



C520 CUSTOM HOUSE STATION - ARCHAEOLOGY SITE SPECIFIC WRITTEN SCHEME OF INVESTIGATION

Document Number: C520-XRL-T1-RGN-CR145-50001

Document History:

Revision:	Date:	Prepared by:	Checked by:	Approved by:	Reason for Issue:
5.0	26/11/12	[Redacted] (CRL Archaeology Support)	[Redacted] (Project Field Engineer)	[Redacted] (Engineering Manager)	Revised C520 Scope for Acceptance
		[Redacted]	[Redacted]	[Redacted]	

CROSSRAIL REVIEW AND ACCEPTANCE STATUS	
This doc is to be used for submitted documents requiring acceptance by Crossrail Central	
<input checked="" type="checkbox"/>	Code 1 Accepted Work May Proceed
<input type="checkbox"/>	Code 2 Not Accepted Revise and resubmit
<input type="checkbox"/>	Code 3 Not Accepted Revise and resubmit Work may proceed subject to incorporation of changes indicated
<input type="checkbox"/>	Code 4 Received for information only Receipt is confirmed
Reviewed/ Accepted by (signature)	[Redacted Signature]
Date	[Redacted] Date: 24/1/13

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1 Executive Summary

- 1.1.1 This document forms a Site-Specific Written Scheme of Investigation (SS-WSI), the new station at Custom House, London Borough of (LB) Newham as part of the Crossrail development. This SS-WSI supersedes those previously prepared for the DLR realignment at Victoria Dock Portal and Custom House Station (Crossrail 2009, Document No .CR-SD-PRWX-IS-00002) and the C146 Custom House Station Site Specific Archaeological Written Scheme of Investigation (Document No. C146-ATK-T1-RGN-CR145-00003). A separate SS-WSI has been prepared for Victoria Dock Portal.
- 1.1.2 The Custom House Station will be located approximately 110m east of Royal Victoria DLR station, adjacent to Victoria Dock Road. Custom House station is located south of Victoria Dock Road, near its junction with Freemasons Road.
- 1.1.3 The Custom House works involves the construction of associated construction compounds and worksites. The existing disused North London Line (NLL) and Custom House station will be demolished; the DLR station will remain. The Custom House station will be replaced with a new Crossrail station with a high level walkway connection to Victoria Dock Road with the station entrance on the site of the Barge Public House.
- 1.1.4 The site lies within an Archaeological Priority Area defined by the LB Newham. This area is identified as having a high potential for prehistoric remains related to the exploitation of high ground and marginal wetland areas present during this period. There are no scheduled ancient monuments or listed buildings within the site. One non-listed historic structure is currently known within the site. This is The Barge Public House, which will be demolished during the works.
- 1.1.5 Previous site investigation in the area has shown that there is a high potential for prehistoric and later palaeo-environmental remains, including peat beds, and moderate potential for prehistoric remains, including structures such as timber track ways. There is also high potential for industrial and railway archaeology. Any remains of structures such as prehistoric track ways would be of high importance; other less well-preserved or extensive resources would be of moderate importance.
- 1.1.6 The overall mitigation strategy for the site is preservation by record. A Non-Listed Built Heritage (NLBH) and Street Furniture survey was undertaken as part of the Grip 4 Design for the construction of the DLR realignment which established the presence of a number of structures of local significance. Where possible, an appropriate level of mitigation has been suggested, which comprise methods to preserve the structures by record in line with standard archaeological/ built heritage practice. NLBH inspection was also carried out of the inside of the Barge Public House.

1.1.7 A programme of archaeological monitoring of geotechnical borehole and trial pit excavation for Packages 19, 19A and Package 30, has resulted in an updated archaeological deposit model for the area, produced by MoLA. This has informed the design of, and will in turn be supplemented by, a trial trench evaluation focused on deposits within 4m of existing ground level. Additional mitigation, if required, will be in the form of archaeological excavation of sample areas within Custom House station Worksite and The Barge Public House Worksite, within the proposed development footprint. Additionally, archaeological watching briefs will take place where localised works may have an impact on below-ground archaeological remains in areas of the worksites not included in the archaeological evaluation or sample excavation trenches.

2 Project Background

2.1 Summary of Previous Crossrail Studies

- 2.1.1 Crossrail is a new pan-London rail link project which will provide new transport routes in the south east and across London. The line will provide a range of both new and improved rail journeys across London and its immediate surroundings. The proposed development will include the construction of seven stations within central London which will have interchanges with other public transport modes including the London Underground, National Rail and the London Bus service; the development will also include the renewal and/or upgrade of existing stations outside central London. The route itself will link Maidenhead and Heathrow in the west with Shenfield in the northeast and Abbey Wood in the south-east. As part of the south-east spur works a portal at Victoria Dock and a new station at Custom House will be required. The DLR will be realigned to accommodate the portal.
- 2.1.2 The proposed Custom House Station is located south of Victoria Dock Road near its junction with Freemasons Road, NGR 540950 180950. It will replace the existing, disused North London Line station of the same name, adjacent to Victoria Dock Road. Crossrail will run from Victoria Dock Portal, above ground, in a retained cut to join existing track levels immediately to the west of Custom House station (ES, Volume 3, 2005, p373). The Custom House Worksites are shown on the worksite layout plan which accompanies this submission (Drawing C146-ATK-T-DDA- CR145_ 1-01020) and as illustrated in Figure 1 below.

2.2 Summary of Previous Assessment work

- 2.2.1 The Crossrail Generic WSI (Crossrail 2011, Document No. CR-XRL-T1-GST-CR001-00003) outlines how the arrangements and controls for managing archaeology will be met in designing and constructing Crossrail. It also provides a common framework for archaeology which will ensure that the works conform to a common project standard. The Generic WSI is supported by additional documents outlining procedures for non-listed historic buildings (Crossrail, 2008a, Document No. CRL1-XRL-T1-GPD-CR001-00001) and specifications for evaluation and mitigation (Crossrail 2008b, Document No. CR-PN-LWS-EN-SP-00001).
- 2.2.2 The Environmental Statement and supporting Specialist Technical Report (STR), 'Assessment of Archaeology Impacts' (Crossrail, 2005) presents the outcomes of the archaeological studies undertaken as part of the Environmental Impact Assessment (EIA). The archaeological assessment has included an evaluation of the likelihood of archaeological resources being present in land affected by the project, their importance and the extent to which they will be physically affected by the construction and operation of Crossrail.
- 2.2.3 A Detailed Desk Based Assessment (DDBA) has also been carried out for the site titled 'Detailed Desk Based Assessments (DDBA) for Victoria Dock portal & Custom House station' (Crossrail 2008c, Document No. CR-SD-PRW-X-IS-00001). DDBAs were undertaken on sites that required additional information to enable decisions to be made regarding an appropriate mitigation strategy.

2.2.4 This Site Specific Written Scheme of Investigation (SS-WSI) supersedes those previously prepared for the DLR realignment at Victoria Dock Portal and Custom House Station (Crossrail 2009, Document No. CR-SD-PRWX-IS-00002) and the C146 Custom House Station Site Specific Archaeological Written Scheme of Investigation (Document No. C146-ATK-T1-RGN-CR145-00003). A separate SS-WSI has been prepared for Victoria Dock Portal.

2.2.5 Information on existing Ground Investigation (GI) boreholes, including historic third party boreholes and boreholes carried out as part of the Crossrail ground investigation packages, can be found in 'MDC4 Geotechnical Design Note — Victoria Dock Portal' (Document No. CR-DVCT2-X-DG-00001) and 'MDC4 Geotechnical Design Note — Custom House Station' (Document No. CR-DV-CUH-X-DG-00002). These provide information on existing and likely ground conditions across the site. Archaeological monitoring of GI packages 19, 19A and 30, undertaken by MoLA (Crossrail 201a, Document No. C156-CSY-T1-RGN-CR146_PT004-00004; Crossrail 2010b, doc no. C122-OVE-T1-RGN-CRG01-50001) in September and October 2010 has resulted in an updated archaeological deposit model for Custom House (Figure 3).

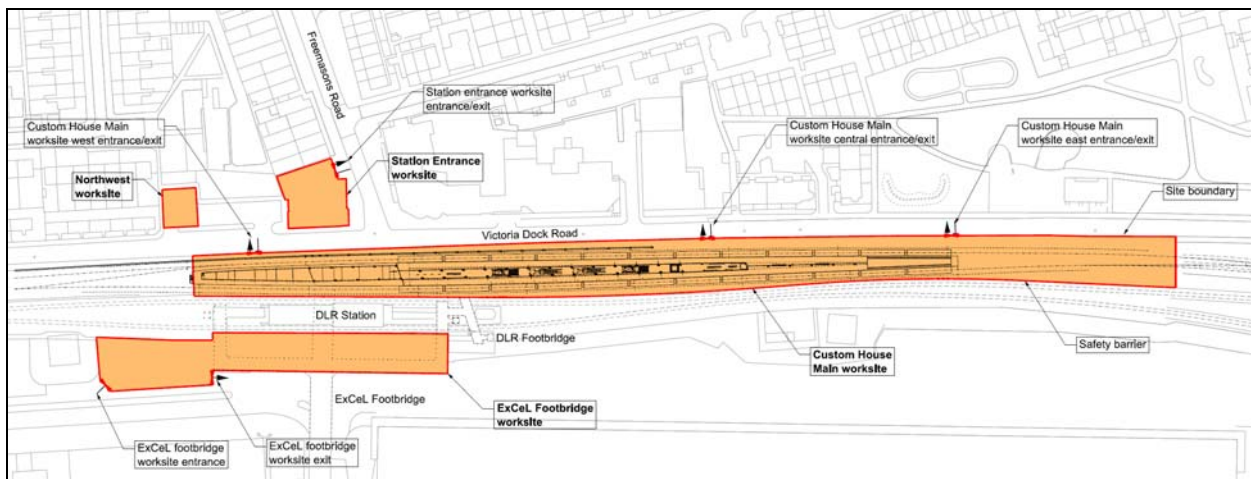


Figure 1: Custom House Worksite Locations Detail (See Annexe 3 for full drawing)

2.2.6 Previous Crossrail studies, relevant to the Custom House site include:

- Crossrail, Environmental Statement — February 2005;
- Crossrail, Assessment of Archaeology Impacts, Technical Report. Part 4 of 6, South-East Route Section, 1E0318-E2E00-00001, February 2005 [Specialist Technical Report (STR)];
- Crossrail, Supplementary Environmental Statement 2 (SES2) — January 2006;
- Crossrail, Assessment of Archaeology Impacts, Technical Report. Additional Provisions — January 2006 (Specialist Technical Report [STR]);
- Crossrail, Amendment of Provisions 2 Environmental Statement – May 2006;
- Supplementary Environmental Statement 3 (SES3). November 2006;

- Crossrail, Archaeology Programming Assessment, November 2006;
- Crossrail, MDC4 Archaeology Updated Baseline Assessment, January 2008;
- Crossrail, MDC4 Archaeology Overview of ground Levels and Land Raising around the Docks in the MDC4 area, January 2008;
- Crossrail, MDC4 Archaeology — Geoarchaeological Deposit Model: Victoria Dock portal. January 2008;
- Crossrail, MDC4 Archaeology DDBA Victoria Dock portal Package Specific WSI Deliverable — 2008;
- Crossrail, MDC4 Written Scheme of Investigation for the DLR realignment at Victoria Dock Portal and Custom House Station 2009; and,
- Central Section Project Geoarchaeological Deposit Model: Victoria Dock Portal and Custom House Station, October 2010.

2.3 Geological and topographical setting

- 2.3.1 The site lies on the reclaimed alluvial floodplain of the River Thames, approximately 700m to the north of the Thames. Overlying London Clay are the Floodplain sands and gravels deposited during the Pleistocene, approximately 2,000,000 to 10,000 Before Present (BP), during which the Thames was a fast flowing braided river, formed of interconnected channels interspersed with higher sand and gravel bars. These floodplain gravels form the 'Holocene Template' on which Mesolithic activity would have taken place, the areas around channels and lakes providing resources attracting a hunter-gatherer population.
- 2.3.2 During the early Holocene, sea levels rose and lower lying areas were inundated. By the time of the Mesolithic/Neolithic transition at approximately 4000BP, the level of the Thames is likely to have risen to approximately 97m ATD. From the Later Neolithic the braided channels gradually silted up, and combined with the rising sea levels; the conditions were conducive to peat formation. The landscape became predominantly marshland, which was crossed by the Thames as a single meandering channel.
- 2.3.3 In the area of this site a geoarchaeological deposit modelling exercise (Crossrail DDBA, Document No. CR-SD-PRW-X-IS-00001) has identified four landscape zones (LZs). This deposit model has been updated with information derived from Ground Investigation (GI) Packages 19, 19A and 30 to enable analysis of underlying geology and the archaeological and palaeoenvironmental potential (Figure 5). The four landscape zones are detailed as follows:
- LZ1 is characterised as gravel terrace, at c.98-100m ATD, probably representing the very beginning of the incline up towards the high ground of the second mid Devensian 'Kempton Park' terrace to the north and does not extend to the Crossrail works;
 - LZ2 consists of a network of braided channels of varying depths, cut into the Late Pleistocene/Holocene land surface. The revised deposit model places the northern boundary of this zone slightly further to the south of the Custom House footprint than previously mapped. In general this zone is characterised by an underlying gravel topography which occurs at c 93.5–97.5m ATD;

- LZ3 represents higher gravel 'islands' with potential for dry-land prehistoric activity lying between 98-99m ATD. The updated deposit model suggests that previously identified 'islands' within the Custom House site, actually represent one larger area underlying the majority of the west and central areas of the Custom House station Worksite, including the former Barge Public House;
- LZ4 consists of marginal wetland, characterised by thick peat deposits and has potential for waterlogged later prehistoric remains such as timber trackways. This LZ is found at the westernmost 50m and easternmost 200m of the Custom House site. These layered peat deposits are identified above gravels at c.97.5m – 98m ATD; and,
- Modern ground level adjacent to the site lies at c. 101.5 to 102m ATD.

