



C257 Archaeology Central
Fieldwork Report
Blomfield Box Site
Archaeological Watching Brief and
Excavation Blomfield Box (XTB12)

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Non technical summary

This report presents the results of an excavation, targeted watching brief and site wide general watching brief carried out by Museum of London Archaeology (MOLA) at 11–12 Blomfield, London EC2, in the City of London, on the site of the future Crossrail Blomfield Box for the Liverpool Street Station, at 11–12 Blomfield Street, EC2, in the City of London. This report was commissioned from MOLA by Crossrail Ltd. This work is being undertaken as part of a wider programme to mitigate the archaeological implications of railway development proposals along the Crossrail route.

This archaeological fieldwork has confirmed the initial evaluation assessment that during the Roman period or earlier the Walbrook stream ran north–south across the site, becoming more shallow and marsh-like to the east. Later Roman activity, probably from the 2nd–3rd centuries AD, consisted of probable refuse disposal, possibly in a gradual attempt at land reclamation. Medieval activity seems to have been limited to the eastern edge of the site, in the form of drainage channels. Late 19th/early 20th-century brickwork and rail lines, probably from Metropolitan Line construction were uncovered under the former basement of 11–12 Blomfield Street.

The archaeological work on site consisted of three separate interventions: an excavation in the area of the grout shaft, a targeted watching brief on the area of the main box, and a general watching brief during ground reduction of the rest of the site (see Fig 2).

The excavation of the grout shaft area was done in two phases to record a full east–west profile across the shaft. The intention of this excavation was to explore the results seen in the evaluation, which uncovered the eastern edge of the main channel of the Walbrook. During the excavation, the channel was successfully recorded across the width of the trench. Natural sand and gravels were seen at the base (106.60m ATD) followed by a sequence of slow sedimentation, an early Roman marsh, quick episodes of sedimentation caused by flooding, and then Roman reclamation in the late 2nd-century topped by further marshy deposits combined with more Roman dumping/reclamation.

The targeted watching brief in the south-west portion of the main box recorded a probable continuation of the width of the Walbrook channel, filled with Roman reclamation dumping, and containing a later Roman ditch.

In the south-east corner of the site, the targeted watching brief recorded natural terrace gravels at a much higher level (108.33m ATD) than in the grout shaft, suggesting this would have been dryer ground near the edge of the Walbrook. An east–west running ditch cut into the subsoil and underlying natural terrace gravels is dated to the 11th/12th century by pottery found within the fills. This was in turn cut by a north–south running ditch. These may represent medieval attempts to drain the higher ground to the east into the Walbrook that ran along the western edge of the site.

The general watching brief on ground reduction across the rest of the site revealed late 19th/early 20th-century brickwork and rail lines in the northern portion of the site, probably from the Metropolitan Line.



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1 Introduction

Crossrail is a new Cross-London Rail Link project which will provide transport routes across the south-east of England and London. The route will link Maidenhead and Heathrow in the west with Shenfield in the north-east and Abbey Wood in the southeast. In central London, from Royal Oak in the west to Pudding Mill Lane and Royal Victoria Dock in the east, Crossrail will consist of a tunnelled section with seven new stations linked to the existing transport network.

The Crossrail Liverpool Street Station is a new underground station proposed on the Crossrail network. The works on and around the site of the future Blomfield Box are part of this wider scheme of construction.

The Crossrail mitigation response to archaeology is described in the Crossrail Generic WSI (Crossrail 2009) and the detailed desk based assessment (DDBA; Crossrail 2008), and can be summarised as follows:

- In the event that intact and important archaeological remains are identified at Crossrail worksites through this process, it may be preferable, where practicable, to preserve these where they are found (ie preservation in situ).
- However, because of the nature of major works projects such as Crossrail, experience of other similar projects suggests that preservation by record is usually the most appropriate method of dealing with archaeological finds.
- Following an extensive Environmental Impact Assessment (EIA) supporting the Crossrail Bill, and the production of site-specific DDBAs, appropriate mitigation measures were scoped and specified in detail in individual project designs (site-specific WSIs – Written Schemes of Investigation) which were prepared in accordance with the principles set out in the Generic WSI, and developed in consultation with the relevant statutory authorities.
- Archaeological information that is gained from fieldwork will be followed by analysis and publication of the results and will be transferred to an approved public receiving body.

This fieldwork report describes the results of an archaeological excavation, targeted watching brief and site wide general watching brief carried out prior to the construction of the above-mentioned shaft at 11–12 Blomfield Street by Museum of London Archaeology (MOLA) under Crossrail contract C257 Archaeology Central.

The Blomfield Box site lies within the City of London. The site consists of the now demolished 11 and 12 Blomfield Street and rearward extensions, bounded to the north by the underground railway, to the south by further buildings along Blomfield Street, and to the east by the western end of Broad Street Avenue. The centre of the site is at Ordnance Survey National Grid Reference 532990 181570.

The watching briefs were conducted between the 4th March and 5th April 2013, and supervised by Bruce Ferguson (MOLA supervisor). The excavations were conducted between 6th November 2013 and 23rd January 2014, and supervised by Greg Laban, Isca Howell and Paolo Guarino (MOLA supervisors).

All levels in this document are quoted in metres Above Tunnel Datum (m ATD). To convert Tunnel Datum to Ordnance Datum subtract 100m, ie 1m OD = 101m ATD.



Table 1 Site Details

Task	Principal Contractor	Programme
<ul style="list-style-type: none">• General Watching Brief on Obstruction Removal	C502 LOR (Laing O'Rourke)	Collectively: 20th August 2012 to 5th April 2013
<ul style="list-style-type: none">• General watching brief on site wide ground reduction to 106.74m ATD	C502 LOR (Laing O'Rourke)	
<ul style="list-style-type: none">• Targeted Watching Brief within the Main Box on ground reduction to 106.70m ATD	C502 LOR (Laing O'Rourke)	
<ul style="list-style-type: none">• Excavation in Grout shaft (13m x 7m x c 2.6m deep)	C502 LOR (Laing O'Rourke)	6th November until 23rd January 2014

The event code (sitecode) is XTB 12. Prior to these phases of fieldwork an evaluation was undertaken and recorded under sitecode XSL10.

2 Planning background

The legislative and planning framework in which all archaeological work took place was summarised in the Site Specific Written Scheme of Investigation (Crossrail 2009) and the Addendum to that WSI (Crossrail 2011) (see section 4 below) – which should be referred to for further detail. A brief summary is included here:

The overall framework within which archaeological work will be undertaken is set out in the Environmental Minimum Requirements (EMR) for Crossrail (Crossrail 2008). The requirements being progressed follow the principles of Planning Policy Guidance Note 16 (PPG16)(DoE 1990), and its replacements Planning Policy Statement 5 (PPS5)(DCLG 2010) and the National Policy Planning Framework (NPPF)(DCLG 2012), on archaeology and planning. Accordingly the nominated undertaker or any contractors will be required to implement certain control measures in relation to archaeology before construction work begins.

Schedules 9, 10 and 15 of the Crossrail Act 2008 concern matters relating to archaeology and the built heritage, and allow the dis-application by Crossrail of various planning and legislative provisions including those related to listed building status, conservation areas and scheduled ancient monuments (Schedule 9). Schedule 10 allows certain rights of entry to English Heritage given that Schedule 9 effectively disapplied their existing rights to the Crossrail project, and Schedule 15 allows Crossrail to bypass any ecclesiastical or other existing legislation relating to burial grounds.

Notwithstanding these disapplications, it is intended that agreements setting out the detail of the works and requiring relevant consultations and approvals of detail and of mitigation arrangements will be entered into by the nominated undertaker with the relevant local planning authorities and English Heritage in relation to listed buildings and with the Department of Culture, Media and Sport (DCMS) and English Heritage in relation to Scheduled Ancient Monuments (SAMs).

3 Origin and scope of the report

This report has been commissioned from Museum of London Archaeology (MOLA) by Crossrail Ltd. The report has been prepared within the terms of the relevant standard specified by the Institute for Archaeologists (IFA 2001). It considers the significance of the fieldwork results (in local, regional or national terms) and makes appropriate recommendations for any further action, commensurate with the results.

This report will be made available from The London Archaeological Archive and Research Centre (LAARC) in due course.

4 Previous work relevant to archaeology of site

The Blomfield Box site, 11–12 Blomfield Street, has been the subject of a series of investigations, notably non-listed built heritage recording (NLBH – standing building recording) of the former 19th-century office building that occupied the site (under site code XSB10), and archaeological evaluation trenches (under site code XSL10), which are reported on in:

- *Crossrail 2005 Assessment of Archaeology Impacts, Technical Report. Part 2 of 6, Central Route Section, 1E0318-C1E00-00001*, [Specialist Technical Report (STR)]
- *Crossrail 2008 MDC – Work Package 3, Archaeology Detailed Desk Based Assessment, Liverpool Station, Doc. No.: CR-SD-LIV-EN-SR-00001* (DDBA)
- *Crossrail 2009 Crossrail SS-WSI - Liverpool Station, Site-specific Written Scheme of Investigation, Crossrail November 2009, Doc. No. CR-SD-LIV-EN-SY-0001 Version 6.0* [WSI]
- *Crossrail 2012 Watching Brief & Detailed Excavation – Blomfield Worksite – (XTB12) Blomfield Box*, Doc. No. C502-XRL-T1-RST-C101-50001, Revision 1.0, 27.06.2012 [WSI Addendum] (this supersedes the earlier addendum C138-MMD-T1-RST-C101-00005 of 20.08.2010)
- MOLA for Crossrail, 2011, C257 Archaeology Central, Heritage Survey Report on 11–12 Blomfield Street, Non-Listed Built Heritage Recording, Doc No. C257-MLA-X-RGN-CRG03-50001, v1 02.02.11
- MOLA for Crossrail, 2012 *Central Section Project, Fieldwork Report, Archaeological Evaluation at 11–12 Blomfield Street (XSL10)*, Doc. No. C257-MLA-X-RGN-CRG02-50126, v1, 04.07.12.

All fieldwork was carried out to a method statement prepared in line with the principal contractor's method statement (MOLA, 2012d).

5 Site Description

The Blomfield Box site consists of the site of the now-demolished 11 and 12 Blomfield Street and rearward extensions, bounded to the north by the underground railway, to the south by further buildings along Blomfield Street, and to the east by the western end of Broad Street Avenue (Fig 1).

The grout shaft is located at the western edge of the site, adjacent to Blomfield Street (Fig 1). The targeted watching brief was located in the south-east corner of the site in the main box (Fig 2).

5.1 Geology and topography of site

The site sits within the ancient flood plain of the River Thames, on the eastern bank for the former Walbrook stream. This tributary of the Thames formed a broad, shallow valley, here sloping down from east to west, and its main channel originally flowed along the western edge of the site.

Tributaries of the river Walbrook are known to have flowed 30m to the south of the site, as recorded at 46–47 New Broad Street (sitecode GM122) and 50m to the south-west at Winchester House (GM193).

Taplow Terrace gravels were previously recorded at the grout shaft area in evaluation Trench 3 at 106.19 to 106.45m ATD. They slope down from east to west (they were recorded slightly higher between 106.7 and 106.9m ATD in evaluation Trench 1 to the east), reflecting the slope of the side of the Walbrook valley, and the channel of the Roman or pre-Roman Walbrook. The channel was filled with a silty clay alluvial deposit to a level of 107.35m ATD. Above this were the Roman deposits within the channel (see 5.2). This understanding of the topography, as known before the fieldwork reported on here, is expanded on from the current results in section 11.1.

5.2 Archaeological and Historical Background

Channels associated with the Roman (and later) management and drainage of the Walbrook have been identified 70m to the north-east at Crossrail Broadgate Ticket Hall site (MOLA 2012). Extensive Roman remains representing varied extra-mural activities have been recorded on surrounding sites, including an east–west aligned road (FIB88 & XSM10) 150m to the west, inhumations at New Broad Street (NEB87) 60m to the south-east, as well as a variety of drainage ditches and pits.

