



C132 – Bond Street Station

SITE-SPECIFIC ARCHAEOLOGICAL WRITTEN SCHEME OF INVESTIGATION

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Record of Document Amendments

Version No.	Section No.	Description of Revision	Items Removed	Items Incorporated	Date
1.1		Updated to reflect CC comments –see comments sheet			13/05/10
1.1	Figure 5	Site Plan WTH	Updated plan	N/A	13/05/10
1.1	Figure 6	Site Plan ETH	Updated plan	N/A	13/05/10
1.1	Figure 8	EDF substations ETH	Updated plan	N/A	13/05/10
1.1	Figure 10	Construction Plan ETH	Updated plan	N/A	13/05/10
1.1	6.1.1	Box construction for Hanover Square	Construction sequence updated	N/A	13/05/10
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4.0	1, 2, 3, 4, 5, 6, 7, 8 and 12	Updated for C411 and C412 construction	Redundant data	Current data	11/10/11
5.0		Archaeology scope at WTH moved to C411 responsibility	Work scope for C412		11/05/12

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1 Introduction

1.1.1 The overall framework within which archaeological work will be undertaken is set out in the Environmental Minimum Requirements (EMR) for Crossrail (CR/HB/EMR/0001) (5th draft July 2008). The requirements being progressed initially followed the principles of Planning Policy Guidance Note 16 on archaeology and planning (1990) and have been reviewed with respect to its replacement Planning Policy Statement 5: Planning for the Historic Environment (2010). Accordingly, the nominated undertaker or any contractors will be required to implement certain control measures in relation to archaeology before construction work begins.

1.1.2 The strategy for archaeological works has been set out in The Crossrail Generic Written Scheme of Investigation (WSI) (CR-PN-LWS-EN-SY-00001). This Generic WSI presents the strategy for archaeology design, evaluation, mitigation, analysis, dissemination and archive deposition that will be adopted for the design and construction of Crossrail. The Generic WSI provides a general statement of objectives, standards and structure for the planning and implementation of archaeological works (Feb 08, version 1.0 section 3).

1.1.3 The new Crossrail station at Bond Street (BOS) will comprise two non-circular, combined platform/concourse tunnels (eastbound and westbound) extending approximately 245m between new ticket halls. The Western Ticket Hall (WTH) is located at 65 Davies Street and the Eastern Ticket Hall (ETH) at 18/19 Hanover Square. Both ticket halls are located at street level and will be linked to the platform tunnels by escalators with lifts to provide direct access for Persons with Restricted Mobility (PRM).

1.1.4 An underground interchange link will connect the WTH to the existing London Underground (LU) Bond Street Station, providing interchange with the Central and Jubilee Lines. There are two schemes at Bond Street being designed in parallel under the powers of the Crossrail Act:

- Crossrail Bond Street Station works;
- LU Bond Street Station Upgrade.

1.1.5 This Site Specific WSI (SS-WSI) only applies to the Crossrail Bond Street works (see the general site location plan in Figure 1). The LU Bond Street Station Upgrade will be dealt with in a separate WSI but, since the worksites are contiguous, it is intended that the outcomes of the archaeology programmes will be integrated to form a comprehensive archaeological record for the whole Bond Street site.

1.1.6 The construction works at BOS broadly comprise construction of the station boxes and platform tunnels with associated passenger adits, escalator, lift and ventilation shafts and Mechanical & Electrical (M&E) equipment rooms and tunnels. Both the ticket halls and ventilation shafts will be integrated with over Site developments (OSDs), 65 Davies Street at the west end, and 18-19 Hanover Square at the east.

1.1.7 This SS -WSI covers the construction sequence from the demolition of buildings, utility diversions, and the construction of the WTH through to the ETH and compensation grout shaft excavation works.

1.1.8 This SS-WSI for the BOS site is informed by research carried out in a Detailed Desk-Based Assessment (DDBA) (Document Reference no. CD-SD-BOS-EN-SR-0001).

1.1.9 Both Test Pit Evaluation (TPE) and archaeological excavation have been carried out in the area of the WTH within the footprint of the existing 65 Davies Street basement prior to and during demolition contracts.

1.1.10 The results of these archaeological investigations have confirmed directly that levels of disturbance within the WTH station footprint were appreciable but in limited areas archaeological deposits did survive. These were noted as being of mainly post-medieval date. Additional investigation is likely to be needed as part of future work within reference to deposits within the River Tyburn channel which have not been accessible to date.

1.1.11 Archaeological monitoring, investigation and recording works will be required during the remaining Advanced Works and Main Works packages to mitigate the construction impacts of the BOS Crossrail Station scheme.

1.1.12 A General Watching Brief will be required during the C207 demolition works at the ETH at Hanover Square (18-19 Hanover Square and 1a Tenterden Street) with an emphasis on providing a basic record of the subterranean vaults.

1.1.13 The Advanced Works construction activities for which the Targeted Watching Brief (TWB) applies are as follows:

- C207 demolition and site preparation works within Dering Yard;
- C240 utilities diversions at both the ETH and WTH (including EDF sub-station decommissioning and relocation of Dering Yard sub-station); and
- C411 construction of the Compensation Grout Shafts.

1.1.14 A Targeted Watching Brief will also be undertaken during the, the; during the C411 bulk excavation works for the WTH on Davies Street with particular emphasis on investigating and recovering environmental/ geoarchaeological samples from the former channel of the River Tyburn further.

1.1.15 This SS-WSI addresses the scope, specification, timing and order of works and the deliverables required to successfully integrate the archaeological aspects of the works into the project phasing.

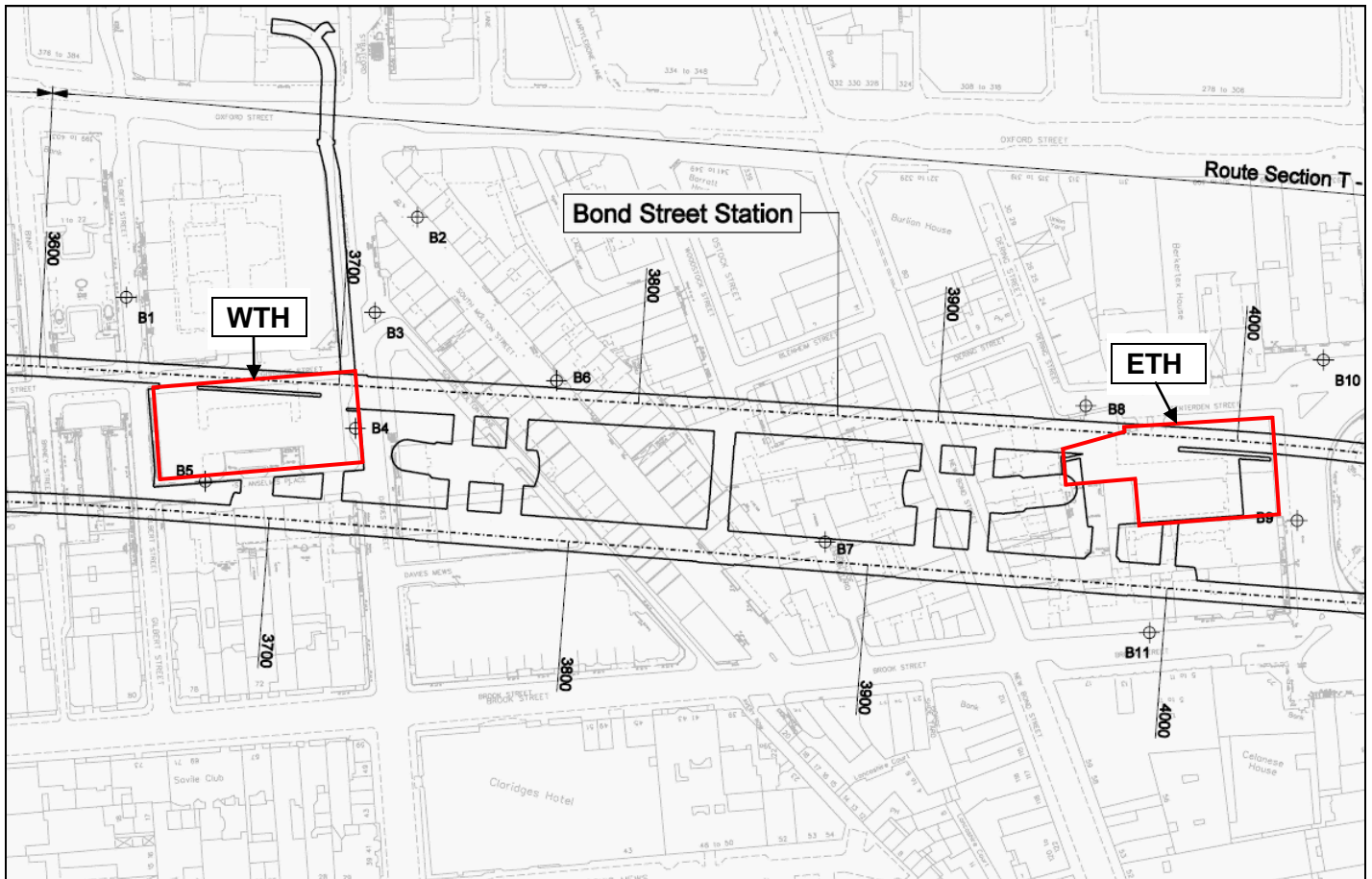


Figure 1 Location of Bond Street Station Works

2 Project Background

2.1 Summary of Previous Crossrail Studies

2.1.1 Previous studies of specific relevance to the archaeological works relate to the work undertaken by the Museum of London Archaeology Service (MoLAS) as technical advisors to Crossrail during the Bill process. The impact of the Crossrail Bill scheme on archaeological remains and deposits has been assessed in the Specialist Technical Reports: Assessment of Archaeology Impacts (Parts 1-6) prepared in support of the 2005 Crossrail Environmental Statement (ES).

2.1.2 Further assessment was carried out and reported in the Archaeology Programming Assessment by the MoLAS (November 2006, 1E0318-G0E00-00006 Rev B). Based on the available information at that time, the report found that archaeological excavation may be required depending on the outcome of field evaluation.

2.1.3 MoLAS, commissioned by Crossrail have also provided a range of information to MDC2 in support of the production of this WSI. MoLAS provided an updated baseline (Figure 2 Drawing No. P20201-C1M06-G00-D-00007), historic map information and data relating to the survival of deposits in the vicinity of the Works. These formed the baseline data for the DDBA (Document Reference no. CD-SD-BOS-EN-SR-0001).

Detailed Desk Based Assessment Summary

2.1.4 The DDBA (Document reference: CR-SD-BOS-EN-SR-00001) work found that there is **low potential** for Palaeolithic remains from the Lynch Hill Terrace Gravel in the area of the ETH and eastern Compensation Grout Shafts. If located, any features or artefacts will have a **low importance**, if they are redeposited. If *in situ* remains are found to be present then they may be of **high importance**.

2.1.5 There is **moderate potential** for alluvium associated with the channel of the River Tyburn which would have important environmental indicators in the area of WTH. This area is also located to the immediate south of an Area of Archaeological Priority (No. 3 Tyburn Settlement) as designated by Westminster City Council. This will have a **moderate to high importance** for environmental information.

2.1.6 There is a **moderate to high** likelihood to locate post-medieval remains, associated with localised dumping, ground build-up and possibly structural remains across the Bond Street site, where new build basements have not truncated these deposits. The trench monitoring summarised below indicated archaeological features of limited significance relating to this post-medieval urbanisation process. These will have a **low to moderate importance**.

Ground Investigation Package 16A Watching Brief

2.1.7 An archaeological watching brief has been carried out by MoLAS of the geotechnical ground investigation works (Package 16A) undertaken by Geotechnical Consulting Group (GCG) on behalf of Crossrail. The information gained from an understanding of sub-surface ground conditions has further informed the assessment as to truncation and likely depths of archaeology. This is described in more detail below (Section 2.4).

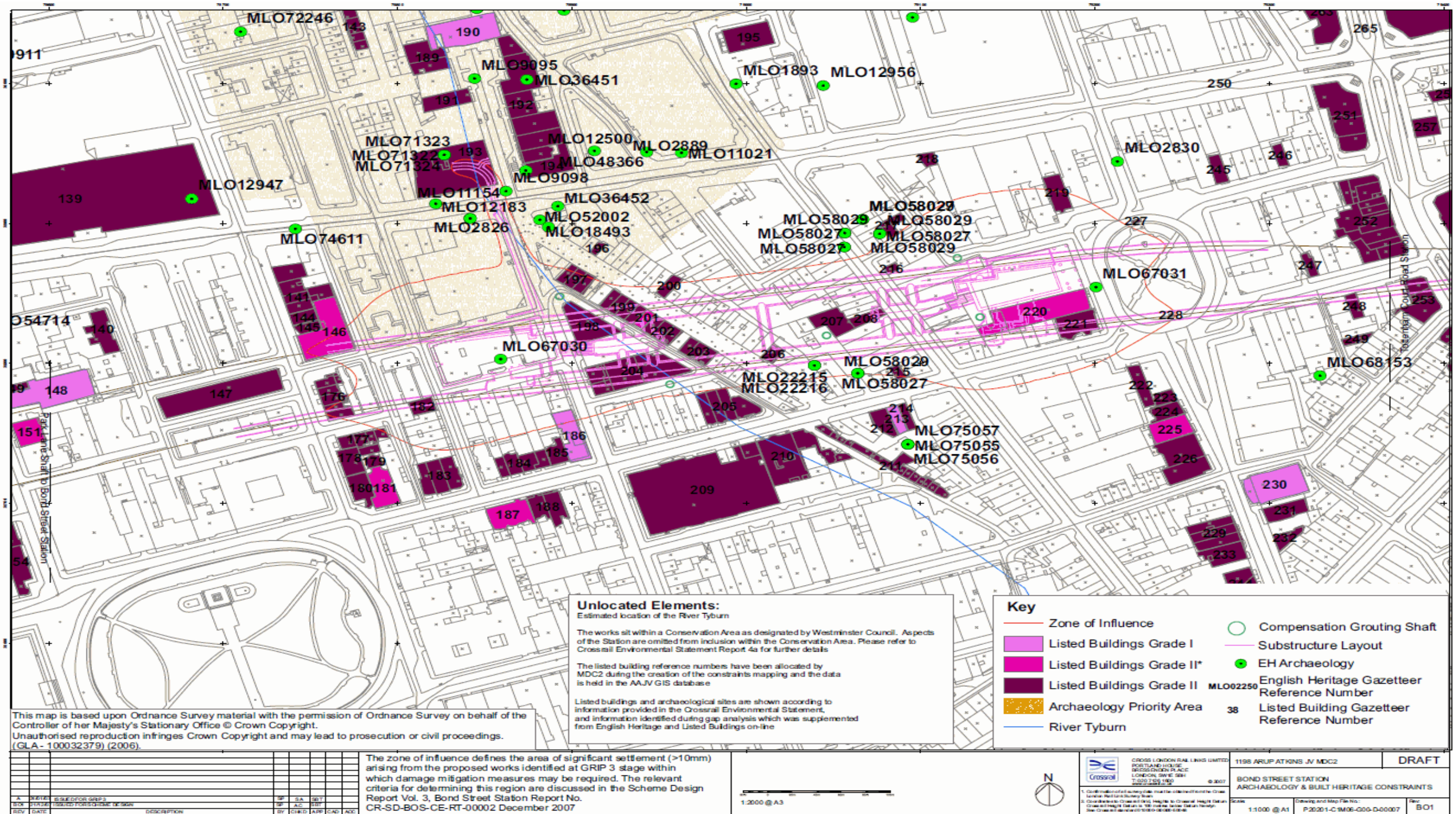


Figure 2 Bond Street Archaeology and Heritage Constraints

Utility Trench Monitoring

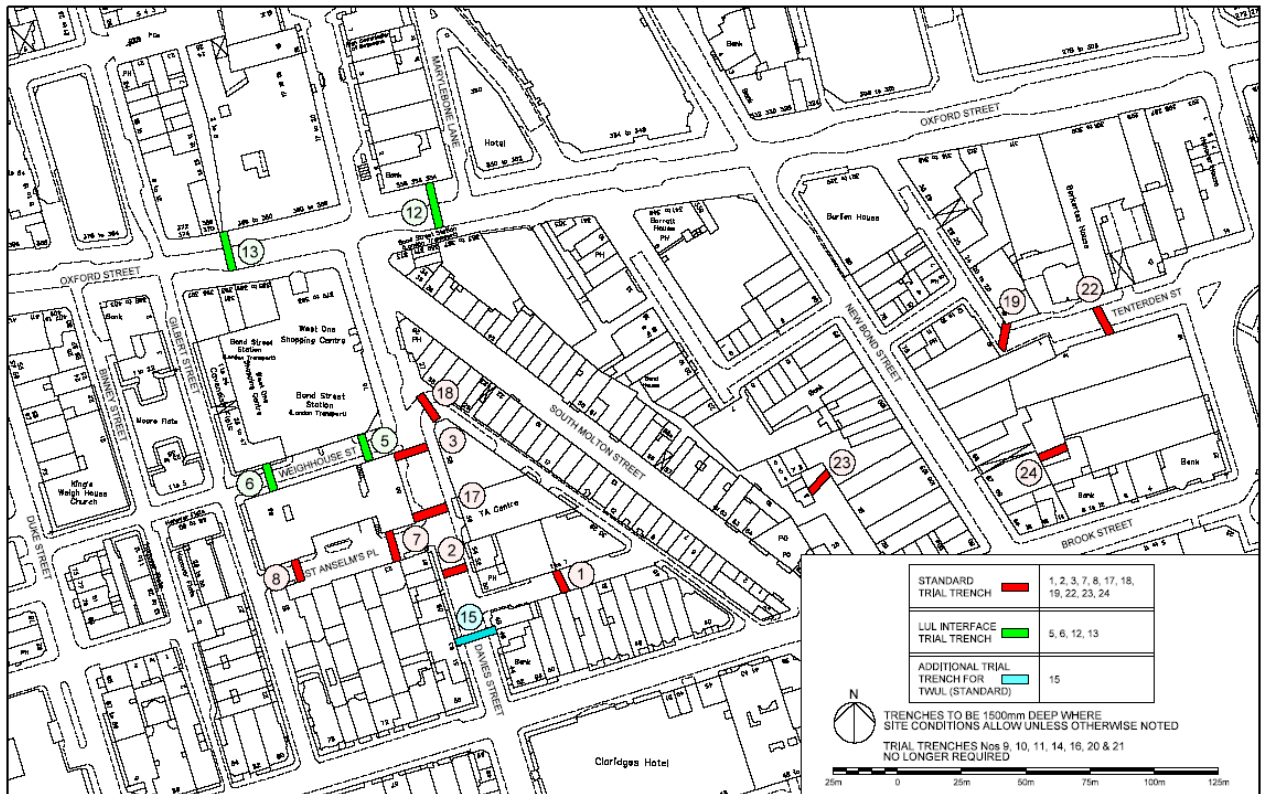


Figure 3 Utility trench locations

2.1.8 Archaeological observation of trenches opened to observe proposed utility and Compensation Grout Shaft locations has been carried out. The results are summarised in Table 1 below. The information provided by this observation of utility works has been incorporated as necessary into the mitigation strategy.