2.3.4 Overall the potential for survival is considered to be high for archaeological deposits, high for Palaeoenvironmental remains and low to moderate for other remains. For further explanation of their archaeological potential see Section 2.6.

2.4 Ground investigation works

- 2.4.1 As noted above archaeological monitoring has been carried out during GI Packages 19, 19A and 30 (Crossrail 2010 a, 2010b, Document Nos. C156-CSY-T1-RGN-CR146_PT004-00004; C122-OVE-T1-RGN-CRG01-50001). In the area of Custom House/Victoria Dock Portal Package 19 consisted of two boreholes and seven window samples. For Package 30, covering the east of Victoria Dock Portal, Custom House and Connaught Tunnel Worksites, a total of six boreholes and eighteen testpits were monitored archaeologically (Figure 2: Custom House Station Location of borehole transects for geoarchaeological deposit model after Crossrail 2010b). The boreholes and window samples show the surface of the Pleistocene gravels between 93.7m and 98.4m ATD. To a limited extent the floodplain gravels are overlain by sands and sandy silts, recorded between 96.2 and 98m ATD. The Pleistocene gravels and fluvial sands are overlain by a woody peat, recorded between c. 97m and c.100m ATD (approximately 1.1 to 2.2m in thickness). These deposits indicate a more stabilised, but wetter, landscape and possibly the development of a Late Neolithic to Late Bronze Age (Yendell 2009) alder carr woodland. The sandy deposits and peats are overlain by blue grey silty clay (alluvium), recorded between 100.09m and 101.3m ATD. These sediments indicate grass/fen environments to mudflats.
- 2.4.2 A more recent programme of archaeological monitoring and recording was undertaken during the C233 Victoria Dock Portal utility diversions along Victoria Dock Road and Seagull Lane to the west of Custom House Station. The monitoring revealed that modern made ground of variable depth had truncated the upper horizons of the alluvial sequence. Due to the nature of the utility diversions it was not possible to observe the full sequence of alluvial deposits.
- 2.4.3 The upper horizons of the alluvial sequence comprised blue-grey minerogenic clays the surface of which was recorded at 101.06m and 100.59m ATD (0.40m and 0.80m bGL) in diversion trenches along Victoria Dock Road, and between 101.24m and 100.80m ATD (1.00m and 1.50m bGL) in the Drive Pit excavations (SL4a and SL6a) along Seagull Lane (Crossrail 2012).

- 2.4.4 The minerogenic clays sealed dark brown black peat deposits which were recorded on both the deeper sewer trench excavations excavated in Victoria Dock Road, between 99.59m and 99.39m ATD (1.80m and 2.00m bGL) and in the Drive Pit excavations (SL4a and SL6a) between 99.30m and 99.24m ATD (both 3.00m bGL) along Seagull Lane. The peat deposits represent marginal marshlands and have potential for the survival of archaeological remains associated with prehistoric wetland activity (*ibid.*).
- 2.4.5 The natural terrace gravels which form the base of the alluvial sequence were only observed within the deeper Drive Pits on Seagull Lane between c.97.23m ATD (5.00m bGL) and c 97.74m ATD (4.50m bGL) (*ibid.*) .

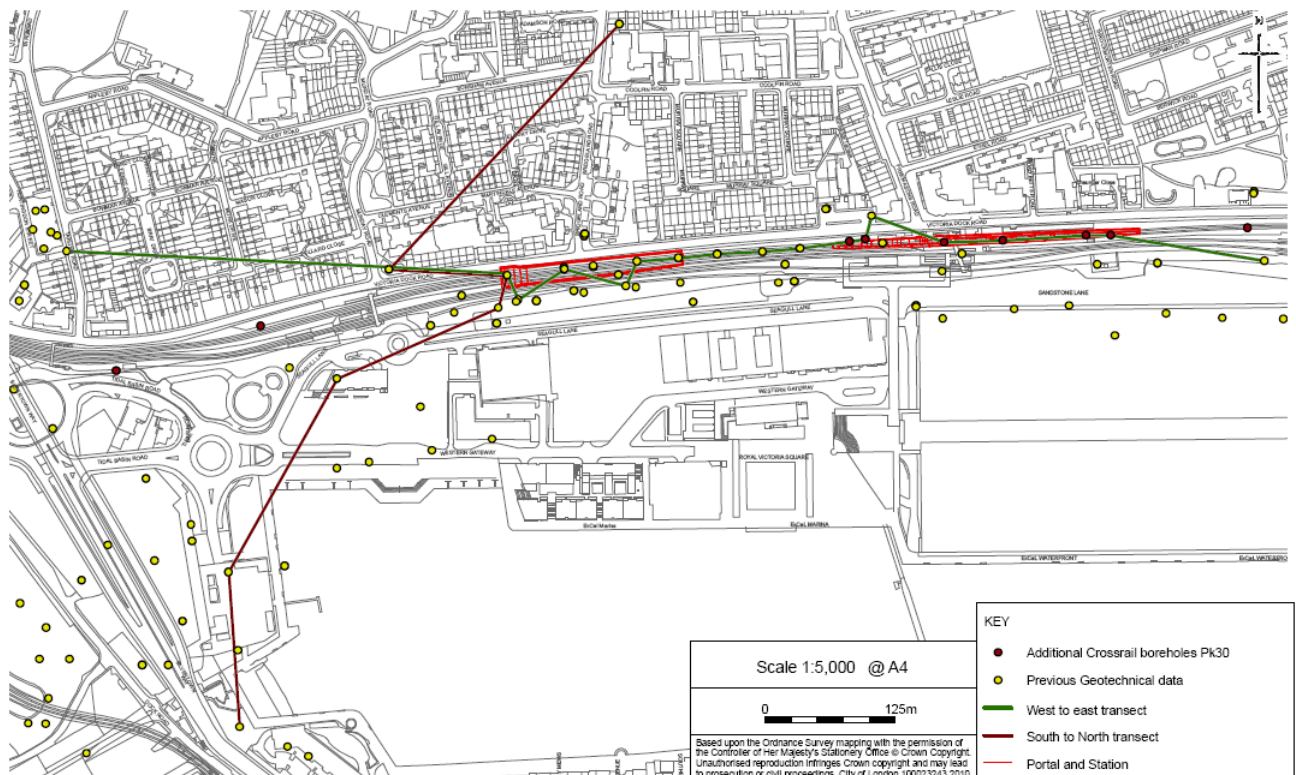


Figure 2: Custom House Station Location of borehole transects for geoaerchaeological deposit model after Crossrail 2010b).

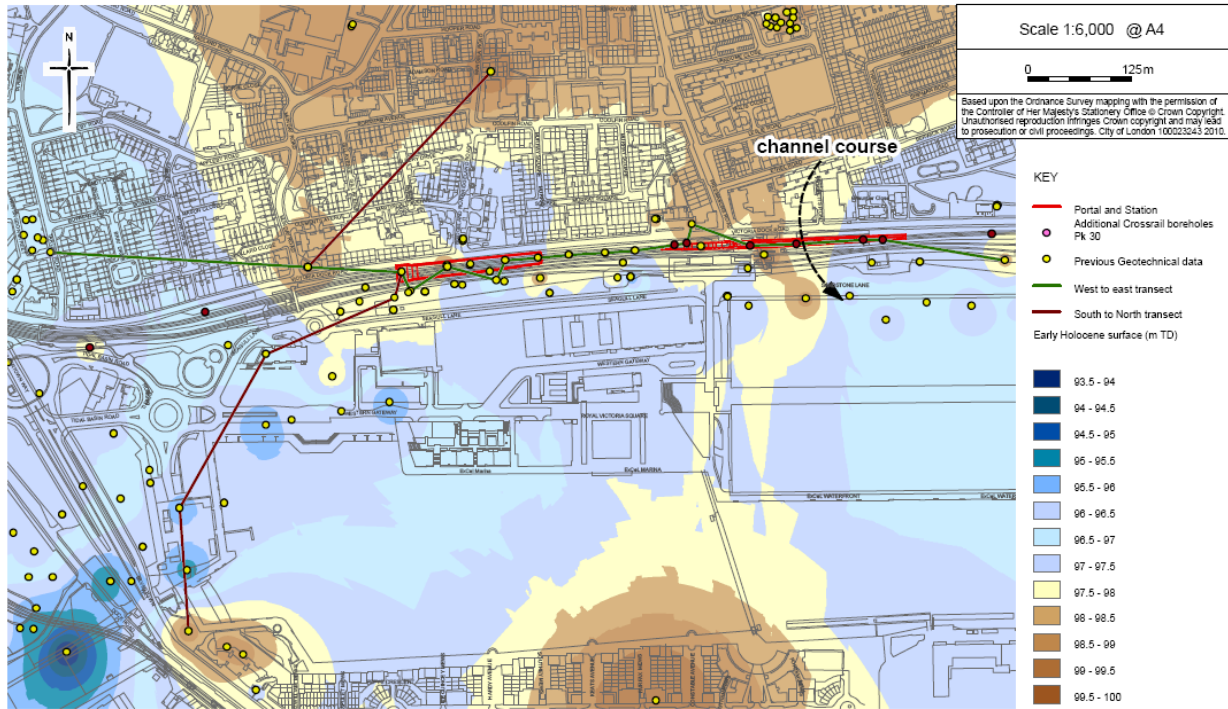


Figure 3: Topography model for Early Holocene period after Crossrail 2010b

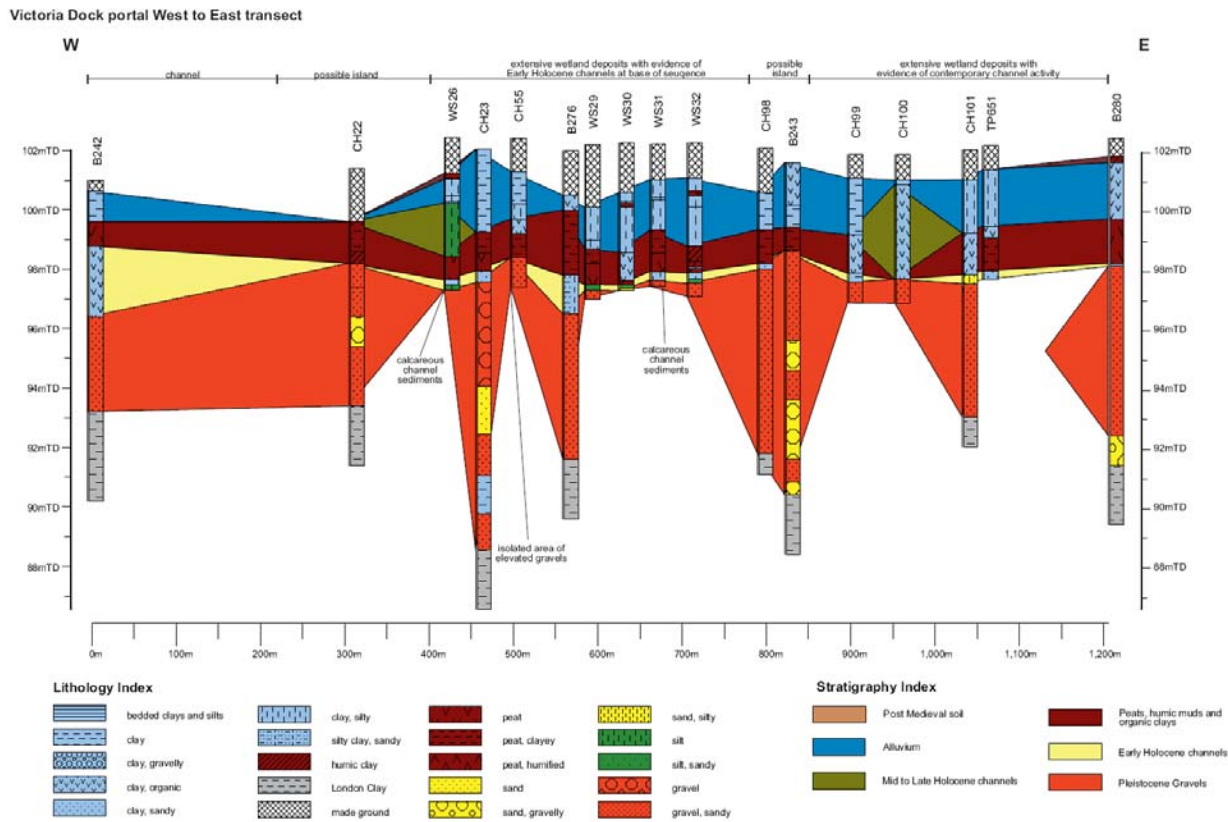


Figure 4: EW transect of GI borehole and trial pits for updated Deposit Model (after Crossrail 2010b)