In evaluation Trench 3 (MOLA for Crossrail 2012), Roman or earlier channel silts from the Walbrook extended more than 4m from the western edge of the site (eastern edge of Blomfield Street) – the full extent was not seen. These deposits were seen in a larger exposure in the excavation and watching briefs, as described in section 11.2.

A number of timber posts have been exposed on sites nearby and on similar alignments to this site. Some were seen running approximately north–south immediately to the south of the western end of the Blomfield street site (sitecode GM122), and also on a site 40m to the west (sitecode FIN81). Crossrail archaeological works on roughly the same alignment to the north at the Broadgate Ticket Hall have exposed two sets of timbers: larger posts of 16th-century or later date (probably associated with the boundary wall of the Bedlam burial ground), and smaller timbers from what appears to be a minor Roman revetment of the Walbrook. No such timbers were found in the excavation and watching briefs.



The Walbrook channel deposits at the Broadgate Ticket Hall have also produced more than two dozen human crania (skulls), and a small quantity of other human and animal bones, along with a an assemblage of early Roman pottery. This concentration may be the result of the particular depositional environment at that point, immediately after the right-angled confluence of two branches of the lost stream. Alternatively much of this material may have eroded from the Eldon Street Roman cemetery and washed down stream. No human remains were found in the excavation and watching briefs.

Roman activity in the evaluation trenches was limited to reclamation dumps in the Walbrook channel, potentially from sometime between the 2nd to 3rd centuries AD. These deposits were truncated by the basement of 12 Blomfield Street. This removed all archaeological remains on the reclaimed banks of the Roman Walbrook to a depth of 106.84m ATD, such as Roman burials seen immediately to the southeast (Site Code NEB87).

Truncation seen in both the evaluation, and in the excavation and watching briefs, had removed any occupation horizons or evidence for other activity taking place on the reclaimed banks of the Walbrook, such as the Roman burials seen on a site immediately to the south-east (sitecode NEB87), which was at levels that had been removed by modern construction in the evaluation trenches.

The Moorfields Marsh formed sometime during, or after, the later Roman period. The marshy conditions continued through the medieval period, until drainage in the late medieval and early post-medieval periods. However, marsh deposits were not present in the evaluation trenches nor the excavation and watching briefs, probably having been truncated by later 19th or 20th-century construction.

Historic mapping indicates that the site of the Blomfield Box was a marginal area and largely abandoned up to the mid-17th century, used as a dumping ground for waste, and the location of industries such as tanning and tawing, and tenter grounds. Occupation of the area began as ribbon development along Bishopsgate to the east, most notably the buildings, gardens and land belonging to the St Mary Bethlem Hospital. By the time of Ogilby and Morgan's survey of 1676 the area was occupied by residential tenement buildings. The area remained occupied by tenement buildings up until the building of the railway and the 11–12 Blomfield Street offices. The Metropolitan Line was built in 1875–76 immediately to the north with the railway lines and retaining walls extending into the northern portion of the site.

The 11–12 Blomfield Street offices were some of the earliest purpose built offices, constructed between 1873 and 1894 and remained until the demolition for this project.

6 Research objectives and aims

6.1 Research Aims

The original overall aims and objectives were listed in the Liverpool Street WSI (Crossrail 2009). Evidence relating to the Walbrook, its tributaries and Moorfields Marsh deposits may provide data relevant to the following themes:

1. Understanding London's hydrology, river systems and tributaries and the relationship between rivers and floodplains;
2. Understanding how water supply and drainage provision were installed and managed;
3. Refining our understanding of the chronology and function of the landward and riverside defences and extramural evidence of defensive or military structures in the Roman period;
4. Understanding the relationships between urban settlements and royal villas or religious estates;
5. Examining the proposal that there was an ideological polarity between town and anti-town systems: Roman towns did not so much fail as were discarded;
6. The end of the Roman occupation: developing explanatory models to explain socio-political change and considering the influence of surviving Roman structures on Saxon development.
7. Examining the use in any one period of materials from an earlier period (eg. Saxon use of surviving Roman fabric) and the influence on craftsmanship, manufacture and building techniques.
8. Understanding the differences, if any, between burial practices in the city and outlying cemeteries;
9. Understanding life expectancy, origins and belief, seen through studying health, diet and disease, and preparing models for future research;
10. Considering the relationship between cemeteries and major or minor roads, in terms of symbolism, status, privacy and convenience; and
11. Understanding the cultural and symbolic roles played by London's defences through the ages as reflections of power and political security or imposition and dominance.

Specifically, in areas not truncated by later activity the archaeological investigations had the potential to recover:

- Artefacts of prehistoric date re-deposited in later deposits.
- Remains of Roman extra-mural activity, potentially including burials.
- Waterlain deposits from the Roman to medieval Moorgate Marsh, with the potential for organic preservation and palaeoenvironmental evidence.
- Late medieval and post-medieval drainage ditches, rubbish dumps and remains associated with the reclamation of Moorgate Marsh.
- Remains of a mid-17th-century or earlier building on the eastern side of Blomfield Street shown on Faithorne and Newcourt's map of 1658, and late 17th/early 18th-century or later buildings across the whole site from 1676 onwards.

6.2 Fieldwork Objectives

The overall objective of the archaeological investigation, as stated in the WSI Addendum, is to mitigate the impact of Crossrail construction through a programme of archaeological works carried out in accordance with the Crossrail Generic WSI (document number CR-PN-LWS-EN-SY-00001) and the standards listed therein.

The following task-specific research questions were devised by MOLA for this work, expanding on the recommendations in the evaluation reporting (MOLA 2012):

- What are the extent, orientation, dating, and character of the **Walbrook channel(s)** in the **Iron Age and/or Roman period**, and how does it fit into the overall topography of the **Walbrook system**?
- Is there evidence that the **Walbrook channel** was **revetted, canalised or bridged** from the Roman period onward? Did timber posts seen during previous watching briefs in Blomfield Street (GM122 and FIN81) belong to a revetment(s) which extended into the Blomfield site?
- Are any **human or animal remains, or artefacts**, present **within the Walbrook deposits**, similar to those from nearby sites along the stream? If so, what is their character, date, and likely origin?
- Are the dumped deposits seen in evaluation **reclamation of the Walbrook** and its valley, or another activity? What is the date, or dates, of this sequence of dumping?
- What is the nature and the date of the **Roman extra-mural activity** on the site, how does it compare with that in the surrounding area? Is this related to any variations in the levels of the natural geology?

7 Methodology of site-based and off-site work

All archaeological excavation and recording during the project was carried out in accordance with:

- Crossrail 2010 **Site-specific Written Scheme of Investigation (SS-WSI)**: SS-WSI – *Liverpool Street Station Design Package 138*, Doc. No. C138-MMD-T1-RST-C101-00001, April 2010 [WSI]
- An **Addendum to the WSI**: *Watching Brief & Detailed Excavation – Blomfield Worksite – (XTB12) Blomfield Box*, Doc. No. C502-XRL-T1-RST-C101-50001, Revision 1.0, 27.06.2012 [WSI Addendum] (this supersedes the earlier addendum C138-MMD-T1-RST-C101-00005 of 20.08.2010)
- MOLA for Crossrail: *C257 Archaeology Central, Method Statement, Archaeological Watching Brief, Blomfield Box, 11–12 Blomfield Street, C257-MLA-X-RGN-CRG02-50141*, v1, 20-08-12
- MOLA for Crossrail: *C257 Archaeology Central, Method Statement, Archaeological Targeted Watching Brief, Blomfield Box, 11–12 Blomfield Street, C257-MLA-X-GMS-C101-50002*, v1, 27.02.13
- MOLA for Crossrail: *C257 Archaeology Central, Method Statement, Excavation, Blomfield Box, 11–12 Blomfield Street, C257-MLA-T1-GMS-CRG03-50001*, v1, 29.10.13
- Museum of London *Archaeological Site Manual* (MoL 1994)
- English Heritage Greater London Archaeology Advisory Service, June 1998 *Archaeological Guidance Papers 1–5*
- English Heritage Greater London Archaeology Advisory Service, May 1999 *Archaeological Guidance Papers 6*
- English Heritage, July 2009, *Standards for Archaeological Work, London Region, External Consultation Draft*

NB the above EH/GLAAS guidelines were in force at the time of the fieldwork (which finished in January 2014). The following came out the next month, replacing them, and applies to reporting and post-excavation work.

- English Heritage Greater London Archaeology Advisory Service: *Standards for Archaeological Work, London Region*, February 2014
- English Heritage Centre for Archaeology *Guidelines, Environmental archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation* (2002)
- English Heritage, 2004, *Geoarchaeology: using earth sciences to understand the archaeological record*
- Corporation of London Department of Planning and Transportation, 2004 *Planning Advice Note 3: Archaeology in the City of London, Archaeology Guidance*
- Crossrail *Environmental Minimum Requirements* (Crossrail 2008)
- Crossrail *Archaeology Generic Written Scheme of Investigation* (draft July 2009)
- Crossrail *Archaeology Specification for Evaluation & Mitigation (including Watching Brief)* (CR-PN-LWS-EN-SP-00001)



- Crossrail Code of Construction Practice
- Institute for Archaeologists (IFA) Standards and guidance for watching briefs and field evaluation (IFA 2001a and 2001b)
- Museum of London General Standards for the preparation of archaeological archives deposited with the Museum of London (1998)
- United Kingdom Institute for Conservation's Conservation Guidelines No. 2

The site finds and records can be found under the site code XTB 12 in the MOLA archive. They will be stored there pending a future decision over the longer-term archive deposition and public access process for the wider Crossrail scheme.

7.1 Targeted Watching Brief Methodology

A Targeted Watching Brief was carried out within the area of the main box (see Fig 2).

A detailed description of the targeted watching brief methodology was included in the Targeted Watching Brief Method Statement (MOLA 2013a).

The Principal Contractor (Laing O'Rourke) removed modern overburden under the supervision of Senior Archaeologist Bruce Ferguson until significant archaeological deposits were encountered. This included linear features and Roman deposits. Investigations into the deposits and features were carried out by a team of archaeologists using hand tools.

A written, drawn and photographic record of all archaeological deposits encountered was made in accordance with the principles set out in the Museum of London site recording manual (MoL, 1994). The archaeological features and sections were located by offset survey using the extant walls on site. The measurements were then given to the MOLA Geomatics team to add to the CAD drawings.

The watching brief ceased when river terrace gravels and sands were encountered.

7.2 General Watching Brief Methodology

A General Watching Brief was carried out across the site on all areas not covered by the targeted watching brief within the main box and the grout shaft excavation (see Fig 2)

A detailed description of the archaeological watching brief methodology was included in the Archaeological Watching Brief Method Statement (MOLA 2012).

Ground reduction to 106.7m ATD and obstruction removal were carried out by the Principal Contractor (Laing O'Rourke) under the supervision of Senior Archaeologist Bruce Ferguson. Recording was carried out on rail lines and brick walls encountered during the work.

A written, drawn and photographic record of all archaeological deposits encountered was made in accordance with the principles set out in the Museum of London site recording manual (MoL, 1994). The archaeological features were located by measuring off the known extant walls on site. The measurements were then given to the MOLA Geomatics team to add to the CAD drawings.

7.3 Excavation Methodology

Detailed archaeological excavation was required in the location of the grout shaft adjacent to Blomfield Street (Fig 2). The grout shaft measured approx. 13m x 7m.



However due to extensive Victorian foundations truncating the northern most part of the grout shaft the excavation area was limited to an area approx. 9m x 7m.

C502 (Laing O'Rourke) needed to install three raking props within the levels of the archaeological horizons. To do this, initial excavation by C502 produced a sloped, 'stepped', profile on the eastern edge of the grout shaft from which to construct the propping, sloping down from 108.8m ATD to 106.74m ATD.

Because of this the work was conducted in three general phases within C502's Construction Sequence Stage 5a.

Phase 6: C502 Excavated down from c 108.8m ATD to the construction level for the props, with archaeological recording by MOLA (cf a watching brief).

Phase 7: C502 inserted the props.