Trenches	Results
3 & 17	No image Grade II-listed John Bolding works basement extends 1.3m into the carriageway – a full 4.95m west of the west wall of the building. On the west side the outer pavement edge marks the limit of the University building basement. Within the road itself there were very small exposures of dark coal-ashy (nightsoil) post-medieval landfill 1m BGL and a small line of bricks possibly 19th-c.


Trenches	Results	
7 & 8		<p>Alluvium exposed at 0.8m bgl in BON8 and at 1.5mbgl at 7.</p> <p>An 18th-c brick culvert exposed in BON7</p>

Table 1 Results from archaeological monitoring of utility trench locations

Test Pit Evaluation (TPE) at WTH 65 Davies Street (Wessex Archaeology)

2.1.9 A TPE was completed by Wessex Archaeology in May 2010 prior to the demolition of 65 Davies Street. The TPE consisted of the excavation of two Test Pits and the examination, recording and sampling of the archaeological and geo-archaeological deposits. The following pits were excavated at 65 Davies Street:

- 2(L) x 2(W) x c.2(D)m pit (Test Pit 1); and
- 4(L) x 4(W) x c.2(D)m (Test Pit 2).

2.1.10 The TPE revealed Post Medieval deposits in Test Pit 1 comprising a sequence of surface layers, dumping and subsequent levelling deposits. A northwest-southeast aligned wall and two parallel red brick drains, possibly dating to the 19th century were also revealed in Test Pit 1. A small assemblage of artefacts was recovered comprising of Post-Medieval pottery Ceramic Building Material (CBM), clay pipe, glass, metalwork bone and oyster shell. The pottery indicated a date range of the 17th to early 18th century whilst the glass demonstrated later activity dating to the late 18th Century or later date for the deposits below the brick wall and drains. No archaeological remains were revealed in Test Pit 2 and no artefacts were recovered.

2.1.11 Additional observations were possible on a third test pit (Test Pit 3) excavated by the demolition contractor as part of their works. Observations were undertaken with the result that no archaeological features or artefacts were noted.

2.1.12 The results of the TPE indicated that archaeological deposits may be present within the basement area of 65 Davies Street. Additional archaeological work was consequently undertaken, as detailed below.

Test Pit Evaluation (TPE) at WTH 65 Davies Street (C254, Site Code XSC10)

2.1.13 A second phase of Test Pit Evaluation was undertaken by C254 Oxford Archaeology/Gifford in June-July 2010 prior to the demolition of 65 Davies Street. The purpose of the additional test pits was to clarify the results of the original investigation notably the development of the landscape, particularly with reference to the location of the River Tyburn.

2.1.14 Two test pits were excavated:

- Test Pit OA 1 measured 12m x 4m and was excavated as a southern extension to Wessex Archaeology Test Pit 1 (WATP1); and

- Test Pit OA 2 (measuring 4m x 4m) and was excavated between OA 1 and Wessex Test Pit 2 (WATP2).

2.1.15 Test Pit OA 1 recorded the 'brickearth' natural (Langley silts) at 116.3m ATD. The Langley silts were cut/eroded by a north-west to south-east aligned channel which was overlain by a sequence of levelling deposits, which were in turn overlain by dumped deposits, surfacing layers and further dumping/leveling deposits. The upper layer of leveling was sealed by two north-to-south aligned post-medieval brick structures.

2.1.16 Test Pit OA 2 revealed Langley silts at a level of 116.37m ATD, sealed by a thicker sequence of dumped deposits that was overlain by a post-medieval brick structure.

2.1.17 The test pits recovered a small assemblage of post-medieval artefacts including pottery, ceramic building material (CBM), clay tobacco pipe, glass, metalwork, bone and oyster shell. The pottery dated to the 17th- to early 18th-century and the glass to the late 18th century demonstrating later activity on the site.

Archaeological Excavation at WTH 65 Davies Street (Site Code XSC10)

2.1.18 The following is taken from Document No.C254-OXF-T1-RGN-CRG03-00001), which should be referred to for more detailed information.

2.1.19 The concrete features of the 20th century office block truncated and sealed a range of features, including probable 19th century building walls and associated deposits. There were tentative hints of several phases, with walls rebuilt or added to and some of the walls appearing to correspond to those of St Anselm's church. An earlier phase of activity seems to be represented by the partial remains of wells uncovered, which may date to the mid- to late 18th century. Until this can be confirmed by a study of the finds assemblages the dating is made on the basis of construction techniques and that, at this point, the area within the block of properties is shown on Horwood's 1792-1799 mapping as having buildings around the perimeter but that the central area was possibly open, rather than built on.

2.1.20 Within the intact upper deposits of the infilled river channel several large horse pelvis bones were recovered, indicating that the remains were being disposed of. The same late 18th century map shows stables towards the southern side of the plot, which could be the source of these remains.

2.1.21 In the south-eastern corner of the site a complex set of brick-built structures were recorded, these clearly having been used for metalworking processes. Although the results await full analysis it seems possible that the structures were part of the activity associated with the stables, such as an iron foundry, farrier's workshop or blacksmith. If this holds true it may be another facet of the presence of stables in the later 18th century, or a later addition in the 19th century. There was no confirmed evidence from the excavation of human occupation pre-dating the 18th century, although an earlier pit seen on the eastern side of the river is awaiting date confirmation.

2.1.22 At the western edge of the site the 'brickearth' Langley silts was uncovered and were also identified at the eastern side of site. Between these two areas there was an infilled area identified as a probable watercourse, the position of which strongly suggests that it may be the remains of the Tyburn River or one of its tributaries or former courses. The watercourse was seen to be approximately 14m wide and the later exposed upper fills were 0.8m thick. The underlying deposits were up to 1.5m thick, as detected in auger results (maximum intact depth estimated as 2.3m; base of channel at approximately 114.75m ATD). This topographical feature

has become fossilised in the modern day topography of this part of London (see the profile of St Anselm's). Samples of the deposits infilling the channel have been taken for dating and environmental purposes, and the results of this work are pending. The final reclamation of the channel appears to date to the late 17th to 18th centuries.

Ground Investigations ETH (Site Code: XSG10)

2.1.23 Nine geotechnical test pits were excavated within the basements of 18 and 19 Hanover Square and monitored under targeted watching brief conditions. The targeted watching brief recorded only 20th century made ground and redeposited natural gravels associated with the construction of the existing buildings which had caused extensive truncation and the removal of any archaeological horizons. Natural Lynch Hill terrace gravels were recorded in several test pits (OAG 10. Document No. C254-OXF-W-RGN-C125_WS088-50001).

2.2 Geological and Topographical Setting

2.2.1 This data is summarised and taken from the DDBA undertaken BOS (Document No. CR-SD-BOS-EN-SR-00001). The ground surface topography for the study area reflects the infilled Tyburn River valley. A river valley once ran in a general north south alignment towards the river Thames. There is an overall trending slope towards the south and the river. The River Terrace Deposits, laid down over centuries of Thames river activity, vary across the site and are absent in places due to later natural and human activities. At the Davies Street site the alluvium filled former valley of the Tyburn River has eroded through the Terrace Gravels into the London Clay.

2.2.2 The River Tyburn has now been culverted along South Molton Lane. Information based on exploratory hole numbers B1, B2, B3, B4, B5, B6, TP23, and TP24 demonstrate that Made Ground across the study area is between 3 to 5.3m thick at +118.3 to +122.1m ATD and is underlain by Terrace Gravels varying between 0.0 to 3.5m thick at +115.05 to +117.90m ATD.

2.2.3 At the Hanover Square site the superficial geology is recorded as the Lynch Hill Thames Terrace Gravels, however there has been extensive basementing work in the area of the box with natural gravels cut through and re-deposited. Based on exploratory hole numbers B7, B8, B9, B10, B11, B12, and B13, Made Ground is likely to be encountered at between +119.95 to +124.25m ATD some 0.65 to 4.35m thick in areas which are not basemented. The Terrace Gravels deposits will vary in thickness between 0.20 to 6.15m at +117.75 to +122.70m ATD. The boreholes described above (B1 - B6 and B7 - B13) were used by the MDC2 Geotechnics team to derive the geological longitudinal section in Figure 4 (Drawing No. P20101-C-G00-D-00106).

2.2.4 A deposit survival assessment, based on previous archaeological works, was carried out by MoLAS as part of background research to this SS-WSI (Table 2).

2.3 Archaeological and Historical Development

2.3.1 The following outline is taken from the DDBA undertaken for this stage of the assessment (Document reference: CR-SD-BOS-EN-SR-00001). There is evidence that the locality of the Bond Street study area has been extensively occupied by various peoples throughout time. The River Tyburn formerly ran through the study area (see Figure 2), and it is likely that the rich resources associated with this water course would have encouraged prehistoric peoples to settle and forage along its banks. A number of Palaeolithic axes have been located in the area surrounding the site to support this.

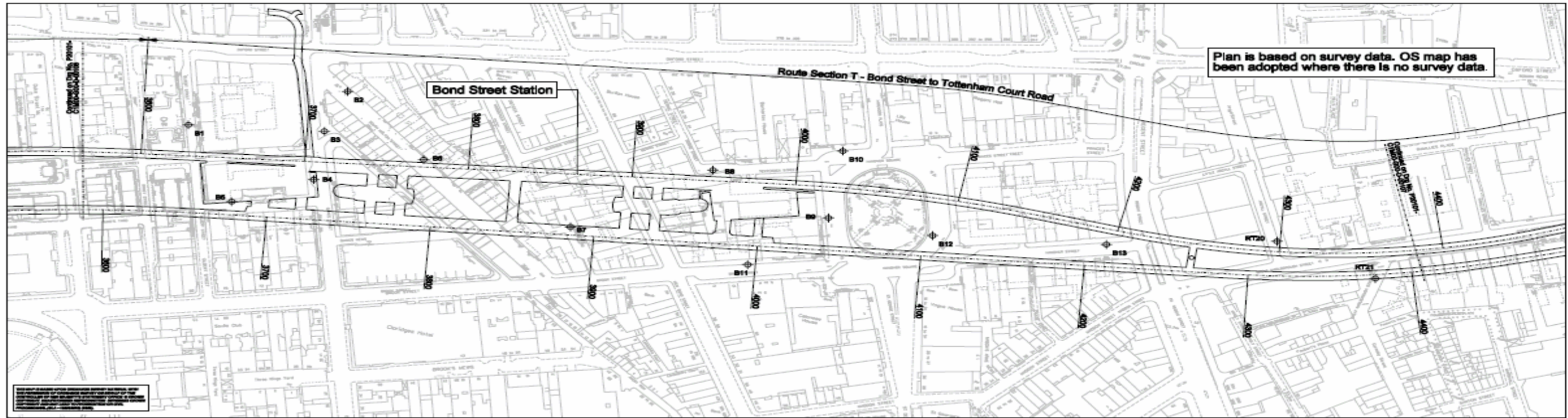
2.3.2 There have been suggestions of a Roman settlement located around Bond Street, where Oxford Street crossed the Tyburn, probably via a bridge. This remained in use for years, and part of a medieval bridge has been recorded. A settlement was located to the north centred around the parish church of St John the Evangelist. Whilst the churchyard may have extended south below Oxford Street the area remained largely rural as evidenced in field ditches located near Wigmore Street and Tenterden Street. This settlement eventually declined and people moved northwest around Marylebone. The area south of Oxford Street was known as Conduit meadow from 1589 onwards. Conduit Street itself reflects the diversion of a rising spring in the 15th century and implies a low density of population. In 1926 the River Tyburn was diverted from near Oxford Street to the City via a number of conduits. This route is still visible in the street patterning around Bond Street.

2.3.3 Urbanisation in the area gathered pace in the 17th century. In 1737 a new Tyburn Bridge was built to replace the medieval one, and it is likely that by this stage much of the River had been diverted into culverts. The street patterning surrounding the study area is Georgian, and rectilinear in form.

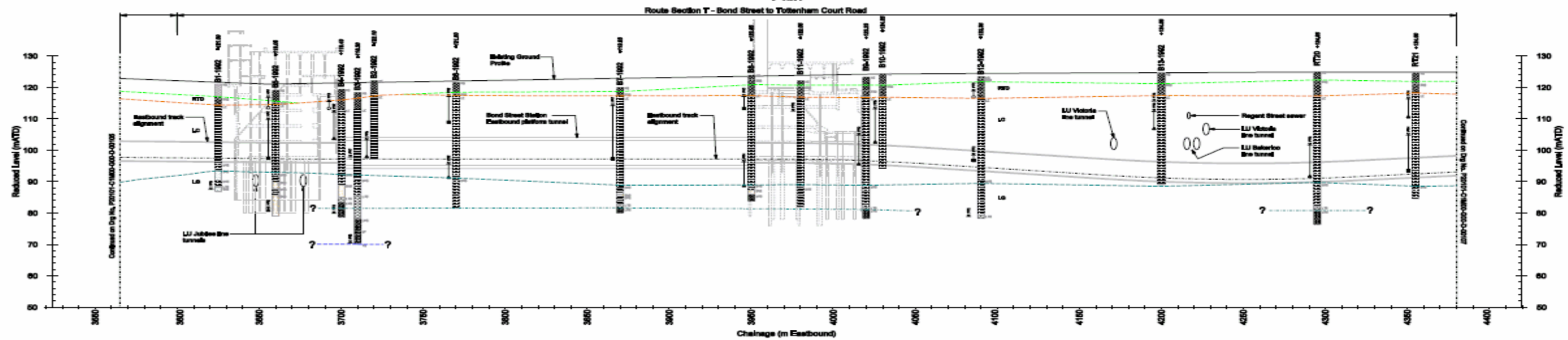
2.3.4 The area to the immediate north of the Davies Street Box is an Archaeological Priority Area, as this area covers the predicted area of the Roman settlement, Tyburn River Crossing and settlement around the church of St John the Evangelist.

2.3.5 A historic map regression exercise was undertaken as part of the DDBA for Bond Street. The results are summarised here:

- The 1746 Roque map shows that the area of Bond Street has been extensively built up by this stage. Expansion occurred in a westward pattern from the Strand and Aldgate area, branching outwards. Both the Hanover Square site and Davies Street site have developments on them. These are likely to have shallow foundations.
- The 1824 Greenwood map indicates a building facing Hanover Square, and Brook St, with an open space at the rear of these buildings. The Davies Street area appears to be completely built on.
- The 1862 Stanford map shows the study area and marks the Hanover Square site as the location of the Oriental Club. The map clearly shows the street of Davies Mews and Haunch of Venison yard.
- The 1870 OS map shows the individual buildings and landmark features. The Hanover Square site shows the oriental club facing to the north now, and depicted several buildings in the site. There are two gardens to the rear of the buildings fronting onto Hanover Square. The Davies Street site shows a number of thin long buildings which front Robert Street to the north and Cock Yard to the south. South of Cock Yard there are several more private gardens.
- The 1889 Booth poverty map shows that the study area appears to be pink and light blue indicating poor to fairly comfortable people lived here, with some red facing the streets.
- The later 1914 OS map depicts a number of the buildings appear to have been re-developed or extended to the rear in the Hanover Square site. Certainly redevelopment is the case for the Davies Yard site where there are now two main buildings with the eastern one being St Anselms Church. Cock Yard is later renamed after this church. There is a school on the corner of Gilbert Street and Cock Yard.



Plan



Longitudinal section through Eastbound tunnel

<p>Notes</p> <p>1. For Geological legend refer to Dig No. P20101-C1M00-G00-D-00101</p> <p>2. Known buried obstructions (structures and tunnels, etc.) are indicated on the geological longitudinal sections. The location of obstruction information is incomplete for Scheme design and an ongoing exercise. Therefore there may be other obstructions comprising buried structures such as piled foundations or deep basements, etc. which have not currently been identified. Further work will be required following Scheme design to outline and confirm the obstruction information</p> <p>3. Details of known obstructions are presented in Crossrail Report 'Central Tunnel Obstructions Report', Report No. C0000-C1M00-00146C1.</p>		<p>VERTICAL SCALE 1:100 @ A1 HORIZONTAL SCALE 1:1000 @ A1</p>	<p>CROSSRAIL LIMITED PORTLAND HOUSE LONDON SW8 5PP WWW.CROSSRAIL.CO.UK</p>	<p>1198 ATKINS ARUP JV MDC2</p> <p>PLAN AND GEOLOGICAL LONGITUDINAL SECTION FOR EASTBOUND TRACK SHEET 5 OF 9</p> <p>SCALE: 1:1250 @ A1</p> <p>DRAWING AND DIG FILE NO: P20101-C1M00-G00-D-00108</p>	<p>DRAFT</p> <p>REV 1</p> <p>A02</p>
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Figure 4 Longitudinal Section through Eastern Tunnel

2.3.6 For the purposes of the TTE at Davies Street, the typical single basement depths are approximately 2.4m below ground level (typically 8 feet), situated on a slab foundation. It is likely that this is located at c.118.m ATD with 1-2 metres of gravels between this and the top of the London Clay at c. 115.0m ATD.

2.3.7 Basement depths for buildings at 18 and 19 Hanover Square and 1a Tenterden Street, have been established as being typical 8ft depth single basements (2.4m). At 18 Hanover Square these sit on a 1 ft thick slab, varying to 9 inches in places. At 19 Hanover Square the basements are underpinned by column bases. Foundations are likely to end at c.118.0m ATD, however the columns at 19 Hanover Square are likely to have truncated through to the London Clay. This indicates likely historical truncation of potential archaeological deposits at these locations.