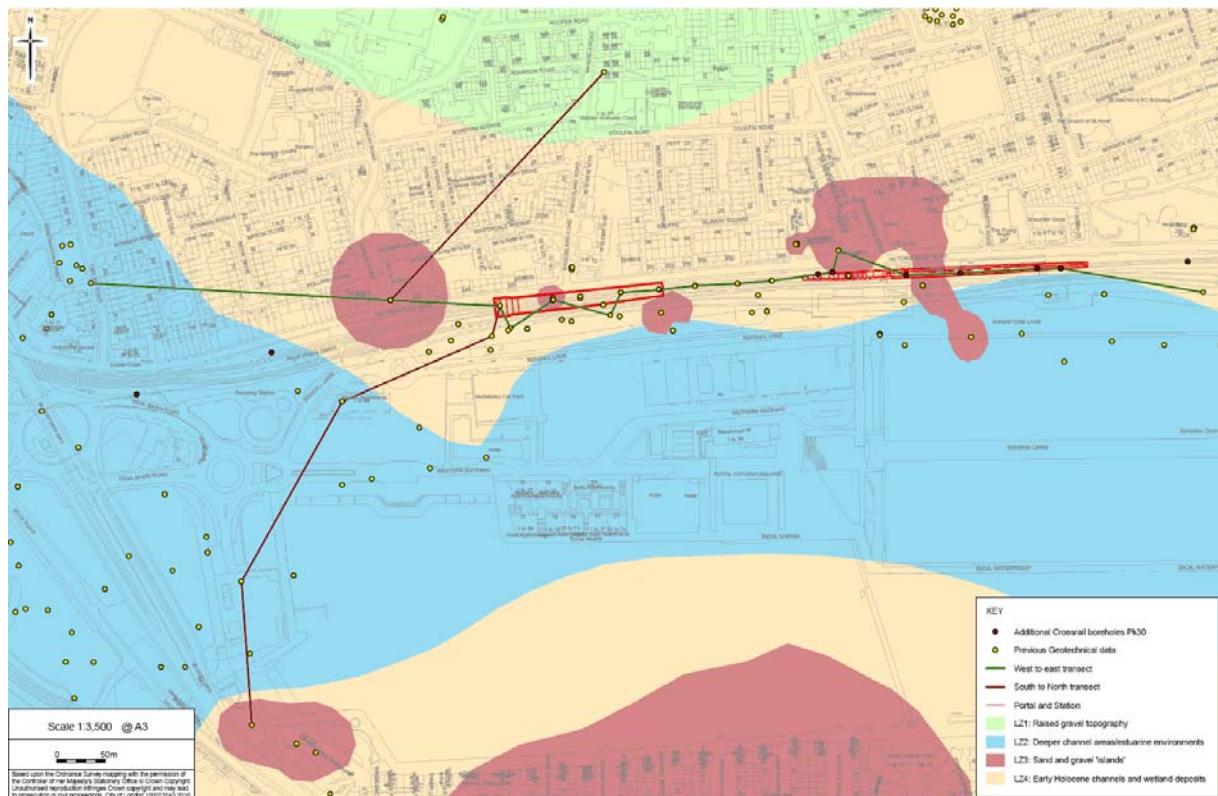


Figure 5: Landscape Zones identified in the geospatial model (after Crossrail 2010b)

2.4.6 The previous model suggested that LZ3 (higher gravel areas) existed as a fairly large area of land across the central and western parts of the station footprint. The new model suggests that the areas of high gravel could be fairly discrete, and consideration should be given as to whether these areas form a continuous surface of raised topography, or simply small scale gravel bar features. These areas of raised gravel may have formed larger 'eyots' within the wetland landscape and have moderate potential for Mesolithic, and possibly Bronze Age, activity and (temporary) occupation.

2.4.7 LZ4's (early Holocene wetland) characteristics remain as before, although a possible prehistoric channel has been identified running across the Custom House Station footprint within the wetland peat deposits. These wetland and channel deposits have moderate potential for timber structures such as trackways and platforms.

2.5 Archaeological and Historical Development of the site

2.5.1 This section provides a brief overview of the archaeological and historical background of the site to enable the site to be seen within its wider context. More details are available within the Detailed Desk-Based Assessment.

2.6 Baseline Data

- 2.6.1 The Custom House station Worksites lie within an Archaeological Priority Area (APA) as defined by the LB of Newham. This area is identified as having a high potential for prehistoric remains related to the exploitation of high ground and marginal wetland areas present during this period.
- 2.6.2 There are no Scheduled Monuments within the study area.
- 2.6.3 No listed buildings are identified as being affected by the proposed works within the worksite. Potential impacts to listed buildings are assessed and mitigated separately under a heritage deed, and are not the subject of this report.
- 2.6.4 No Registered Parks, Gardens, Battlefields, or Wrecks are identified within the Study Area
- 2.6.5 No Conservation Areas are identified within the Study Area
- 2.6.6 Non-listed Built Heritage requirements are identified in this report (See Annexe 4 for details of NLBH assets).

2.7 Prehistoric Period (approximately 500,000BP to AD50)

- 2.7.1 All areas of the site have a high potential for palaeoenvironmental evidence, including the survival of material such as molluscs, insects and pollen, especially within the channel sediments of LZ2, if present, and in LZ4. The deep channel areas of LZ2 (Figure 5), have a moderate potential for prehistoric remains, notably possible Mesolithic activity adjacent to any channels, and later remains such as boats or fish traps within the alluvium which subsequently sealed that horizon as water levels rose.
- 2.7.2 On the islands of higher ground (LZ3) there is a moderate potential for evidence of semi-permanent dry land activity during the prehistoric period, such as Mesolithic and early Neolithic flint working areas or ephemeral structural occupation remains. A Crossrail borehole at such an island at the western end of the DLR diversions, west of the portal, contained a sandy peat layer interpreted as a possible Mesolithic soil horizon, which may offer high potential for evidence such as lithic scatters, CH22, South end of Munday Road, see Section 1.4 of Crossrail 2008b 'MDC4 Archaeology, Geoarchaeological Deposit Model', referenced in section 11. The potential for similar deposits on the other islands is uncertain.
- 2.7.3 The marginal marshland of LZ4 has potential for well-preserved waterlogged prehistoric archaeological remains such as timber trackways or jetties from the Neolithic and Bronze Ages, and other organic remains such as weirs, fish traps, revetments, causeways, peat deposits, and possibly boats.

2.8 Roman Period — AD50 to 450

2.8.1 The environment in the area of the site remained marshy open land throughout the Roman period, although there is evidence of dropping local water levels and therefore there may have been occupation in the previously marshy areas, see Crossrail 2008b 'MDC4 Archaeology, Geoarchaeological Deposit Model'. However the gravel islands forming LZ3 lay at 98 to 99m ATD and probably remained inundated during this period.

2.9 Medieval Period — AD450 to 1540

2.9.1 The site was inundated after the Thames levels rose again during the early medieval period, and much of the landscape would have returned to marshy areas unfit for permanent settlement. The marshy low lying areas were gradually drained and reclaimed during the later medieval period. The higher areas to the north of the site saw the origins of the manors of West Ham and East Ham. The medieval manor of Sudbury is indicated on the GLHER, and may have been located towards the south-east end of the Custom House worksite although its exact location is not known. However there is potential for associated features such as field systems or land boundaries to be present within the worksite.

2.10 Post-medieval — AD1540 to 1900

2.10.1 The process of land reclamation continued into the Nineteenth Century. The North Woolwich Railway line, opened in 1847 was constructed across previously undeveloped marshland. The growth of the docks ensured the area altered in character significantly during the post-medieval period, with the Royal Victoria Dock constructed in 1850 to 1855. There is high potential for industrial, and possibly railway, remains from this period on the site. This period also saw a huge increase in the construction of housing throughout the area north of Victoria Dock Road, including The Barge Public House, formerly the Freemasons Tavern, parts of which were built approximately 1862. The Royal Victoria and Albert Docks Cut (now filled in) is shown on maps of the late Nineteenth Century, and there is potential for this drainage channel at the southern edge of both the portal and Custom House station, and along the DLR diversion. Two smaller channels ran southwards across the Custom House station site into the Docks Cut.

2.11 Modern — AD1900 to present

2.11.1 Although badly damaged during bombing raids of World War II, the docks continued in use until after the war. From the 1960s onwards, the docks suffered from modern improvements in trade, and the move of large shipping to Tilbury docks further downstream. The Royal Victoria Dock ceased to accept commercial shipping in 1980.

2.12 Deposit Survival

2.12.1 It is assumed that there is a depth of at least approximately 0.5m of modern disturbance below present ground level, overlying nineteenth-century below ground archaeological remains, e.g. the former Royal Victoria and Albert Docks Cut, and elsewhere a depth of at least approximately 1.0m over earlier remains. Modern ground level is relatively level at approximately 101.5m-102m ATD, suggesting that archaeological deposits may survive up to approximately 100.5m ATD, respectively. Cellared areas within the former Barge Public House (in LZ3) are likely to have partially removed archaeological remains.

2.12.2 There is likely to be up to approximately 6m thickness of geoarchaeological deposits underlying modern made ground in LZ2, down to the gravels at approximately 95m ATD, approximately 4.0m in LZ3 (97m ATD), and up to approximately 3.5 to 4m in the marginal ground of LZ4 (97m ATD). Natural features such as stream channels may extend below this level, particularly in LZ2.

2.13 Archaeological potential

2.13.1 There is a moderate potential for Mesolithic activity in areas of the floodplain adjacent to stream channels or lakes as follows:

- for remains such as fish traps and boats within the alluvium deposited at the base of relict channels (LZ2), for Mesolithic and early Neolithic activity on high gravel 'islands' (LZ3); and
- for Neolithic/Bronze Age wetland remains such as timber trackways or platforms preserved within peat deposits (LZ4) see Section 2.4 for the locations where such deposits are expected.
- there is high potential for supporting palaeo-environmental sequences across the site.
- there is a low potential for evidence of Roman activity in the marshes.
- there is moderate potential for evidence associated with the medieval Sudbury House in the eastern part of the construction compound (worksite), south-east of Custom House station.
- there is a high potential for Nineteenth- and Twentieth-Century industrial archaeology, including the Royal Victoria and Albert Docks Cut, possible railway features, and elements of The Barge Public House at Custom House station.

2.14 Archaeological Importance

2.14.1 The majority of the potential archaeological remains within the site study area are likely to be of moderate importance if extensive, well-preserved remains are present.

2.14.2 If present, any well-preserved prehistoric structures such as track ways, boats or other evidence of prehistoric exploitation of the area might be of high importance. Less well-preserved or less extensive remains are likely to be of low importance.

2.15 Archaeological works carried out to date

2.15.1 Archaeological monitoring of boreholes and geotechnical testpits has been undertaken as outlined in Section 2.4. Proposed Archaeological Works to be undertaken in order to ensure Crossrail Environmental Minimum Requirements are detailed in Section 5.

Summary of above ground archaeology investigations (NLBH)

2.15.2 The Non-Listed Built Heritage and Street Furniture survey identified and assessed the importance of structures, such as any surviving historic components of The Barge Public House and industrial features associated with the former North London Line railway or docks within the Custom House station site.

2.15.3 Non-Listed Built Heritage assessment and recording forms part of the archaeological mitigation strategy for Crossrail. The definition of Non-Listed Built Heritage adopted follows information Paper D22 'Archaeology' and encompasses above ground historic features and structural elements of historical interest. Two main groups are:




- non-listed buildings proposed for demolition in conservation areas; and
- historic street furniture and materials falling within a worksite and being temporarily or permanently impacted upon by the works.




2.15.4 The detailed scope for this element of works relevant to the Custom House site included:




- important non-listed historic street furniture and materials; and other important non-listed buildings and structures of historic interest outside conservation areas,
- locally listed buildings and any industrial heritage of significance.

2.15.5 A walkover survey of the general worksite area was carried out by MDC4 archaeology and heritage specialists in order to identify any Non-Listed Built Heritage (NLBH) or historic street furniture within the worksite area or in adjacent areas. The results of the walkover survey are presented in Table 1 below. The vantage points where the Non-Listed Built Heritage surveys were undertaken are shown on drawing number P40103-E2M00-C00-D-00481 in appendix A of doc CR-SD-PRWX-IS- 00002.

Table 1: Summary of NLBH survey assessment

Name	Image	Description	Significance	Impact	Mitigation/Further Investigation
Railings south of Chautier Close.		Railings and small flat roofed structure, probably related to North London Line. Situated opposite Chautier Close.	No NLBH significance.	N/A.	No further work required.
View of flat roofed buildings opposite The Barge, taken from the Custom House Hotel.		View of flat roofed buildings from the Custom House Hotel. Possible associated with the former North London Line.	Maybe of minor railway significance.	Unknown, possible demolition.	Recommended that a basic photographic record is carried out commensurate with Level 1 of English Heritage Guidelines.
View of flat roofed buildings opposite The Barge, taken from the Custom House Station platform.		View of flat roofed buildings from the Custom House Station platform. Possible associated with the former North London Line.	Maybe of minor railway significance.	Unknown, possible demolition.	Recommended that a basic photographic record is carried out commensurate with Level 1 of English Heritage Guidelines.