Phase 8: MOLA, aided by C502, excavated the remaining archaeology, followed by MOLA hand back to C502

In Phases 6 and 8, the grout shaft was excavated in two roughly equal halves (north and south), to allow the recording and production of a composite east–west section drawing, showing the profile of deposits across the Walbrook channel and valley.

The strategy for the excavation phases was one of careful machine excavation, under archaeological control and close supervision, in shallow spits of approximately 0.2m or less (depending on site conditions), with cleaning and recording at significant horizons.

A written, drawn and photographic record of all archaeological deposits encountered was made in accordance with the principles set out in the Museum of London site recording manual (MoL 1994)

7.4 Geoarchaeological on-site methodology

All archaeological excavation and monitoring during the evaluation was carried out in accordance with the preceding method statement (MOLA 2013b), the Archaeological Site Manual (MoL 1994) and guided by the recommendations outlined in the English Heritage Guidelines for Environmental Archaeology and Geoarchaeology (2002 and 2004 respectively).

During the excavation phase of the works a geoarchaeologist visited the site when deemed necessary by the site supervisors and the project manager. Preliminary interpretations of the soil and sediment characteristics of the sections were made on site and an overview of the stratigraphy was produced that characterised the deposit sequence, identified soil / sediment processes and suggested depositional environments. Monolith samples were taken through representative deposit sequences and 40 litre bulk samples were taken through key deposits, respecting context boundaries and adjacent to the monoliths. The monolith locations are shown on Fig 3.

8 Results and observations including stratigraphic report and quantitative report

8.1 Targeted watching brief on ground reduction to 106.70m ATD



Photo 1 Recording the east–west linear feature of Roman, possibly later date, looking east

Targeted Watching Brief on ground reduction to 106.70m ATD (Fig 2, Fig 4, Fig 5, Fig 6)	
Location	Main Box
Dimensions	30m x 12m
OS National grid coordinates	533015 181556
LSG grid coordinates	83362 36241
Modern Ground Level	109.60m ATD
Modern subsurface deposits	108.57m ATD



Level of base of archaeological deposits observed	108.33m ATD
Natural observed	Orangey brown terrace gravels [17] and [34] at 108.33m ATD along the eastern edge of the main box and 107.60m ATD at the western edge
Extent of modern truncation	Orangey brown natural sands and gravels truncated in several spots by concrete piles and in the northern half the area was severely truncated by a 19th-century yellow stock brick basement
Archaeological remains	Dating Evidence, Finds, and Samples
[33] Roman dump deposit. 107.87m ATD. Overlaid the natural gravels [34]	Roofing tile dated AD 50–160, a single sherd of pottery dated AD 50–170
[32] ditch with a dark grey black silty clay fill [31]. 107.93m ATD. Cut [33].	[31] a piece of abraded daub likely Roman and a single piece of roofing tile dated AD 50–160
[30] Greyish brown silty clay dump deposit. 108.07m ATD. Overlaid [31]	none
[16] greyish brown silty clay subsoil. 108.63m ATD. Overlaid the natural gravel [17].	Two pieces of hand-built coarsewares dated AD 1050–1150
[21] E–W running ditch, with a primary fill [20] of brown silt, and dark brown sandy silt fills [18] and [19], 108.73m ATD. Cut [16]	[18] three pieces of hand-built coarsewares dated AD 1050–1150
[25] N–S running ditch, with fills of dark brown sandy silt [22], [23] and [24]. 108.73m ATD. Cut [19].	none
Interpretation and summary	
<p>Natural terrace gravels were recorded between 107.60m and 108.33m ATD across the main box area</p> <p>In the south-west corner of the main box (See Fig 2 and Fig 5), despite extensive 19th and 20th-century disturbance, a sequence of Roman activity was recorded. The natural sands and gravel [34] were observed at 107.60m ATD. On top of this was a Roman reclamation layer [33], cut by a N–S running ditch [32] with a fill [31]. This was sealed by a probable Roman dump layer [30]. Everything above and including this layer was truncated by modern activity.</p> <p>Within this south-west corner the depth of the natural gravels suggests this was within the main Walbrook channel, with the eastern edge rising up towards the bank. The amount of Roman land reclamation dumping was thicker than those layers seen further to the west. This showed a distinct pattern of dumping from the eastern bank with amounts diminishing towards the centre of the channel.</p> <p>In the eastern side of the Main Box section, above the natural gravel was a soil horizon [16] (possibly a cultivated ‘topsoil’), dated to the medieval period (Fig 4). Cutting into [16] was a linear feature [21], it ran east–west and may have been a drainage ditch running towards the Walbrook channel. Pottery recovered from the fill</p>	



of this ditch suggests a medieval date. A second linear feature [25] running N–S cut through the fills of linear feature [21]. It is likely this was another drainage ditch dating sometime post AD 1050. These ditches appear to be medieval attempts at draining the higher ground of the site towards the Walbrook channel, possibly as part of a larger system of drains.

8.2 General watching brief

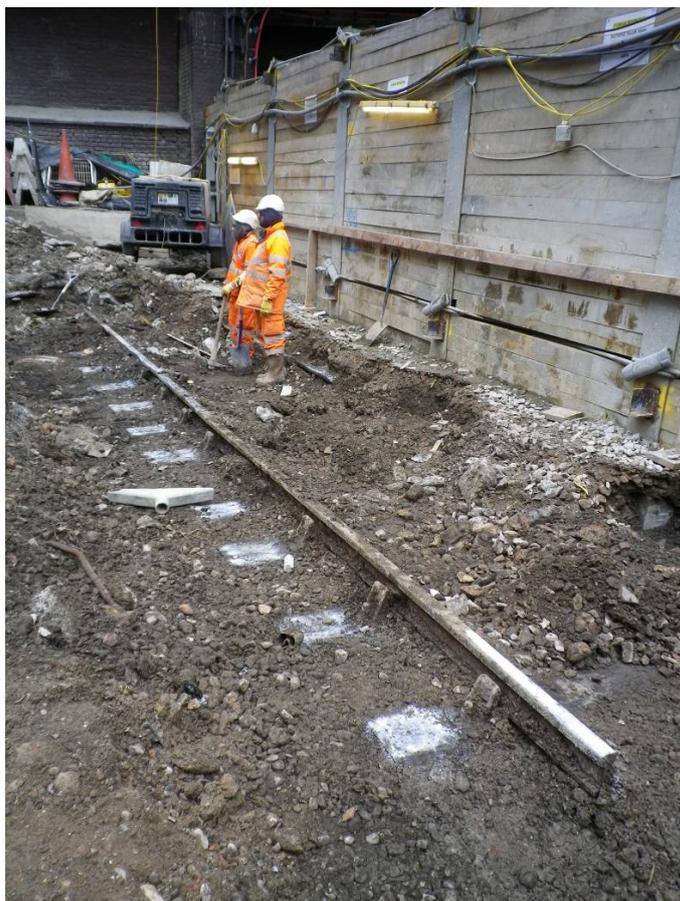


Photo 2 Railway track exposed at the northern edge of the Blomfield Street site, looking west

General Watching Brief (Fig 2, Photo 2)	
Location	Northern edge of site, under 11 Blomfield Street basement
Dimensions	Site wide
OS National grid coordinates	531015 181568
LSG grid coordinates	83363 36252
Modern Ground Level/top of the slab	109.00 ATD
Modern subsurface deposits	20th-century concrete foundations visible at 106.95m ATD
Level of base of archaeological deposits observed	108.50m ATD, level of brick walls
Natural observed	N/A
Extent of modern truncation	19th and 20th-century foundations across the area

Archaeological remains	Dating Evidence, Finds, and Samples
[21] Parallel yellow brick and red brick walls	Early to mid-19th-century bricks, not retained
Iron railway track on wooden sleepers	Probably late 19th-century
Interpretation and summary	
<p>Outside the main box area of the targeted watching brief, ground reduction at the northernmost end of the site, against the Metropolitan and Circle line, exposed the remains of a section of railway track on wooden sleepers (Photo 2). The tracks appeared to be 4ft 8 1/2" standard gauge bullheaded rail.</p> <p>Removal of the track and supporting ballast uncovered two truncated parallel 19th-century walls on an east–west alignment (Photo 3), one constructed from yellow brick, the other from red brick. These were spaced 1.25m apart from one another, again corresponding to the standard gauge. These walls may have been supports for wooden sleepers and tracks, possibly forming a inspection chamber similar to those seen in the basement of Smithfield Market at Farringdon. (Another possibility is that they are from an earlier 19th-century building, pre-dating the railway, but this appears less likely). Both the railway and earlier walls correspond to the area of a siding to the Metropolitan Railway seen on the 1894 Ordnance Survey map (Fig 7), see 11.4.</p>	

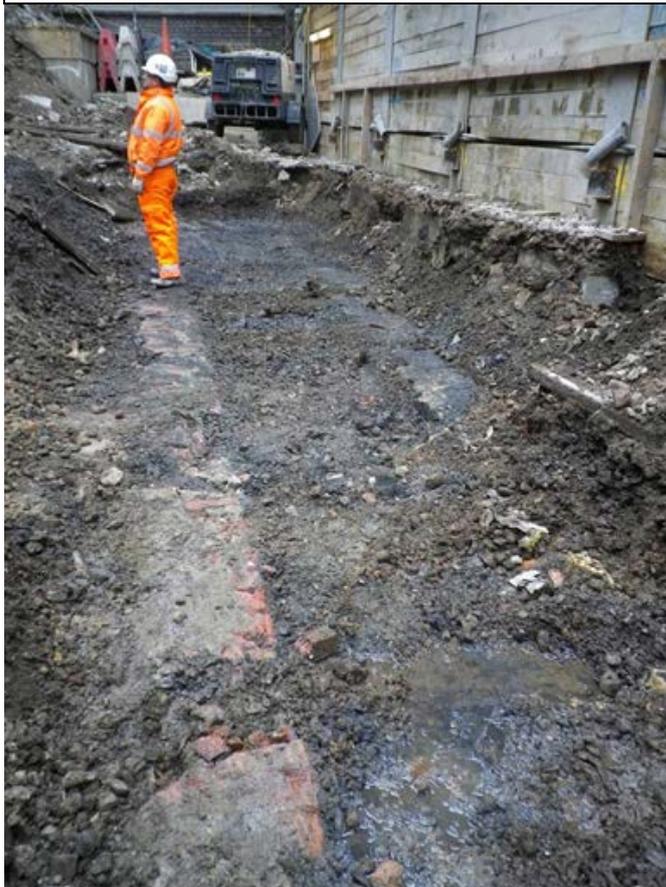


Photo 3 Red and yellow brick walls, potentially for supporting the sleepers of the Metropolitan line seen in Photo 2, looking west.