2.4 Deposit Survival

2.4.1 Table 2 below lists the deposit model for the BOS worksites. The data indicates that Tyburn alluvium will be encountered where it hasn't been truncated by basement and foundations. Archaeological sites where this material was located include XRB92, TP23 & B1) located c.40m to the north west of the WTH. A borehole at 19 Hanover Square (XRB92, B9) indicated truncation to the natural geology, covered by post-medieval dumping. Excavations carried out at site no. TEN98 however, to the immediate east of the ETH, located truncation of the natural geology by 18th century and Roman features down to 121.61m ATD.

2.4.2 A plan outlining the deposit model source locations is shown on Figure 3 below. The heights given in the following table are in metres Ordnance Datum, not ATD.

Relevant subsites	Data ID	Easting	Northing	Data Location	Natural surface mOD	Description	Ground Level	Notes
All	NBO93	528720	181110	78-79 New Bond Street	21.5	Lynch Hill Terrace gravels	23.8	Natural geology truncated down to 21.0-21.5m OD, overlain by archaeological deposits up to 1m in depth.
All	HOY97	528755	180945	Avebury Row, Horseshoe Yard	15.3	London Clay	20.0	Natural geology at 14.52-15.32m OD sloping down NE to SW, probably following slope of Tyburn valley. London Clay overlain by Tyburn alluvium up to 15.46-16.20m OD. Post-medieval deposits and features overlay natural geology.



Relevant subsites	Data ID	Easting	Northing	Data Location	Natural surface mOD	Description	Ground Level	Notes
All	GVR96	528620	180800	55 Grosvenor Street, 14-26 Davies Street	19.2	Lynch Hill Terrace gravels	22.0	Natural geology truncated by individual post-medieval features down to 18.5-18.8m OD; Basement slab at 19.0 to 19.5m OD.
All	NWB00	528570	181200	Dolcis House, New Bond Street	unknown	Lynch Hill Terrace gravels	23.1	Natural geology generally truncated by 19th-century buildings and/or earlier 18th-19th-century cellars.
ETH	XRB92	528867	181061	20 Hanover Square (test pit in road for borehole B9)	20.8	Lynch Hill Terrace gravels	23.0	Post-medieval dumping over quarry pit fills, which overlay natural geology.
ETH	XRB92, B7	528714	181019	Haunch of Venison Yard	17.8	Lynch Hill Terrace gravels ?	19.9	Borehole. ?Natural gravels might be Tyburn deposits
ETH	XRB92, B8	528788	181083	Junction of Dering and Tenterden Streets	22.5	Lynch Hill Terrace gravels	23.8	Borehole
ETH	XRB92, B9	528865	181064	19 Hanover Square (borehole in road)	18.9	Lynch Hill Terrace gravels	23.2	Borehole. Natural geology probably truncated, and covered by post-medieval dumping.
ETH	XRB92, B10	528861	181118	North-West corner of Hanover Square	20.8	Lynch Hill Terrace gravels	24.3	Borehole
ETH	XRB92, B11	528826	181015	8-12 Brook Street (borehole in road)	20.2	Lynch Hill Terrace gravels	22.1	Borehole
ETH	XRB92, B12	528929	181066	South-East corner of Hanover square	22.7	Brickearth	23.4	Borehole
ETH	XRB92, B13	529034	181084	19-20 Hanover Street (borehole in road)	21.2	Lynch Hill Terrace gravels	24.6	Borehole
ETH	RGF03	529000	181110	Block W8, Regent Street	21.7	Lynch Hill Terrace gravels	24.7	Natural geology truncated by 18th-19th-century well or soakaway, and both truncated by basement.



Relevant subsites	Data ID	Easting	Northing	Data Location	Natural surface mOD	Description	Ground Level	Notes
ETH	MXS96	528990	181000	28-32 Maddox Street	21.2	Lynch Hill Terrace gravels	23.0	Natural geology truncated by 19th-century basements down to 19.5m OD.
ETH	NBN07	528888	180928	47-52 New Bond Street	16.9	Not seen	20.1	Alluvium probably truncated by basements.
ETH	GMX05	528967	180953	28-29 St George Street, 40-44 Maddox Street	20.2	Lynch Hill Terrace gravels	22.6	Natural geology appeared underneath cellars, which might suggest it was truncated by them.
ETH	CNS94	529050	180960	9 Conduit Street	20.8	Lynch Hill Terrace gravels	22.6	
ETH	CDT96	529013	180824	40-41 Conduit Street	17.6	Lynch Hill Terrace gravels	c 21.0	Natural geology generally truncated by post-medieval deposits and features. Top of archaeology at 20.35m OD.
ETH	RGN92	529210	180910	172-182 Regent Street	20.6	Lynch Hill Terrace gravels	24.7	Natural geology truncated by post-medieval church.
ETH	CNT95	529080	180920	56-60 Conduit Street	22.5	Lynch Hill Terrace gravels	c 23.0	Natural geology generally truncated, at some areas down to 19.87m OD.
ETH	TEN89	528786	181076	1 Tenterden Street	22.5	Lynch Hill Terrace gravels	c 23.0	Localised truncations of natural geology by 18th-century and Roman features down to 21.61m OD.
WTH	XRB92, TP23	528526	180994	25 St. Anselm's Place (test pit in road)	Not seen	Not seen	18.8	Tyburn alluvium between 15.67 (base of TP) and 17.32m OD. Natural geology overlain by post-medieval deposits and features.
WTH	XRB92, B1	528468	181042	Junction Weighhouse and Gilbert Streets	15.5	Lynch Hill Terrace gravels ?	21.0	Borehole. ?Natural gravels may be Tyburn deposits. Possible Tyburn alluvium up to 17.0m OD.
WTH	XRB92, B2	528555	181091	38 South Molton Street (borehole in road)	16.8	London Clay	22.1	Borehole. 'Disturbed London Clay' between 16.8m OD and 18.1m OD



Relevant subsites	Data ID	Easting	Northing	Data Location	Natural surface mOD	Description	Ground Level	Notes
								might be Tyburn alluvium.
WTH	XRB92, B3	528550	181057	Junction Davies and South Molton Streets	13.0	London Clay	18.3	Borehole. Possible Tyburn alluvium at 14.0m OD
WTH	XRB92, B4	528553	181018	65 Davies Street (borehole in road)	12.9	Lynch Hill Terrace gravels	19.4	Borehole
WTH	XRB92, B5	528509	180989	St Anselm's Place	15.1	Lynch Hill Terrace gravels ?	19.1	Borehole. ?Natural gravels might be Tyburn deposits
WTH	XRB92, B6	528613	181050	50 South Molton Street (borehole in road)	17.9	Lynch Hill Terrace gravels ?	21.5	Borehole. ?Natural gravels might be Tyburn deposits
WTH	PCT98	528365	181230	5-6 Picton Place	19.0	Lynch Hill Terrace gravels	21.0	Natural gravels at 18.3-19.0m OD; 18th-century deposit at 18.70-19.25m OD.
WTH	OXF97	528484	181145	Avon House, Oxford Street	unknown	London Clay	22.0	Natural geology overlain by post-medieval dumping, and truncated by a post-medieval feature.
WTH	WIG78	528400	181300	Junction Wigmore Street, Madeville Place and James Street	16.4	London Clay	21.7	Natural geology overlain by post-medieval deposits, which were between c 16.7 to 19.7m OD.
WTH	STP79	528500	181200	Stratford Place, Oxford Street	16.5	Lynch Hill Terrace gravels	23.0	Natural geology truncated by post-medieval building.
WTH	GRO95	528360	180750	Grosvenor Square	23.1	Lynch Hill Terrace gravels	25.0	Natural geology truncated by possible post-medieval quarry pit.
WTH	BSU96	528772	180503	51 Berkeley Square		Not seen	c 16.5	Tyburn alluvium at c. 13.55m OD.

Table 2 Deposit Survival from previous archaeological investigations

3 Construction Impact Summary and Outline Mitigation Design

3.1 General

3.1.1 The new Crossrail station at Bond Street will comprise two non-circular, combined platform/concourse tunnels (eastbound and westbound) extending approximately 245m between the new WTH and ETH.

3.1.2 Construction activities will take place at two principal locations:

- The WTH at 65 Davies Street (see Annex 3 Drawing No.C132-WSP-DCD-CP001);
- The ETH at 18 and 19 Hanover Square (see Annex 3 Drawing No.C132-WSP-DCD-CP024).

3.1.3 General construction sequence for the Bond Street Station works will be undertaken in two principal stages comprising Advanced Works and Main Works.

3.2 Advance works

3.2.1 Advanced works (contracts C240, C207 and C411) have been undertaken to demolish the existing buildings occupying 65 Davies Street and 18 and 19 Hanover Square and prepare both the WTH and ETH sites for construction of the two station boxes. These works have comprised:

- Utility works and service diversions;
- Archaeological investigation mitigation within the WTH station box;
- Building demolition;
- Archaeological mitigation and recording for at the ETH site;
- Site establishment;
- Compensation grout shaft construction; and
- WTH and ETH station box diaphragm wall construction, piling and ground level capping beams works.

3.3 Advance Works

Utility Works and Service Diversions

3.3.1 The streets surrounding the WTH and ETH sites at BOS contain the normal mix of surface utilities: water and gas mains, electrical, telecom and cable TV cables, and combined sewers. Service diversions will take place during the enabling works phase (see Figure 5 and Figure 6). The mitigation procedure will include briefing of the construction team and a TWB will be undertaken.

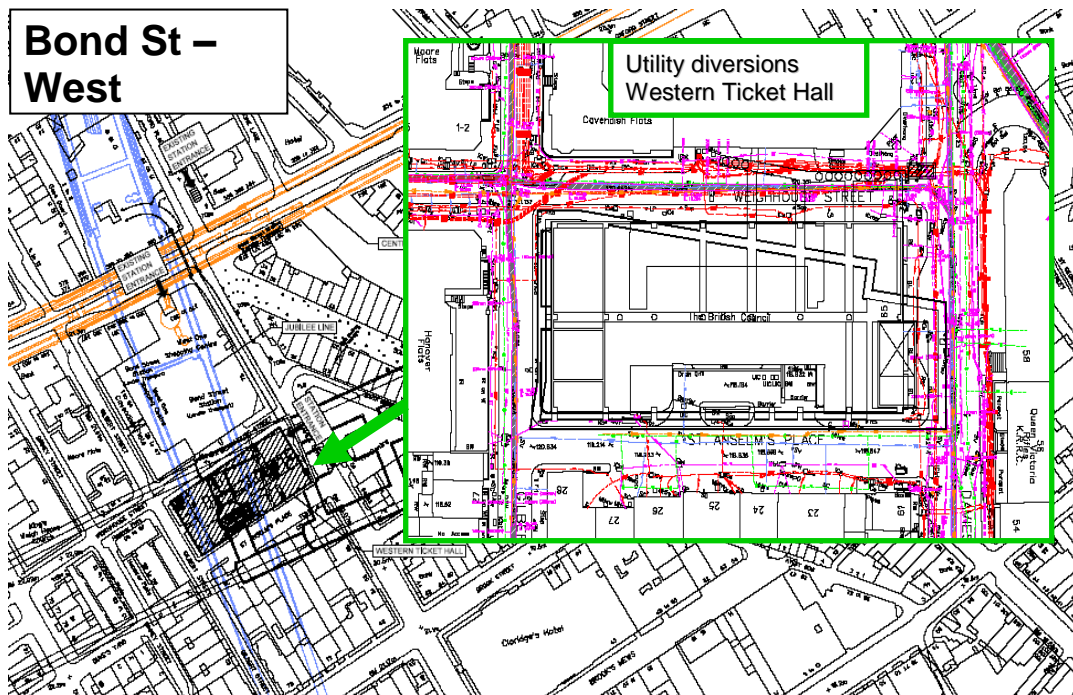


Figure 5 Utility diversions at Western Ticket Hall

3.3.2 The construction of the east wall of the WTH will require diversions for BT, Cable & Wireless and EDF electricity cables into the east side of Davies Street. EDF Energy's substation at the rear of 19 Hanover Square is to be relocated to a permanent position in the ETH in a room in Dering Yard (see Figure 6). The substation is directly connected to the low voltage network in New Bond Street and cannot be decommissioned without replacement.

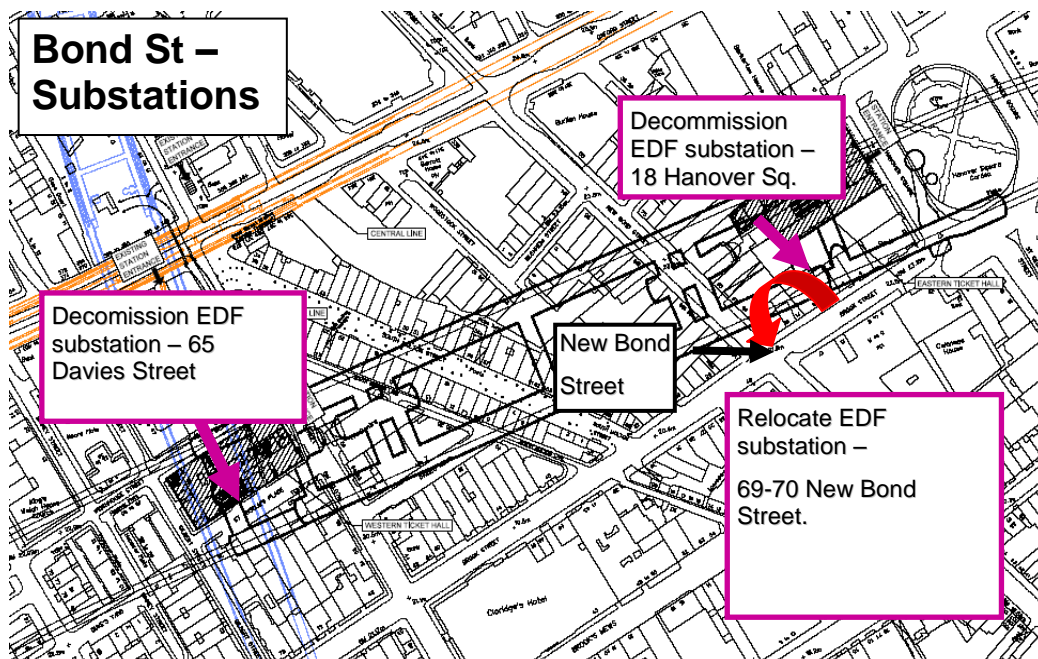


Figure 6 EDF sub-stations to be decommissioned

3.3.3 Worksites for the WTH will be located c.20m east of Gilbert Street. Worksites for the ETH will be located on the west side of Hanover Square and the eastern half to the north of the square.

Building Demolition

3.3.4 Three buildings have required demolition for the construction of BOS and are listed below in Table 3 and are located in a plan in Figure 7. At the time of writing demolition of 65 Davies Street has been completed and the demolition of 18 and 19 Hanover Square is nearing completion.

Location	Description	Reason for demolition	Notes
18/19 Hanover Square	Demolition of Buildings	Location of ETH	Existing basements to be demolished beneath new structural footprint. Basement beyond structural footprint to be demolished and backfilled. Local utilities to be disconnected prior to demolition. Existing substations to be removed / relocated prior to demolition. Demolition works to be co-ordinated with archaeological excavations within the existing basements. Lateral support to 20 Hanover Square to be maintained. Note details of building foundation currently unknown.
1a Tenterden Street	Demolition of Building	Location of Ventilation Shaft for ETH	Existing basements to be demolished beneath new structural footprint. Basement beyond structural footprint to be demolished and backfilled. Local utilities to be disconnected prior to demolition. Lateral support to 1 Tenterden Street to be maintained. Demolition works to be co-ordinated with archaeological excavations within the existing basements. Note details of building foundation currently unknown.
65 Davies Street	Demolition of Building	Location of WTH	Existing basements to be demolished beneath new structural footprint. Basement beyond structural footprint to be demolished and backfilled. Local utilities to be disconnected prior to demolition. Existing substations to be removed / relocated prior to demolition. Demolition works to be co-ordinated with archaeological excavations within the existing basements. Note details of building foundation currently unknown.

Table 3 List of buildings to be demolished for Bond Street Station (Document CR-SD-BOS-CE-RT-00002 – p. 13)

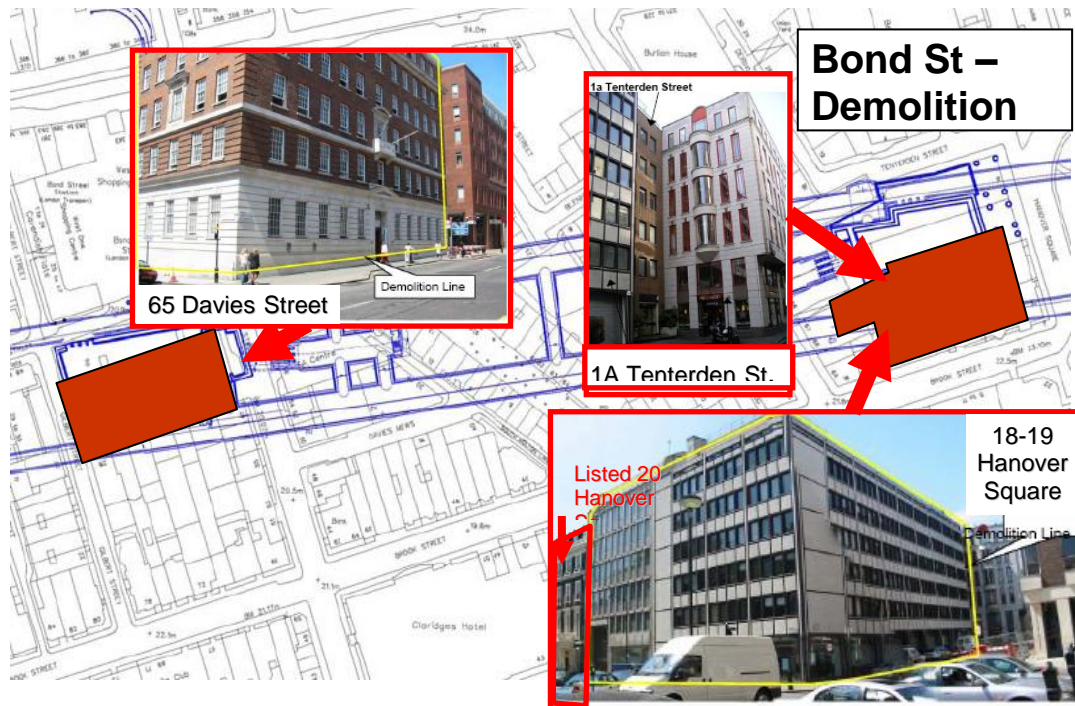


Figure 7 Buildings to be demolished

3.3.5 Prior to demolition works commencing all three buildings were assessed by a heritage specialist for architectural and other qualities which required recording prior to demolition.