Name	Image	Description	Significance	Impact	Mitigation/Further Investigation
The Barge across Freemason Road.		The Barge. Originally constructed c. 1862 and named the Freemason's Tavern. Renamed 'The Barge' in the 1990s.	Local significance – many alterations have taken place but original elements may remain.	Demolition.	Recording is undertaken to a level commensurate with Level 2 of English Heritage Guidelines, which would provide as a minimum a photographic record of the exterior façades (2006).
The Barge on Freemason Road.		The Barge. Originally constructed c. 1862 and named the Freemason's Tavern. Renamed the barge in the 1990s.	Possible original entrance gates – would be of significance and warrant further recording.	Demolition.	Recording is undertaken to a level commensurate with Level 2 of English Heritage Guidelines, which would provide as a minimum a photographic record of the exterior façades (2006).
The Barge from Victoria Dock Road.		The Barge. Originally constructed c. 1862 and named the Freemason's Tavern. Renamed the barge in the 1990s.	Possible original features would be of significance and warrant further recording.	Demolition.	Recording is undertaken to a level commensurate with Level 2 of English Heritage Guidelines, which would provide as a minimum a photographic record of the exterior façades (2006).

Name	Image	Description	Significance	Impact	Mitigation/Further Investigation
The Barge – rear.		The Barge – rear aspect showing multi phased construction.	Local significance.	Demolition.	Recording is undertaken to a level commensurate with Level 2 of English Heritage Guidelines, which would provide as a minimum a photographic record of the exterior façades (2006).
The Barge – west facing wall.		The Barge – west facing wall with detail of traffic controlling pavement.	Minor significance may indicate entrance to former building on the site.	Demolition/removal.	Recommended that a basic photographic record is carried out commensurate with Level 1 of English Heritage Guidelines.
Car Park area to the west of The Barge.		Car Park area to the west of The Barge showing lamp post.	No significance – although maybe the site of a former building which may have surviving archaeological elements beneath the modern surface.	Use as compound.	No further work required from a non listed heritage perspective. Potential archaeological implications. It may be necessary to carry out a watching brief covering any ground breaking in this area.

2.15.6 An internal inspection was carried out of the Barge Public House, an unlisted heritage building scheduled for demolition as part of the Custom House station works. The purpose of the visit was to determine what, if any, mitigation measures in the form of heritage building recording would be necessary ahead of demolition work.

2.15.7 The interior of the building has been largely modernised to cater for its current use as a youth hostel; however, some features have been retained relating to both the age of the building and its public house origins.

2.15.8 The main area of interest within the building is the reception area/lounge, where there are surviving public house features. Chief amongst these is the Victoria timber bar counter, with a panelled and pilastered apron, slim turned column supports and a deep overhanging hood. Behind the bar, the bar back has shelving, with heavier, squared columns. At the top of the shelving is timber coving, with foliate decoration and a cornice above. The current tenants of the building believe that bar mirrors survive behind current panelling. The bar back also features a simple clock face. The rest of the former lounge bar has deep skirting, timber dado and picture rail.

2.15.9 Features within the remainder of the building, which may date the original construction of the building c.1862 are the central stair, which has timber skirting, turned balusters to the ground and first floors, and timber treads, plus a number of doorcases and panelled doors.

2.15.10 The cellar is also of some interest, showing two blocked fireplaces, the keg drop from the ground floor, and modern but relevant beer taps and hoses.

2.15.11 The requirements for the NLBH works are proposed in Chapter 5.

3 Construction Impact Summary and Outline Mitigation Design

3.1.1 The following sections describe the impacts as at RIBA F Design Submission.

3.2 Construction summary

- 3.2.1 The works involve the demolition of the existing disused NLL station and buildings. The new station will include a main concourse area and ticket office, raised at bridge level over the tracks, with an island platform at ground level, accessed via stairs, and a lift at the west end of the island platform.
- 3.2.2 The general sequence of construction will run from east to west, and then west to east, centred around the existing DLR footbridge carrying the 24 hour pedestrian route. Work will begin on the section of the site west of the footbridge with erection of hoarding and the barrier to the DLR. Once the site is secure, asbestos removal and demolition will follow, then probing, piling and construction of the pilecaps and foundations. Work will follow in the same order on the section of the site east of the footbridge.
- 3.2.3 Once the western foundations are complete and have reached 28 day strength, and work is sufficiently far east to allow a continuous lorry route from the central to the western access, the erection of the structure will commence, moving from west to east. Erection can only proceed up to gridline 9 of the Custom House setting-out grid (See Annex 3 drawing C146-ATK-A-DDA-CR145_1-42100), and must then halt for a period. A temporary pedestrian route will be created, running via a footbridge from the DLR western link and a footbridge across Victoria Dock Road to a temporary stair and lift adjacent to the station entrance worksite.
- 3.2.4 Once this is functional, the existing DLR footbridge will be closed and demolished. This will allow the remaining piles and foundations in the central section of the site to be installed, and once these reach their 28 day strength erection of the structure will resume. The remainder of the station structure will then be installed, up to the eastern end of the platform.
- 3.2.5 The other elements of the station – the entrance, station footbridge, and ExCeL and DLR footbridges – will be constructed at the appropriate time to fit in with the general sequence.
- 3.2.6 A series of sequence diagrams have been included as Appendix F of the Constructability report, showing the operations in progress each month.
- 3.2.7 The major design changes since the RIBA E Constructability Report are as follows:
- The track foundation has been added to the station scope. This has added a further 372 No. 450mm diameter CFA piles to the contract, together with the concrete slab foundation
 - The station entrance structure has been redesigned to be a simple stair plus lift
 - The station footbridge across Victoria Dock Road has been reduced from 9m to 6m wide

- The canopy has been removed from the station entrance and footbridge, the footbridge connection to the ExCeL walkway, and the section of concourse between them
- The plant rooms west of gridline 7 are now panellised structures, and the columns from platform to concourse level have been extended to the western end of the station
- The gateline has been removed from the station
- The lift has been moved eastward to between Gridlines 11 and 12, and the concourse has been reduced in length, and now finishes at Gridline 20 rather than 23
- The escalators on the platform have been replaced by stairs
- Canopies for passengers have been added to the eastern area of the platform
- The design of the station structure has been refined, to alter the number of precast units to improve buildability
- The boundary between C146 and C154 (Victoria Dock Portal) has been agreed;
- modifications to the track slab foundation upstand have been made to resist flood levels

3.2.8 These changes are explained in more detail in the RIBA F Design Report.

3.3 Permanent works

3.3.1 The permanent works comprise of:

- excavation and other ground works. An area running the length of the track for c. 375m, including the total area of the station and an access ramp, would be excavated to a depth of c. 1.5m below ground level. Subsequent works here include track laying, construction of island platforms, piled foundations for the station and track, including piled foundations and a track slab for the track, and ground disturbance within construction compounds.
- piled foundations. The high-level station building, footbridges, surface rail track and some of the lifts/stairs and an extension of the existing ExCeL exhibition centre walkway, will also have piled foundations. Piling would increase the impact within the area of ground reduction to complete removal of any surviving remains along the line of the retaining walls, and partially or completely at individual pile and cap positions elsewhere;

- a station entrance building at the corner of Freemasons Road and Victoria Dock Road, constructed following demolition of the former public house, 'The Barge Public House c. 1862. The new building will have piled foundations. Stairs, a lift, and an associated plant room, would also be supported on piled foundations. The impact would be to partially or completely remove potential archaeological remains locally, within the areas of individual foundations, depending on their depth. The location of the new station entrance building falls within LZ3, where the archaeological remains are likely to be higher, at c. 97 to 101m ATD. The Barge Public House will be demolished, resulting in the loss of any surviving historic elements of the building; and
- a lay-by area and cycle park on the north side of the Victoria Dock Road just west of junction with Freemason's Road would be unlikely to have any impact on potential archaeological deposits.

3.4 Temporary works

3.4.1 A construction compound, Victoria Dock/Custom House worksite, is proposed to serve both this site and Victoria Dock portal. It extends from east of the Prince Regent DLR station along the cutting, westwards to Royal Victoria DLR station. Details of construction for the temporary compound are given in the C146 Constructability report for RIBA F (CRL document C146-ATK-C-RGN-CR145_00007). The impact of works for preparatory ground reduction, hard standing and footings for plant, accommodation and a site footbridge, c. 1m deep, may partially remove potential archaeological remains.

3.4.2

3.5 Outline Mitigation Design

3.5.1 The overall mitigation strategy for the site is preservation by record. The Non-Listed Built Heritage and Street Furniture survey has been undertaken and identified the Non-Listed Built Heritage features present on the site. The survey also determined the appropriate level of recording required; in the case of The Barge Public House an English Heritage Level 2 historic building record. These are tabled in Chapter 5, section 5.2.

3.5.2 A field evaluation, comprising a series of four trial trenches, is proposed to assess the archaeological survival and level of truncation at the Custom House construction sites. This has been informed by assessment of the archaeologically monitored GI work boreholes (package 19, 19A and 30) which have identified at least two Landscape Zones to be present within the Custom House Worksites (see Section 2.3).

3.5.3 The trial trench evaluation will take place within selected areas of the Custom House Station, and at the Barge Public House. They will be excavated in such a way as to allow for additional sample excavation at the base and potential extension if required, for further excavation. However, it is intended that they form the bulk of works designed to mitigate impacts to the archaeological resource caused by construction of the new station.

3.5.4 Dependant on the results of archaeological evaluation, General Watching Briefs (GWBs) or Targeted Watching Briefs (TWBs) will take place during the excavation and construction of remaining areas of Custom House station not included within the sample excavation trenches. Watching briefs will also be carried out during works of limited impact within the construction compounds.



4 Research Design Objectives of the Investigation and Research Aims

4.1 Objectives of the Archaeological Investigations

- 4.1.1 The aim of archaeological evaluation is to determine if significant archaeological remains, in particular those representing human activity not likely to be recovered by boreholes or geotechnical trial pits, are present within approximately 1.5m to 4.0m below ground level, and their nature, extent, survival quality and significance. This includes the evaluation of buried industrial or railway structures. These results will be used to identify areas of expansion for subsequent sample excavation trenches should they be required.
- 4.1.2 The overall aims of any subsequent excavations (mitigation) will be to investigate, record, and take environmental/geoarchaeological samples if required, from a proportion of the Custom House Station Worksite, and from The Barge Public House Worksite. Sample areas within station footprint will be targeted on a selection of the different horizons within the archaeological sequence (see Section 5), and shallower deposits, such as post-medieval archaeology. These aims will be refined from the results of the evaluations, as part of an iterative process if investigation.
- 4.1.3 The precise aims, and types, of any additional watching briefs will be determined during the evaluation stage, but in general they will be to investigate, record, and where appropriate sample, any archaeological remains encountered by works where the extent of the impact is limited, and/or there is only a low potential for the works to encounter archaeological remains. They will also be employed in areas of the Custom House Station Worksites not included in the evaluation trenches or sample excavations. The watching briefs may include geoarchaeological recording and sampling.

4.2 Objectives of the Non Listed Built Heritage Recording

- 4.2.1 The purpose of a Non-Listed Built Heritage Level 2 historic building record is to ensure the preservation by record of The Barge Public House prior to its demolition. The historic building record will provide an appropriate record of the surviving historic fabric; notably any features, fixtures or fittings of architectural or historic interest associated with its original use as a Victorian pub.
- 4.2.2 The historic building recording aims to identify:
- Any surviving features or fabric that can be related to the initial construction and use of The Barge as a public house
 - Evidence for the more recent alteration and phasing of the building over time.
- 4.2.3 The specific objectives of the recording are:
- To investigate the fabric of the building before its demolition in order to inform our understanding of its structural history
 - To record and analyse the surviving evidence for the history and development of the building using applicable archaeological methods.

- To make an internal and external record of the existing building in its current condition; the record will comprise; a written description, photography and a combination of measured drawings and annotated sketches and will include an appropriate level of documentary research in order to provide the historical context for the building.
- To present the results of the recording in accordance with Crossrail's standards and English Heritage guidance (EH 2006) and archive the records.

4.3 Site Specific research aims

4.3.1 The following specific research aims for the works at Custom House station can be identified at this stage:

Prehistoric

- P1 What is the development of the local landscape, topography and environment of the Thames floodplain? What Palaeoenvironmental data is there to inform on this development?
- P2 Is there any evidence for Palaeolithic activity at the interface between the Pleistocene gravels and early Holocene channel deposits? If so, what form does this take?
- P3 Is there any evidence for Mesolithic activity at the base of the alluvium/surface of the gravels? Is there any evidence of Mesolithic activity on the higher gravel areas of LZ3? If so, what form does this activity take- fishing, hunting, flint working etc?
- P4 If peat deposits can be securely dated, what activity is contained within them, and how does this help to refine knowledge of prehistoric activity, occupation and settlement in the marginal wetland habitats?
- P5 Can buried wood remains identified in the peat deposits be determined to be natural or artefactual in nature? If so is there evidence for prehistoric trackways additional to that already known in the area, and how do they interrelate?
- P6 Is there any evidence for later prehistoric activity or occupation? What is the nature of activity in the marginal marshlands of LZ4? Is there evidence of prehistoric water management or subsistence fishing? What is the nature of activity on the higher grounds of LZ3? Is there evidence of semi-permanent occupation?