8.3 Grout shaft excavation



Photo 4 Grout shaft eastern portion with section revealing channel alluvial deposits, looking north

Grout Shaft (Fig 2, Fig 3, Fig 6, Photo 4, Photo 5, and Photo 6)	
Location	Grout Shaft
Dimensions	11.25m east to west, 14.00m north to south
OS National grid coordinates	532992 181571
LSG grid coordinates	83339 36256
Modern Ground Level	108.98m ATD
Modern subsurface deposits	19th/20th-century foundations stopped at 108.30m ATD
Level of base of archaeological deposits observed	106.60m ATD
Natural observed	Orangey brown terrace gravels [52] observed at 106.80m ATD
Extent of modern truncation	The northern third of the grout shaft was taken up by a 19th century building foundation. Several spots within the grout shaft had been disturbed by recent excavations.
Archaeological remains	Dating Evidence, Finds, and Samples
[51] Pale greenish grey clayey silt, base deposit of channel, 107.25m ATD. Overlaid the natural gravels [52].	Environmental Bulk Sample <4> contained preserved floral and faunal remains (see 16.6)



[50] Black humic clay, plant and wood inclusions. 107.42m . Overlaid [51]	A single sherd of pottery was dated AD 50–170 Environmental Bulk Sample <5> contained preserved floral and faunal remains (see 16.6)
[49] Orangey brown mixture of sand, silt and very fine gravel. 107.67m ATD. Overlaid [50].	None
[48] A mid brown gritty clay with frequent charcoal and shell fragments. 107.75m ATD. Overlaid [49]	None
[47] Mid to pale brown grey, soft silty clay. 107.83m ATD. Overlaid [48].	A small assemblage of 29 pottery sherds dated AD 160–200. A single piece of roofing tile dated AD 50–160 fragments of ‘cattle-sized’ and ‘sheep-sized’ rib, a single dog humerus (upper fore-leg) and a complete fully-fused cattle first phalange (basal toe joint)
[46] A dark reddish brown highly organic clay. 108.23m ATD. Overlaid [47]	Two sherds from an unsourced amphora fabric dated AD 50–400, a single voussoir/ box-flue tile dated AD 70–100, a cattle metatarsal, and intrusive post-medieval worked stone recovered from the edge of one of the many truncations through this context (see 16.5) Environmental Bulk Sample <6> contained a mix of preserved floral and faunal remains (see 16.6); also 50 well-preserved mollusc shells, all derived from freshwater snail species (see 16.8)
[36] Greyish brown silty clay, with flecks of CBM. 108.02m ATD. Overlaid [46].	none
[35] Reddish brown silty clay, with flecks of CBM. 108.12m ATD. Overlaid [36]	none
Interpretation and summary	
<p>In section natural terrace gravels [52] were recorded between 106.80 and 106.60m ATD. These gravels were likely scoured out by the river channel, which was then filled by a water lain alluvial clay layer [51] The composition of which suggests it formed by consecutive overbank flood events depositing fine grained sediment. Bulk sample <4> from this context contained an abundance of floral and faunal remains, such as water-plantain, bur-reed, larval cases of caddis fly and leech egg cases all of which represent a clean waterside environment. No finds were retrieved from the basal layer, and it may represent pre-Roman deposition.</p> <p>Above this was a black peat layer [50], probably a waterlogged marshy area, from which a single Roman pottery sherd was recovered. Bulk sample 5 from this context contained a very similar assemblage of floral and faunal remains as sample 4,</p>	

suggesting a lightly flowing waterside environment. Context [49] lying on top of the peat probably represents a period of flooding and erosion. This was topped by [48] and [47], layers with frequent anthropomorphic inclusions such as animal bone, charcoal and shell fragments. These are probably the first attempts at Roman reclamation within the Walbrook channel in an effort to make the land usable.

On top of these was context [46], a thick dark reddish brown highly organic layer with some charcoal, shell, a cattle metatarsal and a single sherd of pottery dating it to the Roman period. Sample <6> from this context contained a small group of mollusc shells with types that prefer areas such as marshes and swamps. The floral remains from the sample indicate a marshy area with water-plantain, caddis and leech remains present. It also contained remains of typical Roman food waste, fennel and blackberry/raspberry seeds. The layer represents a marshy area with significant dumping, probably demonstrating the struggle of trying to reclaim an area prone to flooding.

Three pieces of post-medieval worked stone were recovered from the edge of a modern truncation in this layer and likely derive from earlier construction work in the area.

Two further flooding deposits [35] and [36] mixed with large amounts of charcoal, oyster shell and flecks of CBM were above [46]. Again this suggests a mixture of sedimentation mixed with possible dumping.

Modern truncations had removed/ destroyed everything above this level.

Overall, the archaeology demonstrates a sequence of a pre-Roman channel, slow sedimentation, an early Roman marsh, quick episodes of sedimentation caused by flooding and then Roman reclamation in the late 2nd-century topped by further marshy deposits combined with more Roman dumping/reclamation.



Photo 5 Western portion of grout shaft with section displaying channel deposits, looking north-west

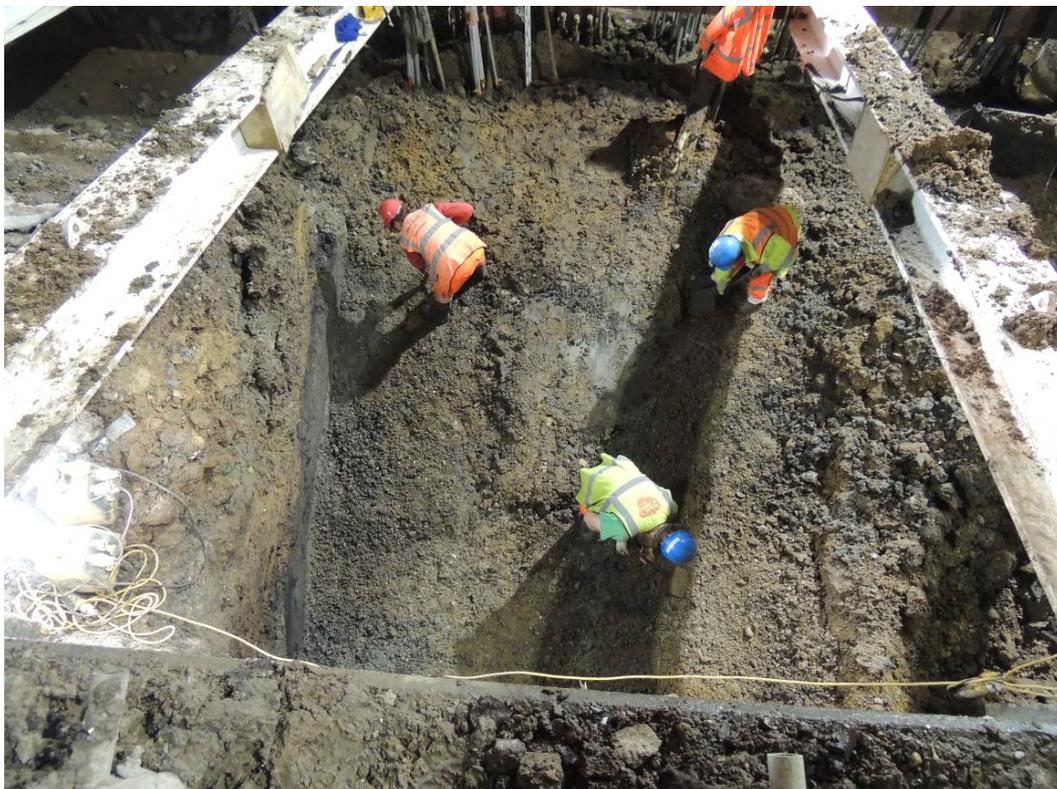


Photo 6 Northern portion of the grout shaft with archaeologists cleaning the base of the Walbrook channel, looking east

9 Assessment of results against original research aims

The GLAAS guidance (EH 2014) require an Assessment of results against original expectations (these no longer mention the criteria for assessing national importance).

Likewise City of London guidance (CoL 2004) sets out advice for work carried out in London, including an assessment of results against original objectives (assessment against the above criteria are only required for evaluations).

The results are assessed below against the original research aims and fieldwork objectives from section 6.

9.1 Research Aims

1. *Understanding London's hydrology, river systems and tributaries and the relationship between rivers and floodplains;*

Information on the extent of the eastern edge of the main Walbrook channel was revealed as well as information on the higher floodplain along the eastern bank. This information will be assessed along with information from other nearby sites in the post-excavation programme for Blomfield Street and Broadgate Ticket Hall.

2. *Understanding how water supply and drainage provision were installed and managed;*

The nature, function and use of the channel uncovered are not known. However, Roman dumps layers were recorded, potentially demonstrating an attempt to reclaim part of the eastern bank.

Medieval ditches recorded on the higher ground to the east of the Walbrook channel suggest there were attempts to drain and reclaim the land during this period. It may be that this activity truncated any prior Roman attempts to drain the higher eastern ground.

3. *Refining our understanding of the chronology and function of the landward and riverside defences and extramural evidence of defensive or military structures in the Roman period;*

Despite finding evidence of a channel or riverside edge, no evidence for defensive military establishments was uncovered.

4. *Understanding the relationships between urban settlements and royal villas or religious estates;*

No relevant data

5. *Examining the proposal that there was an ideological polarity between town and anti-town systems: Roman towns did not so much fail as were discarded;*

No relevant data

6. *The end of the Roman occupation: developing explanatory models to explain socio-political change and considering the influence of surviving Roman structures on Saxon development.*

No relevant data



7. *Examining the use in any one period of materials from an earlier period (eg Saxon use of surviving Roman fabric) and the influence on craftsmanship, manufacture and building techniques.*
No relevant data
8. *Understanding the differences, if any, between burial practices in the city and outlying cemeteries;*
No relevant data
9. *Understanding life expectancy, origins and belief, seen through studying health, diet and disease, and preparing models for future research;*
No relevant data
10. *Considering the relationship between cemeteries and major or minor roads, in terms of symbolism, status, privacy and convenience; and*
No relevant data
11. *Understanding the cultural and symbolic roles played by London's defences through the ages as reflections of power and political security or imposition and dominance.*
No relevant data

9.2 Fieldwork Objectives

- *What are the extent, orientation, dating, and character of the Walbrook channel(s) in the Iron Age and/or Roman period, and how does it fit into the overall topography of the Walbrook system?*

The excavations and targeted watching brief have provided additional information regarding the location and extent of the eastern edge of the Walbrook channel. There is clear evidence for dumping and reclamation along this eastern edge, primarily within the 2nd to 3rd centuries AD.

Overall the evidence agrees with the prevailing idea of the main Walbrook channel running north–south along Blomfield Street, the evidence collected does however suggest that its width may have extended further east than previously expected.

- *Is there evidence that the Walbrook channel was revetted, canalised or bridged from the Roman period onward? Did timber posts seen during previous watching briefs in Blomfield Street (GM122 and FIN81) belong to a revetment(s) which extended into the Blomfield site?*

There was no evidence of structures or timbers during the project.

- *Are any human or animal remains, or artefacts, present within the Walbrook deposits, similar to those from nearby sites along the stream? If so, what is their character, date, and likely origin?*

There were no remains or artefacts recovered from the bottom most deposits within the Walbrook channel.



There were a number of pottery sherds and pieces of CBM recovered from dump layers within the Walbrook channel. Overall the finds appear to be typical domestic waste generally from the 2nd to 3rd centuries AD. The remains identified were entirely in keeping with those found on surrounding sites on New Broad Street (GM122, GM74 and NEB87). However there was no evidence for burials or cremations as found at FIB88.

The environmental samples taken from the Walbrook deposits included water-plantain, caddis and leech remains, all of which suggest a fresh water source. The samples also contained both fennel and blackberry/raspberry seeds, both of which prefer drier ground; indicating food waste and dumping, and the fennel is a likely indicator of Roman activity in London. The presence of charcoal in these samples is another indicator of human activity.

- *Are the dumped deposits seen in evaluation reclamation of the Walbrook and its valley, or another activity? What is the date, or dates, of this sequence of dumping?*

The dump deposits seen during this excavation appear even and spread across a large distance, probably over an extended period of time. This suggests reclamation as opposed to random pocket depositions of material seen with general waste disposal.

Finds retrieved from the overlying dumped deposits, including ceramics, tegula (flat Roman roof tile) and food waste suggest that land reclamation utilised general household waste and started during the Roman period, probably sometime between the 2nd and 3rd centuries. The relatively wide spread of finds and the variety in the horizontal deposits suggest that this was a gradual process, rather than a one-off concerted attempt at backfilling the Walbrook channel.

- *What is the nature and the date of the Roman extra-mural activity on the site, how does it compare with that in the surrounding area? Is this related to any variations in the levels of the natural geology?*

The Roman dump/refuse deposits are likely an attempt to reclaim part of the Walbrook channel. Previous work to the south and east (NEB87) also identified an extensive channel margin that had been reclaimed from the stream during the 2nd century. This might suggest a coordinated attempt to recover land in this area during this period, perhaps due to an increase in demand.

A single Roman ditch recorded in section along what may have been the eastern edge of the Walbrook channel suggests activity within an area that had already been reclaimed. The exact function of this ditch is unknown.

Two ditches were located on the higher ground to the east. Where the terrace gravels were recorded as high as 108.33m ATD. These were likely medieval in date, truncating any earlier Roman activity.

10 Statement of potential archaeology

The following potentials will be assessed in greater detail during post-excavation assessment (see 12).