3.3.6 During demolition of 18-19 Hanover Square sub-surface basement vaults along the Hanover Square and Tenterden Street frontages will be partially demolished and backfilled. Archaeological recording of these structures is required under a General Watching Brief.

3.3.7 The listed building at 20 Hanover Square abuts the western wall of 18-19 Hanover Square. This is being addressed and mitigated in a separate Heritage Method Statement.

Compensation Grout Shaft Construction

3.3.8 There are five Compensation Grout Shafts will be constructed in the area between the WTH and ETH (see Figure 8; for the CGS locations and worksite layout plans see Annex 3 of this SS-WSI):

- Compensation Grout Shaft (CGS) 1 is located in the centre of Davies Mews.
- CGS 2 is located to the northern end of Haunch of Venison Yard.
- CGS 3 is located at the west end of Tenterden Street near the confluence of with Dering Street.
- CGS 4 is located on Davies Street at the entrance to South Moulton Lane; and
- CGS 5 is located in Dering Yard (at the rear of 67 New Bond Street).

C411 Diaphragm Wall Construction and Piling Works

3.3.13 Once demolition works are completed and surface obstructions removed from the line of the diaphragm wall the basement area of 18 and 19 Hanover Square and part of Dering Yard will be backfilled and a piling matt laid across the site. It is understood that excavation of guide wall trenches and sheet piling works in advance of diaphragm wall construction will be undertaken within the imported material used to backfill the basement void. Consequently there is no requirement for archaeological mitigation during these work activities.

3.3.14 The basement area of 65 Davies Street has been backfilled and a piling matt laid across the site. As at the ETH, the excavation of guide wall trenches and sheet piling works in advance of diaphragm wall construction will be undertaken within the imported material used to backfill the basement void. As a result there is no requirement for archaeological mitigation during these work activities.

3.3.15 C411 shall undertake the bulk excavation of the WTH and ETH once piling works and d-wall construction are complete.

Western Ticket Hall

3.3.16 The WTH station box will predominantly be constructed using the top down construction sequence that will in general comprise:

- Excavation to the underside of the Level 0 (ground level) slab and transfer beams, slab construction including temporary openings for subsequent construction activities;
- Excavation for the construction of ground beams across Weighhouse Street;
- Excavation to the underside of the Level -1 slab and cast -1 slab;
- Excavation to the underside of the Level -2/ -3 slab and cast -2/ -3 slab;
- Excavation to the underside of the Level -4 slab, install passive wells and cast -4 slab;
- Excavation for and construction of the construction raft locally above the LU Jubilee Line zone of influence; and
- Excavation to the underside of the Level -5 slab and cast -5 slab.

3.3.17 Subsequent works at the WTH will comprise tunnelling works, construction of the LU Central and Jubilee Line link tunnels and construction of the station structure itself.

3.3.18 During the advanced works and site preparation the former basements of 65 Davies Street were demolished, excavated to a depth of approximately 6.0m below the existing street level (to a depth of c. 116.0 to 115.0m ATD) and then backfilled to provide a stable piling platform from which to undertake diaphragm wall construction and piling works.

3.3.19 TPE investigation and archaeological excavation undertaken prior to and during the demolition of 65 Davies Street have confirmed that archaeological deposits including the former channel of the River Tyburn, survive between areas of later ground disturbance caused by the construction of the 20th century buildings that occupied the site.

3.3.20 It was not possible to investigate the lower 1.50m of the sequence of deposits infilling the former Tyburn during the programme of previous archaeological mitigation. In order to investigate and record the remaining sequence of Tyburn deposits and any associated archaeological remains a TWB will be required. The TWB will be programmed to be undertaken once the material currently backfilling the footprint of 65 Davies Street has been

removed and during the excavation of the station box to the depth required for the Level –1 slab. The TWB will have a particular focus on recording and recovering environmental/ geoarchaeological samples from the deposits infilling former channel of the River Tyburn.

Eastern Ticket Hall

3.3.21 The general construction sequence for the ETH differs slightly from the method used at the WTH and will comprise:

- Stage 1 construction of access shaft, mining and construction of Crossrail running tunnels and platform tunnels.
- Excavation to the underside of the Level –1 slab and transfer beams,
- Construct Level –1 slab;
- Construct bottom up columns above Level –1 slab;
- Construct Level 0 (ground level) slab including temporary support works;
- Excavation to the underside of the Level –2 slab and cast –2 slab;
- Excavation to the underside of the Level -3 slab and cast -3 slab;
- Excavation to the underside of the Level –4 slab, install passive wells and cast –4 slab;
- Excavation to the underside of the raft and cast raft; and
- Excavation for and construction of sump beneath raft.

3.3.22 Subsequent ETH works will comprise construction of the internal lining walls to form the tunnel eyes and construction of the station structure itself.

3.3.23 The ETH substructure comprises a deep box constructed to platform level. A new basement is to be constructed to the north of the deep station box and above the eastbound running tunnel. The archaeological monitoring of trial pit excavations at 18 and 19 Hanover Square have confirmed that the existing basements and underground vaults have removed any surviving archaeological deposits and consequently no archaeological mitigation will be required during the Main Works construction of the ETH.

C300/C410 Platform Tunnel and SCL Works

3.3.24 It is understood that the C300/C410 tunnelling works and spray concrete lining works for the BOS station platforms will be undertaken at sufficient depth within the natural geology to result in no impact to archaeological horizons. No archaeological mitigation will be required during these works.

3.3.25 Similarly the access shaft in the ETH to facilitate the tunnelling and SCL works will be constructed within the former basement of 18 and 19 Hanover Square where potential archaeological horizons have been removed by previous construction activity. As a result there is no requirement for archaeological mitigation during construction of the access shaft.

3.4 Main Works (C412)

3.4.1 Both the WTH and ETH share a common design. The WTH is located within the footprint of 65 Davies Street, while the ETH structures will be located within the footprint numbers 18 and 19 Hanover Square. Both will comprise a five storey below-ground box



structure with a single storey ticket hall at ground level. Both stations will have an integrated over site development (OSD) constructed above the station ticket hall.

3.4.2 The Main Works contract (C412) will commence after the completion of the advanced works and bulk excavation completed by C411. C412 shall complete the civils construction of the two station box structures.

3.4.3 The construction sequence information has been taken from the Construction Arrangements Written Statement submitted to Westminster City Council (Document No. C132-WSP-T-XST-C125-00007).

4 Research Aims and Objectives of the Investigations

4.1 Research Aims

4.1.1 The research objectives set out for Zone A between Royal Oak and Hatton Gardens (ES route Window C1-C5) are set out in Annex 1.

4.1.2 The fieldwork priorities for the works will be to recover data that addresses the following research objectives of importance to this landscape. These are:

- To record the landscape development (i.e. land construction) through assessment of the soil stratigraphy, including the definition of any survival Brickearth deposits;
- To define the location and development of the Tyburn River alignment, where it survives at 65 Davies Street (WTH);
- To define levels of landscape change due either to environment and climate or human interaction;
- To define levels of truncation in relation to adjacent past archaeological investigations and geotechnical works providing a clear deposits model to inform further development works in the area.

4.2 Objectives of the Investigations

4.2.1 The overall objectives of the investigation are to establish the character, nature, date, extent and state of preservation of any surviving archaeological remains that will be impacted upon by the development. This includes the non-listed built heritage.

4.2.2 The GWB undertaken during C207 demolition works at the ETH may provide information that furthers the understanding of the 18th –19th century buildings that formerly occupied the site and how the development of Hanover Square and Tenterden Street fit within the wider urbanisation of this part of London at that time.

4.2.3 The TWB at Dering yard during the C207 Advanced works may provide further information regarding the settlement and land use sequences relevant to understanding the urbanisation, growth and development of Hanover Square and the Oxford Street area.

4.2.4 The TWB in the area of the C240 utility diversions may provide information regarding early settlement and land use sequences relevant to understanding the growth and development of this area.

4.2.5 The TWB at the compensation grout shaft locations during the C411 Advanced Works has the potential to uncover features relating to the River Tyburn as well as palaeo-environmental information relating to the early landscape and settlement.

4.2.6 The TWB at the WTH during the C411 Main Works the potential to uncover features relating to the River Tyburn and expose the lower sequence of alluvial deposits infilling the former channel. This has the potential to further the understanding of the formation and development of the Tyburn over time and how this water resource was exploited. The TWB also has the potential to recover palaeo-environmental information relating to the early landscape and settlement of the Tyburn and its surrounding area.

5 Scope of the Investigation

5.1.1 The historic development of the Bond Street Station area is summarised in section 2.5 of this SS-WSI and in the Bond Street Station Site Specific Archaeological Detailed Desk-Based Assessment (Document No. CR-SD-BOS-EN-SR-00001). The potential for the survival of archaeological remains is described in sections 2.1.4 to 2.1.6 above and the construction impacts and outline mitigation set out in Section 3 of this SS-WSI.

5.2 General Requirements for Main Contractors

Site Accommodation and Facilities

5.2.1 For each works package the *Main Contractor* shall provide the following site accommodation facilities for the use of archaeological operatives, inclusive of any hardstanding and services required:

- Welfare and mess facilities (including power, water and lighting);
- Toilets, with drying and washing facilities for both male and female contractors;
- First Aid;
- Storage for small plant and tools; and
- Temporary office including 1 No. desk space for the use of the C254 lead archaeologist complete with furniture, telephone and internet access.

5.3 Specific Requirements for Main Contractors

Advanced Works – Utility Diversions

C240 Targeted Watching Brief

5.3.1 A number of utility diversions are required in the streets surrounding both the WTH and ETH. The impact of these works is described in section 3.3 of this SS-WSI which has identified the requirement for an archaeological mitigation in the form of a TWB. Archaeological investigation by targeted watching brief is defined in the Generic WSI (CR-PN-LWS-EN-SY-00001).

Targeted Watching Brief Procedure

5.3.2 When undertaking the TWB the C240 Main Contractor's methodology should allow provision for the following procedure:

- Identify the location all known live services and utilities prior to excavation and brief the C254 archaeologist as to their location;
- Modern overburden and post-medieval made ground will be machine or hand excavated under the supervision of a C254 Archaeologist, to the first archaeological horizon or where the utility trenches are deep enough the surface of the natural Langley Silts or Lynch Hill terrace gravels;
- Where the utility trenches are deep enough allow provision for the C254 Archaeologist to monitor the removal of the natural Langley Silts or Lynch Hill terrace gravels in order to identify and investigate the potential survival of Palaeolithic remains;

- Allow adequate time for any surviving archaeological remains to be investigated and recorded. This will be agreed between the C240 Main Contractor, C254 Archaeologist and the Crossrail Project Archaeologist;
- In the event that buried structures such as vaults or cellars are encountered allow adequate time to make a photographic and basic written record of the vault structures;
- Allow suitable secure access/egress from ground level to bottom of excavated area for archaeologists to work;
- Remove, as directed by the C254 archaeologist, materials once they have been recorded by the C254 archaeologists;
- Allow safe access for archaeological operatives into the site and any required temporary works;
- Allow for up to 2 archaeologists to be on site during the utility works; and
- Provide further technical advice to C254 as may be required to safely complete the works.

ETH Advanced Works

C207 Demolition Hanover Square General Watching Brief

5.3.3 Demolition works and the removal of the basements of 18 and 19 Hanover Square are nearing completion. Archaeological monitoring during geotechnical investigation on the site has confirmed that the existing basements have removed any potential archaeological remains. However, a number of brick vaults of 18th or 19th century date are known to survive behind the reinforced concrete basement walls on the Hanover Square and Tenterden Street frontages.

5.3.4 The brick built vaults will be partially demolished and backfilled in preparation for the C411 diaphragm wall construction and piling works. As a result basic archaeological recording under a GWB will be undertaken to mitigate this impact. The GWB will comprise a photographic record of the visible external structure of the vaults and basic written description of their form and construction. This level of recording will be commensurate with a that set out by English Heritage for a Level 1 historic building record as set out in the guidance *Understanding Historic Buildings* (EH, 2006). Archaeological investigation by general watching brief is defined in the Generic WSI (CR-PN-LWS-EN-SY-00001).

General Watching Brief Procedure

5.3.5 The method of working for the C207 Main Contractor during demolition works shall allow for:

- Identify the location all known services and utilities prior to excavation and brief the C254 archaeologist as to their location;
- Allow suitable access/egress from ground level to bottom of the basement area for C254 archaeologists;
- Allow adequate time to make a photographic and basic written record of the vault structures;
- Allow suitable secure access, shoring and edge protection where required from ground level to bottom of excavated area for archaeologists to work;
- Allow for up to 2 archaeologists to be on site during demolition works; and
- Provide further technical advice to C254 as maybe required to safely complete the works.

C207 Targeted Watching Brief

5.3.6 At the time of writing it discussions are ongoing regarding extending the scope of C207's advanced works to incorporate the central area of Dering Yard situated at the rear of 67 New Bond Street. Demolition and site clearance works within this area currently fall within the scope of works for the GPE Masterplan Scheme. It is proposed that demolition, ground reduction, the clearance of subsurface-obstructions and backfilling works now be undertaken by C207 and the site prepared in advance of C411's diaphragm wall construction.

5.3.7 Archaeological monitoring of trial pits and utility diversions within Derings Yard have recorded cobbled surfaces, brick culverts and possible vault structures and there remains the potential for archaeological deposits to survive in situ.

5.3.8 Archaeological impacts resulting from the demolition, ground reduction and site clearance works will be mitigated by an archaeological targeted watching brief. Archaeological investigation by targeted watching brief is defined in the Generic WSI (CR-PN-LWS-EN-SY-00001).

Targeted Watching Brief Procedure

5.3.9 When undertaking the Targeted Watching Brief the C207 Main Contractor's methodology should allow provision for the following procedure:

- Provide a suitable and safe position from which to supervise machine excavation;
- Modern overburden and post-medieval made ground will be machine excavated in stages, under supervision of C254 Archaeologist, to the first archaeological horizon or the surface of the natural Langley Silts or Lynch Hill terrace gravels;
- Allow provision for the C254 Archaeologist to monitor the removal of the natural Langley Silts or Lynch Hill terrace gravels in order to identify and investigate the potential survival of Palaeolithic remains;
- Provide provision for the use of a smooth bladed (toothless) machine bucket to ensure that a clean machine excavated surface to archaeological horizons is achieved;
- Allow adequate time for any surviving archaeological remains to be investigated and recorded. This will be agreed between the C207 Main Contractor, C254 Archaeologist and the Crossrail Project Archaeologist;
- In the event that buried structures such as vaults or cellars are encountered allow adequate time to make a photographic and basic written record of the vault structures;
- Allow suitable secure access/egress from ground level to bottom of excavated area for archaeologists to work;
- Remove, as directed by the C254 archaeologist, materials once they have been recorded by the C254 archaeologists until the natural Langley Silts or Lynch Hill terrace gravels are reached;
- Allow safe access for archaeological operatives into the site and any required temporary works;
- Allow for 1 archaeologist to supervise the ground reduction supported by additional archaeological operatives as necessary and agreed between the C207 Main Contractor, C254 Archaeological Sub-contractor and Crossrail Project Archaeologist ; and
- Provide further technical advice to C254 as may be required to safely complete the works.

Advanced Works - C411 Compensation Grout Shafts

5.3.10 The excavation of the exploratory trial pits and CGS construction have the potential to remove or truncate archaeological deposits. To mitigate this impact a programme of observation, investigation and the recording of archaeological remains will be required.

5.3.11 Subterranean brick structures including vaults, cellars and culverts have been identified at several of the CGS locations during previous archaeological monitoring work. If such structures are encountered the targeted watching brief methodology will include a photographic record of the visible structure and basic written description of their form and construction. This level of recording will be commensurate with a that set out by English Heritage for a Level 1 historic building record as set out in the guidance Understanding Historic Buildings (EH, 2006).

Targeted Watching Brief Procedure

5.3.12 The C411 Main Contractor will work with the C254 Archaeologist to ensure that the necessary controls are implemented in order to allow archaeological recording to take place to the required standard. When undertaking the Targeted Watching Brief the C411 Main Contractor's methodology should allow provision for the following procedure:

- Identify the location all known services and utilities prior to excavation and brief the C254 archaeologist as to their location;
- Provide a suitable and safe position from the C254 archaeologist is able to supervise machine excavation;
- Machine or hand excavate in stages under supervision of a C254 Archaeologist, modern overburden and post-medieval made ground to the first archaeological horizon or the surface of the natural Langley Silts or Lynch Hill terrace gravels;
- Allow provision for the C254 Archaeologist to monitor the removal of the natural Langley Silts or Lynch Hill terrace gravels in order to identify and investigate the potential survival of Palaeolithic remains;
- Allow for the use of a smooth bladed (toothless) machine bucket to ensure that a clean machine excavated surface to archaeological horizons is achieved;
- Allow adequate time for any surviving archaeological remains to be investigated and recorded. This will be agreed between the C411 Main Contractor, C254 Archaeologist and the Crossrail Project Archaeologist;
- In the event that buried structures such as vaults or cellars are encountered allow adequate time to make a photographic and basic written record of the vault structures;
- Allow suitable secure access/egress from ground level to bottom of excavated area for archaeologists to work;
- Remove, as directed by the C254 archaeologist, materials once they have been recorded by the C254 archaeologists until the natural Langley Silts or Lynch Hill terrace gravels are reached;
- Allow safe access for archaeological operatives into the site and any required temporary works;
- Allow for 1 archaeologist to supervise the ground reduction; and
- Provide further technical advice to C254 as may be required to safely complete the works.

C411 Bulk Excavation in WTH

5.3.13 Within the footprint of the WTH it is acknowledged that small areas of archaeological deposits may survive which warrant additional investigation. These relate mainly to alluvial deposits within the relic channel of the River Tyburn. As such, works which will result in the disturbance of these deposits will require the adoption of a programme of archaeological mitigation.

