest deposit uncovered was the light blueish grey unoxidised London Clay (1105) seen at a depth of 109.8m ATD. The unweathered London Clay was sealed by a firm brown clay containing rare pebbles (1103), this 0.1m-thick deposit was probably the interface of the weathered oxidised surface of the London Clay with the overlying River Terrace Gravels. Directly above 1103 was a 0.2m-thick layer of gravel (1102), part of the River Terrace deposits seen across most of the western half of the Site.
- 5.2.28 The Terrace gravels were in turn sealed by a brown mottled clay sand which contained rare pebbles but no other inclusions (1101). This deposit was only 0.23m thick (its upper surface was seen at 110.55m ATD). This was overlain by a 0.84m thick layer of modern track ballast, the present depot's surface, whose upper surface was seen at 111.4m ATD.
- 5.2.29 No artefacts, ecofacts, archaeological features or structures were uncovered in this trench.

#### **Archaeological trial trench 12**

- 5.2.30 This trench was 4m long, 4m wide and 2.2m deep (Fig. 10). The trench was designed to test the absence or presence of the Ilford Silts in an area of the Site to be covered by the new Logistics/Stores.
- 5.2.31 Aside from the uppermost deposit, which was modern, all the deposits observed in this trench were geological in nature. The earliest deposit uncovered was London Clay (1205) at a depth of 109.1m m ATD. The London Clay was sealed by a 0.3m-thick layer of sand and gravel (1204). This was in turn overlain by a 1.3m-thick layer of light greenish grey silty clay (1203), the upper surface of which was at 110.8m ATD. Layer 1203 was extremely uneven with many cryoturbation hollows and ice wedges, which contained light brown silty clays (1202). This deposit was overlain by a yellowish red mottled silty clay (1201) which contained lenses of light brown clay. This was in turn overlain by the modern granite track ballast (1200) which underlay the concrete hard standing of the present depot's surface.
- 5.2.32 No artefacts, ecofacts, archaeological features or structures were uncovered in this trench.

### **5.3 General Watching Brief**

#### **Paint Shop**

- 5.3.1 Situated at the western end of the Site, the watching brief included the monitoring of enabling works, excavation of geotechnical test pits and trenches, general surface reduction and the excavation of attenuation tanks and drainage runs in the Site to be occupied by the Crossrail Paint Shop and staff car park.

- 5.3.2 In this part of the Site the following sequence was observed. At the base of the sequence, deposits of stiff blue grey London Clay were observed at a height of 110.2m ATD. This deposit, which represents the solid geology in this part of London, was covered by deposits of coarse sandy gravel (03, 10, 11 and 17). The thickness of this deposit ranged from 0.6m in the south-western corner of the Site up to 1.5m beneath the Greater Anglia training building. These deposits, which have been interpreted as parts of the Hackney/Taplow River Terrace Gravel deposits, lay directly beneath the ballast track sub base (09) and concrete hard standing (13) of the present depot which was up to 0.6m thick.
- 5.3.3 No artefacts, ecofacts, archaeological features or structures were uncovered in this part of the Site and any traces of the Ilford Silt Membrane as well as any Holocene deposits had been removed during quarrying and/or the construction of the railway sidings in the 19th century.
- 5.3.4 However, the archaeological sequence was much thicker in two places. These were observed during works to install sheet piling up against a c 2m-high tree-covered slope which forms the Ilford Depot's western boundary, and beneath a c 1m- to 2m-high bank and bund which was aligned east-west to the south of the Greater Anglia training building.
- 5.3.5 The following sequence was revealed by the sheet piling works along the Site's western edge. The earliest deposits uncovered were the coarse gravels (03) of the Hackney/Taplow River Terrace gravels, which were uncovered at the base of the slope at 111.1m ATD. This was covered by a 1.2m-thick deposit of mid yellow-brown sandy clay silt (22) with frequent blue mottles and wavy lenses of light blue clay and yellow and brown sand. The upper surface of this deposit, which was at 112.2m ATD, was very uneven, with many irregular cryoturbation hollows in its upper surface. This was covered by a 0.6m-thick layer of mid greyish brown fine sandy clay silt which contained occasional pebbles (15). This was in turn sealed by the present topsoil (05), the upper surface of which was seen at 113.40m ATD (Fig. 8; Plate 4).
- 5.3.6 The bank and bund to the south of the Greater Anglia training building was overgrown with vegetation and appeared to be at least partly the last remains of the allotments which stood between the Ilford mainline sidings and the Coal Yard until the 1970s (the area is labelled as 'allotment gardens' on OS maps from 1962 until 1968 but appears to be free of buildings on the 1919 and 1977 OS maps). At this location the coarse sandy River Terrace Gravels (03) were overlain by a thin layer of soft yellow sand (02). This was covered by an *in situ* compact, mid orange to yellowish brown, clayey sandy silt brickearth, mottled with frequent wavy lines of light blue and containing occasional small sub-angular to sub-rounded pebbles (06). This deposit, which has been interpreted as being part of the Ilford Silts, did not contain any fauna or other remains. It was c 1.20m thick and sloped down from west to east, lying below the former topsoil (04) of the allotment gardens which stood on this part of the Site until the 1970s. The former topsoil was itself covered by a 0.5m-thick layer of mixed topsoil and demolition material (01) which appears to have been dumped here during the construction of the Greater Anglia training building.

## **Substation**

- 5.3.7 This intervention measured 7m by 3.6m. Aside from the uppermost deposit, which was modern, all the deposits observed in this trench were geological in nature.
- 5.3.8 The earliest deposit was the London Clay at 109m ATD (23). This was covered by a 4m-thick sequence of River Terrace deposits, which consisted of layers of coarse sandy gravels and sands (24). The upper surface of this sequence was seen at 112.80m ATD and its base was 109m ATD.
- 5.3.9 No archaeological features or structures were uncovered during the excavation of the substation.

## **Workshop A (Plate 5)**

- 5.3.10 Works monitored by OA/R during the refurbishment of the southern bay of the existing Workshop A comprised the general bulk machine excavation to a depth of 109.21m ATD across the whole length of the bay, and the monitoring of the excavation of two c 1.2m-deep parallel drainage pipe trenches and associated c 3m-deep manholes in the base of the affected area.
- 5.3.11 Beneath the modern concrete slab and sub base (26) of the pre-existing workshop, the upper surface of which was at 111.83m ATD, the works revealed a 1.5m-thick mixed deposit of dark grey ashy silt and stone track ballast (25). This layer of 'made ground' was observed as far as 109.33m ATD. Layer 25 sealed a series of fills (28/29), comprising various lens of yellow and brown sandy silts, grey clays and ashy grey silts. These backfills, which contained quantities of 19th-century pottery (see section 5.4 below) almost certainly represent the deliberate backfill of the former Cauliflower Pit which was in operation from the 1840s until the late 1890s. The fills were all seen to slope down at an angle of 45° from the east to west and from north to south. The base of the fills was not reached at 106.75m ATD.
- 5.3.12 None of the geological deposits seen elsewhere on the Site were uncovered during the work in Workshop A.

## **5.4 Finds**

- 5.4.1 Finds were limited to pottery and clay tobacco pipe, all of which were retrieved from the watching brief monitoring carried out within Workshop A. The material is likely to derive from quarry infilling and is unremarkable (Tables 2 and 3).