The results from the fieldwork have potential for study of the following:

- A portion of a channel of the Walbrook, with a series of waterlain deposits likely to be Roman or prehistoric.
- Reclamation dumps dating to the Roman period.
- Medieval activity in the form of ditches.
- Railway tracks and 19th/20th-century structures probably related to the Metropolitan Railway.

10.1 Importance of Resources

The importance of the excavated remains has been assessed using professional judgement, informed, where applicable, by the criteria for assessing the national importance of monuments (DCMS 2010, Annex 1)

The majority of the remains have limited rarity and diversity. However, they have group value when considered in conjunction with results from the surrounding area, resulting in potential to contribute to study of the Walbrook stream and Roman/Medieval extra-mural activities.

The brick walls and train lines are of low to moderate importance given their historic associations with the Metropolitan Line. However their historical use is better demonstrated by other, more extensive, parts of that rail line.

Therefore the results from this site are considered to be of **low to moderate importance** when considered in conjunction with the results from other sites, notably the past and future results from the Crossrail Broadgate Ticket Hall.

11 Conclusions

11.1 Geology

Natural geology in the form of Thames Terrace gravels was exposed across the site. Levels ranged from 106.19m to 106.80m ATD in the grout shaft to as high as 108.33m ATD in the eastern most part of the site. The levels and deposits found across the site suggested a north–south running channel, of the former Walbrook stream, along the western edge of the site, quickly rising to a higher valley area in the east. Natural deposits at the base of the channel suggest periods of flooding followed by periods of marshy stagnation.

11.2 Roman remains

The results of the excavation and watching briefs confirmed many of the conclusions reached in the initial evaluation.

Within the Walbrook channel, the lower deposits could be Roman, but due to their sterility are interpreted as probably pre-Roman. Otherwise Roman remains were limited to horizontal deposits and a single possible ditch. These horizontal deposits are probably attempts at levelling the land to facilitate later activity, most of which would have been subsequently truncated by later activity on site (notably the basement of the previous building). Pottery from these reclamation layers had inclusions of (possible) domestic rubbish with dates primarily from the 2nd to 3rd centuries AD.

A previous excavation undertaken to the south and east of this site (NEB87) also identified a channel that had reclamation attempts during the 2nd century. This might suggest a concerted attempt to utilize otherwise marshy ground along the Walbrook.

The single Roman ditch recorded in section during the targeted watching brief (Fig 4) suggests activity within an area that had already been reclaimed. This is the only evidence of extra-mural activities on the site besides reclamation. The exact function of this ditch, however, is unknown.

11.3 Medieval remains

Several sherds of medieval pottery were uncovered within the deposits along the eastern edge of site. It is likely that this area would have been part of the Moorfields Marsh, and the ditches recorded here were medieval attempts at draining the higher ground. It is also likely that these would have been part of a wider system of crisscrossing ditches attempting to clear larger areas. No Moorfields Marsh deposits, if they existed, survived in this area due to later building construction and truncation.

11.4 19th-century remains

The section of railway track on wooden sleepers recorded during the general watching brief to the north of the site probably belongs to the 1875 extension of the cut and cover Metropolitan Line which passed east from Moorgate Station, through Finsbury Circus and into Bishopsgate Station. These tracks are represented for the first time on the 1894 OS map (Fig 7). It appears these were the southernmost set of tracks which come to an end to the west on that map, south of the tunnel to the west, indicating that they are a siding.



Underneath the rail line were two parallel walls on an east–west alignment (see Photo 5), one constructed from yellow brick the other from red brick.

These were likely contemporary with the tracks. They appear to be either supports for the timber sleepers within the marshy ground, or they supported timber sleepers creating an inspection chamber, similar to those seen in the basement of Smithfield Market at Farringdon. It may be that the walls were from the original sleeper line and the tracks that were recorded were from a later phase.

12 Publication and dissemination proposals

The results of the excavation and watching briefs will initially be disseminated via this report and the supporting site archive of finds and records (including digital data).

The results are expected to be included, along with the those from the Broadgate Ticket Hall site, in the relevant volumes of proposed Crossrail publication CRL11 Roman and Medieval Broadgate and Blomfield Street.

A summary report will be published in the London Archaeologist excavation round up and also deposited with the LAARC.

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14 Acknowledgements

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The watching briefs were supervised by Bruce Ferguson. The excavation was supervised by Paolo Guarino, Isca Howell and the author. The fieldwork was managed by MOLA Project Manager Nicholas Elsdon.



15 NMR OASIS archaeological report form

OASIS ID: molas1-176914

Project details

Project name	11–12 Blomfield Street
Short description of the project	<p>The archaeological work on site consisted of three separate interventions: an excavation in the area of the grout box, a targeted watching brief on the area of the Main box, and a general watching brief during ground reduction of the rest of the site. The excavation of the grout shaft area was done in two phases in order to get a full east–west section across the shaft. The intention of this excavation was to explore the results seen in the evaluation that uncovered the eastern edge of the main channel of the Walbrook. During this phase the channel was successfully recorded across the width of the trench. Natural sand and gravels were seen at the base (5.90m OD) followed by a succession of flood deposits, marshy peat, and a Roman dump layer which contained a number of pieces of pottery and ceramic building material dating between 50 and 400 AD. The targeted watching brief in the southern portion of the site recorded a probable continuation of the Walbrook Channel with Roman dumping layers and a north–south running ditch. In the south-east corner of the site the targeted watching brief recorded natural terrace gravels at a much higher level (8.33m OD) than in the grout shaft, suggesting this would have been dryer ground near the edge of the Walbrook. An east–west running ditch cut into the subsoil and underlying natural terrace gravels dated to the 12th century by pottery found within the fills. This was in turn cut by a north–south running ditch. These may represent medieval attempts to drain the higher ground to the east into the Walbrook. The general watching brief on ground reduction across the rest of the site revealed late 19th/early 20th century brickwork and rail lines in the northern portion of the site, probably related to Metropolitan Line.</p>
Project dates	Start: 04-03-2013 End: 23-01-2014
Previous/future work	Yes / No
Any associated project reference codes	XTB12 - Sitecode
Type of project	Recording project
Site status	Area of Archaeological Importance (AAI)
Current Land use	Transport and Utilities 2 - Other transport infrastructure
Monument type	WATER CHANNEL Roman
Significant Finds	POTTERY Roman
Significant Finds	CBM Roman

Project location

Country England



Site location	GREATER LONDON CITY OF LONDON CITY OF LONDON 11-12 Blomfield Street
Postcode	EC2M 7AY
Study area	0 Square metres
Site coordinates	TQ 533079 181711 50.9419962474 0.182419392811 50 56 31 N 000 10 56 E Point
Height OD / Depth	Min: 6.80m Max: 8.33m

Project creators

Name of Organisation	MOLA
Project brief originator	Crossrail
Project design originator	Crossrail
Project director/manager	Nicholas Elsdon
Project supervisor	Greg Laban
Project supervisor	Bruce Ferguson
Project supervisor	Isca Howell
Project supervisor	Paolo Guarino
Type of sponsor/funding body	Client
Name of sponsor/funding body	Crossrail Ltd

Project archives

Physical Archive recipient	LAARC
Physical Contents	"Animal Bones", "Ceramics", "Environmental"
Digital Archive recipient	LAARC
Digital Media available	"Images raster / digital photography", "Survey"
Paper Archive recipient	LAARC
Paper Media available	"Context sheet", "Drawing", "Matrices", "Notebook - Excavation', Research', ' General Notes", "Report", "Survey "



*Blomfield Box Site Excavation and Watching Brief Fieldwork Report, XTB 12
C257-MLA-T1-RGN-CRG03-50017*

Entered by

Greg Laban (glaban@mola.org.uk)

Entered on

10 April 2014

16 Appendices

16.1 Summary Note on Building Materials

Ian M. Betts

A total of eight fragments of building material were recovered from XTB12 (contexts [31], [33], [46] and [47]). These comprise mainly Roman imbrex and tegula roofing tile.

The building material from XTB12 has been fully recorded and the information added to the Oracle database.

Listed below is a summary of the building material in each context:

Context	Fabric	Type	Context Date
[31]	2815	Roofing tile	AD 50–160
[31]	3102	Daub	
[33]	2815	Roofing tile	AD 50–160
[46]	3054	Voussoir / box-flue tile	AD 70–100
[47]	2915	Roofing tile	AD 50–160

Discussion

The building material comprised Roman roofing tile, abraded daub (almost certainly Roman), and a fragment of relief-patterned box-flue or voussoir tile. Unfortunately, not enough survives of the relief-patterned tile to identify the die type.

The Roman roofing tile was made at a tilery either in or close to London, whilst the voussoir / flue tile was imported in from a tilery believed to have been situated near the south-east coast. The latter tilery, which seems to have been in operation around AD 70–100, supplied their products over a large geographical area. They specialised in the production of tiles for heated rooms and bath buildings.

16.2 Roman pottery

Amy Thorp

A total of 34 sherds (1010g) of Roman pottery were recovered from six contexts. The condition of the pottery is good with a medium to large sherd size, and only one sherd shows noticeable abrasion.

Comments on the individual contexts are given below:

[16] Dated AD 50–400 on a single sherd from an unsourced amphora fabric (AMPH). There are moderate quantities of black, possibly volcanic, inclusions in this fabric and it might be of Italian origin. This context also contained two sherds of medieval pottery so the Roman material is likely to be residual.

[20] Dated AD 50–160 on a single sherd from the base of a Verulamium region white ware flagon or jar (VRW 1/2)

[33] Dated AD 50–170 on a single sherd of Baetican early Dressel 20/Haltern 70 fabric (BAETE).

[46] Dated AD 50–400 on a two sherds from an unsourced amphora fabric (AMPH). The fabric is particularly micaceous (gold) and has some similarities with those from the Gaul region.

[47] Dated AD 160–200. The bulk of the pottery was retrieved from this context with a small assemblage of 29 sherds. A 2nd-century AD emphasis is immediately clear for the group with sherds from Central Gaulish samian, East Gaulish samian, and black burnished ware vessels dominating. Dating specifically to the late 2nd century AD is based primarily upon a probable Dragendorff form 31 dish with rouletted decoration (5DR31R). A slightly more unusual component of the group is a section of an unsourced white-slipped ware tazza (RWS 9C) which has both rouletted and frilled decoration.

[50] Dated AD 50–170 on a single sherd of Baetican early Dressel 20/Haltern 70 fabric (BAETE). This sherd contrasts with the rest of the assemblage as it is in poor condition; heavy abrasion has removed all the original surfaces of the vessel.

16.3 Medieval Pottery

Nigel Jefferies

The five sherds of medieval pottery from this site was found in contexts [16] and [18], both of which yielded a range of hand-built coarsewares in sources of supply and fabrics (MOL fabric codes EMS, EMSS, EMSH, and ESUR are represented) common to London during the Saxo-Norman period. The medieval pottery in [16] (dated 1050–1150) was found alongside Roman dated material and questions of residuality and intrusiveness of both periods will need to be addressed.

16.4 Accessioned finds

Michael Marshall

A single accessioned 'small find' a fragment of lead sheet and an iron nail were recovered from the excavations. The sheet <1>, [16] is corroded and relatively undiagnostic. Similar fragments are often associated with demolition and destruction layers. The single iron nail comes from context [47]. Handmade nails of this sort are ubiquitous and are found in contexts of Roman to post-medieval date in London, only comparatively recently being replaced as the most common type by the modern wire drawn nail. This example is associated with Roman pottery and although rather corroded can probably be assigned to Manning's type 1b (1985) a common all-purpose type.

This small assemblage of finds is of very limited interpretative value. As evidence for the character of construction in the area they may contribute a little to our understanding of the immediate stratigraphic environment. They should be included in any wider studies of the area but they do not merit publication in their own right and require no further work at this stage.



16.5 Worked Stone

James Wright

Introduction/methodology

All of the worked stone has been recorded using the standard worked stone recording forms used by MOLA. The stones were photographed and where appropriate a 1:1 or 1:2 profile drawing was made; or 1:1 rubbing or a scaled plan drawing was made. Fabric analysis was undertaken with a x10 binocular microscope and a comparison was made with the MOLA stone library. The information on the recording forms has been added to an Oracle database.