5.3.14 Previous archaeological investigation undertaken within the basement of 65 Davies Street have identified natural superficial geology in the form of Langley Silt 'brickearth' at a depth of c.116.37m ATD and the underlying solid London Clay geology at c.116.23m ATD. As noted above in sections 2.1.18 to 2.1.22 above the natural deposits were cut/eroded by a former channel of the River Tyburn. The upper deposits infilling the channel were investigated and recorded to a depth of 116.15m ATD. Below this approximately a further 1.50m of channel deposits survive in situ, with the base of the former Tyburn channel at approximately 114.75m ATD.

5.3.15 A TWB will be required after the material currently backfilling the basement footprint of 65 Davies Street but during the excavation of the station box to the level of the Level -1 slab at approximately 114.55m ATD. A key objective of the TWB will be to investigate, record and recover environmental/geoarchaeological samples from the lower sequence of deposits infilling former channel of the River Tyburn.

5.3.16 As noted in section in section 3.4.6 above the former basements of 65 Davies have been excavated to a depth of approximately 6.0m below the existing street level (to a depth of c. 116.0 to 115.0m ATD) and then backfilled to provide a stable piling platform. As a result of this excavation there is a possibility that the remaining sequence of deposits infilling the Tyburn have been further truncated. In the event that a sequence of deposits suitable for sampling does not survive the C254 Archaeological Contractor will in consultation with the Crossrail Project Archaeologist review whether it is appropriate to either continue the TWB, down grade it to a GWB or cease the watching brief altogether.

Targeted Watching Brief Procedure

5.3.17 The method of working for the C411 Main Contractor during excavation works to the Level -1 slab shall allow for:

- Provide a suitable and safe working environment within which the C254 archaeologist is able to supervise machine excavation;
- Machine excavate in stages under supervision of the C254 Archaeologist, modern overburden and post-medieval made ground to the first archaeological horizon, surface of the natural Langley Silts or Lynch Hill terrace gravels or base of the Tyburn channel at c.114.75m ATD;
- Allow provision for the C254 Archaeologist to monitor the removal of the natural Langley Silts or Lynch Hill terrace gravels in order to identify and investigate the potential survival of Palaeolithic remains;
- Allow for the use of a smooth bladed (toothless) machine bucket to ensure that a clean machine excavated surface to archaeological horizons is achieved;
- Allow adequate time for any surviving archaeological remains to be investigated and recorded and environmental/geoarchaeological samples recovered from the alluvial deposits infilling the Tyburn channel. This will be agreed between the C411 Main Contractor, C254 Archaeologist and the Crossrail Project Archaeologist;

- Allow suitable secure access/egress from ground level to bottom of excavated area for archaeologists to work;
- Remove, as directed by the C254 archaeologist, materials once they have been recorded by the C254 archaeologists;
- Allow safe access for archaeological operatives into the site and any required temporary works;
- Allow for 1 archaeologist to supervise the ground reduction supported by additional archaeological operatives as necessary and agreed between the C207 Main Contractor, C254 Archaeological Contractor and Crossrail Project Archaeologist; and
- Provide further technical advice to C254 as may be required to safely complete the works.

5.3.18 The TWB will be considered completed when:

- in areas outside of the Tyburn channel the Langley Silts or Lynch Hill terrace gravels have been investigated for potential Palaeolithic remains and all archaeological deposits have been appropriately investigated and recorded; and
- in the area within the former channel of the Tyburn the lower sequence of archaeological deposits (to a depth of c.114.75m ATD) has been appropriately investigated, record and environmental/geoarchaeological samples have been recovered.

5.4 Specific Requirements for the C254 Archaeological Contractor

5.4.1 The programme of archaeological investigation during the C207, C240 and C411 Advanced Works and the C411 Main Works will comprise General and Targeted Watching Briefs.

5.4.2 For each contract package and the specific construction activities set out in Section 3 the Archaeological Contractor shall provide an archaeological method statement for carrying out the works and a risk assessment and health and safety plan.

Advanced Works

C207 General and Targeted Watching Briefs

5.4.3 TWB and GWB will be required during the C207 Building Demolitions Advanced Works package as detailed in section 3 above. During these works the C254 Archaeological Contractor should make provision to:

- Provide suitably qualified archaeologists, experienced in archaeological monitoring and recording and the nature of archaeological deposits which are expected at the ETH site;
- Ensure that appropriate photographic and written records are made of subsurface structures such as vaults, cellars or culverts sufficient to determine type, method and materials of construction and the relationships between different phases of construction. The records will conform to an English Heritage Level 1 historic building record as set out in the guidance *Understanding Historic Buildings* (EH, 2006); and
- Ensure that during the TWB and GWB individual features/structures are to be hand cleaned, defined and sample excavated: sufficient to determine type, plan form and relationships (e.g. for structures and rebuilds) and recorded.

C240 Targeted Watching Brief

5.4.4 TWB will be required during the C240 Utility Diversions package. During these works the C254 Archaeological Contractor should make provision to:

- Provide a suitably qualified archaeologist, experienced in archaeological monitoring and recording and the nature of archaeological deposits which are expected at the BOS station sites; and
- Ensure that during the TWB individual features, deposits or structures are hand cleaned, defined and sample excavated: sufficient to determine type, plan form and relationships (e.g. for structures and rebuilds) and recorded.

C411 Targeted Watching Brief

5.4.5 TWB will be required during the construction of compensation grout shafts undertaken by C411. During these works the C254 Archaeological Contractor should make provision to:

- Provide suitably qualified archaeologists, experienced in archaeological monitoring and recording and the nature of archaeological deposits which are expected at the BOS CGS locations summarised in section 3;
- Ensure that appropriate photographic and written records are made of subsurface structures such as vaults, cellars or culverts sufficient to determine type, method and materials of construction and the relationships between different phases of construction. The records will conform to an English Heritage Level 1 historic building record as set out in the guidance *Understanding Historic Buildings* (EH, 2006); and
- Ensure that during the TWB individual features, deposits or structures are hand cleaned, defined and sample excavated: sufficient to determine type, plan form and relationships (e.g. for structures and rebuilds) and recorded.

For the C411 Main Works package TWB will required during the excavation of the WTH box structure to the depth of the Level –1 slab. During these excavation works provision should be made to:

- Provide suitably qualified archaeologists, experienced in archaeological monitoring and recording of archaeological deposits expected at the WTH site detailed above;
- Provide a suitably qualified geoarchaeologist experienced in archaeological site investigation and the nature of archaeological deposits which are expected within the former channel of the River Tyburn;
- Ensure that during the TWB individual features or structures are hand cleaned, defined and sample excavated: sufficient to determine type, plan form and relationships (e.g. for structures and rebuilds) and recorded; and
- Ensure that sufficient environmental/geoarchaeological samples are recovered from the lower sequence of the Tyburn channel deposits to adequately understand its formation, development and silting and if possible inform the understanding of the surrounding palaeo-environments.

5.4.6 A specification for the programme of archaeological works is provided at Section 7 below and the deliverables for each works package at Section 8 of this WSI.

6 Programme for the Investigation

6.1 Archaeology

6.1.1 Site-specific evaluation and mitigation measures are presented using the following remaining project phases:

- **Phase 2** archaeological works to be undertaken commensurate with the Main Works;
- **Phase 3** archaeological works to be undertaken after the Main Works phase (e.g. post-excavation assessment, analysis, publication and dissemination).

6.1.2 Detail on construction design is included above in Section 3 and Section 5.1.

Advanced Works

C207 Demolition Works

6.1.3 The C207 demolition of the 18 and 19 Hanover Square basements is currently underway. GWB attendance by C254 and recording of the exposed sub-surface vaults will be completed by the end of July.

6.1.4 The transfer of part of the Dering Yard into C207s scope for demolition, site clearance and preparation for C411's piling works has at the time of writing not be confirmed. The C207 construction programme and required attendance by C254 will be confirmed when the change to C207's scope has been agreed.

C411 Compensation Grout Shaft Construction

6.1.5 The programme details for the construction of the compensation grout shafts is summarised in Table 4 below. The programme information is been provided by C411.

C411 Activity	Archaeological Mitigation/ C254 Activity	Start Date	Finish Date	Duration (Days)
Excavate and construct CGS 1 Davies Mews	TWB	03-10-11	04-11-11	23
Excavate and construct CGS 2 Haunch of Venison Yard	TWB	22-08-11	23-09-11	25
Excavate and construct CGS 3 Tenterden Street	TWB	07-07-11	12-08-11	27
Excavate and construct CGS 4 Davies Street/South Moulton Lane	TWB	03-10-11	04-11-11	23
Excavate and construct CGS 5 Dering Yard	TWB	07-07-11	12-08-11	27

Table 4 C411 Compensation Grout Shaft Construction Programme

C411 Main Works

6.1.6 The programme information currently available for the Main Works requiring further archaeological mitigation is summarised in Tables 5 below and has been taken from PCS-05:

Task	Archaeological Mitigation/ C254 Activity	Estimated Duration	Detail
Complete below ground civils ETH	None	Q1 2013 – Q1 2014	To be confirmed
Complete below ground civils WTH	TWB	Q2 2012 – Q4 2013	To be confirmed

Table 5 C411 Main Works Programme Information

6.1.7 A detailed programme summary of the Main Works construction activities requiring will be communicated to the C254 Archaeological Contractor and the Project Archaeologist when it becomes available.

6.2 Non-Listed Built Heritage

6.2.1 All required recording works for NLBH at 65 Davies Street have now been completed.

7 Specification for Evaluation & Mitigation (including Watching Brief)

7.1 Generic Standards

7.1.1 The archaeological evaluation and mitigation works and scope of any archaeological scientific methods shall be designed and undertaken in accordance with the Generic WSI and relevant best practise guidance (and any subsequent revisions) i.e.:

- Crossrail standards and specifications;
- Institute for Archaeologists - Standard and Guidance for archaeological field evaluation, 2008 (revised);
- 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 (MOLAS 1994); and
- English Heritage - Understanding Historic Buildings - A guide to good recording practice, 2006.

7.2 Potentially Nationally Important Remains

7.2.1 Where unexpected, potentially nationally important archaeological remains (as defined in the Crossrail EMRs and Generic WSI) are identified during the works, the Archaeology Contractor shall undertake works in accordance with the Environmental Requirements (archaeology) section of the relevant package Works Information and shall adhere to procedures as set out in the Site Specific WSI.

7.2.2 The Archaeology Contractor shall submit details of their procedure for excavating and recording potentially nationally important remains in the Archaeology Contractor's Method Statement.

7.2.3 In the event that archaeological remains of potentially national importance are encountered the C254 Archaeology Contractor will immediately inform the Project Archaeologist and not recommence work at the location until further instruction has been received from the Project Archaeologist. The discovery of archaeological remains of potentially national importance will be confirmed in writing within 24hours of discovery.

7.2.4 The Project Archaeologist will be responsible for informing the relevant statutory consultees (EH GLAAS) and co-ordinate any meetings required between Crossrail Central, the Principal Contractor, the C254 Archaeology Contractor and the relevant statutory consultees.

7.2.5 The Principal Contractor will be responsible for supplying any material required to protect archaeological remains of potentially national importance from possible damage by ongoing construction activities in the vicinity. This may include the provision of barrier fencing, terram and sand.

7.2.6 As a result of the discovery of unexpected, potentially nationally important archaeological remains, the Site Specific WSI will be updated by the Project Archaeologist to incorporate any additional specific primary fieldwork event aims.

7.3 Human Remains

7.3.1 Certain aspects of the normal legal procedure for the removal of human remains (and associated monuments) from burial grounds has been modified by Schedule 15 to the Crossrail Act 2008. However for other aspects, normal legislation applies.

7.3.2 Where human remains are identified, all subsequent works must be undertaken in accordance with relevant legislative and environmental health requirements as set out in the Environmental Requirements (archaeology) section of the relevant package Works Information.

7.3.3 In the event that human remains are encountered the C254 Archaeology Contractor will immediately inform the Project Archaeologist and not recommence work at the location until further instruction has been received from the Project Archaeologist. The discovery of human remains will be confirmed in writing within 24 hours of discovery during which time C254 will apply for the relevant Ministry of Justice (Coroner's Division) licence.

7.3.4 The Project Archaeologist will be responsible for informing the relevant statutory consultees (EH GLAAS) and co-ordinate any meetings required between PDP, the Principal Contractor, the C254 Archaeology Contractor and the relevant statutory consultees.

7.3.5 The Archaeology Contractor shall confirm how the requirements set out in the SS- WSI will be implemented as part of their procedure for excavating and recording human remains in the Archaeology Contractor's Method Statement. This should incorporate best practice guidance e.g. Council for the Care of Churches (1999) and English Heritage (2002 and 2002a).

7.3.6 At sites known in advance to have a high risk of encountering human remains, provision shall be made by the Archaeology Contractor for site inspection by a recognised specialist.

7.3.7 Should human remains be discovered, the Archaeology Contractor shall notify the Project Archaeologist immediately so that these procedures can be implemented. This notification may be initially made personally or by telephone but shall be confirmed in writing within 24 hours of discovery.

7.3.8 The Principal Contractor will be required to cease all works at that location until further instruction is provided by the Project Archaeologist. The Archaeology Contractor shall undertake an initial in situ observation and assessment of the remains and shall advise the Project Archaeologist of the course of action required.

7.3.9 Lifting of human skeletal remains shall be kept to the minimum which is compatible with an adequate evaluation or excavation. Notwithstanding this, the Archaeological Contractor shall ensure that all burials are planned/photographed in-situ and that appropriate samples have been recovered prior to any lifting.

7.3.10 Visible grave goods and other obvious artefacts, shall be recorded and lifted before the end of the working day to avoid the risk of vandalism and theft. Where this is not feasible or appropriate, the Archaeology Contractor shall ensure, on liaison with the Project Archaeologist that adequate site security is provided by the Principal Contractor. As a minimum, this will require a 24 hour comprehensive security regime until sensitive remains have been recorded and lifted.

7.3.11 As a result of the discovery of unexpected, potentially nationally important archaeological remains, the Site Specific WSI will be updated by the Project Archaeologist to incorporate any additional specific primary fieldwork event aims.

7.4 Treasure Act

7.4.1 The Treasure Act 1996 defines 'Treasure' as:

- Any object at least 300 years old when found which is: not a coin, but has metallic content of which at least 10% is precious metal; or
- One of at least two coins with at least 10% precious metal content;
- One of at least 10 coins;
- Any object at least 200 years old designated as treasure by the Secretary of State;
- Any object which would have been 'Treasure Trove';
- Any object found with any of the above.

7.4.2 The Treasure (Designation) Order 2002 extends the definition of treasure to include:

- Finds of at least two base metal objects (other than coins) of prehistoric date; and
- Any object (other than a coin) of prehistoric date with any precious metal content.

7.4.3 All finds falling within the definitions of treasure shall be reported immediately to the Project Archaeologist and all subsequent works must be undertaken in accordance with the relevant legislative requirements as set out in the Environmental Requirements (archaeology) section of the relevant package Works Information.

7.4.4 To protect the finds from theft, the Archaeology Contractor shall record the finds and remove them to a safe place. Where recording and removal is not feasible or appropriate on the day of discovery, the Archaeology Contractor shall ensure, on liaison with the Project Archaeologist that adequate site security is provided by the Principal Contractor.

7.4.5 Subject to the Provisions of the Treasure Act 1996, all material that is defined as Treasure is vested in the franchisee or, if none, the Crown.

7.4.6 With respect to Treasure finds, a reward may be payable to the finder, the landowner and/or the occupier. The Crown usually offers finds to a museum.

7.5 Health and Safety

7.5.1 The Archaeology Contractor shall undertake the works in accordance with the Employer's Health and Safety requirements and the Principal Contractor's Health and Safety Plan. Where specific health and safety constraints or requirements for the Archaeology Contractor's method of work are required, these shall be set out in this section and detailed in the Archaeology Contractor's Method Statement (in the Health and Safety Plan).

7.5.2 No ground intervention or other survey shall be made without approval of the Archaeology Contractor's Health and Safety Plan, Method Statement and Risk Assessment by the CDM co-ordinator.

7.5.3 Hand excavation or other remote sensing method may be required prior to any mechanical excavation in the first instance to locate any known or suspected below ground hazards. The Archaeology Contractor's Method Statement and Risk Assessment shall take account of any design information (including the Designer's and Principal Contractor's Risk Assessment) pertaining to above ground hazards such as buildings and other structures or public rights of way and below ground hazards such as services, utilities and infrastructure and shall contain a site specific Risk Assessment for unknown below ground hazards such as contaminants including unexploded ordnance. All appropriate mitigation measures shall be in place prior to commencement of any ground intervention or other survey.

7.5.4 Trial trench or deep excavation methods and earthworks support design, shall conform to Health and Safety legislation and safety standards as well as incorporating current engineering best practice, where appropriate.

7.6 Location and Ground Elevation of Interventions and Survey Grids

7.6.1 The spatial extent of the investigation(s) shall be set out in accordance with the setting out co-ordinates supplied by the Project Archaeologist. All spatial setting out and recording shall be in accordance with The London Survey Grid Standard (formerly Crossrail Survey Grid). See Crossrail standard CR-STD-010.

7.6.2 Interventions shall be located to a horizontal accuracy of +/-500mm in relation to the detail illustrated in the contract drawing(s). The corner points of each excavation or the centre point of each soil core location shall be set out with a Total Station Theodolite or other suitable automated equipment referenced from approved Permanent Ground Marker (PGM) data supplied to the Archaeology Contractor by the Project Archaeologist. The positions of the trenches and survey points shall be verified by the Archaeology Contractor taking additional check measurements to additional known-location points of detail.

7.6.3 Surface heights shall be recorded and related to PGMs or approved Ordnance Survey Bench Marks (OSBM). The full descriptions and locations of PGMs and OSBMs known to the Employer will be supplied to the Archaeology Contractor by the Project Archaeologist. Levelling accuracy between OSBMs/PGMs and site TBMs shall be within 10 mm k: where 'k' is the total distance levelled in kilometres. Each TBM shall be levelled as part of a closed loop starting and finishing on approved OSBMs or Crossrail PGMs. Where more than one TBM is required per site the Archaeology Contractor shall establish the TBMs as part of the same closed loop.

7.6.4 The Archaeology Contractor shall include details of their surveying methodology within their Method Statement (see Section 8), including the setting out of the grid and how they intend to provide the project grid co-ordinates to the Project Archaeologist with the Survey Report.