Table 2: Pottery

Context	Spot-date	Fabric code	No.	Weight (g)	Comments
28	c 1850-1880?	TPW	18	408	Transfer-printed ware: Range of large and small sherds from c 1830/40 through to c 1880? 1 bowl rim in particular with stiff floral dec in dark and lilac blue transfer probably c 1850/60-1880. Rims from 2 teacups including a profile with footring base and vertical panels of blue dec separated by white panels. Cylindrical mug rim with picturesque ?Alpine lake scene and ruined castle. Several Willow pattern plates/dishes and sherd from perforated ?soap dish or strainer. 2 joining sherds from another teacup rim with purple transfer showing European scene with Quaker-style man.
28	c 1850-1880?	BONE	4	67	English bone china: 4 vessels including teacup footring base with gilded posey on floor int and gilded foot border; on underside of footring is a small hand-painted number '8748' in pale purple paint. Teacup rim and sideplate rim with blue sprigged floral/posey dec - typically mid-19th-century Saucer rim with pink lustre dec - v faint.
28	c 1850-1880?	REFW PNTD	1	3	Refined whiteware with hand-painted decoration. Rim possibly from egg cup with traces pink and green decoration
28	c 1850-1880?	YELL SLIP	4	130	Yellow ware with slip banded decoration including 3 sherds forming profile of carinated sugar bowl with brown slip bands and larger band of blue mocha dec on white background. Body sherd from a plain vessel.
28	c 1850-1880?	NOTS	2	63	Nottingham stoneware. Late types – 19th century. Includes complete tubular handle from a small pipkin. Bodysherd from a separate jar with horizontal grooves and traces of rouletted dec
28	c 1850-1880?	ENGS BRSL	2	49	English stoneware with Bristol glaze (c 1835+): 2 vessels including ?storage jar with globular shoulder and neckless beaded/thickened rim, band of rouletted beading on shoulder, pale brown (?salt) glaze external, grey Bristol glaze internal. Body sherd from cylindrical bottle or jar in pale grey fabric with clear glaze all over.
28	c 1850-1880?	ENGS	2	62	English stoneware. Brown salt-glazed 19th-century cylindrical bottles (2 vessels) including flat base and wall/shoulder sherd. Probably blacking or ink bottles
<b>TOTAL</b>			<b>33</b>	<b>782</b>	

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd.  
Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0

Table 3: Clay tobacco pipes

Context	Spot-date	Stem	Bowl	Mouth	Total sherds	Total weight (g)	Comments
28	c 1840-1880	0	1	0	1	10	Damaged bowl profile. Type AO29 (c 1840-1880; Atkinson and Oswald 1969). Moulded oakleaf seams. Makers initials in relief on spur 'PB', probably for Mrs P. Bellis of Romford, Essex (died 1851) (Oswald 1975, 170). 53mm of stem attached.
28	c 1840-1880	0	1	0	1	8	Complete bowl profile. Type AO29. Moulded oakleaf seams. Crudely made. Spur of squared profile with a shield in relief on both sides. The shield has a diagonal bar or sash. On the left side (Christian name side) the shield is inverted. Maker unknown but shield motif mid to late 19th-century. 20mm of stem attached.
28	c 1840-1880	0	1	0	1	6	Broken bowl lacking rim. Type AO29. Moulded oakleaf seams. Spur of squared profile with a shield in high relief on both sides. The shields have faint gridded portcullis-like design within. Maker unknown. 55mm of stem attached.
<b>TOTAL</b>		<b>0</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>24</b>	

## 5.5 Environmental Evidence

5.5.1 A series of bulk samples and monoliths for soil morphology, micro fauna and pollen were taken for the Natural History Museum from the Ilford Silts and underlying sands uncovered in ATT 9 and ATT10. A sequence of these were sent to John Whittaker at the Natural History Museum. The samples, noted MP (micro-palaeontology), are highlighted in Table 4 and on Figure 6. Although there was no visible indication of faunal or environmental evidence these were micro-sieved and assessed. However, the specialist described the strata as 'silty-clays and silty-sands, all ferruginous, and unfortunately, completely decalcified and barren'. No further report or work was recommended.

Table 4: Samples (see Figure 6 for location)

Context	Sample number	Type
32	1	Monolith
32-36	2	Monolith
36, 37, 38	3	Monolith
32	7, 8, MP, 5B	MP =micropalaeontology B=Bulk
36	9, 10 MP	
37	11MP	
38	12MP 4B	
39	6B	

## 5.6 Phasing

5.6.1 Broad phasing has been ascribed to the deposits and structures encountered during the works based on relative stratigraphy and finds uncovered, in conjunction with cartographic and documentary evidence. The results are presented below in chronological order.

### Phase 1: Geology

5.6.2 London Clay was seen across most of the Site at a height of between 108.5 and 109.1m ATD.

5.6.3 In ATT9 no London Clay was uncovered although investigation reached a depth at 105m ATD.

5.6.4 Gravels and coarse sands of the Taplow/Hackney River Terrace were uncovered across most of the Site to the west of the new Logistics/Stores building.

5.6.5 Deposits that were confidently identified as *in situ* Ilford Silts were seen in the western part of the site and within ATT9 corresponding with the predictive model (Fig. 3) site of the Crossrail Logistics and Stores within the slope which forms the western edge of the Site and within ATT9 to the east of Workshop B.

5.6.6 There was no indication of artefacts or ecofacts in the Ilford Silts where they were revealed.

### Phase 2: 1839 to present

5.6.7 Evidence of the Cauliflower Pit brick works shown on historical maps (first appearing on the 1846-1875 OS map to the north of the ECR Mainline railway) took the form of a series of sloping backfills and tips containing 19th-century pottery within Workshop A.

5.6.8 The only evidence for the railway activity uncovered during the OA/R watching brief and evaluation, were the cutting for the 1839 ECR mainline railway and the later Ilford sidings, which had removed and levelled out the original ground level to c 111m ATD, and the various levels of track ballast and hard standing.

## **6. CONSTRAINTS**

6.1.1 Due to the active construction nature and partial trackside designation of the site, obtaining access for works was complex and required rapid mobilisation where opportunities for investigations were available. As a consequence, the OSL specialist was unavailable for the intended sampling sequence of ATT9 which was the last investigation. However, the absence of faunal remains or a direct correlation between the revealed Ilford Silts and the sediment bodies historically containing faunal remains reduces the integrity that any such OSL dating may have had in providing dating information to associate with the remains.

### **6.2 Assessment of Results**

6.2.1 The results of the evaluation and watching brief confirm a predictive model for the location of Ilford Silts but did not locate any of the faunal assemblages for which the silts are known. Soil analysis also confirmed the absence of micro-palaeontological remains in the silts.

### **6.3 Relative Completeness and Condition**

6.3.1 Aside from the modern track ballast of the depot's present surface and the backfilled quarry fills within Workshop A, only geological deposits were present. The uppermost sequence appears to have been truncated during the construction of the cutting in which the present depot stands. This terracing appears to have removed any potential Holocene and any prehistoric to post-medieval deposits from the top of the sequence.

6.3.2 In places, such as the area beneath the Crossrail Paint Shop building and new Sub-Station, the Upper Pleistocene deposits (the Ilford Silts) also appear to have been removed by the construction of the railway depot, with only the River Terrace Gravels and London Clay remaining intact. Elsewhere, beneath the new Crossrail Stores/Logistic buildings and to the east of Workshop B, the Ilford Silts and underlying sands appear to be intact although probably truncated by the 19th-century construction works. Sheet piling works on the Site's western edge showed how much of the Ilford Silts may have been removed during the construction of the depot. Here the Ilford Silts were 1.2m thick with their upper surface at 112.3m ATD, whilst to the east (ATT 9, 10, 11, 12 and 2) their upper surface was c 111m ATD.

### **6.4 Rarity**

6.4.1 The survival of Pleistocene head deposits (Ilford Silts) recorded within the Site area is of low rarity. However, it is known that in the locality of the site these have contained faunal assemblages of National significance and 'high' rarity.