Roman

- R1 Is there any evidence for Roman activity, in particular for water management, marginal wetland agriculture, flood defences and/or fishing?

Saxon

- S1 Is there any evidence for Saxon activity, in particular for water management, marginal wetland agriculture, flood defences and/or fishing?

Medieval and post-medieval

- M1 Is there any evidence for the medieval manor house of Sudbury?

M2 What can be learned about the process of land reclamation and management of the area from the medieval period until the construction of the docks, in particular in relation to marginal agriculture and water management?

Industrial

- I1 What can be learned about the development of the docks during the recent historic period? Can details about London's growth as a 'world city' and the contribution of the Docks to this economic growth be further elucidated?
- I2 Are there any surviving remains of the Royal Victoria and Albert Docks Cut, and the channels that fed into it? If so, what can be learned about the methods, materials and techniques employed in its construction?

4.4 Relevant Regional Research aims

4.4.1 The Custom House site has potential to address several general research aims identified in the regional research agenda: 'A Research Framework for London Archaeology' — Museum of London, 2002. The specific regional research themes are outlined below (page numbers are in brackets):

- understanding the significance of geomorphology, ecology, ecosystems and climate, hydrology, and vegetational and faunal development, on human lives (79);
- understanding London's hydrology, river systems and tributaries particularly the role of the Thames (as boundary, communication route, resource, ritual focus etc) in shaping London's history, and the relationships between rivers and floodplains (79);
- understanding the relationship between landscape, river and settlement, and the influences of the Thames in particular on communications and social interaction (79);
- understanding the origins of the prehistoric metalwork sequence from the Thames, and examining the links between the metalwork hoards deposited at the headwaters of river tributaries and other activities (79);
- studying the correlation between sites associated with watercourses and meander bends, so as to understand the origin of settlements (80);
- understanding the relationship between the Bronze Age wooden trackways and the settlements to which they presumably led, and what the trackways represent in terms of woodcraft and woodland management (82);
- understanding the development of London's Docklands and Waterways (82);
- examining breeding programmes and wildlife management, and marine and riverine exploitation, to understand the strategies used, their success or otherwise, and their consequences (83);
- understanding the nature and meaning of the deposition of metalwork in the Thames and at the headwaters of river tributaries (86); and
- The Mesolithic to Neolithic transition: understanding the significance of horticultural experimentation at this time, and the transition from hunter-gatherer's to farmers (87).

5 Scope of the Investigation

5.1 Archaeology

- 5.1.1 Works that require excavation below 101-101.50m ATD are likely to require either archaeological excavation or a watching brief as a mitigation response, depending on their extent and depth.
- 5.1.2 The individual elements of the archaeological strategy are to be considered in relation to those proposed for Victoria Dock portal. The archaeological fieldwork should form a single integrated project across the two parts of this site. It is only presented separately in this SS-WSI because of the uncertainty over the extent of the mitigation required between Custom House and Victoria Dock Portal.
- 5.1.3 The 'Main Contractor' refers to the main contractor appointed under Crossrail contract C520. The main contractor will be responsible for providing machinery, and undertaking trench excavation, providing trench protection, and for providing welfare etc.
- 5.1.4 Archaeological trial trenches are to be located and laid out by the main contractor, with support from the archaeological contractor C263.
- 5.1.5 The 'Archaeological Contractor' refers to the archaeological contractor appointed under the archaeological contract C263. The archaeological contractor will have responsibility for delivering archaeological mitigation as outlined in this specification. They will also be responsible for supervision of the level to which mechanical excavation will extend during the excavation of the archaeological trial trenches.
- 5.1.6 The 'Project Archaeologist, Crossrail Archaeologist, or variations thereof refers to the Crossrail Central Project Archaeologist.
- 5.1.7 Liaison with GLAAS as statutory consultees was undertaken on 27 September 2010, and a meeting held on October 11 2010 to discuss outline proposals. Further liaison will be on-going.

5.2 Archaeological Trial trench Evaluation

- 5.2.1 Four No. archaeological trial trenches are will be carried out across two areas of the Custom House Station site (see Figure 6 below):
- Trench 1 will be excavated within the area of the Barge Public House in order to assess the potential for archaeological survival in the higher gravel areas; and
 - Trenches 2, 3 and 4 will be located within the Crossrail route alignment to investigate the higher gravel 'islands' and the gravel/alluvium interface at the transition from LZ3 to LZ4 (Trenches 2 and 3). Trench 4 will investigate eastern end of the proposed new platform, to assess the potential for woody deposits identified in the Geotechnical investigations.

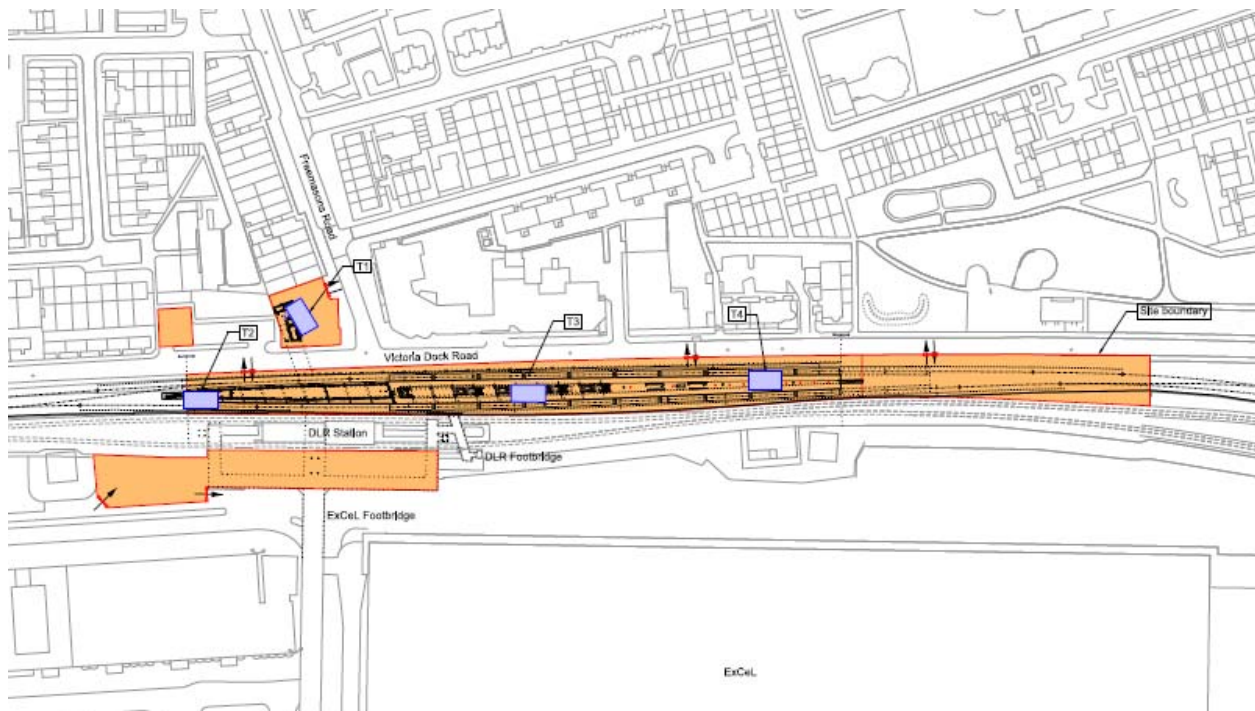


Figure 6: Proposed location of archaeological evaluation trial trenches

5.3 Archaeological Trench Evaluation Specific Requirements for the C520 Main Contractor

5.3.1 The Main Contractor shall excavate the four No. trial trenches on behalf of Archaeological Contractor C263. These shall be excavated at between 100mm and 300mm spits. The trenches to be excavated are numbered Tr.1 through to Tr.4 on Figure 6 above.

5.3.2 There are two options for excavation of the archaeological trenches. Option 1 is to dig a benched trench measuring 15 x 10m at top (as outlined below in Figure 7). If Option 1 is not suitable due to space restriction, Option 2 is an alternative suitable method (see figure 8). Option 2 requires shoring of a 4m x 2m x 4m deep trench usually sheet piled. In order to get an archaeologically robust profile the following method is proposed for excavation of Option 2.

- 1) Excavate an agreed depth (approx. 1m) of soil longitudinally and leave an approximately 1m thick section against the longitudinal side of the sheet piling.
- 2) Allow thin section to be recorded by archaeologists
- 3) Remove this strip and repeat excavation to 2nd agreed depth (approx 1m)
- 4) Repeat recording and excavation process until base depth of trench is reached.
 - Modern overburden will be removed by the Main Contractor by machine under the supervision of the Archaeological Contractor to expose any surviving archaeology. Following the removal of the overburden, the Main Contractor shall allow the Archaeological Contractor to enter the trench to allow for recording and sampling of features.

- All machine work and demolition of below-ground obstructions (e.g. removal of Station foundations and surface rail foundations) shall be carried out by the Main contractor under supervision by the Archaeology Contractor. The Main 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 excavate arbitrarily down to natural deposits without regard to the archaeological stratification.
- The archaeological level shall be cleaned in plan by the Main 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.

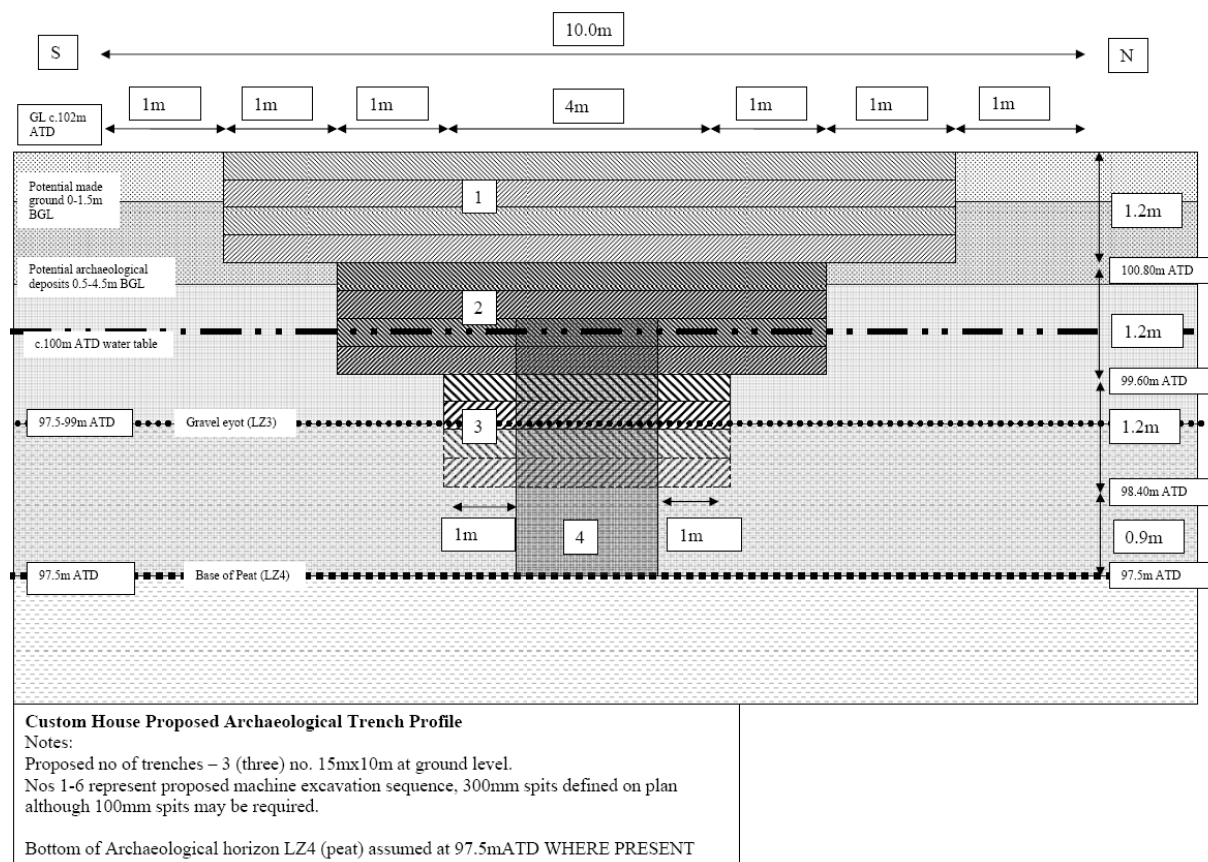


Figure 7: Option 1-Proposed excavation method for Archaeological Evaluation trial trenches