7.6.5 The Archaeology Contractor shall ensure that all trench or excavation limits, and significant archaeology detail are surveyed 'as dug' in relation to the project grid before leaving the site. Ground level height data shall be recorded for each intervention. Survey methodology and a detailed survey record shall be provided to the Project Archaeologist within the Survey Report.

7.7 Specification for Watching Brief

Scope of Watching Brief

7.7.1 Watching brief, as defined in the Generic WSI, is a programme of archaeological monitoring (i.e. observation, investigation and recording) which is carried out by a suitably qualified archaeologist during site investigations (e.g. geotechnical test pits, boreholes and utilities trial trenches) and construction works. The purpose of a watching brief is to identify the potential of any archaeological remains that are uncovered in the course of the works and record them appropriately (as far as is reasonably practicable). The watching brief shall result in the preparation of an ordered archive which will be incorporated into the post-excavation works and into publication of the project results.

7.7.2 The Archaeology Contractor shall undertake the watching brief for all areas of ground disturbance which may potentially contain archaeological remains as set out in the Site Specific WSI. This shall include any activities (including those associated with site set-up and demolition) undertaken by the Principal Contractor that involve the removal of modern material, made ground and topsoil, subsoils, and superficial geological deposits such as alluvium and colluvium.

7.7.3 Areas that have been previously subject to archaeological excavation and which are known not to contain significant deposits (for example tunnels, cuttings, and areas of known large-scale modern disturbance) shall be excluded from the scope of the watching brief, unless stated otherwise in the Site Specific WSI. Areas that have been subject to previous assessment and evaluation (e.g. geophysical survey, surface artefact collection, geotechnical survey, trial trenching etc.) shall be included within the watching brief, as appropriate.

7.7.4 Two classes of watching brief are set out in the Generic WSI:

- i) A general watching brief shall comprise observation and recording of the Principal Contractor's works without constraint on their working methods.
- ii) A targeted watching brief shall comprise observation and recording of the Principal Contractor's works with specific operations carried out under the supervision of the Archaeology Contractor. Under targeted watching brief, the Archaeology Contractor may impose constraints on, or require changes to, the Principal Contractors' or his sub-contractor's method of working to enable the archaeological investigation to take place alongside construction works.

7.7.5 TWB shall be used for areas of known occasional, dispersed features which are either not considered to be of sufficient significance to warrant archaeological investigation in advance of construction, or where access prior to construction has not been possible and where, as a result, there is a possibility of unexpected discoveries except in cases where unexpected, potentially nationally important, archaeological remains are discovered, the targeted watching brief shall be designed and implemented so as to avoid adverse impact on the construction programme, wherever practicable.

7.7.6 The Principal Contractor shall make allowance in their activity programme for the completion of any targeted or general watching briefs as set out in the Site Specific WSIs.

7.7.7 The specification for watching briefs (general and targeted) are set out below:

Scope of Targeted Watching Brief - Constraints on Principal Contractor's Methodology

7.7.8 In archaeologically sensitive areas, where the need for a targeted watching brief has been identified in the Site Specific WSI, the Principal Contractor will strip soils (which may include modern made ground, topsoil, subsoil, alluvium and colluvium) using a 360 degree excavator and toothless ditching bucket under the supervision of the Archaeology Contractor. The Principal Contractor will limit their tracking of vehicles and plant within areas specified in the Site Specific WSI and/or as instructed by the Project Archaeologist. The Principal Contractor will facilitate mapping and sampling of deposits by the Archaeology Contractor through use of agreed plant, a site share agreement and careful liaison between the Archaeology Contractor's supervising archaeologist and the Principal Contractor's site supervisor.

Specification for watching brief

7.7.9 The Archaeology Contractor shall undertake a general watching brief during the C207 demolition works at the ETH at Hanover Square (18-19 Hanover Square and 1a Tenterden Street) with an emphasis on providing a basic record the subterranean vaults. Targeted watching briefs will be undertaken during the C207 demolition and site preparation works within Dering Yard, the C240 utilities diversions at both the ETH and WTH; during the C411 construction of the Compensation Grout Shafts and during the C412 Main Works for the WTH on Davies Street with particular emphasis no investigating and recovering environmental/geoarchaeological samples from the former channel of the River Tyburn. The GWB will take place during the Advanced Works and TWBs will take place during both the Advanced and Main Works as illustrated on Figures 1-10 of the SS-WSI.

7.7.10 The Works to be carried out by the Archaeology Contractor shall consist of two parts:

- a) Watching brief ('observation') following, and without interruption to, the progress of the Principal Contractor by a core team of archaeologists.
- b) Investigation of archaeology and remains of quaternary geological importance undertaken either:
 - by the core team, following the progress of the Principal Contractor; or
 - by additional archaeologists (the 'support team'), to be deployed to investigate unanticipated archaeological remains, where appropriate.

7.7.11 The Archaeology Contractor's core team shall consist of the Archaeology Contractor's key person (the field director) and other appropriately experienced archaeologists commensurate with the scale and nature of the Principal Contractor's works.

7.7.12 The core team shall undertake the observation and any required investigation such as they may reasonably be able to undertake.

7.7.13 The Archaeology Contractor's support team shall consist of additional experienced archaeologist. The size of the support team shall be commensurate with the scale and programme of the Principal Contractor's works. The Archaeology Contractor shall be required to supply teams of 5 and 10 persons within 24 and 48 hours notice respectively.

7.7.14 The Archaeology Contractor's core and support teams shall be advised where necessary by specialists, as appropriate and as agreed with the Project Archaeologist.

7.7.15 The Archaeology Contractor shall record the following observations on a daily basis. The record shall consist of, as a minimum:

- The Event Code and chainage/location of the area observed;
- The date(s) of the observation;
- Personnel employed on site;
- A description of the construction works observed;
- The works (sub) contractor and personnel undertaking and supervising the construction activity;
- Depths and extents of excavation works observed;
- 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; and
- Location and description of any modern remains.

Investigation undertaken during watching brief

7.7.16 An appropriate sample shall be excavated from cut features and other archaeological remains of importance. Sampling of cut features shall include feature inter-sections to establish relative chronologies. The extent of sampling shall be determined by the Archaeology Contractor in liaison with the Project Archaeologist (and as discussed with Westminster City Council and English Heritage, and a quaternary specialist, if necessary) but may, for instance, include the sample excavation of a selected number of deposits (both layers and negative, cut features), recording of structural remains, drawn sections and profiles, and/or be aimed at recovering sufficient information to determine function, form, and date. Any specific variations from this specification shall be indicated in The Archaeology Contractor's Method Statement.

7.7.17 Heights for all deposits shall be related to approved PGMs or approved OSBM, where reasonably accessible. Levelling accuracy between OSBMs/PGMs and site Temporary Bench Marks (TBMs) shall be within 10 mm?k: where 'k' is the total distance levelled in kilometres. Each TBM shall be levelled as part of a closed loop starting and finishing on approved OSBMs or URL PGMs. Where more than one TBM is required per site, the Archaeology Contractor shall establish the TBMs as part of the same closed loop. The Archaeology Contractor shall prepare a record of their surveying methodology for inclusion in the archive.

7.7.18 It may not be possible to clean and record the archaeological profile of geotechnical test pits, due to health and safety or access constraints. Every effort shall be made to establish the presence or absence of archaeological deposits by establishing the Absolute Ordnance Datum (AOD) for the height of significant deposits, including the depth of modern intrusions, key stratigraphic components and natural deposits.

7.8 Recording Standards

7.8.1 The archaeological remains shall be recorded to best practice standards, recognising the special circumstances of a watching brief which demand flexibility in order to achieve archaeological objectives and requirements within the construction environment.

7.8.2 The recording is to include as a minimum:

- The written record of individual context descriptions on appropriate pro-forma.
- The drawn record shall normally include, plans and section drawings of appropriate features, structures and individual contexts (1:50 1:20 or 1:10). Isolated archaeological remains (artefacts) may be spot located in plan and a height provided where possible. Deposits which are regular in plan (pits and ditches) may be located though co-ordinates, annotated with dimensions, and may be recorded digitally.
- Other appropriate drawn and written records shall also be produced (for environmental sampling etc.).
- The photographic record shall consist of monochrome prints/negatives and colour transparencies. A 35mm format (film or digital) SLR camera is acceptable for all site photography. The Archaeology Contractor shall maintain a minimum of two 35mm SLR cameras on site at all times during working hours. The photographic record shall include photographs and transparencies of archaeological features, appropriate groups of features, structures, and quaternary deposits. Each photograph and transparency shall clearly show details of the above. Each photograph and transparency shall include an appropriate graduated scale, a north arrow, and a header board detailing (as a minimum) the event code and context/feature number. In addition, the Archaeology Contractor shall take appropriate record photographs to illustrate work in progress.

7.9 Specification for Archaeological Investigation

7.9.1 A sufficient sample of the archaeological features and deposits revealed must be sampled/or fully excavated to allow the resolution of the aims and objectives of the work. Structures, features, or finds which might reasonably be considered to merit preservation in-situ shall not be unduly damaged.

7.9.2 Where modern foundations are likely to be present, the Site Specific WSI shall identify whether they should be left in-situ for the purposes of the evaluation or removed. Where it is clear that modern foundations have truncated certain archaeological levels they should be removed to assess lower archaeological levels. The Archaeology Contractor shall take all

reasonable care to ensure that any damage is limited as far as practicable. If significant damage is likely to occur the work shall be suspended and the Project Archaeologist informed so that a technical solution can be agreed with the Project Manager.

7.9.3 The location and objectives of the trial excavations set out in Section 5 of the Site Specific WSIs have been established in consultation with the projects' statutory consultees.

7.9.4 Each trial excavation has been assigned a unique ID number by the Project Archaeologist. The Archaeology Contractor shall not vary this number unless agreed by the Project Archaeologist in writing.

7.9.5 The dimensions of each trial excavation in plan, inclusive of the trench support system employed (if required) to secure personnel entry to the excavation, shall be set out in the Site Specific WSI. Trial excavations shall be excavated to the base of the alluvial sequence or to a depth specified in the Site Specific WSI (Section 5). This shall be dependent on the agreed objectives of the excavation.

7.9.6 Temporary works and any required hand investigation to address below ground hazards shall be carried out by the Principal Contractor under supervision by the Archaeology Contractor in accordance with their approved Method Statement and Risk Assessment. All subsequent trial excavations shall be excavated by the Principal Contractor under supervision by the Archaeology Contractor using a mechanical excavator with toothless ditching bucket, except where the nature of the made ground or surface of the pits is such that an alternative bucket or means of breaking out prior to excavation is required (and the Project Archaeologist has agreed an alternative method).

7.9.7 All machine work and demolition of below-ground obstructions (e.g. removal of basement slabs) shall be carried out by the Principal Contractor under supervision by the Archaeology Contractor. The Principal Contractor shall cease work when archaeological evidence is revealed and allow the Archaeology Contractor to undertake investigation, as appropriate. An excavator shall not be used to cut arbitrary trial trenches down to natural deposits without regard to the archaeological stratification.

7.9.8 All undifferentiated topsoil, or overburden of recent origin, shall be removed down to the first archaeological layer. An exception to this would be where a focused soil-sampling strategy is proposed to record and collect data from reworked soil contexts above recognisable stratified archaeological contexts. If a mechanical excavator is to be used to remove modern overburden, such as floor slabs or recent levelling layers, this shall be undertaken in spits of 0.20m-0.5m depth (dependant on specific site conditions), moving along the length of the trench or area. The Archaeology Contractor's supervising archaeologist shall use their professional judgement to determine the appropriate depth of each spit and will advise the Principal Contractor accordingly. Any variations to the excavation methodology shall be at the discretion of the supervising archaeologist and recorded in writing for inclusion in the final report to the Project Archaeologist.

7.9.9 Each spit shall be examined carefully to assist the recovery of any archaeologically significant artefacts and thus to determine when to cease machining.

7.9.10 The archaeological level shall be cleaned in plan by the Principal Contractor using a wide blade, ditching bucket or similar, with no teeth. If the machine has to re-enter the trench care will need to be taken to ensure that it does not damage underlying remains.

7.9.11 The Archaeology Contractor shall undertake hand excavation and cleaning of any archaeologically significant horizons, to fulfil the aims of the work. Within alluvial sequences the Archaeology Contractor shall pay particular attention to establishing the vertical extent of layers of archaeological potential and shall be aware that horizons of cultural activity may be interdigitated with horizons of sterile alluvium. The Archaeology Contractor shall supervise the excavation of each test pit in such a manner so as to allow a cumulative or continuous section to be recorded.

7.9.12 The Archaeology Contractor's excavation, sampling and recording policy shall be included in the Archaeology Contractor's Method Statement. This is to include, as a minimum:

- The recording of individual contexts on appropriate pro-formas;
- Excavation plans at 1:50 scale; planning and section drawing of appropriate single contexts and features (usually at 1:20 scale for plans and 1:10 scale for inhumations and sections);
- Photographs; and other appropriate drawn and written records; and
- PGM's, any temporary benchmarks and approved OS benchmarks shall be indicated on the relevant plans.

7.9.13 The Archaeology Contractor's survey and recording policy shall meet the following requirements:

- All levels shall be recorded to London Grid standards and reduced to OS datum;
- All trial pit locations shall be electronically surveyed with reference to the London Grid and Crossrail PGM's upon the completion of fieldwork by the Archaeology Contractor;
- The locations of trial pits shall be plotted on appropriate scale plans related to the London Grid and labelled with six figure eastings and northings; and
- The electronic survey record shall be retained with the project archive.

7.9.14 In alluvial sequences, each trial excavation shall be excavated to the base of the alluvial sequence, and shall be appropriately shored and kept free of water by the Principal Contractor to allow 'person entry' to the excavations i.e. to allow the Archaeology Contractor to undertake investigation and recording to fulfil the aims of the work.

7.9.15 The Archaeology Contractor shall identify any temporary works and dewatering requirements associated with the archaeological investigation in the Archaeology Contractor's Method Statement and shall agree the detailed arrangements for such with the Principal Contractor. The Archaeology Contractor will be required to undertake works in accordance with the Principal Contractor's arrangements for matters such as off site-spoil disposal or storage, on-site facilities and services. Relevant requirements shall be incorporated in the Archaeology Contractor's Method Statement.

7.9.16 Where areas of extensive archaeological stratification are encountered, trial trenches shall not be fully excavated. However, the horizontal and vertical extent of archaeological stratification shall be assessed by the Archaeology Contractor through implementation of an appropriate strategy including, either the excavation of features cut into horizontal stratification, limited test pitting or auguring. The aim shall be to recover suitable stratigraphic, finds and environmental samples from the full, intended depth of the trench, as far as is practicable. The exact methodology may need to be determined by the Archaeology Contractor during the excavation of individual trenches and agreed with the Project Archaeologist.

7.9.17 A sufficient sample shall be excavated from cut features and other archaeological deposits to fulfil the aims of the work. Sampling of cut features shall include feature intersections to establish relative chronologies.

7.10 Recording Systems

7.10.1 The trial excavations shall be recorded by the Archaeological Contractor to the standards of current best practice. The recording systems adopted during the investigations must be fully compatible with those published by the Museum of London Archaeology Service (MoLAS 1994 3rd ED) and Museum of London (MoL 1998).

7.10.2 The recording is to include, as a minimum:

- At least one representative section at (1:10 or 1:20 scale) of each trial excavation from ground level to the base of the excavation;
- The written record of individual context descriptions on appropriate pro-forma;
- Plans at appropriate scales (1:10 or 1:20);
- Single context planning if appropriate; and
- Photographs and other appropriate drawn and written records.
- Other sections, including the half-sections of individual layers or features shall be drawn as appropriate to 1:10 or 1:20.

7.10.3 Site plans shall identify both London Grid and OS co-ordinates. A 'site location plan', indicating site north shall be prepared at 1:1250. Individual 'trench plans' or 'excavation area plans' at 1:200 (or 1:100) shall be prepared which show the location of archaeology investigated in relation to the investigation area.

7.10.4 Section drawings shall be located on the relevant plan and both London Grid and OS co-ordinates recorded. The locations of the OSBM or PGM bench markers used and any site TBM shall also be indicated.

7.10.5 A record of the full extent in plan of all archaeological deposits as revealed in the investigation shall be made; these plans shall be on polyester based drawing film, and be at a scale of 1:10 or 1:20 unless otherwise agreed with the Project Archaeologist. 'Single context planning' shall be used on deeply stratified sites. Drawing information shall be digitised for eventual CAD applications. The GLSMR will accept Autocad DXF or .DWG format of extent of site and location of major features with the completed Sites and Monuments Report Form.

7.10.6 A 'Harris matrix' stratification diagram shall be employed to record stratigraphic relationships (Harris 1993). This record shall be compiled and fully checked by the Archaeological Contractor during the course of the excavations. Spot dating shall be incorporated onto this diagram during the course of excavations.

7.10.7 Recording of structural evidence revealed below ground level will vary according to the level of special interest of the structure and its relationship to below-ground archaeology. Structures of little or no significance shall be noted on a site plan. Detailed element detail drawings of important features revealed in investigations may be required in accordance with the aims and objectives of the investigation.

7.10.8 The Archaeology Contractor shall agree the appropriate level of recording and analysis for discovered standing structures with the Project Archaeologist, in accordance with the Crossrail procedure for non-listed built heritage recording (Document CR-PN-PRW-EN-PD-00010). The Archaeology Contractor shall revise the Archaeological Contractor's Method Statement to reflect any additional requirements for built heritage recording.

7.10.9 The photographic record shall consist of monochrome prints/negatives and colour transparencies. A 35mm format SLR camera (film or digital) is acceptable for all site photography. The Archaeology Contractor shall maintain a minimum of two 35mm SLR cameras on site at all times during working hours. The photographic record shall include photographs and transparencies of archaeological features, appropriate groups of features, and structures. Each photograph and transparency shall clearly show details of the above, and may require the use of artificial lighting to achieve suitable definition. Each photograph and transparency shall include an appropriate graduated scale, a north arrow, and a header board detailing (as a minimum) the project event code and context/feature number. In addition, the Archaeology Contractor shall take appropriate record photographs to illustrate work in progress.

7.10.10 The transparencies shall be mounted in suitable frames for long-term curation in preparation for deposition with the archive. Digital photography and video recording may be appropriate in some circumstances and the Archaeology Contractor shall set out proposals for such recording in the Archaeology Contractor's Method Statement for approval by the Project Archaeologist.