### **6.5 Group Value**

6.5.1 The presence of the Pleistocene strata illustrates the survival of periglacial and interglacial sediments in parts of the Site. However, their value in this instance is reduced by the absence of artefacts and ecofacts.



## 7. RESULTS IN RELATION TO INVESTIGATION AIMS

- 7.1.1 At each stage of this project, aims were established as part of the framework of investigation. After the completion of each stage the aims were re-examined and the results checked to see whether the general and site specific objectives had been achieved.
- 7.1.2 *'Confirm if possible the presence, and assess the extent of, survival of Palaeolithic archaeological, faunal and palaeoenvironmental remains associated with the Ilford Silt Member and gravel terraces within the site'*. Although the works did reveal evidence of the Ilford Silt Member and Gravel Terrace deposits, no faunal or palaeoenvironmental remains were uncovered during the project.
- 7.1.3 *'Further our understanding of the gravel terrace sequence in Ilford, in particular the relationship between the Taplow and Hackney gravels'*. Gravel Terraces deposits were uncovered across much of the Site. These appear to slope down from north to south. The upper surface of the gravels lay at 112.8m ATD in the Substation watching brief in the north-west corner of the Site, c 111m ATD in the area of the new Paint Shop building and in the south-west corner of the Site and 105.7m ATD in ATT9 to the east of Workshop B. Within the works carried out in the area of the Logistics/Stores (i.e. in ATT10 and ATT6) the gravels were not seen, the Ilford Silts and sands lying directly on the London Clay. This apparent lack of gravels in the southern edge of the Site almost certainly reflects the natural topography and the silts are presumed to lie within a paleochannel or embayment of the Thames. No faunal or palaeoenvironmental remains were uncovered within the gravels and it was not possible to differentiate between the Hackney and Taplow River Terraces.
- 7.1.4 *'Confirm the presence/absence of any Mesolithic, Neolithic, Bronze Age and Iron Age activity within the site'*. The absence of remains dated to these periods was confirmed in the areas investigated and monitored and is implied in surrounding areas similarly affected by railway development.
- 7.1.5 *'Confirm the presence/absence of Roman activity associated with the Roman road to Colchester, located to the south of the site'*. The absence of remains dated to this period was confirmed in the areas investigated and monitored and is implied in surrounding areas similarly affected by railway development.
- 7.1.6 *'Assess the character of the medieval activity within the site and its relationship with medieval settlements to the west and east of the site'*. The absence of remains dated to this period was confirmed in the areas investigated and monitored and is implied in surrounding areas similarly affected by railway development.
- 7.1.7 *'Assess and record the nature and extent of post-medieval and early modern field boundaries and quarrying in relation to the layout recorded by historic maps'*. The investigation revealed the southern edge of the allotments which are shown on the British Rail Ilford EMU map of 1953 and the 1968 OS map as lying between the Main Line Railway sidings and the depot's coal yard. This was characterised by a thin 2m-high east-west aligned bund which stood to the south of the Greater Anglia training building.

- 7.1.8 The project also uncovered limited evidence of the quarry which is shown on early OS maps as laying in the centre of the Site (OA/R 2013b, fig. 7). This took the form of a series of sloping backfills containing 19th-century pottery. These were revealed during drainage works within Workshop A, and were seen to a depth of 106.75m ATD. The present land surface in the depot is c 111m ATD. The edges and base of the quarry were not found, but its western edge must lie somewhere between the western end of Workshop A and ATT12, where the Ilford Silts did not appear to have been only truncated by the quarry.
- 7.1.9 *'Assess and record the levels of truncation of surface deposits resulting from the development of the Great Eastern Railway and the Ilford Depot'*. The various cuttings associated with the construction and development of the railway at Ilford appear to have removed all the prehistoric to post-medieval deposits on the Site down to a height of c 111m ATD. Parts of the underlying geological deposits including Pleistocene silts, sands and gravels appear to have survived. These have been at least partly truncated by the railway, as is shown from work to install sheet piles along the north-south bank which forms the western edge of the Site. Here the railway cutting to the east appears to have removed c 1.2m worth of the brickearth/Ilford Silt Member. The top of the brickearth was 112.2m ATD in the bank and 111m ATD in the sidings.
- 7.1.10 *'Assess and record any evidence for built heritage assets associated with the development of the Ilford Depot. These are taken to include the site's workshops, coal depot, huts, stores, earlier track and siding layouts and also the remains of any associated railway infrastructure'*. Record shots were taken of the extent buildings on the Site which were to be demolished or altered by the Crossrail project. These will form part of the site archive
- 7.1.11 *'Assess and record any remains of WWII air raid shelters within the site'*. No air raid shelters were revealed by the investigation works.

## **8. STATEMENT OF POTENTIAL OF ARCHAEOLOGY**

### **8.1 Stratigraphic Data**

- 8.1.1 The stratigraphic record provides confirmation of the survival of Ilford Silt units as predicted by the SSWSI. These data may be used in future for further investigations to attempt to locate further faunal assemblages within the deposits.

### **8.2 Finds Data**

- 8.2.1 The very modest assemblage and variety of finds recovered from the works, which all dated to the late 19th century, has no further potential.

### **8.3 Primary Potential**

- 8.3.1 The Ilford Depot watching brief dataset confirms the very low level potential for prehistoric to post-medieval archaeology and highlights the presences of Pleistocene strata, including deposits which are known from historical sources to have the potential to contain quantities of important mammalian fossil remains.

## 8.4 Documentary Study

8.4.1 There is no clear benefit from further documentary study of the site.

## 9. CONCLUSIONS

- 9.1.1 Aside from geological deposits (such as Eocene London Clay and Pleistocene silts, sands and gravels), no pre-railway features or deposits were identified within the scope of this project as the various cuttings associated with the construction and development of the railway at Ilford appear to have removed all the pre-modern deposits on the Site.
- 9.1.2 Except in ATT9 and within Workshop A, deposits of London Clay were seen across most of the works area. In the western third of the Site, in the new Paint Shop, the track ballast of the rail yard sealed *in situ* sandy gravel River Terrace deposits, which in turn covered London Clay.
- 9.1.3 These River Terrace deposits were uncovered across much of the Site. In the north-west corner of the Site, near to the present vehicle entrance on to Ley Street/Hainault Street, the sandy silts of the Ilford Silt Member were not present. Here the modern surface of the yard lay directly above up to 4m of sands and gravels. These appear to slope down from north to south. The upper surface of the gravels were at 112.8m ATD in the Substation watching brief in the north-west corner of the Site and c 111m ATD in the new Paint Shop building and in the south-west corner of the Site.
- 9.1.4 Within the works carried out in the Logistics/Stores, i.e. in ATT10 and ATT 6, the gravels were not seen. At these locations the Ilford Silts and sands lay directly on the London Clay. The apparent lack of gravels in the southern edge of the Site almost certainly reflects the natural topography where the silts are presumed to lie within a palaeochannel or embayment of the Thames which had eroded away any traces of the Terrace Gravels.
- 9.1.5 No faunal or palaeoenvironmental remains were uncovered within the gravels and it was not possible to differentiate between the Hackney and Taplow gravel Terraces.
- 9.1.6 To the east in the new Logistics/Stores, the sand and gravels of the River Terrace deposits gradually became thinner before finally disappearing. Here the track ballast and hard standing of the present depot lay directly above deposits of *in situ* Ilford Silts. The Ilford Silts lay above deposits of sand, which in turn sealed the London Clay.
- 9.1.7 Contrary to the proposed ground model (Fig. 2), which predicted that the Ilford Silts would be present in the south-west corner of the Site, the construction of the railway sidings had removed all traces of the silts across the area to be covered by the new Paint Shop. (Fig. 7). However, the archaeological sequence was much thicker in two places where the Ilford Silts did survive. These were within a c 2m-high tree-covered slope which forms the Ilford Depot's western boundary, and beneath a c 2m-high bank or bund which was aligned east-west to the south and south-east of the Greater Anglia training building.