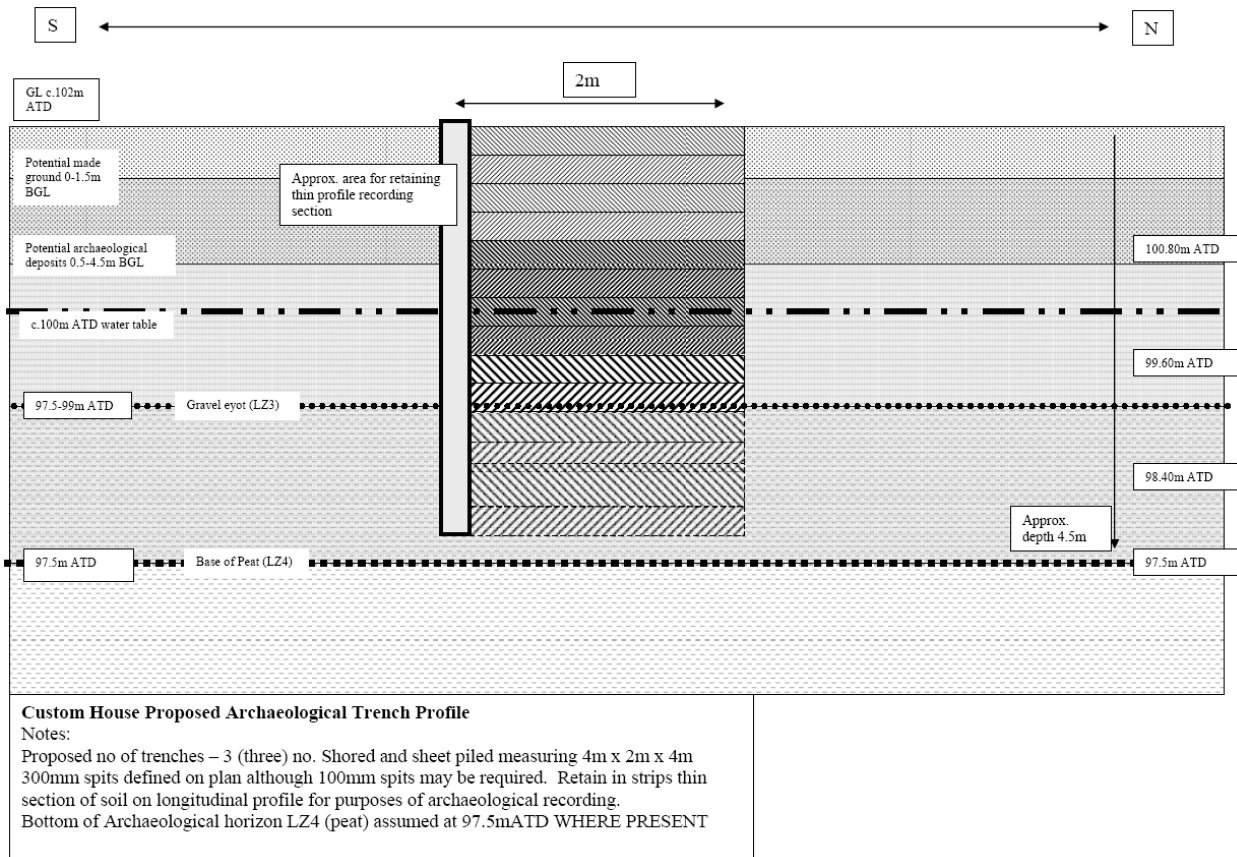


Figure 8: Option 2- Proposed excavation method for Archaeological Evaluation trial trenches

5.3.3 To ensure the successful completion of the archaeological trial trench evaluation the Main Contractor shall:

- Ensure no live underground services exist in the area identified for excavation;
- Remove, under supervision of Archaeologist Contractor, modern overburden,
- Prepare and undertake breakout structures and soils with the agreement of, and under the supervision of, the Archaeological Contractor C263;
- Place excavated material in spoil heaps at an agreed safe distance from the site of the trench, as agreed with the Archaeological Contractor;
- Provide all temporary earthworks support to excavations where required;
- Provide dewatering within the trenches to allow the investigation to proceed;
- Allow suitable access from ground level to base of excavated area for archaeologists to work, including the provision of shoring and propping as required to make trenches safe;
- Excavate in stages/steps to the bottom of archaeology to aid archaeological excavation by localised machining of areas of recorded soils or structures between the ground level and the top of natural soils;

- Use of excavators or other plant within the excavation area shall only be undertaken with the agreement of and under the supervision of, the Archaeological Contractor; and
 - Provide further technical advice to the Archaeological Contractor as maybe required to safely complete the works.
- 5.3.4 The Main Contractor shall also provide the following site accommodation facilities for the use of archaeological operatives, inclusive of any hardstanding and services required
- Toilets, with drying and washing facilities;
 - First Aid;
 - Temporary office for the use of archaeologists complete with furniture, desk and telephone/internet connection; and,
 - Secure storage facilities for tools, finds etc.

5.4 Archaeological Trench Evaluation Specific Requirements for the C263 Archaeological Contractor

- 5.4.1 The Archaeology C263 Contractor is to request a Crossrail archaeological site code, in accordance with the LAARC Site Code system, from the Project Archaeologist prior to commencement of works.
- 5.4.2 The Archaeology Contractor shall supervise the excavation of each evaluation trench in such a manner so as to allow a cumulative or continuous section to be recorded. The Archaeology Contractor shall undertake hand excavation and cleaning of any archaeologically significant horizons, to fulfil the aims of the work.
- 5.4.3 Further background information on the general scope of work and requirements on the Archaeological Contractor are to be found in the Site Specific Written Scheme of Investigation for Custom House Station, document reference number: C146-ATK-T1-RGN-CR145-00003.
- 5.4.4 The C263 Archaeological Contractor shall provide suitably qualified archaeologists, experienced in building recording and the nature of archaeological deposits which are expected on this site.

5.5 Healthy by Design

- 5.5.1 Additional considerations for provision of a safe working environment are given in Annex 4 – Designer’s Risk Control Log Summary, in accordance with the Crossrail Standards:
- *Healthy By Design: A guide for Crossrail Design Teams (Document reference: CR-XRL-Z7-XCS-CR001-0001)*

5.6 Archaeological Watching Brief

5.6.1 A General Watching Brief (GWB) will be required for any groundworks or construction activities that impact below a depth of 101m ATD (the area of the GWB is shown on Figure 6 above). This will include groundwork activities that have the potential to remove archaeological remains such as:

- Preparatory ground reduction;
- Groundworks for the hardstanding and footings for plant, accommodation;
- Foundations for the site footbridge, c.1m deep; and
- The foundations for the gantry crane.

5.6.2 This is to ensure any surviving historic railway features are identified and recorded.

5.6.3 A GWB will also be required during demolition of the Barge Public House (see Section 5.7.2 below).

5.7 NLBH Recording: Barge Public House

5.7.1 Based on the English Heritage good practice guidance *Understanding Historic Buildings: a guide to good recording practice*, it is recommended that the building be recorded at Level 2. The record will include at least:

- Site plan
- Record of location, grid reference and designation (if any)
- Written record detailing type and purpose of building, form, date and phases of development
- Building plans/sections/elevation
- External photography – general views, elevations, details including but not limited to:
 - Public house frontage and entrance
 - Single storey red brick addition, possibly jug and bottle
- Internal photography – general views, plus internal detail relevant to the buildings age or purpose including but not limited to:
 - Bar counter and bar back (including uncovered mirrors)
 - Timber features including stairs, doorcases and doors, skirting, dados and picture rails
 - Blocked fireplaces and keg drop in the cellar.

5.7.2 Prior to the start of the NBLH recording the existing panelling in the bar will need to be removed to expose the Victorian bar mirrors which are believed to survive behind.

5.7.3 In addition to recording the fabric of the building the NLBH record should also identify any architectural features or individual heritage assets that are worthy of salvage either for accession in a museum collection or for reuse. The C263 Archaeological Contractor will prior to demolition of the building, highlight any features or assets identified for salvage during the NLBH record to the Crossrail Project Archaeologist and C520 Main Contractor, who will arrange for their careful removal and storage.

- 5.7.4 A GWB will be required during demolition of the Barge Public House. The purpose of the GWB will be to record any architectural features or buried structural elements exposed that may inform the understanding of the development of the building as the building is dismantled.
- 5.7.5 The archaeological archive and accompanying report will be lodged with the London Archaeological Archive Centre. Copies of the report and a summary in the form of an OASIS record sheet shall be provided to the Greater London Historic Environment Record and to the London Borough of Newham's relevant Local Archive, as appropriate.

5.8 Further Archaeological Works

- 5.8.1 Further works may be necessary to be completed under Main Contractor C520 by Archaeological Contractor C263 following completion of evaluation trenches. Results of the archaeological evaluation will inform the iterative mitigation design, and will constitute *preservation-by-record* (e.g. archaeological excavation and/or watching brief). Additional archaeological mitigation (if required) would be undertaken commensurate with the main works. These mitigation measures are described in the Crossrail Archaeology Generic Written Scheme of Investigation (Crossrail, 2011 Document No. CR-XRL-T1-GST-CR001-00003).
- 5.8.2 In the event of significant archaeology being located, a further phase of works for mitigation excavation will be required, and will be programmed to begin as soon as possible upon discovery, pending approval of next phase of works by Crossrail Central. The programme for the second phase is likely to begin immediately following discovery.

6 Programme for the Investigation

- 6.1.1 Possession of the Custom House Station site by the C520 Main Contractor commences on 15th January 2013.
- 6.1.2 At the time of writing the full construction programme is still being developed by the C520 Main Contractor for approval by Crossrail. Available programme information includes key dates for the archaeological and NLBH works.
- 6.1.3 The NLBH recording of the Barge Public House should be programmed to be undertaken as early after site possession in January as is possible and certainly in advance of the asbestos strip, which may remove architectural features of interest.
- 6.1.4 The C520 Main Contractor currently forecasts that demolition of the Barge Public House will commence on 29th April 2013, with a target completion date of 28th May 2013.
- 6.1.5 The archaeological trial trenches are currently sequenced and programmed by C520 to be undertaken during the following dates:
- West - Dig and Backfill archaeological trial trench Tr2 Grid Line (GL) 1A-13A, 22nd to 26th April 2013;
 - Station Entrance (Barge PH) - Dig and Backfill archaeological trial trench T1 GL 13A-33A, 29th May to 4th June 2013;
 - East - Dig and Backfill archaeological trial trench Tr3 GL 13A-33A, 5th to 11th June 2013; and
 - East - Dig and Backfill archaeological trial trench Tr4 GL 13A-33A, 12th to 18th June 2013.
- 6.1.6 Further programme information will be communicated to the C263 when it is made available by the C520 Main Contractor.

7 Specification for archaeological evaluation and mitigation

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 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 SS-WSI.

7.2.2 The Archaeology Contractor for C263 shall submit to the Crossrail Project Archaeologist the details of their procedure for excavating and recording potentially nationally important remains in the Archaeology Contractor's Method Statement.

7.2.3 Upon discovery of potentially nationally important remains, the Project Archaeologist is to insert the procedure (or reference to the procedure) to be followed in the SS-WSI, identifying any specific individual roles or circumstances that are relevant to the works. Details shall include how relevant parties are to be informed of such discoveries, the criteria to be utilised by the Archaeology Contractor in the assessment of the significance of such discoveries and the timescales to be adhered to.

7.2.4 As a result of the discovery of unexpected, potentially nationally important archaeological remains, the SS-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 Upon discovery of human remains the Project Archaeologist is to insert the procedure (or reference to the procedure) to be followed in the SS-WSI, identifying any specific individual roles or circumstances that are relevant to the works. Details shall include how relevant parties are to be informed of such discoveries, the criteria to be utilised in the assessment of the significance of such discoveries, the application process for licences and the timescales to be adhered to.

7.3.4 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).

7.3.5 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.

7.3.6 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.

7.3.7 The Main 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.

7.3.8 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.

7.3.9 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 Main contractor. As a minimum, this will require a 24 hour comprehensive security regime until sensitive remains have been recorded and lifted.

7.3.10 As a result of the discovery of unexpected, potentially nationally important archaeological remains, the SS-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 Project Archaeologist to insert the procedure (or reference to the procedure) to be followed in the SS-WSI, identifying any specific individual roles or circumstances that are relevant to the works. Details shall include how relevant parties are to be informed of such discoveries, the criteria to be utilised in the assessment of the significance of such discoveries and the timescales to be adhered to.

7.4.5 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 Main contractor.

7.4.6 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.

7.4.7 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, the Main contractor's Health and Safety Plan and the Designers Risk Assessment. 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 Main 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 excavation method 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 Crossrail Permanent Ground Markers (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 Temporary Bench Marks (TBMs) shall be within $10 \text{ mm} \sqrt{k}$: 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

- 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 within the Barge Public House worksite and the Main Custom House worksite which may potentially contain archaeological remains as set out in the SS-WSI. This shall include any activities (including those associated with site set-up and demolition) undertaken by the Main 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 SS-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.

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

- A General Watching Brief (GWB) shall comprise observation and recording of the Main contractor's works without constraint on their working methods.