7.10.11 Where appropriate a photogrammetric record or laser scan record shall be made of complex structures, features and horizons, liable to be damaged in the course of the investigation, such as buildings or parts of buildings. Appropriate technical specification and scales shall be specified in the Site Specific WSI and addressed in the Archaeology Contractor's Method Statement.

7.11 Specific Requirements for the Excavation of Trial Trenches or Pits

7.11.1 The Archaeology Contractor shall ensure that water is discharged and arisings from archaeological excavations are stored in accordance with the Principal Contractor's environmental protection requirements (as set out in the package Works Information and their Environmental Management Plan (EMP)) and any relevant consents for the worksite. The Project Manager shall monitor discharge rates and if necessary conductivity of discharge waters to ensure compliance.

7.11.2 Should any material be excavated that is deemed to be contaminated or potentially contaminated it shall be investigated, controlled (e.g. placed separately from clean material) and removed from the site in accordance with the Principal Contractor's environmental protection requirements (as set out in their EMP).

7.11.3 The Archaeology Contractor shall ensure, in liaison with the Project Archaeologist that adequate protection is provided for any archaeological remains. Any specific archaeological requirements relating to backfilling shall be included by the Archaeology Contractor in their Method Statement.

7.11.4 The trenches shall be pumped dry by the Principal Contractor and any necessary protection measures for archaeological remains (in addition to those for below ground infrastructure, services or utilities) shall be completed prior to backfilling. Backfilling and reinstatement shall be undertaken by the Principal Contractor as specified in the package works information and in accordance with the approved Archaeology Contractor's Method Statement

or other instruction from the Project Archaeologist and/or Project Manager. Generally, all backfill material shall consist of non-toxic, uncontaminated, non-putrescible, natural and inert material which shall be compacted and (if necessary) tested (dynamic compaction test or other) in accordance with a specification provided by the Project Manager. Surface conditions shall be reinstated to the required standard.

7.11.5 In order to protect any waterlogged remains during the works, the Archaeology Contractor may identify a requirement for trial excavations to be allowed to refill with water overnight. In such cases, the Archaeology Contractor shall request approval from the Project Manager and shall ensure that any hazards to staff or third parties are minimised.

7.12 Archaeological Science

7.12.1 The strategy for sampling archaeological and palaeo-environmental deposits and structures (which can include soils, timbers, pollen, diatoms, animal bone, human bone etc.) will be developed by the Project Archaeologist in consultation with English Heritage Regional Science Advisor and the Archaeology Consultant. On-site work and off-site analysis of the processed samples and remains will be undertaken by the Archaeology Contractor's environmental archaeologist as specified in the Archaeology Contractor's Method Statement.

7.12.2 The finds retrieval policies of the appropriate recipient museum will be adopted. In accordance with the collection and retention strategy set out in Site Specific WSI, all finds (artefacts and ecofacts) visible during excavation shall be collected and processed by the Archaeology Contractor. In some cases, sampling may be the most appropriate strategy. Finds shall be appropriately packaged and stored under optimum conditions, as detailed in the RESCUE/UKIC publication First Aid for Finds (Watkinson and Neal 1998).

7.12.3 Where there is evidence for industrial activity, macroscopic technological residues (or a sample of them) shall be collected by hand. Separate samples (c. 10ml) shall be collected for micro-slugs (hammer-scale and spherical droplets). Reference should be made to the Centre for Archaeology Guideline on Archaeometallurgy (English Heritage 2001). Assessment of any technological residues shall be undertaken.

7.12.4 Where appropriate, samples shall be taken for scientific dating (for example radiocarbon dating, OSL, thermoluminescence at the evaluation stage). This may apply where dating by artefacts is insecure or absent, and where dating is necessary for development of the Site Specific WSI for subsequent mitigation strategies. Procedures and specifications shall follow English Heritage guidance (English Heritage 2008b).

7.12.5 Buried soils and sediment sequences shall be inspected and recorded on site by the Archaeology Contractor's geoarchaeologist, since field inspection may provide sufficient data for understanding site formation processes. Procedures and techniques presented in the English Heritage documents Environmental Archaeology (English Heritage 2002) and Geoarchaeology (English Heritage 2007) shall be followed. Samples for laboratory assessment shall be collected where appropriate, following agreement with the Project Archaeologist.

7.12.6 Deposits shall be sampled for retrieval and assessment of the preservation conditions and potential for analysis of biological remains following English Heritage guidance (English Heritage 2002). The sampling strategy shall include a reasoned justification for selection of deposits for sampling, and shall be developed by the Archaeology Contractor's environmental archaeologist or recognised bioarchaeologist in liaison with the Project Archaeologist. Flotation samples and samples taken for coarse-mesh sieving from dry deposits shall be processed at the time of the fieldwork wherever possible, to permit variation of sampling strategies if

necessary. Sampling strategies for wooden structures shall follow the methodologies presented in Brunning (1996).

7.12.7 Artefacts, biological samples and soils shall be assessed for evidence of site and deposit formation processes and taphonomy and especially for evidence of recent changes that may have been caused by alterations in the site environment.

7.12.8 Assessment of finds assemblages shall include x-radiography of all iron objects (after initial screening to exclude obviously recent debris) and, where appropriate, non-ferrous artefacts (including all coins). Where necessary, active stabilisation /consolidation shall be carried out to ensure long-term survival of the material, but with due consideration to possible future investigations.

7.12.9 Once assessed, all material shall be packed and stored in optimum conditions, as described in First Aid for Finds (Watkinson and Neal 1998). Waterlogged organic materials shall be processed in accordance with: Guidelines for the care of waterlogged archaeological leather (English Heritage/Archaeology Leather Group 1995) and Waterlogged wood: the recording, sampling, conservation and curation of structural wood (Brunning 1996).

7.12.10 Samples for absolute dating shall be submitted promptly to the supply laboratory proposed by the Archaeology Contractor or other supplier as instructed by the Project Archaeologist. Delivery times shall be agreed to ensure that the results are available to aid development of specifications for subsequent mitigation strategies in the Site Specific WSI. Where it is proposed to date human remains, the time limits for reburial imposed by Schedule 15 of the Crossrail Act (for remains removed from burial grounds) or set out in the relevant burial licence under the Burial Act 1857 (in all other cases) shall be adhered to.

7.12.11 Processing of all soil samples collected for biological assessment, or sub-samples of them, shall be completed as soon as reasonably practicable. The preservation state, density and significance of material retrieved shall be assessed by the Archaeology Contractor's recognised specialist. Special consideration shall be given to any evidence for recent changes in preservation conditions that may have been caused by alterations in the site environment. Unprocessed sub-samples shall be stored in appropriate conditions in accordance with the Archaeology Contractor's Method Statement.

7.12.12 Samples collected for geo-archaeological assessment shall be processed promptly by the Archaeology Contractor's specialist, particularly where storage of unprocessed samples is thought likely to result in deterioration. Appropriate assessment shall be undertaken as agreed with the Project Archaeologist. Where preservation in situ is a viable option, consideration shall be given to minimising the possible effects of compression and loading on the physical integrity of the site and any hydrological or chemical impacts of the proposed construction works (English Heritage 2002).

7.12.13 Animal bone assemblages, or sub-samples of them, shall be assessed by the Archaeology Contractor's specialist with reference to English Heritage guidance (2002).

7.12.14 The results from any specific investigations in Archaeological Science shall be included in the Site Archive and presented in the evaluation report or final fieldwork report. Reports shall include sufficient detail to permit assessment of potential for analysis. They shall include tabulations of data in relation to site phasing and contexts, and include non-technical summaries. The objective presentation of data shall be clearly separated from interpretation i.e. recommendations for further investigations, (both on samples already collected, and at future excavations), shall be clearly separated from the results and interpretation.

7.13 Generic Specification for Environmental Sampling

7.13.1 Appropriate features and deposits shall be sampled to retrieve palaeo-environmental and economic indicators. The Archaeology Contractor shall make provision for the sampling of a wide range of contexts for potential assessment and analysis for plant and animal micro/macro fossils and soils/sediments in order to fulfil the aims of the Site Specific WSI.

7.13.2 The Archaeology Contractor shall use ten litre plastic buckets (with lids and handles), or strong polythene bags (double bagged) secured at the neck, for the recovery of bulk 'disturbed' environmental samples. An adhesive label recording the project event code, context number and sample information shall be securely fixed to a vertical face of the bucket only or attached to the neck of the bag. Labels shall be completed with an indelible ink pen. A duplicate non-adhesive label shall be inserted within the bucket or between the polythene bags.

7.13.3 The selection, preparation for and methods of taking samples together with their size, presentation and processing shall be in accordance with current best practice (e.g. IFA Standard and Guidance for Artefact and Environmental Study, Collection, Research and Conservation 2008d; English Heritage - Geoarchaeology, 2007; English Heritage - Archaeological Science at PPG16 interventions: Best Practice Guidance for Curators and Commissioning Archaeologists, 2003).

7.13.4 The Archaeology Contractor shall be responsible for the protection of all samples and finds and for their transport (including loading and unloading) to the Archaeology Contractor's facilities or other location as agreed with the Project Archaeologist. Samples shall be protected at all times from temperatures below 5 and above 25 degrees Celsius and from wetting and drying out due to weather exposure.

7.13.5 Bulk samples shall normally be in the range of 10-60 litres. The size selected will depend on the likely density of macrofossils in the soil. The lower end of the range (10-20 litres) will be suitable for the recovery of macrofossils from waterlogged deposits. For non-waterlogged deposits the sample volume is likely to be in the middle to higher range (20-40 or 40-60 litres) dependant upon site activity, conditions and preservation. The residue of soil left in the bottom of any inhumations after the removal of human remains shall be retrieved for bulk processing. Vessel or pit fills containing human remains shall be processed as bulk samples to ensure the maximum retrieval of cremated bone. Cremation vessels and deposits of placed human bone within cut features may require excavation in spits. The fill residues from the excavation of these features shall be bulk sampled to ensure maximum retrieval of cremated bone, associated small finds and floral and faunal remains. All work shall be undertaken in compliance with the generic Crossrail standards for Human Remains (see Section 7A) which may require the reburial of human remains within a specific timeframe.

7.13.6 For 'bulk disturbed' samples the limits of the sample zone shall be recorded and identified on plan.

7.13.7 The Archaeology Contractor shall use appropriately sized monolith or kubiena boxes for the recovery of 'undisturbed' monolith samples for geo-archaeological study (pollen, other microfossil and micromorphological studies etc). Care shall be taken to ensure that wherever possible only newly exposed sections are sampled to avoid contamination, desiccation and decalcification. This sampling shall be undertaken under supervision of the Archaeology Contractor's environmental specialist. Boxes shall be wrapped neatly and tightly in bin-liners or plastic sacks and secured with rubber bands. A label shall be attached to the outside (in duplicate) with site name and code, feature/context number and depths of sample.

7.13.8 The Archaeology Contractor shall record the depth of the 'undisturbed' monolith at the top and the bottom of the sample. There shall be a 50mm overlap between each monolith. This information shall be plotted onto a section drawing at an appropriate scale, with all levels reduced to heights relative to Ordnance Datum. Where the sample crosses archaeological context boundaries these shall be noted on the sample recording pro-forma.

7.13.9 Where it is not possible to insert monolith boxes, the Archaeology Contractor shall take a vertical series of small 'spot' samples. Samples shall be at 20mm vertical intervals with no more than 10mm depth being sampled. In the case of deposits with a low organic content it may be necessary to take as much as 5g or even 20g per sample. If so, sampling shall be extended laterally at a given depth in 10mm deep spits.

7.13.10 Where appropriate, the Archaeology Contractor shall take contiguous column samples for the retrieval of macrofossils. The individual sub-samples will be of 1-10kg, depending on the nature of the deposit and the category of material to be retrieved. Where several specialists are involved it may be necessary to take separate sub-samples for a range of palaeo-environmental evidence, for example, insects, molluscs and seeds, to ensure that adequate sub-samples are available for specialist assessment.

8 Deliverables

8.1 C254 Archaeological Contractors Deliverables

8.1.1 The Archaeology Contractor shall provide a detailed Archaeological Method Statement for the archaeological fieldwork events (General and Targeted Watching Brief) for each works package.

8.1.2 During the execution of each fieldwork event the Archaeology contractor shall submit a weekly progress report to the Project Archaeologist.

8.1.3 On completion of each archaeological fieldwork event the Archaeology Contractor shall provide the post-excavation deliverables summarised in Table 6 below:

Fieldwork Event	Deliverable		
	Weekly Progress Report	Interim Report	Fieldwork Report
C240 Utility Diversions			
Targeted Watching Brief	✓	✓	✓
C207 ETH Building Demolitions			
General Watching Brief	✓	✓	* ₁
Targeted Watching Brief	✓	✓	* ₁
C411 Compensation Grout Shaft Construction & C411 WTH Main Works			
Targeted Watching Brief	✓	✓	✓

*₁ Due to the scope of these watching briefs it is suggested that they are reported together in a single Fieldwork Report.

Table 6 C254 Archaeological Contractor Fieldwork Event Deliverables

8.1.4 The requirement for production of a formal Post-excavation Assessment will be dependant on the significance of the results of the archaeological mitigation undertaken during the C207, C240 and C411 Advanced Works and C411 Main Works packages.

8.1.5 Details of each deliverable are provided below.

8.2 Archaeological Contractors Method Statement

8.2.1 The Archaeology Contractor shall provide a detailed Method Statement for the works for the Project Archaeologist's approval. The Method Statement shall be prepared in association with the Principal Contractor, taking account of their Environmental Management Plan and other relevant site information provided by them and requirements for the works set out in the Works Information (e.g. relating to health and safety, security, engineering design requirements and attendances). The Method Statement shall include, as appropriate:

- a) A resource plan and programme and CV's;
- b) The Archaeology Contractor's IT capability and proposed IT plan (including specific survey methods for on-site recording of stratigraphic profiles and sub-surface topographic modelling;
- c) The Archaeology Contractor's approach to Archaeological Science;
- d) The methods for survey and setting out works;
- e) The methods to address specific event types required (trial trench, area excavation etc);
- f) The safe method of working whilst excavating trenches or pits including any temporary works required;
- g) The method for disposing of water from trenches and test pits in waterlogged ground;
- h) Site management plan to include details of the method for preparing safe access route to the working areas, the proposed site accommodation, services and welfare;
- i) The retention and disposal policies for samples and artefacts recovered during the work;
- j) The method for excavating and recording inhumations and cremations in compliance with the generic Crossrail standards for Human Remains (see Section 7.3);
- k) The method for preparation of the required reports, archive and all associated deliverables;
- l) The procedures for assessment of potential for analysis (post excavation assessment); analysis and publication proposals;
- m) The method for preparation of the digital dataset, digital drawings, and digital report deliverables;
- n) The Archaeology Contractor's methods and approach for undertaking the site based works and off site processes to completion.
- o) The Health and Safety Plan and Site-Specific Risk Assessment (including unexploded ordnance);
- p) The Quality Assurance Plan;
- q) The procedures for on- and off- site security and emergency response plan (including environmental incidents);
- r) The method for complying with project generic and site specific environmental and consent requirements; and
- s) The Archaeology Contractor's requirements and specification for services and facilities and attendances required to be supplied by the Principal Contractor or the Employer.

8.3 Site Archives

8.3.1 Site archive shall be organised to be compatible with other archaeological archives in London, or where outside the Greater London Area, any specific requirements of the receiving museum. This requirement for archival compatibility includes computerised databases.

8.3.2 For London archives, individual descriptions of all archaeological strata and features excavated or exposed shall be entered onto prepared pro-forma recording sheets which include the same fields of entry on the recording sheets of Museum of London Archaeology. Sample recording sheets, sample registers, finds recording sheets, registered finds catalogues and photographic record cards shall also follow the Museum of London Archaeology equivalents.

8.3.3 Archives shall be prepared to conform with current best practise (e.g. Brown and Duncan 2007; Institute of Field Archaeologists 2008f) The archive shall cover all finds, samples and records (drawn, written, photographic and electronic) collected and produced during the works. The archive shall be indexed and internally consistent. The Archaeology Contractor shall complete the site archive and submit to the Project Archaeologist within 8 weeks of completion of a fieldwork event.

8.3.4 Site archive shall be deposited by at a museum to be confirmed by the Project Archaeologist.

8.4 Digital Data

8.4.1 The Archaeology Contractor shall produce a digital data archive of all primary field data produced during the works in accordance with ADS guidelines (Richards and Robinson 2001).

8.4.2 The Archaeology Contractor shall prepare and provide field and laboratory data, evaluation or excavation trench and phasing plans showing archaeological features recorded, and report text in digital form, as well as in paper form. Consideration should be given to recording electronic plans during fieldwork.

8.4.3 The digital archive for each fieldwork event shall be copied to CD-R or DVD (recordable laser disc) and submitted to the Project Archaeologist for archiving in the Employer's document management system.

8.4.4 Final reports, site plans and other illustrations shall be prepared in accordance with the Employer's Information Management standards and procedures.

8.4.5 All data files submitted shall be scanned by a virus detection programme updated to the most current version. The disk label shall clearly indicate:

- Confirmation that this check has been carried out (including details of the virus checking programme name and version used) and that the submission is virus free.
- Fieldwork event name and code.
- Supplier company name, date and QA details (as a minimum, the name, position and signature of the approver).

8.4.6 Prior to commencing the works, the Archaeology Contractor shall submit an example hard copy and data output of each of the data formats required (i.e. data, graphic, CAD and text) produced by their current software, for approval by the Project Archaeologist. The Archaeology Contractor shall inform the Project Archaeologist of any changes or upgrades

made to approved software prior to processing any works data. The sample disk shall include data from a previous real job or jobs.

8.4.7 A sequential numbering of data issues shall be rigorously adhered to so that no data versions are submitted out of sequence. The organisation of the data prior to submission shall be the responsibility of the Archaeology Contractor. The Archaeology Contractor shall ensure that data originating from different sources within the Archaeology Contractor's organisation is compatible with the project requirements. The Archaeology Contractor shall nominate one person to the Project Archaeologist who is the main point of contact for matters relating to the digital data submissions.

8.4.8 Where errors or inconsistencies are noted in the data, by either the Project Archaeologist or Archaeological Contractor they shall be corrected by the Archaeology Contractor and a corrected data file issued to the Project Archaeologist. When a change or addition is made to the data within an issue, a complete data group shall be re-issued, not just the changed fields. This may not require complete replacement of the whole data set which includes other previous issues.