- 9.1.8 Within the bank, the earliest deposits uncovered were the coarse gravels of the Hackney/Taplow River Terrace gravels, which were found at the base of the slope at 111.1m ATD. This was covered by a 1.2m-thick deposit of sandy clay silt. The upper surface of this deposit, which was at 112.2m ATD, was very uneven, with many irregular cryoturbation hollows in its upper surface. This was covered by a layer of fine sandy clay silt which contained occasional pebbles. This was in turned sealed by the present topsoil.
- 9.1.9 The bund to the south-east of the Greater Anglia training building appeared to contain at least part of the last remains of the allotments that stood between the Ilford mainline sidings and the Coal Yard until the 1970s. Here the River Terrace Gravels were overlain by a thin layer of brickearth. This has been interpreted as being part of the Ilford Silts, but did not contain any fauna or other remains. The brickearth lay directly below the former topsoil of the allotment gardens.
- 9.1.10 In the area of the new Logistics/Stores and to the east of Workshop B, deposits of brickearth were seen overlying layers of sand during the archaeological trial trench evaluation by OA/R and the general watching brief. Here the Ilford Silts were up to 1.5m thick, with their upper surface at c 111m ATD. The deposits all appeared to have been subjected to various degrees of cryoturbation. Although these deposits were seen across most of the area within the footprint of the Logistics/Stores building, they did not contain any artefactual or fauna remains.
- 9.1.11 Within the Workshop, beneath the concrete slab and brick sub base of the modern floor, only 20th-century deposits were observed. These appear to be an extensive levelling layer put down as part of the construction of the depot and workshop and were seen across all the parts of the workshop affected by the Crossrail works. These deposits sealed a series of ash-rich backfills containing 19th-century pottery and clay tobacco pipes, and appeared to be the backfill of the brick quarry (Cauliflower Pit) shown on 19th-century maps of the Site.
- 9.1.12 Aside from the backfilled quarry no archaeological remains were observed during the works.

## **10. PUBLICATION AND DISSEMINATION**

- 10.1.1 The results of the investigation will be disseminated through grey literature deposited with LAARC and online deposition of the report and digital data at ADS.

## **11. ARCHIVE**

- 11.1.1 The complete project archive includes paper context records and indices, permatrace drawings, both black and white and colour photographs, digital plans and photographs.
- 11.1.2 These were prepared following the guidelines set out in the 'Guidelines for the preparation of excavation archive for long-term storage' (Walker 1990).
- 11.1.3 The digital data will be temporarily stored on the server at OA South, which is backed-up daily. For long-term storage of the digital data CDs/DVDs will be used and will include the reports, plans, scanned images and digital photographs. Each disk will be fully indexed and accompanied by the relevant metadata as provenance.

11.1.4 The project archive and finds are currently held at the offices of OA South under the Site code XTL 13. The archive will be deposited with LAARC (London Archaeological Archive and Research Centre):

Mortimer Wheeler House  
46 Eagle Wharf Road  
London N1 7ED  
Tel: 020 7410 2200  
<http://www.museumoflondonarchaeology.org.uk>

11.1.5 Copies of the report will be lodged with English Heritage Greater London Archaeological Advisory Service, GLHER (Greater London Historic Environment Record), and local historical archives.

11.1.6 All dry and stable finds will be packaged as per the Museum of London's specifications, in either acid-free cardboard boxes, or in airtight plastic boxes for unstable material. Each box will have a compiled list of its contents and the boxes will in general contain only one type of material, e.g. bone or ceramic.

11.1.7 It is anticipated that the finds will also be deposited with LAARC.

## 12. BIBLIOGRAPHY AND REFERENCES

- |                             |       |   |
|-----------------------------|-------|---|
| Atkinson, D. and Oswald, A. | 1969  | London clay tobacco pipes. <i>Journal of the Archaeological Association</i> , 3rd series, 32, 171-225   |
| Bridgland, D. R.            | 1994  | <i>Quaternary of the Thames</i> . London: Chapman and Hall.   |
| British Geological Survey   | 1974  | Drift Geology, Romford, Sheet 257   |
| Gibbard, P. L.              | 1994  | <i>The Pleistocene History of the Lower Thames Valley</i> . Cambridge: Cambridge University Press.  |
| Greenwood, P.               | 1989  | 'Uphall Camp, Ilford, Essex: An Iron Age fortification', <i>London Archaeol</i> 6, 94–101   |
| Crossrail                   | 2005  | Crossrail Assessment of Archaeology Impacts, Technical Report. Part 3 Of 6, North-East Route Section. Stratford to Shenfield (1e0318-E1e00-00001) |
| Crossrail                   | 2008a | <i>Procedure for non-listed built heritage recording</i> (CR-PNPRW-EN-PD-00010)   |
| Crossrail                   | 2008b | Archaeology Generic Written Scheme of Investigation (CRPN-LWS-EN-SY-00001) revised as CR-XRL-T1-GSTCR001-00003 (2012)                             |
| Crossrail                   | 2008c | Environmental Minimum Requirements (EMR) for Crossrail (CR/HB/EMR/0001) (5th draft, July 2008)  |
| Crossrail                   | 2009  | Archaeology Specification for Evaluation & Mitigation (CR-PN-LWSEN-SP-00001) revised as CRL1-XRL-T1-RSP-CRG03-50001 (2012)                        |
| Crossrail                   | 2012  | The Ilford Yard Ground Investigation Report - C161-MMD-G-RGN-CR112-50003  |

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd. Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0

Green, C.P., Branch, N.P., Coope, G.R., Field, M.H., Keen, D.H., Wells, J.M., Schwenninger, J., Preece, R.C., Schreve, D.C., Canti, M.G. and Glead-Owen, C.P	2006	Marine Isotope Stage 9 environments of fluvial deposits at Hackney, north London, UK. <i>Quaternary Science Reviews</i> , 25, 89-113
Juby, C.	2011	<i>London before London: Reconstructing a Palaeolithic Landscape</i> , unpublished thesis, University of London
MoLAS	2000	The archaeology of Greater London: An assessment of archaeological evidence for human presence in the area now covered by Greater London (Museum of London Archaeology Service)
Nixon, T., E. McAdam, R. Tomber and H, Swain	2003	<i>A Research Framework for London Archaeology 2002</i> (Museum of London Archaeology Service)
Oswald, A.	1975	<i>Clay Pipes for the Archaeologist</i> , British Archaeological Reports, British Series 14
Oxford Archaeology/ Ramboll	2013a	C254 Archaeology West-Crossrail Post Excavation Assessment and Updated Project Design (C254-OXF-T1-RGN-CRG03-50160)
Oxford Archaeology/ Ramboll	2013b	C254 Archaeology West: Ilford Depot Archaeological Site Specific Written Scheme of Investigation (C254-OXF-T1-GMS-CRG03-50007. Rev.2.0)
Oxford Archaeology/ Ramboll	2014	C254 Archaeology West: Ilford Yard Stabling Project C828 works Archaeology Method Statement (C254-OXF-T1-GMS-CRG03-50008 Rev 4.0)
Redknap, M. and Currant, A.	1985	Another day's elephant hunting in Essex: recently excavated fossil remains from Ilford. <i>Essex Journal</i> , 20/1, 8-10.