- A Targeted Watching Brief (TWB) shall comprise observation and recording of the Main 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 Main contractors' or his sub-contractor's method of working to enable the archaeological investigation to take place alongside construction works.
- 7.7.4 Targeted watching brief 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
- 7.7.5 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 Main contractor shall make allowance in their activity programme for the completion of any targeted or general watching briefs as set out in the SS-WSIs.
- 7.7.7 The specification for watching briefs (general and targeted) are set out below:

7.8 Specification for watching brief

- 7.8.1 The Archaeology Contractor shall undertake a general watching brief during utility diversion works of Victoria Dock Road and of open works where safe and appropriate within the main works site and the Barge Public House worksite.
- 7.8.2 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 Main 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 Main contractor; or
 - by additional archaeologists (the 'support team'), to be deployed to investigate unanticipated archaeological remains, where appropriate.
- 7.8.3 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 Main contractor's works.
- 7.8.4 The core team shall undertake the observation and any required investigation such as they may reasonably be able to undertake.
- 7.8.5 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 Main contractor's works. The Archaeology Contractor shall be required to supply teams of 5 and 10 persons within 24 and 48 hours notice respectively.
- 7.8.6 The Archaeology Contractor's core and support teams shall be advised where necessary by specialists, as appropriate and as agreed with the Project Archaeologist.

7.8.7 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.

7.9 Investigation undertaken during watching brief

7.9.1 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 the relevant local authority 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.

7.9.2 Heights for all deposits shall be related to approved Permanent Ground Markers (PGMs) or approved Ordnance Survey Bench Marks (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.

7.9.3 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.

7.10 Recording standards

7.10.1 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.

7.10.2 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.

7.11 Specification for archaeological investigation

7.11.1 The *Main Contractor (C520)* shall excavate four No. trial trenches measuring either 15 x 10m at the top if stepped, or, 4m x 2m at base if sheet piled and up to 4m in depth (as outlined in Section 5) on behalf of Archaeological Contractor C263 (see **Error! Reference source not found.** and 8).

7.11.2 Modern overburden will be removed by the *Main Contractor* by machine under the supervision of the *Archaeological Contractor* to expose any surviving archaeology. Following the removal of the overburden, remains will be recorded and sampled by the *Archaeological Contractor* with provision for more detailed sample investigation and recording of any features of particular interest identified during this stage.

- 7.11.3 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.
- 7.11.4 Where modern foundations are likely to be present, the SS-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.
- 7.11.5 The location and objectives of the trial excavations set out in Section 5 of the SS-WSIs have been established in consultation with the projects' statutory consultees.
- 7.11.6 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.
- 7.11.7 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 SS-WSI. Trial excavations shall be excavated to the base of the alluvial sequence or to a depth specified in the SS-WSI (Section 5). This shall be dependent on the agreed objectives of the excavation.
- 7.11.8 Temporary works and any required hand investigation to address below ground hazards shall be carried out by the Main 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 Main 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).
- 7.11.9 All machine work and demolition of below-ground obstructions (e.g. removal of Station foundations and surface rail foundations) shall be carried out by the Main contractor under supervision by the Archaeology Contractor. The Main 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.

- 7.11.10 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 c.300mm depth (dependant on specific site conditions), moving along the length of the trench or area. A depth of 500mm should not be exceeded. The Archaeology Contractor's supervising archaeologist shall use their professional judgement to determine the appropriate depth of each spit and will advise the Main 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.
- 7.11.11 A proposed excavation methods are indicated in **Error! Reference source not found.** and 8.
- 7.11.12 Each spit shall be examined carefully to assist the recovery of any archaeologically significant artefacts and thus to determine when to cease machining.
- 7.11.13 The archaeological level shall be cleaned in plan by the Main 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.



Custom House Station
 PK 30 GI
 Schematic profile

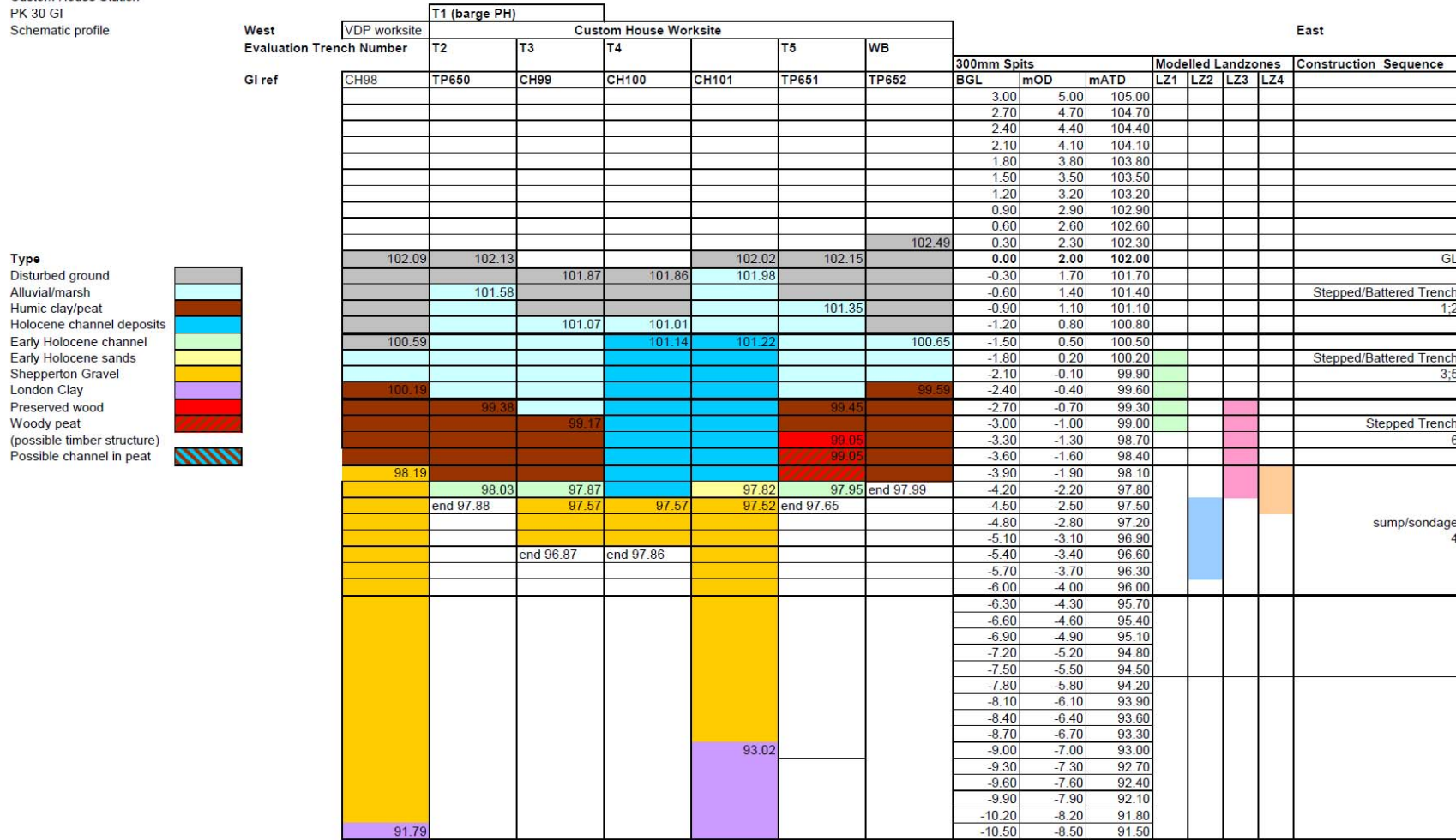


Figure 9: Schematic profile of Geotechnical boreholes and trial pits in relation to proposed excavation sequence for Archaeological Evaluation trial trenches



7.11.14 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.

7.11.15 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
- Permanent Ground Markers (PGM's), any temporary benchmarks and approved OS benchmarks shall be indicated on the relevant plans.

7.11.16 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 archaeological trial trench 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 archaeological trial trenches 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.

- 7.11.17 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 Main 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.
- 7.11.18 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 Main contractor. The Archaeology Contractor will be required to undertake works in accordance with the Main 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.
- 7.11.19 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 data for 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.
- 7.11.20 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.

7.12 Recording systems

- 7.12.1 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).
- 7.12.2 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.
- 7.12.3 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.

- 7.12.4 Section drawings shall be located on the relevant plan and both London Grid and OS coordinates recorded. The locations of the OSBM or PGM bench markers used and any site TBM shall also be indicated.
- 7.12.5 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.
- 7.12.6 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.
- 7.12.7 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.
- 7.12.8 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.
- 7.12.9 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.
- 7.12.10 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.
- 7.12.11 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 SS-WSI and addressed in the Archaeology Contractor's Method Statement.

7.13 Specific Requirements for the excavation of Archaeological trial trenches

- 7.13.1 The Archaeology Contractor shall ensure that water is discharged and arisings from archaeological excavations are stored in accordance with the Main contractor's environmental protection requirements (as set out in the package Works Information and their Environmental Plan) and any relevant consents for the worksite. The Project Manager shall monitor discharge rates and if necessary conductivity of discharge waters to ensure compliance.
- 7.13.2 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 Main contractor's environmental protection requirements (as set out in their Environmental Plan).
- 7.13.3 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.
- 7.13.4 The trenches shall be pumped dry by the Main 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 Main contractor as specified in the package works information and in accordance with the approved Archaeology Contractors 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.
- 7.13.5 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 3rd parties are minimised.

7.14 Archaeological science

- 7.14.1 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.
- 7.14.2 The finds retrieval policies of the appropriate recipient museum will be adopted. In accordance with the collection and retention strategy set out in SS-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).
- 7.14.3 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.
- 7.14.4 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 SS-WSI for subsequent mitigation strategies. Procedures and specifications shall follow English Heritage guidance (English Heritage 2008b).
- 7.14.5 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.
- 7.14.6 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).
- 7.14.7 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.
- 7.14.8 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.

- 7.14.9 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).
- 7.14.10 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 SS-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.
- 7.14.11 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.
- 7.14.12 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).
- 7.14.13 Animal bone assemblages, or sub-samples of them, shall be assessed by the Archaeology Contractor's specialist with reference to English Heritage guidance (English Heritage 2002).
- 7.14.14 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.

7.15 Generic specification for Environmental Sampling

- 7.15.1 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 set out in the SS-WSI.
- 7.15.2 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.
- 7.15.3 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).
- 7.15.4 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.
- 7.15.5 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.
- 7.15.6 For 'bulk disturbed' samples the limits of the sample zone shall be recorded and identified on plan.
- 7.15.7 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.

- 7.15.8 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.
- 7.15.9 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.
- 7.15.10 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

8.1.1 This section sets out what is required from the Archaeological Contractor per event. The specific event types listed at Custom House are:

- Non-Listed Built Heritage recording requiring updates to existing reporting and plans and archiving as detailed in section 8.2 below;
- Archaeological trial trench evaluations require deliverables as set out in Section 8.1, 8.2 and 8.3. A Method Statement (Section 8.1) will be required prior to commencement of works. Interim reporting (Section 8.4) will be required to action further Stage 2 mitigation.
- General watching brief of utilities and ground excavation within the main Custom House Worksite. These require weekly progress reporting followed by a fieldwork report (section 8.6).

8.1.2 All other requirements such as archiving, summary report for HER and post-excavation should be followed as set out 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 Main contractor, taking account of their Environmental 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 CVs;
- 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 the 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 7.1);
- 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 Main contractor or the Employer.

8.3 Site Archives

- 8.3.1 The 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 The 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.
- 8.5.2 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.
- 8.5.3 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.
- 8.5.4 The Interim Statement including illustrations shall be submitted as a single PDF file to the Project Archaeologist. CAD drawing files shall also be submitted.
- 8.5.5 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.
- 8.5.6 The Interim Statement shall include an approved report title sheet and QA page (to be supplied by the Employer).
- 8.5.7 The following shall appear in the footer or header of each Interim Statement:
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- 8.5.8 Copies of the Interim Statement shall be provided by the Project Archaeologist to Adam Single (English HeritageGLAAS), Archaeological Advisor to the London Borough of Newham, for comment and Sylvia Warman (English Heritage) Regional Science Advisor.

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 TBMs. 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 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 evaluation report will be prepared either as soon as is practicable if significant find requiring mitigation are uncovered, or within 6 weeks of completion of fieldwork if no archaeological finds are uncovered. 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 Reports 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 Reports shall utilise information collected during

archaeological fieldwork and from any other appropriate sources agreed with the Project Archaeologist.

- 8.7.3 The Fieldwork Reports 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 residuality 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 Adam Single (English Heritage) the GLAAS advisor for the London Borough of Newham, to and the London Borough of Newham for comment.

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

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8.8 OASIS Summary Sheet

8.8.1 The Archaeology Contractor shall complete an OASIS Summary Sheet for the works (i.e. one per fieldwork event) for submission both to OASIS and the Greater London Historic Environment Record (GLHER). The Summary Sheet shall be included in the Fieldwork Report.