8.4.9 Where any changes are made to a data record between digital data submissions, the Archaeology Contractor shall record the date of the change and the name of the person carrying out the change. The Archaeology Contractor shall ensure that each data amendment is carried out correctly.

8.4.10 The Archaeology Contractor shall make two identical copies of the digital archive. The first copy shall be retained by the Archaeology Contractor until the expiry of the Contract maintenance period. The second copy shall be issued to the Project Archaeologist.

8.4.11 A digital archive for each Crossrail site (incorporating individual event archives) shall be submitted to a regional or national data archive as agreed with the service provider by the Employer.

8.5 Interim Statement

8.5.1 Within 7 days of completion of a fieldwork event the Archaeology Contractor shall submit an Interim Statement to the Project Archaeologist. The Interim Statement shall be brief, and the information contained commensurate with the timescale for production. The report shall not duplicate effort to be utilised at a later date and shall draw on the data gathered during the initial assessment undertaken during fieldwork.

8.5.2 A site plan indicating all as-dug investigations shall be provided. Key stratigraphic profiles and topographic templates of the major stratigraphic units shall be provided.

8.5.3 The Interim Statement including illustrations shall be submitted as a single PDF file to the Project Archaeologist. CAD drawing files shall also be submitted.

8.5.4 The Interim Statement text shall be submitted in hard copy and as an MS Word *.document in accordance with the Employer's information management standards and procedures.

8.5.5 The Interim Statement shall include an approved report title sheet and QA page (to be supplied by the Employer). The following shall appear in the footer or header of each Interim Statement:

CRL Ltd, 20\$\$

8.5.6 Copies of the Interim Statement shall be provided by the Project Archaeologist to Rob Whitehead (English Heritage) and the City of Westminster.

8.6 Survey Report

8.6.1 The Archaeology Contractor shall provide a written and graphic survey report for the works upon completion of fieldwork. Evidence shall be provided for check measurements and results of levelling for establishment of TBM's. The survey report shall be submitted by the Archaeology Contractor to the Project Archaeologist within 2 weeks of the completion of fieldwork.

8.6.2 The Archaeology Contractor shall prepare and submit 'as excavated' site area outlines and levels in accordance with Crossrail standard CRS-SDT-05. Each drawing shall identify the relevant event code and sub-site division, if applicable.

8.7 Fieldwork Report

8.7.1 The evaluation, excavation and watching brief reports shall be prepared by the Archaeology Contractor within 6 weeks of the completion of the fieldwork (unless this is varied by the Project Archaeologist). The Fieldwork Report shall follow the standard structure set out in City of London Planning Advice Note 3 and IFA standards i.e.:

Contents list

Non technical summary

1. Introduction

2. Planning background

3. Previous work(s) relevant to archaeology of site (DBA, DDBA, surveys etc)

4. Geology and topography of site

5. Research objectives and aims

6. Methodology of site-based and off-site work

7. Results and observations including quantitative report, stratigraphic report(including any constraints on site).

8. Assessment of results against original expectations (using criteria for assessing national importance i.e. period, relative completeness, condition, rarity, and group value) and review of evaluation strategy

9. Statement of potential of archaeology

10. Conclusions and recommendations for appropriate mitigation strategy

11. Publication and dissemination proposals (in addition to fieldwork report)

12. Archive deposition

13. Bibliography

14. Acknowledgements

15. Sites & Monuments Record form

16. A3 plans

8.7.2 The Fieldwork Report shall provide an illustrated factual statement and statement of importance with associated assessment of potential for further fieldwork and/or analysis of the

archive. The Fieldwork Report shall utilise information collected during archaeological fieldwork and from any other appropriate sources agreed with the Project Archaeologist.

8.7.3 The Fieldwork Report shall include sections detailing the background to the project, any previous relevant research and investigation, location and topography/geology, a description of the methodology employed and the techniques adopted. Where relevant, these sections shall include location plans with scale and grid co-ordinates.

8.7.4 Each component of the works (e.g. stratigraphic/structural, artefactual and environmental/economic) shall be supported by a statement setting out:

- A quantification of the resource (tabulated and cross referenced as appropriate);
- Provisional dating and evidence for residually and intrusiveness;
- The range of material, including sampling and/or taphonomic biases; and
- The condition of the material, including preservation bias.

8.7.5 The stratigraphic statement shall include: a description of the geomorphology and sedimentation record of the survey area; a description of the fieldwork results (brief context descriptions supported by plans and sections as necessary, with levels related to Ordnance Datum); a trench summary table indicating depths of all major stratigraphic units, and their boundaries. Photographs shall be included where appropriate.

8.7.6 The Archaeology Contractor shall produce a subsurface model(s) and profiles to illustrate the extent, character and depth of the major stratigraphic topology identified. The model shall be correlated with previous works within the survey area in order to inform the mitigation design. The processing software and presentation format of the data shall be included in the Archaeology Contractor's Method Statement for approval by the Project Archaeologist.

8.7.7 The assessment of results and statement of potential shall include the Archaeology Contractor's conclusions based on the recorded data, e.g. the monument/site class represented, site/feature function and relevant parallels. The statement shall also comment on the potential of the data to address the projects' research themes. As appropriate, comment shall be made on the site as a whole and the individual components (e.g. artefactual, palaeo-environmental, economic). The statement shall utilise the criteria laid down by the Secretary of State for Culture, Media and Sport Criteria for Scheduling, to establish importance.

8.7.8 In reporting the results of the works, the accuracy of the original expectations and the appropriateness of the methods adopted shall be assessed by the Archaeology Contractor in order to illustrate what level of confidence can be placed on the information. The Project Archaeologist will use that information as the basis for developing any further mitigation strategy and/or further analysis and publication.

8.7.9 The report shall be illustrated with a site location plan, survey location plans as appropriate (to include archaeological interpretation of results), and individual trench and area plans identifying archaeological features exposed and investigated.

8.7.10 When submitted at evaluation stage, the report shall set out an outline recommendation for mitigation. This may include preservation in situ and/or further investigation and recording of the remains and/or watching brief. The development of a detailed mitigation strategy shall be progressed by the Project Archaeologist in liaison with the Project Manager's

engineering design team, the Archaeology Contractor, and the English Heritage Regional Science Advisor (and other statutory authority), as appropriate.

8.7.11 Copies of the Fieldwork Report shall be provided by the Project Archaeologist to Rob Whitehead (English Heritage) and the City of Westminster.

8.7.12 The following shall appear in the footer or header of each Fieldwork Report:

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8.8 SMR/HER Summary Sheet

8.8.1 The Archaeology Contractor shall complete a Greater London Historic Environment Record Summary Sheet for the works (i.e. one per fieldwork event). The Summary Sheet shall be included in the Fieldwork Reports.

8.9 Summary Report

8.9.1 A short summary report of no more than 500 words (the Summary Report) for the works shall be prepared by the Archaeology Contractor for submission to the Project Archaeologist for subsequent publication within London Archaeologist or another local (county) journal or publication outlet specified by the Project Archaeologist.

8.9.2 The Archaeology Contractor shall submit the draft Summary Report to the Project Archaeologist for approval within 8 weeks of the completion date of the fieldwork event. The Archaeology Contractor shall allow two weeks in the programme of works for the Project Archaeologist to provide comments. The Archaeology Contractor shall include any amendments required by the Project Archaeologist in the final Summary Report which shall be submitted within one week of receiving the Project Archaeologist's comments on the draft report.

8.9.3 The Summary Report shall be submitted as an MS Word *.document in accordance with the Employer's information management standards and procedures.

8.10 Post excavation assessment

8.10.1 If instructed by the Project Archaeologist, the Archaeology Contractor shall undertake a post-excavation assessment of the site archive and submit a report of their findings to the Project Archaeologist for approval. Assessment of potential for analysis shall be undertaken in accordance with English Heritage guidelines.

8.10.2 The Archaeology Contractor shall provide details of its current post excavation assessment procedures with their Method Statement.

9 Site Monitoring & Progress Reports

9.1.1 Prior to commencing the works the Archaeology Contractor shall agree a programme of weekly written progress reports and periodic progress meetings with the Project Archaeologist an/or Project Manager and shall be represented at such meetings to the satisfaction of the Project Archaeologist. The Archaeology Contractor shall provide information describing progress on-site to date, the processing of samples and artefacts and feedback from any initial assessment.

9.1.2 The City of Westminster, GLAAS officer and, if required the English Heritage Inspector for works affecting a Scheduled Monument (collectively the 'external consultees') shall be informed in writing at least one week in advance of commencement of fieldwork by the Project Archaeologist.

9.1.3 Periodic updates on the progress of the Crossrail archaeology programme shall be submitted to the external consultees by the Project Archaeologist. The Archaeology Contractor shall provide information to the Project Archaeologist as requested to inform this reporting.

9.1.4 The Project Archaeologist shall arrange and convene monitoring site visits by the external consultees, as appropriate. There shall be no unauthorised access to the works in any other circumstances. Any visits to the works shall be in accordance with the Principal Contractor's health and safety, site access and security requirements.

9.1.5 The Archaeology Contractor may propose that archaeological excavation be carried out as an extension to evaluation works, if the scope of such work is readily incorporated into the Site Specific WSI. The detailed method for this work shall be agreed between the Archaeology Contractor and the Project Archaeologist at a site meeting and subsequently in writing between the Project Archaeologist and the relevant external consultees.

10 Personnel Requirements

10.1.1 The Archaeology Contractor shall provide project personnel of experience as described below. The personnel shall be approved by the Project Archaeologist. Approval may be withdrawn by the Employer at their discretion and in accordance with the contract conditions.

10.1.2 The BOS archaeological works will require inputs from specific project personnel including a geoarchaeological specialist and possibly a historic buildings specialist.

10.1.3 The Archaeology Contractor shall submit CVs of all proposed personnel including any specialists, but excluding site technician grades, to the Project Archaeologist for approval if this has not already been done as part of the pre-qualification process.

10.1.4 The works shall be managed, directed and staffed by appropriately qualified and experienced personnel. The Archaeology Contractor's Key Person shall possess at least ten years relevant experience.

10.1.5 The excavation, sampling and recording of the works shall be directed in the field by a Fieldwork Director who is a Member of the Institute of Field Archaeologists (MIFA) The Fieldwork Director shall be on site throughout the fieldwork stages.

10.1.6 The Archaeology Contractor's project team shall include an environmental archaeologist suitably qualified in archaeological science and geo-archaeological sediment description methods, and on site sample processing and assessment techniques.

10.1.7 The Archaeology Contractor's project team shall be staffed by technician grades with minimum six months experience in appropriate aspects of excavation and recording.

10.1.8 Specialist staff employed on any aspect of the works, including post-excavation assessment or analysis of any kind including the writing of reports, shall be suitably qualified and shall be supervised by personnel with a minimum of ten years of relevant experience in their field (this may be inclusive of post-graduate studies).

10.1.9 Specialist staff shall be available, normally at 24 hours notice, for the duration of the works to provide advice on any specialist tasks to be undertaken.

11 References and glossary of terms

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12 Annexes

Annex 1 Archaeological Research Agenda

The specific fieldwork aims and objectives are presented in Section 4 of this SS-WSI. The archaeological research agenda as set out in *A Research Framework for London Archaeology 2002* (Nixon et al, 2003) relevant to the BOS scheme are summarised below:

- Understanding London's hydrology and river systems and tributaries and the relationships between rivers and floodplains. (79).
- Understanding the evolving character of development in central London between Westminster and the City, and Southwark. (79).
- Understanding the relationships between the different urban foci within the London region (such as two urban foci of Saxon *Lundenwic* and *Lundenburh*). (80).
- Examining the concept of core/periphery for different periods in London's past, as a means of understanding a settlement and its environs, a city and its hinterland. (81).
- Contributing to our understanding of the creation of the London suburbs (81).
- Understanding the reasons for evolution of the road systems, street layouts, river crossings and ferries, and their importance as engines of development and change. (82)
- Understanding how water supply and drainage provision were installed and managed. (82).
- Considering the relationship between cemeteries and major or minor roads, in terms of symbolism, status, privacy and convenience – both in London and at roadside settlements around the region. (85).

Annex 2 Site Information

Services and Utilities

The Principal Contractor will advise the C254 Archaeological Contractor of the latest works information regarding the location and depth of all known services and utilities prior to the start of the archaeological works.

Extinguishments of Rights of Way

For further information please refer to the Works Package Information for the C254 Archaeological Contract.

Surface Water Control

For further information please refer to the Works Package Information for the C254 Archaeological Contract.

Protective Fencing

Site security and protective fencing is the responsibility of the Principal Contractor. For further information please refer to the Works Package Information for the C254 Archaeological Contract.

Credit Boards

For further information please refer to the Works Package Information for the C254 Archaeological Contract.

Care in Executing the Site Operations

For further information please refer to the Works Package Information for the C254 Archaeological Contract.

Parking of Vehicles

For further information please refer to the Works Package Information for the C254 Archaeological Contract.

Annex 3 Plans and other Illustrations

Drawing Number	Title	Scale
C132-WSP-DCD-CP001	Western Ticket Hall, Ground 0, Indicative Site Arrangement during D-Walling	NTS
C132-WSP-DCD-CP024	Eastern Ticket Hall, Ground 0, Indicative Site Arrangement during D-Walling	NTS
C411-SKC-05-DWG-C125-50001	Tenterden Street Hoarding Arrangement	NTS
C411-SKC-05-DWG-C125-50002	Dering Yard Hoarding Arrangement	NTS
C411-SKC-05-DWG-C125-50003	Haunch of Venison Yard Hoarding Arrangement	NTS
C411-SKC-05-DWG-C125-50004	Davies Mews Hoarding Arrangement	NTS
C411-SKC-05-DWG-C125-50005	South Moulton Lane/Davies Street Hoarding Arrangement	NTS



Drawing 1 Street furniture identified during survey, Bond Street Station Eastern Ticket Hall proposed hoardings

Annex 4 Health and Safety Requirements

Archaeological Contractors Risk Assessments and Health and Safety Plans

The C254 Archaeological Contractor will prepare method statements, site-specific risk assessments and a health and safety plan to be approved by the Principal Contractor and Crossrail Central.

Archaeological Contractor's Safety Audits, Safety Inspections, Reporting of Accidents

The Archaeological Contractor's requirements for safety audits, inspections and the reporting of accidents are set out in the Works Package Information for the C254 Archaeological Contract.

Personal Protective Equipment (PPE)

Mandatory PPE to be worn by all C254 personnel will comprise:

- High Visibility Vest (of an appropriate colour for the nature for the Worksite);
- Hard Hat;
- Gloves;
- Light Eye Protection;
- Lace-up boots with ankle support, steel insoles and toe caps (rigger boots are not permitted on Crossrail Sites).

For further information please refer to the Works Package Information for the C254 Archaeological Contract.

Labelling of Hazardous Substances, Contaminated Land

For further information please refer to the Works Package Information for the C254 Archaeological Contract.

Crossrail Health and Safety Management System, Crossrail Drugs and Alcohol Policy

For further information please refer to the Works Package Information for the C254 Archaeological Contract.

Crossrail Policy for work on Network Rail Land

For further information please refer to the Works Package Information for the C254 Archaeological Contract.

Annex 5 Environmental Protection Requirements

For the environmental protection requirements refer to the Works Package Information for the C254 Archaeological Contract.

Annex 6 Programme and Order of Work for Implementation of Works and Integration with other Activities

The programme and construction sequence for each contract package and the associated archaeological works are set out Section 6 of this site specific WSI.

Annex 7 Enabling and Temporary Works Design Requirements, Attendances and Implementation

The Principal Contractor will be responsible for the design of temporary works and will design these in line the requirements for site Health & Safety and for the archaeological works set out in this SS-WSI.

The Principal Contractors is also responsible for the excavation activities within the separate contract packages forming the BOS scheme (including the WTH, ETH worksites and surrounding areas) under supervision of the C254 Archaeological Contractor. A clear, safe working area will be defined for use by C254. For construction activities requiring archaeological mitigation the Principal Contractor will consult the C254 Archaeological Contractor prior to starting work.

For general and site specific security requirements at the BOS Crossrail site please refer to the Works Package Information for the C254 Archaeological Contract.

Annex 8 Security Requirements

For further information please refer to the Works Package Information for the C254 Archaeological Contract.

Annex 9 Need for Screening or Other Protective Works

For further information please refer to the Works Package Information for the C254 Archaeological Contract.

Annex 10 Procedure for Notification of the Discovery of Human Remains

The procedure for notifying the discovery of human remains during the archaeological works are set out in Section 7 of this site specific WSI.

In the event that human remains are encountered the C254 Archaeology Contractor will immediately inform the Project Archaeologist for Paddington and not recommence work at the location until further instruction has been received from the Project Archaeologist. The discovery of human remains will be confirmed in writing within 24 hours of discovery during which time C254 will apply for the relevant Ministry of Justice (Coroner's Division) licence.

Annex 11 Procedure for the Notification of the Discovery of Material Falling Under The Treasure Act 1996

The procedure for notifying the discovery of material falling under The Treasure Act 1996 during the archaeological works are set out in Section 7 of this site specific WSI.

All finds falling within the definitions of treasure under The Treasure Act 1996 shall be reported immediately to the Project Archaeologist and all subsequent works must be undertaken in accordance with the relevant legislative requirements as set out in the Environmental Requirements (archaeology) section of the relevant package Works Information.

To protect the finds from theft, the Archaeology Contractor shall record the finds and remove them to a safe place. Where recording and removal is not feasible or appropriate on the day of discovery, the Archaeology Contractor shall ensure, on liaison with the Project Archaeologist that adequate site security is provided by the Principal Contractor.

Annex 12 Procedure for Notification of Major Unexpected Discoveries

The procedure for notifying major unexpected discoveries during the course of the archaeological works are set out in Section 7 of this site specific WSI.

In the event that archaeological remains of potentially national importance are encountered the C254 Archaeology Contractor will immediately inform the Project Archaeologist and Principal Contractor. Where the remains cannot be preserved *in situ* a suitable scheme of investigation and recording (preservation by record) will rapidly be agreed and implemented. The scope of the archaeological recording and sampling will comply with the standard Crossrail mitigation strategy and will be proportionate to the significance of the archaeological remains discovered. The C254 Archaeology Contractor will deploy appropriate resources in order to successfully undertake the archaeological recording and sampling with minimal delay to the Principal Contractor's construction programme.