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd. Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0

Rolfe, W.D.I.	1957	A recent temporary section through Pleistocene Deposits at Ilford. <i>Essex Naturalist</i> , 30,93-102.
Powell, W. R. (ed.)	1966	The Borough of Ilford', in A History of the County of Essex: Volume 5, pp. 249-266 <a href="http://www.british-story.ac.uk/vch/essex/vol5/pp249-266">http://www.british-story.ac.uk/vch/essex/vol5/pp249-266</a> [Accessed 31 August 2015].
Walker K	1990	Guidelines for the preparation of archives for long-term storage. UKIC Archaeology Section
West, R.G.	1969	Pollen analyses from interglacial deposits at Aveley and Grays, Essex. <i>Proceedings of the Geologists' Association</i> , 80, 271-282. 2/1462



# APPENDIX 1 - ARCHAEOLOGICAL CONTEXT INVENTORY

## GENERAL WATCHING BRIEF

Context	Type	Category	Description
01	Deposit	Topsoil	Moderately compact, dark brownish grey, silt containing occasional sub rounded pebbles
02	Deposit	Natural geology	Soft, mid-light yellow, coarse sand
03	Deposit	Natural geology (River Terrace)	Loose, mid yellowish grey, coarse gravel with sub rounded –sub angular pebbles inclusions
04	Deposit	Made ground	Loose, mid grey, mixed clay silt, and sub angular granite pebbles (track ballast). Containing demolition rubble, fragments of concrete, wooden railway sleepers and clinker
05	Deposit	Topsoil	Friable, dark grey, mixed clay silt, containing occasional fragments red froged bricks and moderate sub rounded pebbles
06	Deposit	Natural geology (Brickearth)	Compact, mid orange –yellowish brown, mottled with light blue wavy lines. A clayey sandy silt, containing occasional small sub angular to sub rounded pebbles
07	Deposit	Natural geology (Weathered London Clay)	Stiff, light brown, clay
08	Deposit	Natural geology (London Clay)	Stiff, dark blue grey, clay
09	Deposit	Track sub base (Ballast)	Compact, dark grey, mixture of clinker and sub angular granite ballast. Contained occasion fragments red brick, concrete and wooded railway sleepers
10	Deposit	Natural geology (River Terrace)	Compact, dark brown, coarse sandy gravel with sub angular pebbles
11	Deposit	Natural geology (River Terrace)	Compact, mid orange brown, coarse sandy grave with, angular-sub angular pebbles
12	Deposit	Natural geology (Brickearth)	Moderately compact, fine sandy silt containing occasional sub rounded pebbles

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd. Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0

13	Deposit	Hard standing	Concrete
14	Deposit	Natural geology	Compact, mid yellow, a clean sandy silty clay
15	Deposit	Natural geology	Moderately compact, mid greyish brown, a well sorted fine sandy clay silt. Containing occasional sub rounded pebbles
16	Deposit	Natural geology	Stiff, mid greyish brown, homogenous fine sand
17	Deposit	Natural geology (River Terrace)	Compact, mid orange, a coarse sandy gravel made up of angular to sub angular pebbles
18	Deposit	Natural geology	Soft, mid orange brown, coarse sandy gravel rich clay containing small sub angular-sub rounded pebbles. Fill of cryoturbation hollow 19
19	Cut	Natural feature (peri glacial cryoturbation hollow)	Linear, irregular in plan, in profile V shaped wedge
20	Deposit	Channel?	A 45° slope seen along whole southern length of the western 1/3 of Site. sloped down towards the south
21	Deposit	Channel?	A 45° slope north -south aligned slope filled with silts sloped down towards the east
22	Deposit	Natural geology (Brickearth)	Mid yellow brown with large patches of mid orange brown and light blue grey mottles. A stiff fine sandy clay silt. Frequent wavy lens/ patches of mid of yellow brown coarse sand and light blue clay. Occasional large areas of mid orange brown coarse sand
23	Deposit	Natural Geology (River Terrace)	Coarse sandy gravels with lenses of coarse and clayey sand
24	Deposit	Natural Geology (London Clay)	Stiff, grey blue, clay
25	Deposit	Made ground	Loose, dark grey, ashy gravel rich silt, frequent lenses of sub angular granite track ballast and yellow clay
26	Deposit	Floor of Workshop A	Concrete
27	Deposit	Sub base	Rubble, red bricks up to half bats in size

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd. Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0

28	Deposit	Backfill	Moderately compact, mid –light grey, silty sands. Containing frequent fragments of oyster shell, glass, red unfrosted brick and glazed “china”
29	Deposit	Backfill	Friable, ashy grey brown, clay
30	Cut	Quarry	Sides and base not found at least 1.3m deep extended across whole of Workshop A  (c E-W:168m x N-S:10m)

## ARCHAEOLOGICAL TRIAL TRENCHES

### ATT2

Context	Type	Category	Description
201	Deposit	Natural geology	Loose, strong brown, medium sand rare sub rounded to rounded pebbles. Weak lamination
202	Deposit	Natural geology (Brickearth)	Firm, light bluish grey mottled with orange brown, slightly clay silt with large lenses / patches of orange brown, well sorted sand with rare pebbles. The fills of cryoturbation hollows/ice wedges
203	Deposit	Natural geology	Loose, brown, fine to coarse weakly laminated sand lens of silty sand with rare sub angular pebbles. Poorly sorted
204	Deposit	Natural geology (River Terrace)	Loose, fine to coarse grey sand with sub angular to rounded pebbles and cobbles
205	Deposit	Natural geology	Black, fibrous organic residue

### ATT6

Context	Type	Category	Description
600	Deposit	Hard standing	Loose, black, small angular granite pebbles and Tarmac
601	Deposit	Natural geology	Moderately firm, reddish brown, clay sand large light grey mottles and wavy brown sand lens
602	Deposit	Natural geology	Moderately firm, yellow brown with common fine greenish grey mottles,

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd. Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0

		(Brickearth)	clay silt, rare small sub rounded pebbles
603	Deposit	Natural geology (Weathered London Clay)	Stiff, olive brown bluish grey mottles, clay
604	Deposit	Natural geology (London Clay)	Stiff, bluish grey with abundant greyish brown mottles, clay silt

### ATT9

Context	Type	Category	Description
31	Deposit	Made ground (Track Ballast)	Loose, black, small sub angular and irregular granite pebbles, clinker slag and Tarmac
32	Deposit	Natural geology (Brickearth)	Mid orange brown with light greyish blue mottles throughout, a homogenous silty clay containing rare small sub angular pebbles. Ilford Silts
33	Deposit	Natural geology	Fill of cryoturbation hollow 40. Mid orange brown coarse sand clay with frequent small sub angular gravel
34	Deposit	Natural geology	Fill of cryoturbation hollow 35. Mid orange brown coarse sandy clay and small sub angular to angular gravel
35	Cut	Natural geology (Cryoturbation hollow)	Irregular in plan, sides varied from vertical to 45° base pointed
36	Deposit	Natural geology	Light orange brown compact clayey silty sand. Homogenous deposit no inclusions
37	Deposit	Natural geology	Moderately compact light yellow, coarse sand. No inclusions
38	Deposit	Natural geology	Light-mid greyish yellow medium to fine sand with silty layers, upper boundary marked by 50mm thick depots of dark brown manganese stained sand.
39	Deposit	Natural geology	Soft, light to mid orange yellow coarse sand with 10% small sub angular pebbles. Some dark brown iron staining at upper surface
40	Cut	Natural geology (Cryoturbation)	Irregular in plan, sides varied from vertical to 45° base pointed

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd. Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0