The post-medieval period

Moulded stones

[Context 46]

N.B. these were recovered from the edge of a modern truncation into a Roman deposit, and are therefore intrusive (see 8.3).

<2>

A fragment of moulded Middle Jurassic oolitic limestone similar in character to the “Hard White” bed quarried at Ancaster in Lincolnshire. The stone is a very badly damaged piece of door or window surround with associated integrated string course above.

<3>

A fragment of moulded Middle Jurassic oolitic limestone similar in character to the “Hard White” bed quarried at Ancaster in Lincolnshire. The stone is so fragmentary that its purpose is unclear although it may be part of a fireplace or door/window lintel. The presence of modern cement upon the top bed of the stone is indicative of its age as are three drill holes and the rust corrosion associated with a metal plate fixing.

<4>

A fragment of moulded Middle Jurassic oolitic limestone similar in character to the “Hard White” bed quarried at Ancaster in Lincolnshire. The moulding is very delicate and suggests a use in a location that was very visible from head-height such as a fireplace or lintel. The presence of modern cement within the joint of the stone is indicative of its age.

Site archive: finds and environmental, quantification and description

Table 2 Finds and environmental archive general summary

<i>Building material</i>	<i>Three worked stones were recovered from site. All were recorded. All stones were retained.</i>
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Analysis of potential

All three stones from [Context 46] are of the same petrology and have similar if slightly different mouldings. Two of the stones <2> and <4> have been bedded or jointed with modern cement and one stone <3> has received modern drill holes and a metal fixing. Although it is admitted that the pointing and fixings could be a modern intervention upon an older stone the use of Ancaster Hard White is suggestive of a post-medieval date as it did not achieve widespread use in London until after its incorporation in the rebuilding of the Palace of Westminster during the mid-19th century.

It appears that the stones were part of the modern truncation within context [46] instead of directly from that context.

The moulding forms are common post-medieval types based on Classical designs. However there is simply not enough left of the stones to attempt to accurately state what part of a building that they came, from let alone the purpose of that structure. The stones are so very fragmentary that very little more can be gleaned on top of the basic site recording.

However, comparison with the records of the last building on the site, 11 and 12 Blomfield Street, recorded by MOLA for Crossrail before demolition in 2011 (MOLA 2011), suggests that some or all of these stones may be from the neo-classical decoration of that building, surviving amongst demolition rubble on the site. Alternatively, it may have come from an earlier building.

16.5.1 Significance of the data

Whilst moulded stone always represents a significant investment of income and therefore relates to a high status structure, it is not possible to say precisely what the function, location or specific date or dates of these buildings was. Therefore the significance of the moulded stone is low. The stones in themselves do not offer the potential for any future work, and are not artistically worthy of note therefore it is recommended that they be discarded.

16.6 Evaluation of the environmental samples

Karen Stewart

Introduction

6 environmental bulk samples were taken from this phase of the site. Four of these were processed and found to contain material of archaeological interest.

Methodology

The samples were processed by flotation, and the wet flots evaluated to determine the presence and nature of any plant remains and other biological material present. The results were recorded on the MOLA Oracle database.

Results

Sample 3 from [51] contained little of archaeological interest, with root fragments the only preserved environmental material.

Samples 4 [51] and 5 [50] were similar in character, with abundant preserved floral and faunal remains, all representing clean freshwater environments. Both contained rich seed assemblages including abundant water-plantain (*Alisma* spp.), bur-reed (*Sparganium* spp.) and gipsy-wort (*Lycopus europaeus*), all characteristic of waterside environments, both standing and lightly flowing. Sample 4 also contained some indicators of drier environments such as prickly sow-thistle (*Sonchus asper*). Both these samples also contained larval cases of caddis fly (Trichoptera) and leech egg cases, again both good indicators of clean freshwater. Sample 4 also contained evidence of ostracods, another wet environment indicator. The evidence from these samples accords with the geoarchaeological observations of the deposits as waterlain (See 16.9).

Sample 6 [46] contained a mix of wet environment indicators as the above samples, including water-plantain, caddis and leech remains. It also contained both fennel (*Foeniculum vulgare*) and blackberry/raspberry (*Rubus fruticosus/idaeus*) seeds, both of which prefer drier ground; these taxa may indicate food waste, and the fennel is a likely indicator of Roman activity in London. The low volume of charcoal in this sample is another indicator of human activity.

16.7 Animal Bone

Introduction and methodology

This report identifies, quantifies and interprets the animal bone from contexts [46] – [49]. Hand-collected animal bone from [47] and [49] and wet-sieved animal bone from [46] {6} was recorded directly onto the MOLA Oracle assessment and post-assessment databases. Each context and sample group was described onto the MOLA Oracle assessment database in terms of weight (kg), estimated fragment count, faunal group, preservation, modification, and the recovery of epiphyses, mandibular tooth rows, measurable bones, complete long bones, and very young sub-adult age groups with the assemblage not recorded as individual fragments or identified to skeletal element. The context and sample groups were then recorded onto the MOLA Oracle post-assessment database as individual fragments in terms of species, skeletal element, body side, fragment count, epiphysial fusion, age and modification. All identifications referred to the MOLA reference collection; and Schmid 1972. Fragments not identifiable to species or genus level were generally allocated to an approximate category; ‘cattle-sized’ or ‘sheep-sized’, as appropriate. Estimation of age at death from epiphysial fusion followed Schmid 1972.

Table 2 (*p:\multi\1051\XTB12\env\zoology\bonetab01*) gives a summary of the hand-collected context groups and wet-sieved sample group in terms of estimated fragment count, faunal and skeletal composition, and estimated age at death.

Summary, Roman

This assemblage provided 0.180 kg, seven fragments, of well-preserved hand-collected and wet-sieved animal bone with a maximum fragment size generally greater than 75mm. The hand-collected bone produced 0.105 kg, six fragments; the wet-sieved sample produced 0.075 kg, a single fragment.

The hand-collected bone derived from cattle *Bos taurus* metatarsal (hind-foot) [46] {6}; phalange 1 (basal toe joint) [47] and ‘cattle-sized’ rib [47] and [49]; with single fragments of sheep-sized rib [47] and dog *Canis lupus familiaris* humerus (upper fore-leg) [47].

There was no recovery of fish, amphibians, poultry, ‘game’, small mammals or any other wild species. There was no recovery of human bone. There were no foetal, neonate, infant or juvenile animals.

There was no other evidence of bone-working, and no evidence for butchery, burning, gnawing, pathological change or any other modification. There were no mandibular tooth rows, no measurable bones and no complete long bones.

Wet-sieved sample [46] {6} produced a single bone fragment; a cattle metatarsal (hind foot) from the proximal (‘ankle’) end of the bone. The proximal articulation of the bone had been drilled with a hole approximately 16.5mm in diameter, perhaps suggesting an attachment modification for the posterior end of an ice skate. This fragment will be accessioned as an artefact.

Context group [47] produced fragments of ‘cattle-sized’ and ‘sheep-sized’ rib with single examples of a dog humerus (upper fore-leg) and a complete fully-fused cattle first phalange (basal toe joint) indicating an animal in at least the second year of life.

Context group [49] produced a fragment of ‘cattle-sized’ rib.

16.7.1 Analysis of potential

The hand-collected and wet-sieved assemblage has negligible potential for further study of the local meat diet and patterns of waste disposal. It appears to include elements of post-consumption waste (ribs) associated with consumption of beef and, probably, mutton, with cattle hind-foot and toe elements (metatarsal and phalange) probably discarded during primary processing of beef carcasses. Context group [47] also included a fragment of dog upper fore-leg indicating disposal of a non-consumed domesticated carcass.

There is no evidence for consumption of wild species and, in view of the absence of amphibian and small mammal bone, there is no potential for interpretation of local habitats and conditions.

16.7.2 Significance of the data

The hand-collected and wet-sieved animal bone is of negligible significance in terms of meat diet and waste disposal, with emphasis on beef and mutton. A single fragment of cattle metatarsal from [46] {6} may provide some evidence for local bone-working. There is no wider significance or significance for interpretation of local habitats.

16.8 Molluscs

Introduction/methodology

This note identifies and interprets the freshwater mollusc remains recovered in wet-sieved/floated sample [46] {6} from XTB12. The sample produced no shells of terrestrial or marine molluscs and no remains of crustaceans. Identification of freshwater mollusc species followed Macan 1977; preliminary ecological interpretation followed Kerney 1999.

The freshwater molluscs

Sample [46] {6} produced a small group of fewer than 50 well-preserved mollusc shells, all derived from freshwater snail species. These derived mainly from common bithynia *Bithynia tentaculata* and keeled ram's-horn snail *Planorbis carinatus*. In addition, the group included single examples of great ram's-horn snail *Planorbis corneus* and marsh pond snail *Stagnicola palustris*.

Common bithynia occurs widely throughout south-east England in slow-moving, well-oxygenated, 'hard' (calcium-rich) waters, particularly in muddy-bottomed situations with dense growths of aquatic plants. It is rare in small closed ponds (Kerney 1999, 39).

Keeled ram's-horn snail is also common through south-east England in still or slow-flowing, calcium-rich, well-vegetated permanent waters, avoiding situations liable to dry up (Kerney 1999, 59).

Great ram's-horn snail is common throughout south-east England, normally in still or slow-moving waters including those choked with rotting vegetation where the bottom is anaerobic (Kerney 1999, 70).

Marsh pond snail is a mainly lowland species living in stagnant or slowly-moving water including 'hard' (calcium-rich) or 'soft' (calcium-poor). Although it can occur in open water, it is typical of swamps, shallow drains and ditches choked with vegetation including those liable to dry up in summer (Kerney 1999, 53).

In general, the ecological requirements of this very small snail species group appear to indicate slow-flowing, permanent, calcium-rich conditions, probably with abundant



vegetation and a muddy substrate. There is no indication of seasonal desiccation (drying out) or gross organic pollution.

16.8.1 Analysis of potential

The small freshwater assemblage provided by [46] {6} has some potential for further interpretation in terms of the habitats from which the two main snail species derive, particularly with regard to local vegetation, drainage and patterns of disturbance and land use. Ecological interpretation following Davies 2008 may allow some comment on these aspects of local habitats and conditions.

16.8.2 Significance of the data

The freshwater mollusc assemblage provides a very small group of local significance only.

16.9 Geoarchaeology

These results are also integrated into the results section (section 8). For methodology see 7.4.

16.9.1 Geoarchaeological sequence

The basal deposit seen in section was a soft pale greenish grey clayey silt [51]. Some oxidation was apparent to the east of section, associated with some modern truncation. This deposit was formed by consecutive overbank flood events depositing low energy fine grained sediment.

This was overlain by a soft dark brown to black humic clay [50]. Context [50] was a vegetated marginal flood deposit. Some degree of overbank flooding occurred, as for context [51], but the frequency or duration reduced enough for waterlogged vegetation growth and some stabilisation. No visible inclusions were present, apart from one horizontally aligned piece of degraded wood near to its surface.

The lower part of context [49] was a soft pale orange/red to brown sandy silt with occasional sand bands and appears to represent a mix of flooding and erosional environments. To the middle of the context the deposit becomes predominantly sand, with a fine gravel band to the east end. This is indicative of river action depositing higher energy sediments on the bank or near by the flowing channel. The fine gravel may represent some kind of 'tip line' of the water flow/level. To the top of context [49] the unit returns to pale orange/red to brown sandy silt of the lower portion.

Context [48] was a mid brown gritty clay with frequent shell fragments and tile, along with occasional small gravel and charcoal. Visible anthropogenic input marks this unit as overbank flood deposits with possible rubbish/waste dumping.

Context [47] was a thin unit of mid to pale brown grey, soft silty clay. It contains rare inclusions and becomes a pale yellow fine sand with occasional gravel to its surface. This unit shows a reduction of anthropogenic input and fluctuations between overbank deposits and a possible return to higher energy fluvial action.

These deposits are sealed by a soft, mid brown grey clay silt with occasional stone and shell fragments and significant anthropogenic inclusions. This deposit is likely a marginal waterlogged overbank accumulation within a ditch like environment with significant dumping of human rubbish/waste.