		Hollow)	
--	--	---------	--

### ATT10

Context	Type	Category	Description
1000	Deposit	Made ground (Track Ballast)	Loose, black, pebbles and crushed tarmac
1001	Deposit	Natural geology (Brickearth)	Soft to moderately firm, pale greenish grey, mottled strong brown, cryoturbated clay silt, common lens of fine to medium sand
1002	Deposit	Natural geology	Loose to firm, reddish brown with pale greenish grey lens, fine to medium sand, traces of clay lens of gravely sand
1003	Deposit	Natural geology	Firm to loose yellowish olive brown fine to medium sand rare lens of small sub angular pebbles rare lens of light grey slightly clay
1004	Deposit	Natural geology	Loose, yellowish brown, medium sand with sub angular to rounded pebbles
1005	Deposit	Natural geology (Weathered London Clay)	Stiff, brown with fine bluish grey mottle, silty clay
1006	Deposit	Natural geology (London Clay)	Stiff, dark brown with fine small bluish grey mottles, clay silt

### ATT 11

Context	Type	Category	Description
1100	Deposit	Made ground (Track Ballast)	Loose, black, pebbles and crushed tarmac
1101	Deposit	Natural geology	Soft, yellowish brown, clay sand, rare rounded to sub angular pebbles
1102	Deposit	Natural geology	Loose, greyish brown mottled strong brown, fine to coarse sand traces of silt, abundant sub rounded to rounded pebbles rare cobbles
1103	Deposit	Natural geology	Firm, brown, clay with rare rounded pebbles
1104	Deposit	Natural geology (Weathered	Firm, brownish yellow with grey

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd. Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0

		London Clay)	mottles, silty clay
1105	Deposit	Natural geology (London Clay)	Stiff, bluish grey common mottles of greyish brown, clay

**ATTP 12**

<b>Context</b>	<b>Type</b>	<b>Category</b>	<b>Description</b>
1200	Deposit	Made ground (Track Ballast)	Loose, black, small sub angular pebbles and crushed tarmac
1201	Deposit	Natural geology (Fluvial sand)	Loose to very firm, yellowish red pale yellow mottles, medium sand traces of clay rare rounded pebbles
1202	Deposit	Natural geology (Brickearth)	Moderately firm, brown, clayey silt thin black organic silt lens
1203	Deposit	Natural geology (Brickearth)	Stiff, light greenish grey with abundant fine strong brown mottles, silty clay
1204	Deposit	Natural geology	Firm, greenish grey, clay fine to medium sand with common angular to rounded pebbles
1205	Deposit	Natural geology (London Clay)	Stiff, bluish grey common mottles of greyish brown, clay

This document contains proprietary information. No part of this document may be reproduced without prior written consent from the chief executive of Crossrail Ltd. Document uncontrolled once printed. All controlled documents are saved on the CRL Document System

© Crossrail Limited

CRL RESTRICTED

DT Decal Template: CRL1-XRL-Z-ZTM-CR001-50038 Rev 2.0

## **APPENDIX 2 - SUMMARY OF SITE DETAILS**

**Client name:** Crossrail Ltd

**Site name:** Ilford Yard Stabling Project

**Site code:** XTL13

**Grid reference:** TQ 44506 86889

**Type of investigation:** Archaeological Trial Trench Evaluation and General Watching Brief

**Date of project:** December 2013-September 2016

**Location of archive:** The archive is currently held at OA, Janus House, Osney Mead, Oxford, OX2 0ES, and will be deposited with the Museum of London in due course.

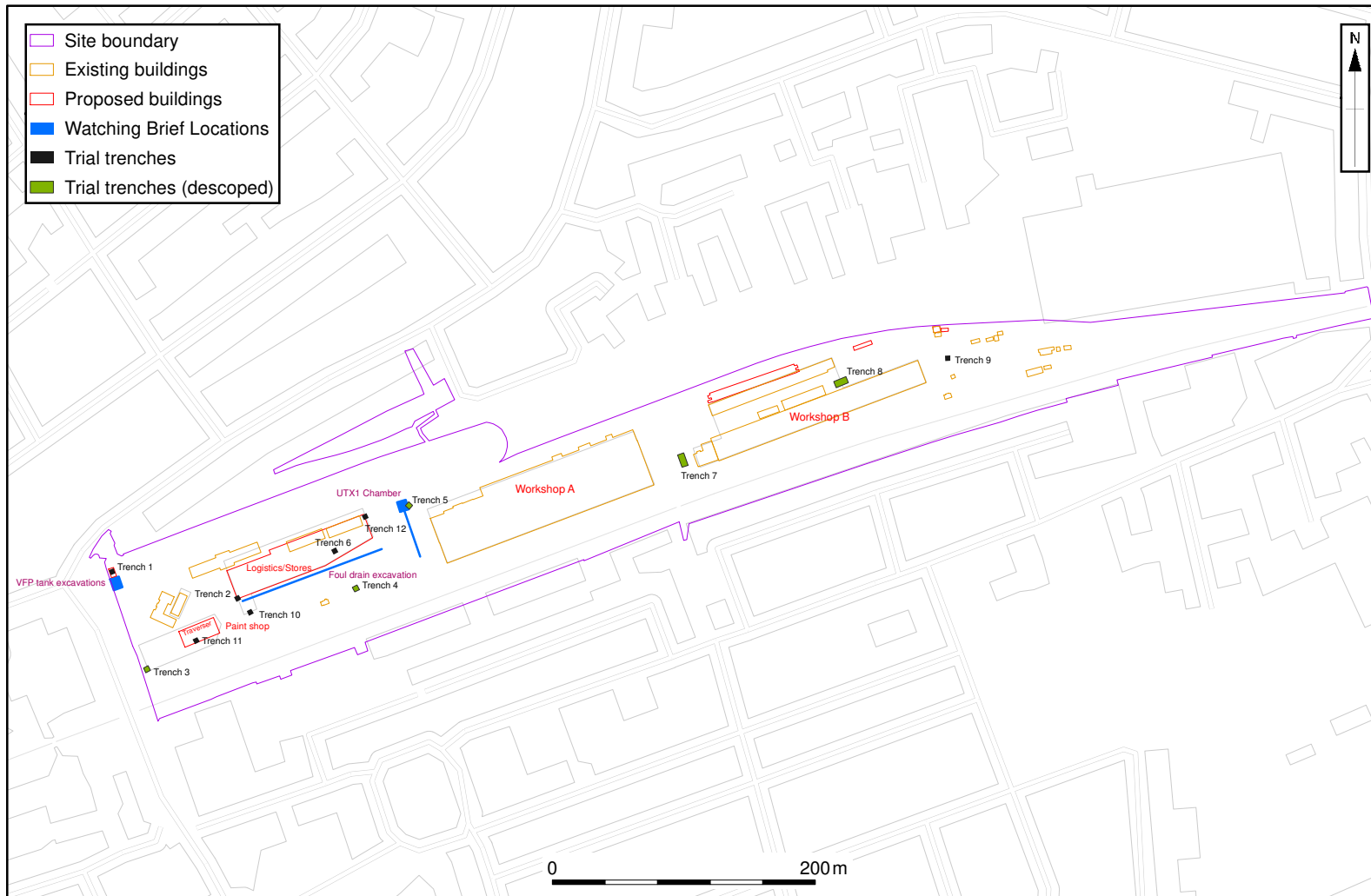


Figure 4: Location of Archaeological Trial Trenches (Proposed and actual) and major watching brief locations