Two monolith samples, <1> and <2>, were taken through the sequence, covering contexts [51] up to [48], for later assessment of micro fossils (pollen and diatoms). Three bulks samples were collected adjacent to the monoliths for macro botanical remains and ostracod assessment; <3> (20ltr) from the base of [51], <4> (20ltr) from the top of [51] and <5> (40ltr) from [50]. A bulk sample was recovered from [46] (60ltr) for the recovery of finds and macro botanical remains relating to the dumping occurring at this time. See 16.6 and 16.8.



17 Figures

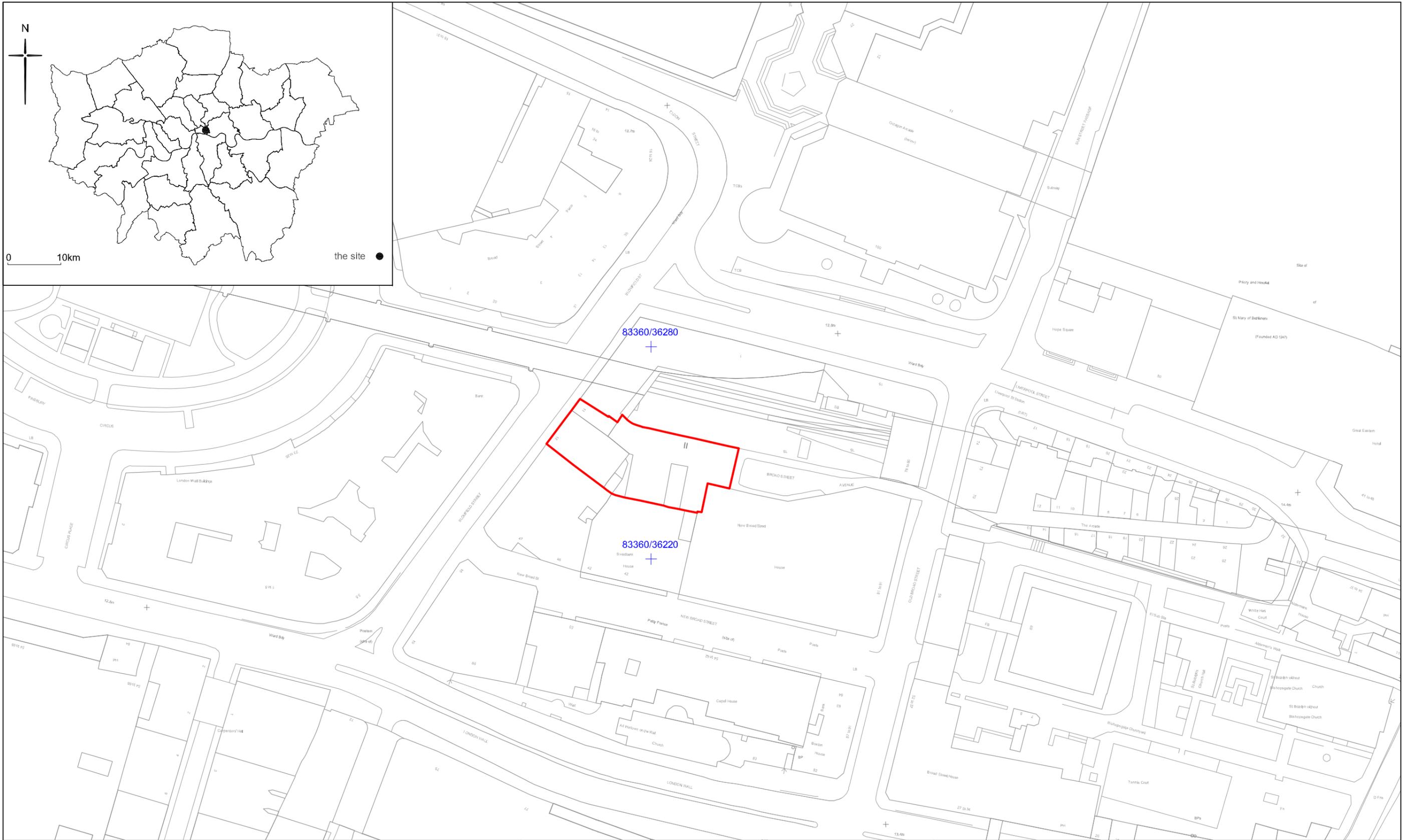


Fig 1 Site location

Site code: XTB12

Site outline

1:1000 @ A3



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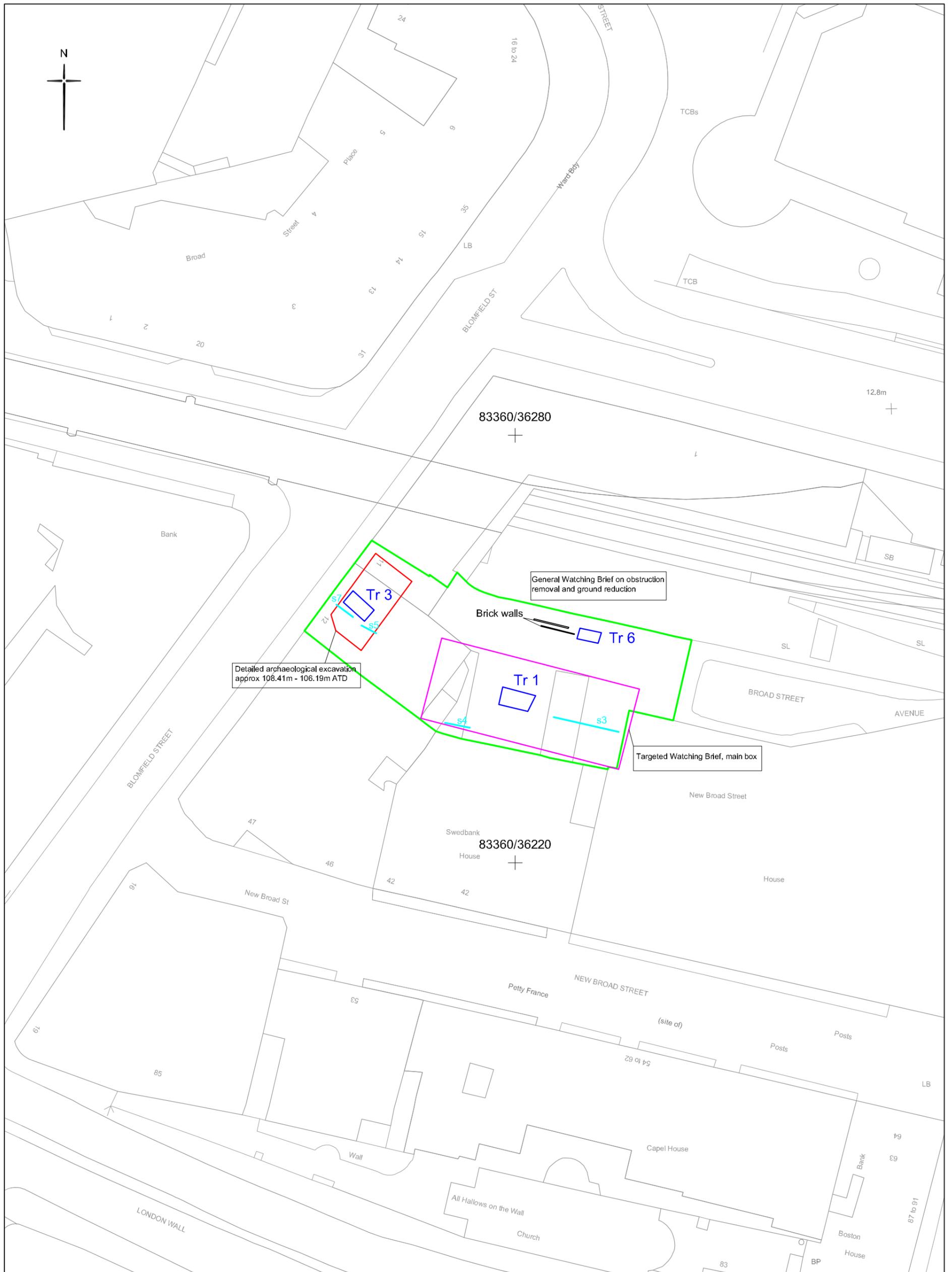


Fig 2 Trench and section locations

Site Code: XTB12

- Site outline
- Grout Shaft excavation 2014
- Target WB area
- Evaluation trenches 2012

0 1:500 @ A3 35m

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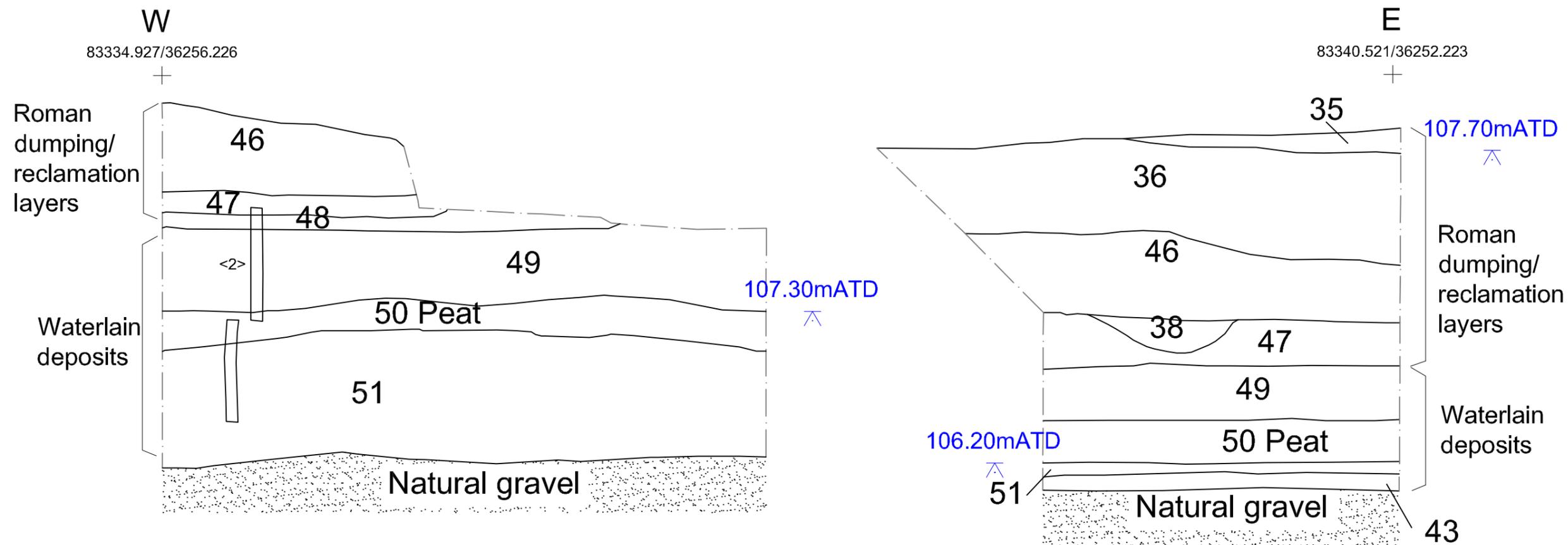


Fig 3 Section 5 and 7. South facing. See fig 2 for location

Site Code: XTB12

- L.O.E.
- Archaeological features
- 107.30mATD
^ Height Above Tunnel Datum (m ATD)

1:20 @ A3
0 1m

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South facing

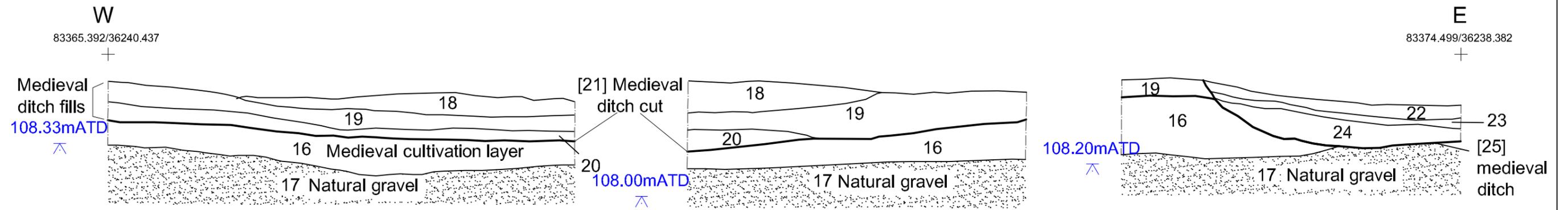


Fig 4 Section 3. South facing. Targeted Watching Brief. See fig 2 for location

Site code: XTB12

-  L.O.E.
-  Archaeological features
-  Height Above Tunnel Datum (mATD)

1:25 @ A3
0 1.25m

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North facing

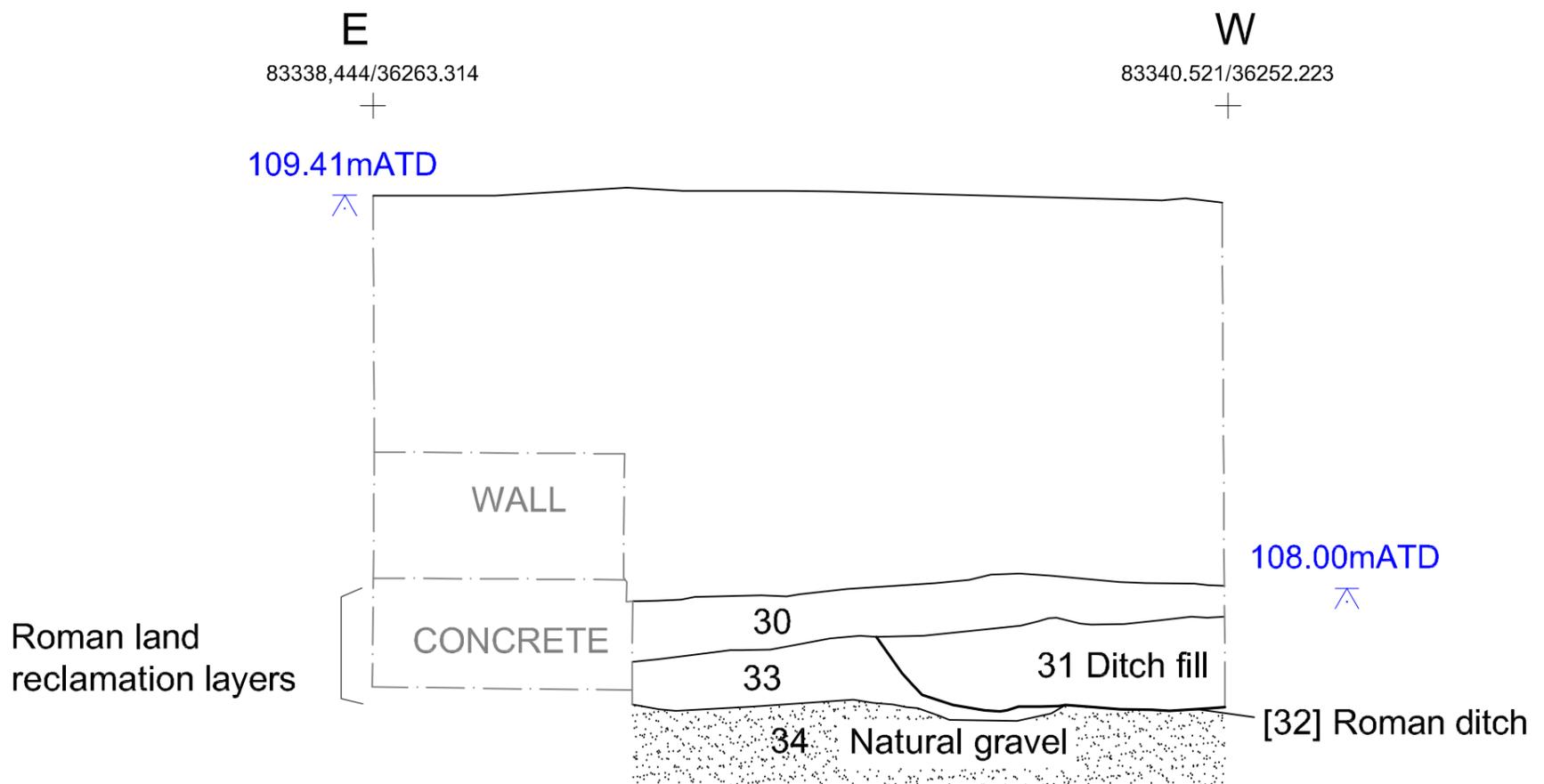


Fig 5 Section 4. North facing. Targeted Watching Brief. See fig 2 for location

Site Code: XTB12

□ L.O.E.
[43] Archaeological features
107.30mATD
⋈ Height Above Tunnel Datum (m ATD)

0 1:20 @ A3 1m

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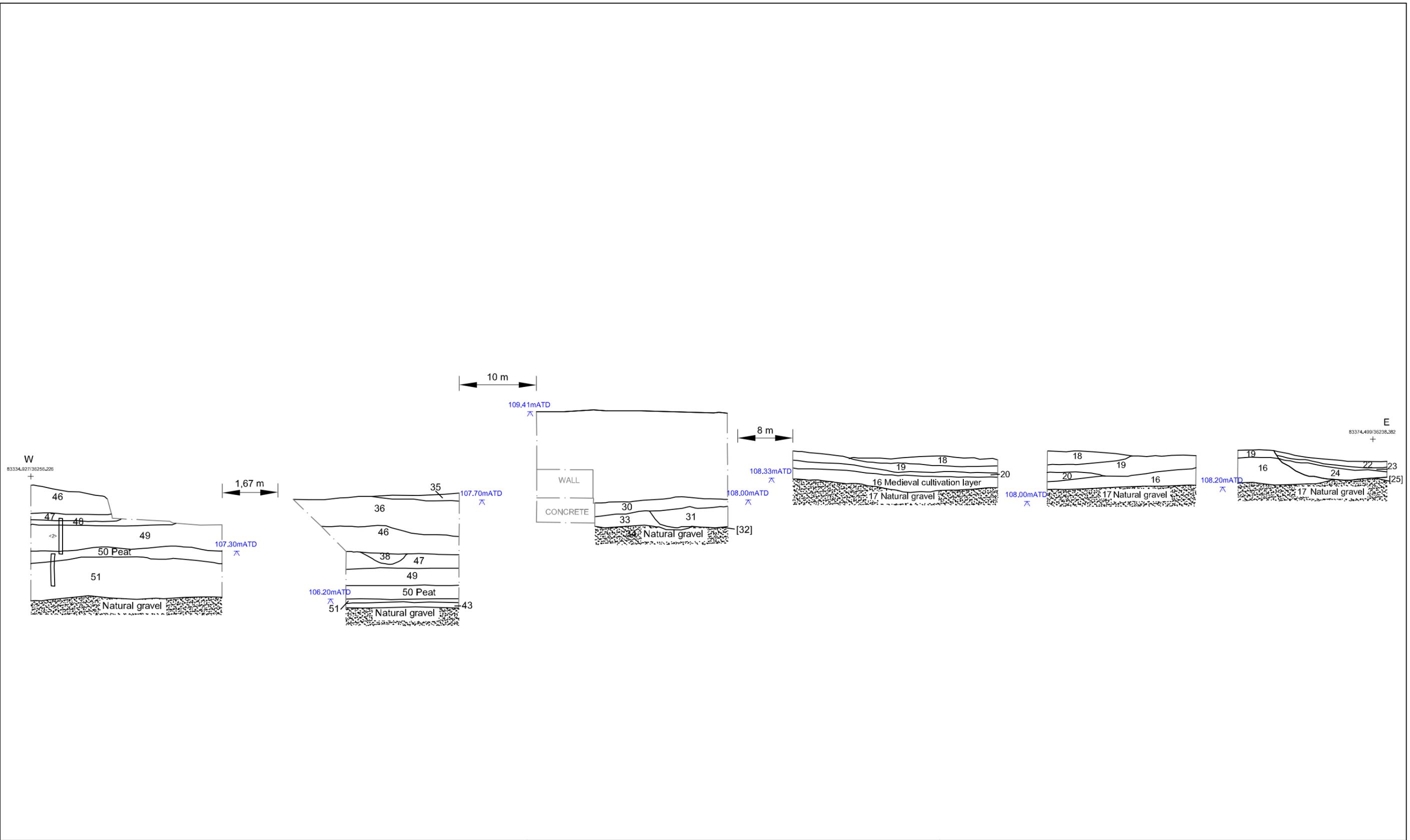


Fig 6 Composite sections. See fig 2 for locations

Site code: XTB12

-  L.O.E.
-  Archaeological features
-  Height Above Tunnel Datum (m ATD)

1:50 @ A3


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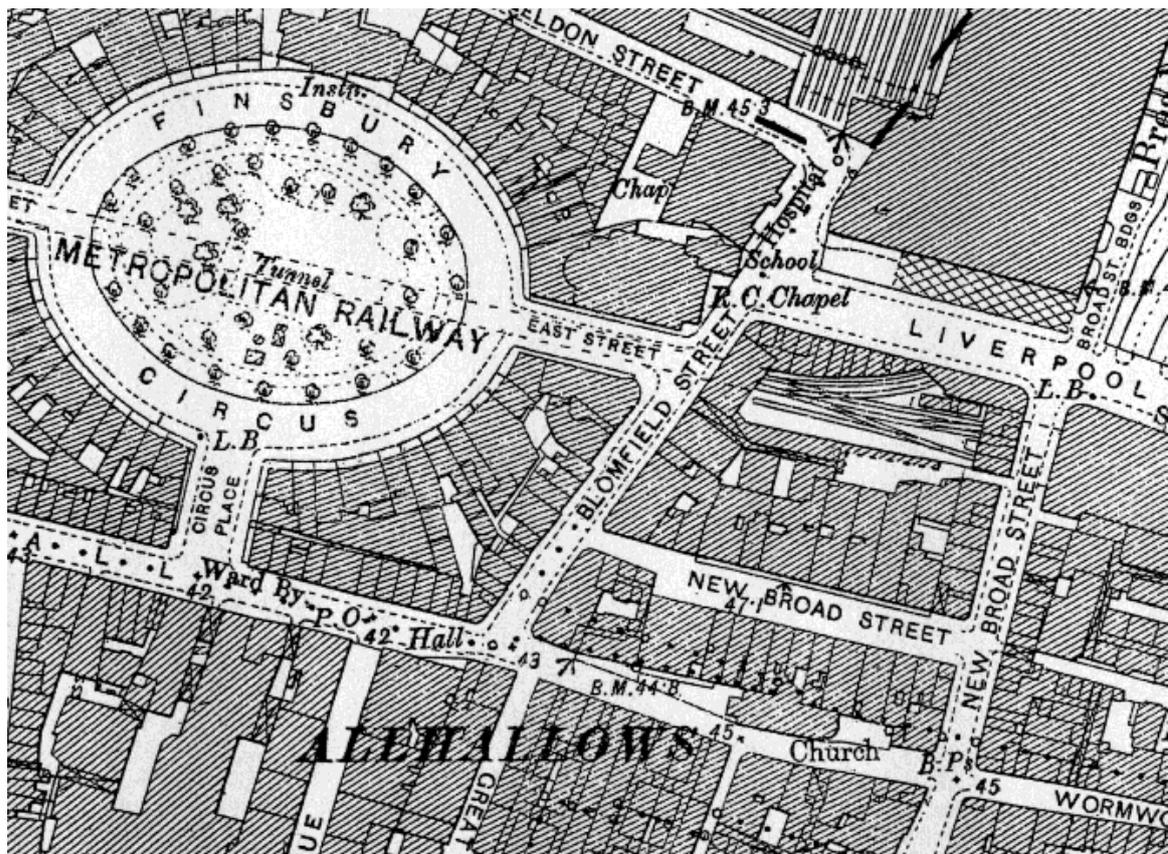


Fig 7 1894 Ordnance Survey Map