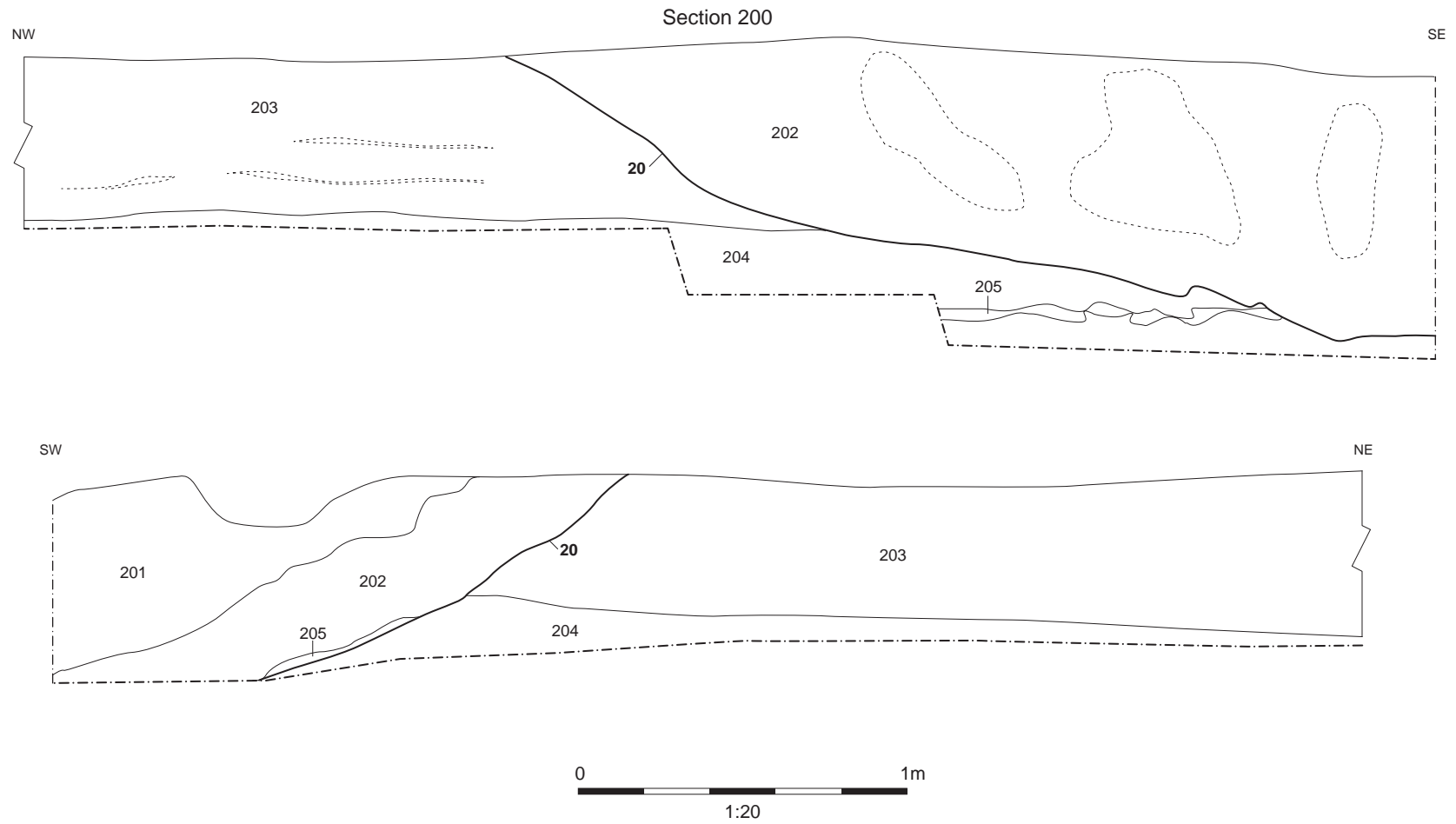


Figure 5: North facing section ATT2

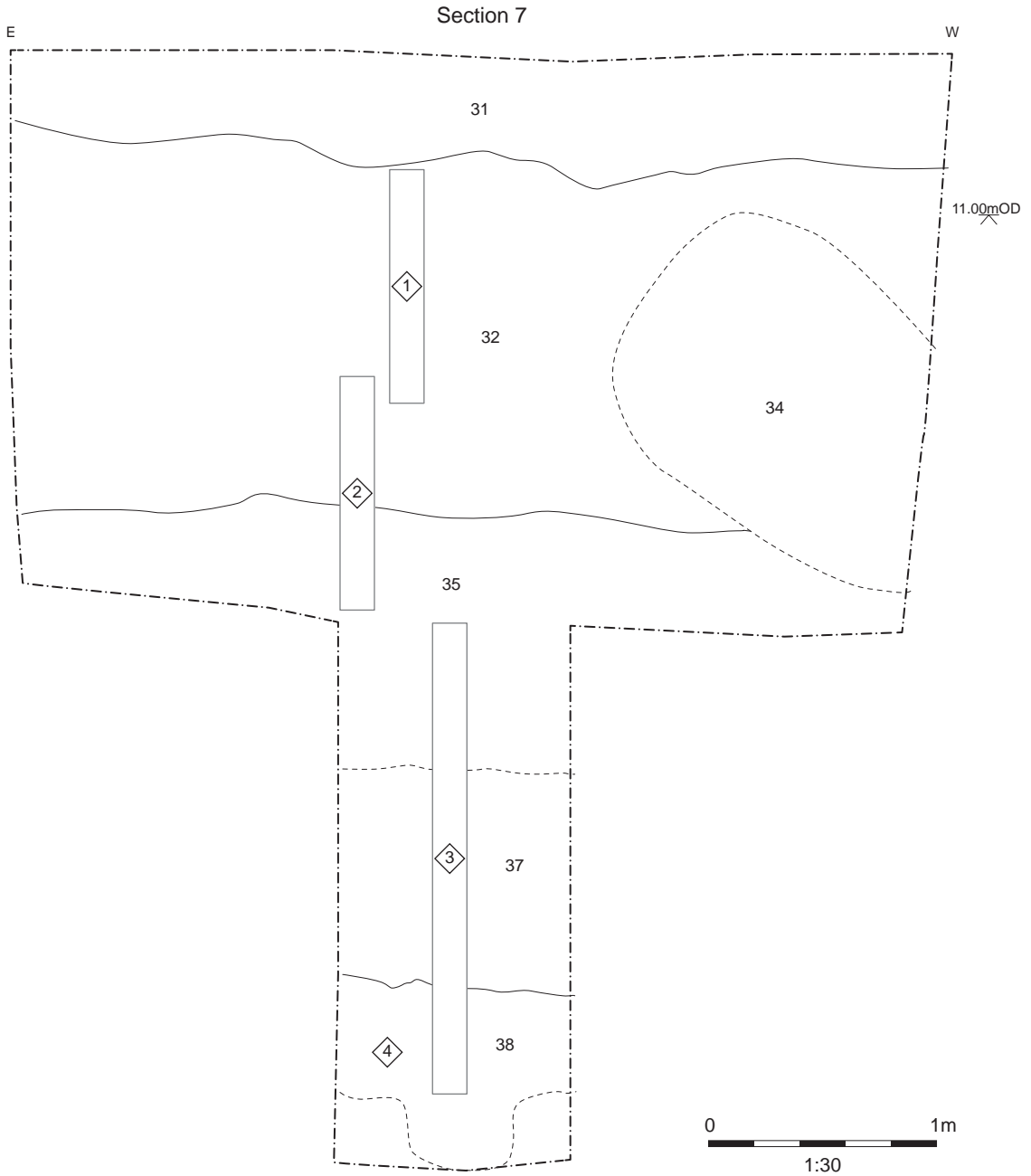


Figure 6: North facing section ATT9

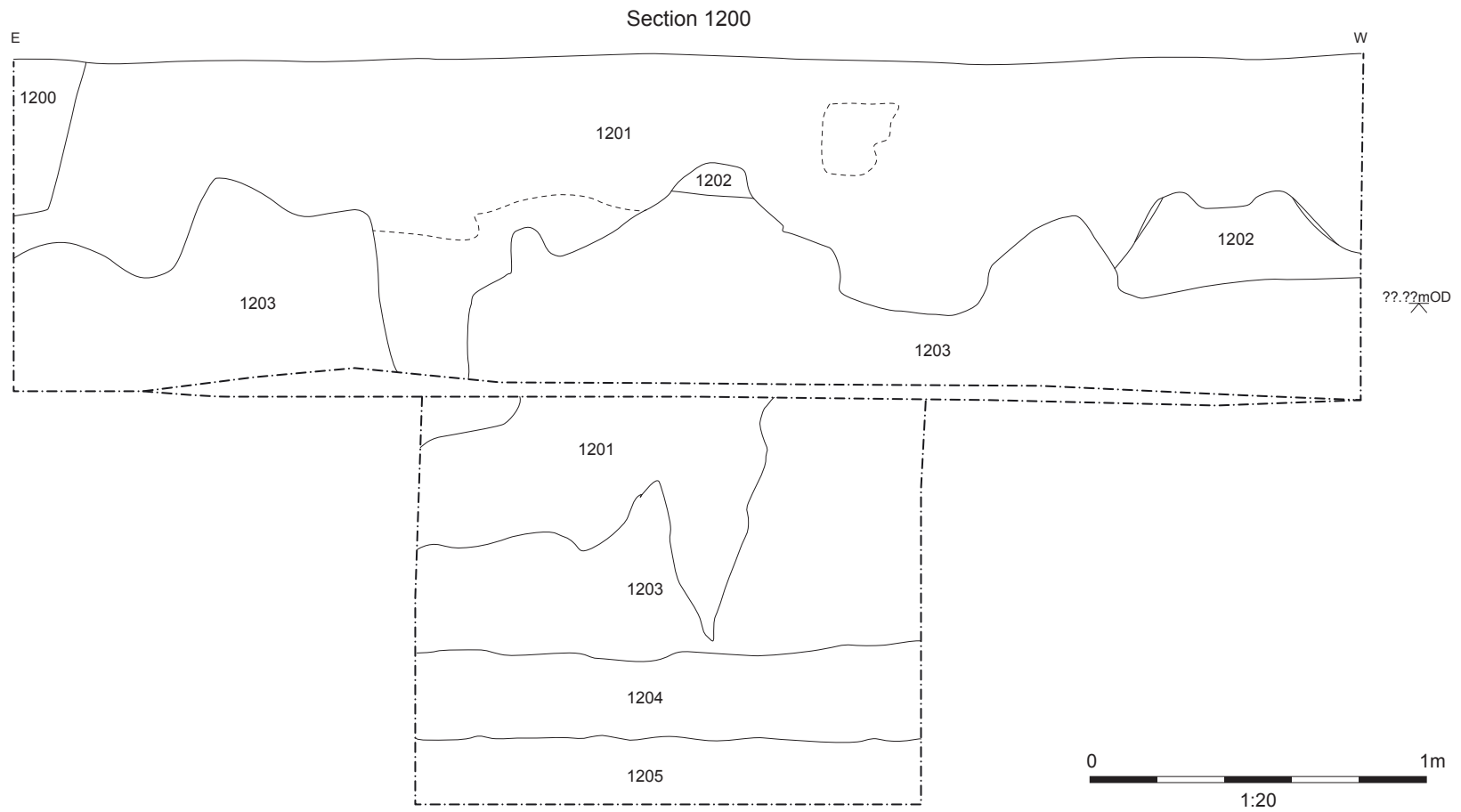


Figure 7: North facing section ATT12

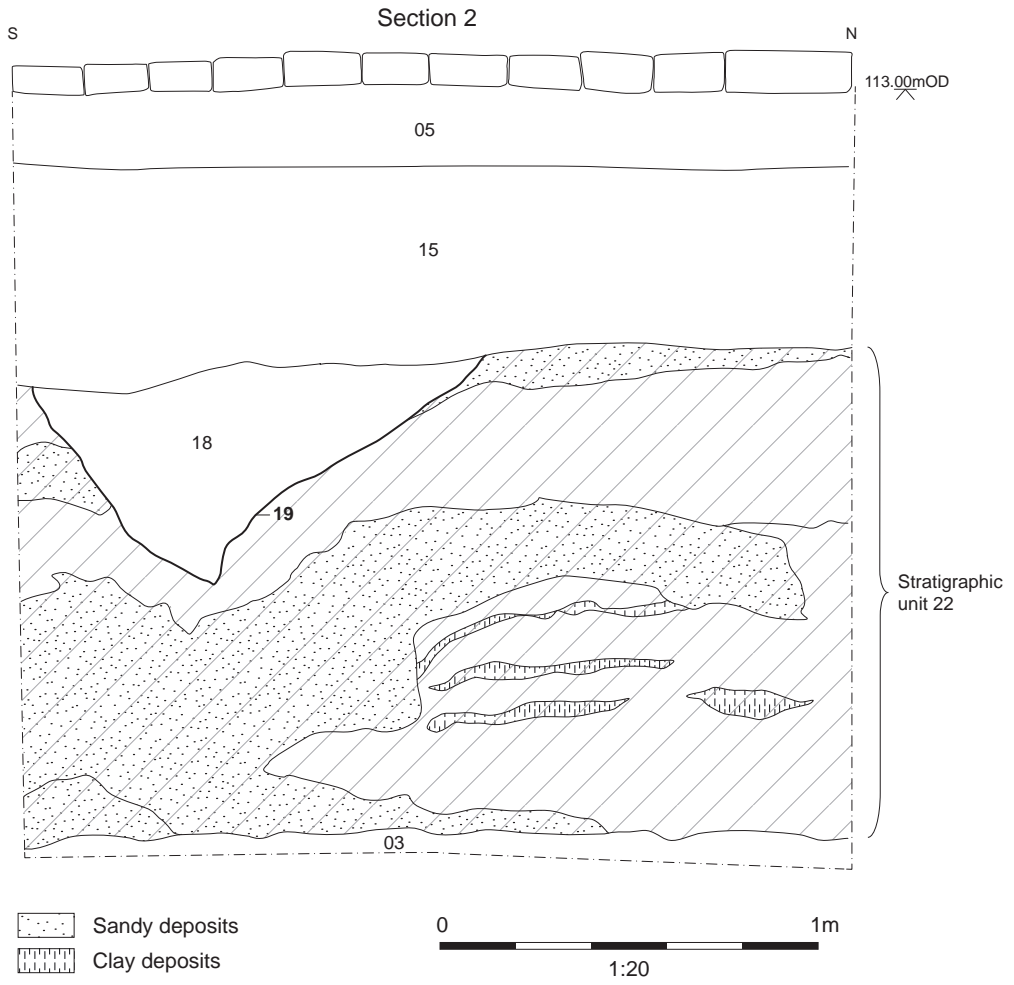


Figure 8: Section through bank along western edge of the site showing Ilford Silts



Plate 1: View of south-west-facing section of ATT2 showing River Terrace Gravels (203) and edge of silt filled "paleochannel" (20)



Plate 2: North-facing section of ATT9 showing the Ilford Silts (32) with sand filled ice wedge beneath modern "made ground" and above sands (36)



Plate 3: North-facing section of ATT12



Plate 4: Section revealed by the sheet piling works along the Site's western edge



Plate 5: Workshop A - working shot