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 their 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 LB of Newham, the GLAAS advisor and Robert Whytehead (English Heritage) 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 Main 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 SS-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 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.
- 10.1.3 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.
- 10.1.4 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.
- 10.1.5 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.
- 10.1.6 The Archaeology Contractor's project team shall be staffed by technician grades with minimum six months experience in appropriate aspects of excavation and recording.
- 10.1.7 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).
- 10.1.8 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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ANNEXES

Annex 1 Archaeological Research Agenda

Generic Research Aims

The following generic research objectives, with reference to the Greater London Archaeology Research Framework Agenda (MoLAS 2002) have been identified for Zone D: West India Dock to Dartford Tunnel (appropriate to individual worksites (or groups of worksites) within ES Route window C11)

- Understanding the significance of geomorphology, ecology, ecosystems and climate, hydrology, and vegetational and faunal development, on human lives. (79).
- Understanding London's hydrology and river systems and tributaries and, in particular, understanding the role of the river Thames (as boundary, communication route, resource, ritual focus, barrier, link, etc) in shaping London's history, and the relationships between rivers and floodplains. (79).
- Understanding the relationship between landscape, river and settlement, and the influences of the Thames in particular on communications and social interaction. (79).
- Understanding the origins of the prehistoric metalwork sequence from the Thames, and examining the links between the metalwork hoards deposited at the headwaters of river tributaries and other activities. (79).
- Studying the correlation between sites associated with watercourses and meander bends, so as to understand the origin of settlements. (80).
- Understanding the relationship between the Bronze Age wooden trackways and the settlements to which they presumably led, and what the trackways represent in terms of woodcraft and woodland management. (81).
- Understanding the development of London's Docklands and Waterways. (82).



Annex 2 Site Information

Annex 2.1 Services and Utilities

Please refer to C263 Works Information Chapter 1 Worksite Information

Annex 2.2 Extinguishments of Rights of Way

Please refer to C263 Works Information Chapter 1 Worksite Information

Annex 2.1 Surface Water Control

Please refer to C263 Works Information Chapter 1 Worksite Information

Annex 2.1 Protective Fencing

Please refer to C263 Works Information Chapter 1 Worksite Information

Annex 2.1 Credit Boards

Please refer to C263 Works Information Chapter 1 Worksite Information

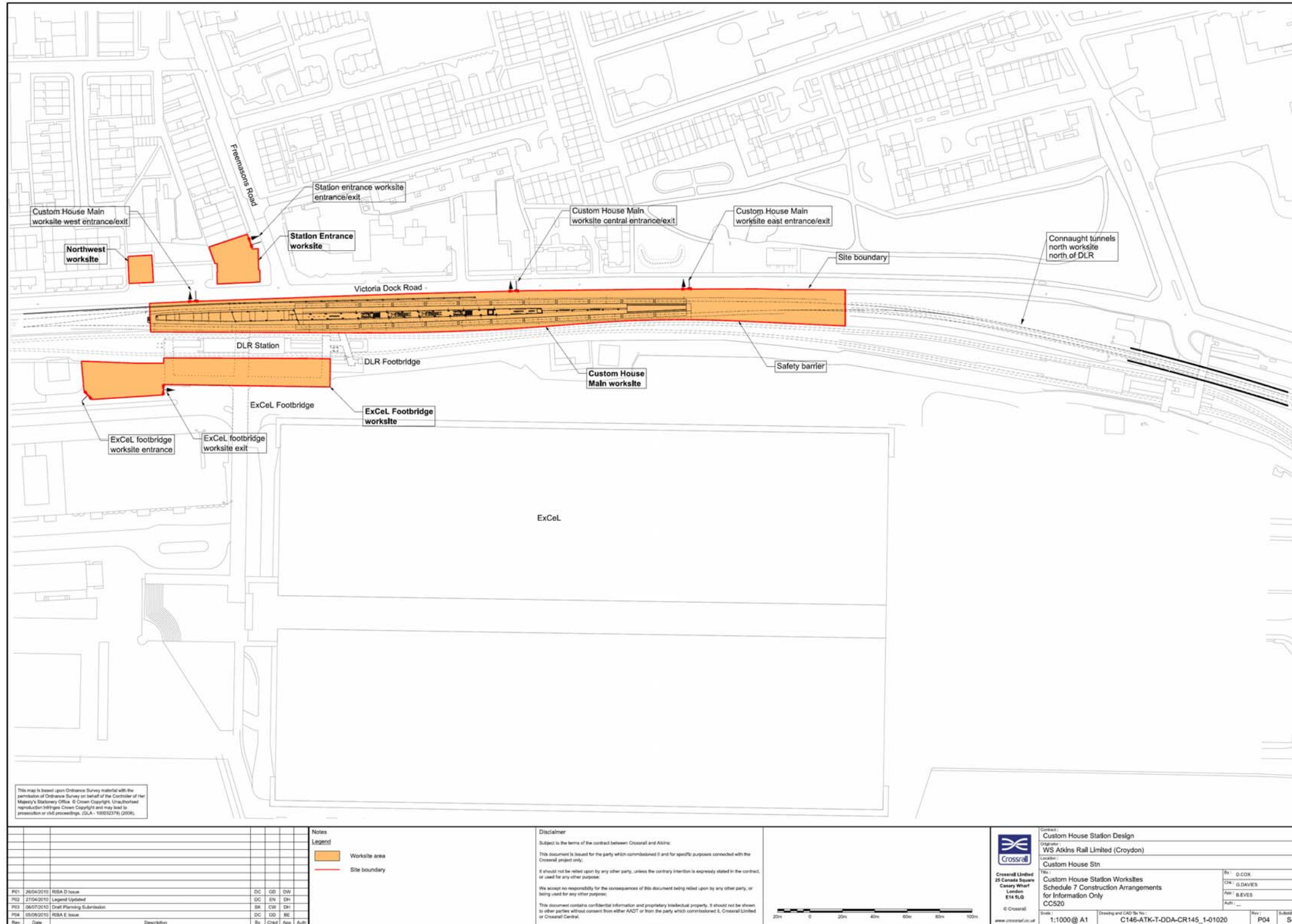
Annex 2.1 Care in Executing the Site Operations

Please refer to C263 Works Information Chapter 1 Worksite Information

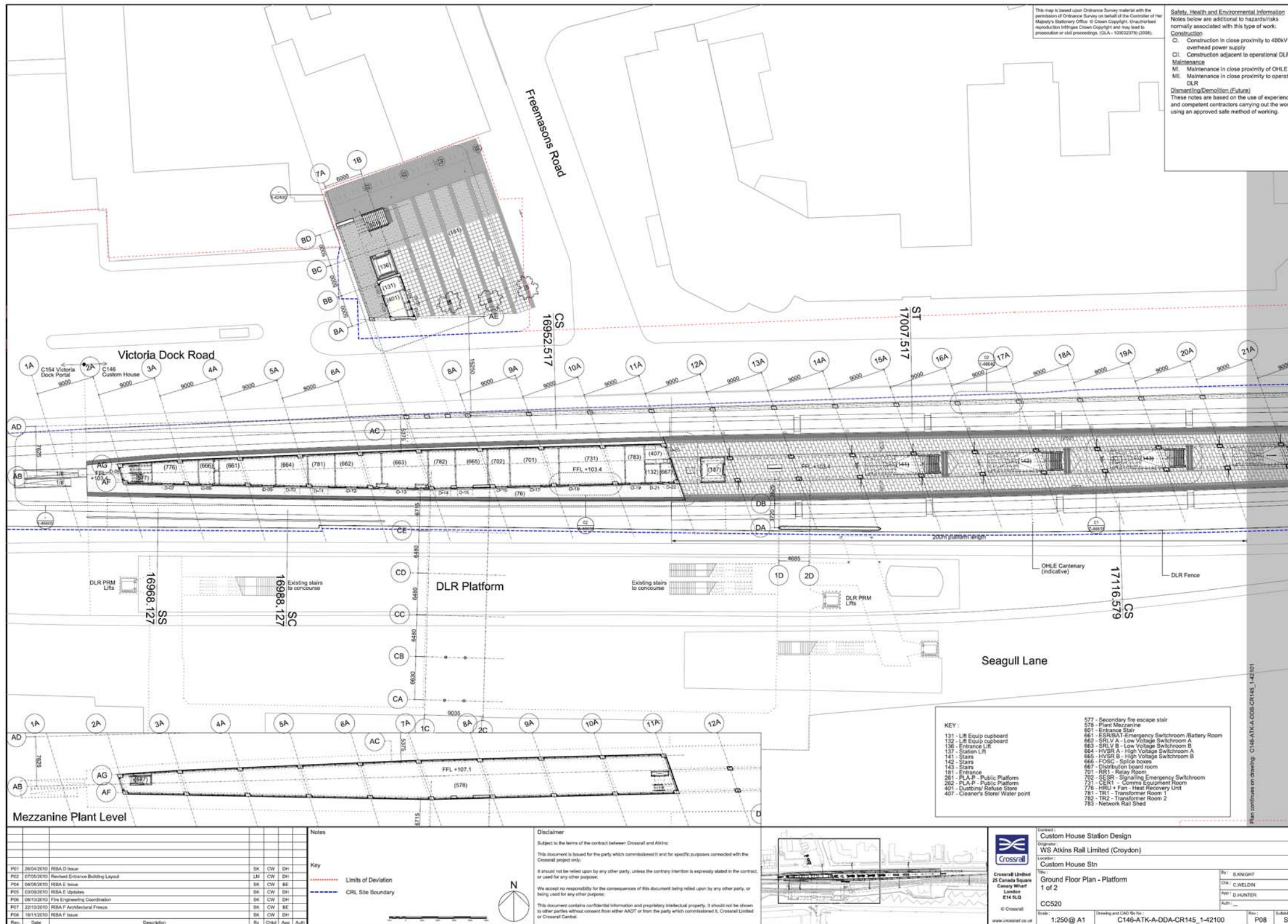
Annex 2.1 Parking of Vehicles

Please refer to C263 Works Information Chapter 1 Worksite Information

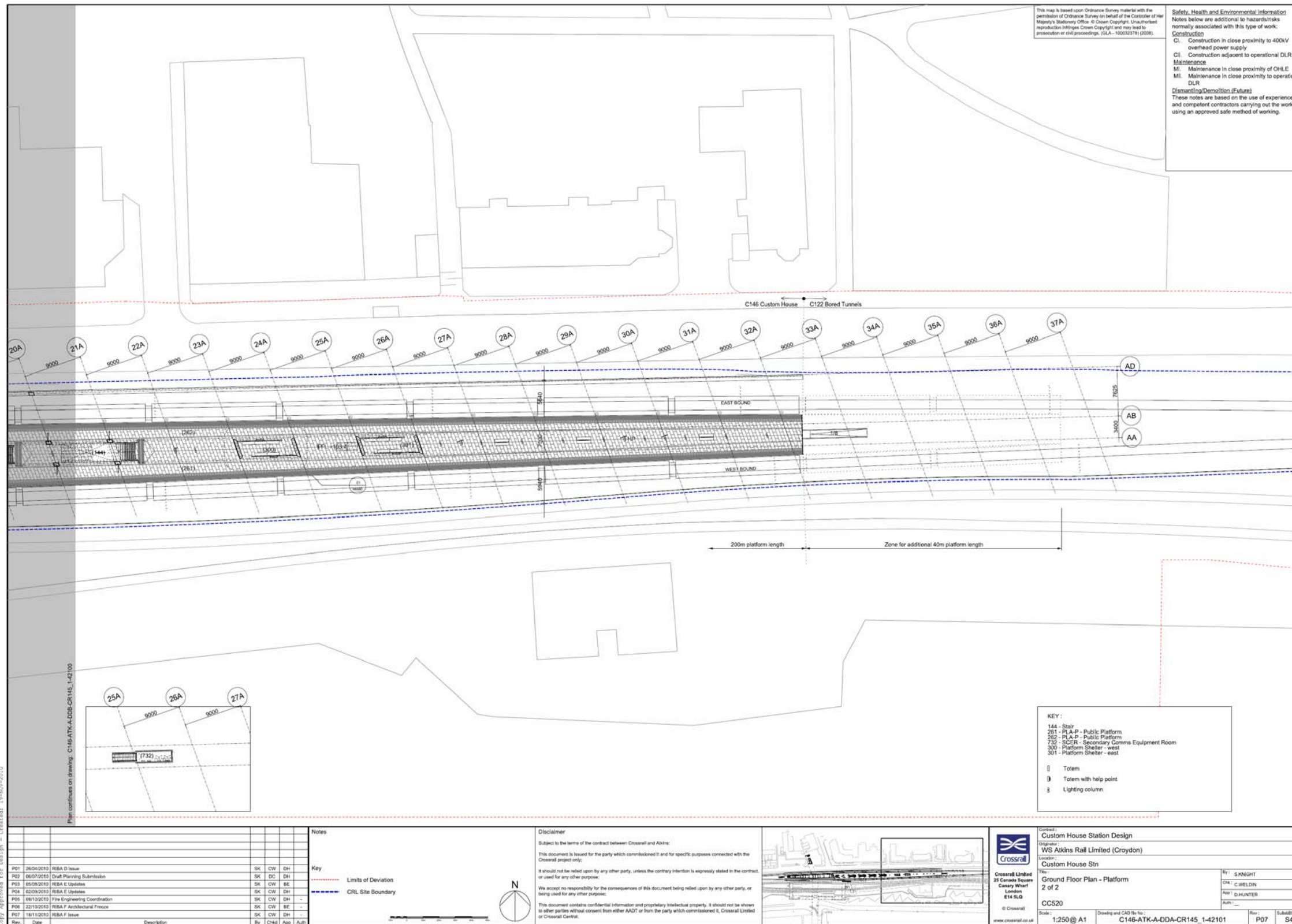
Annex 3 Plans and Other Illustrations



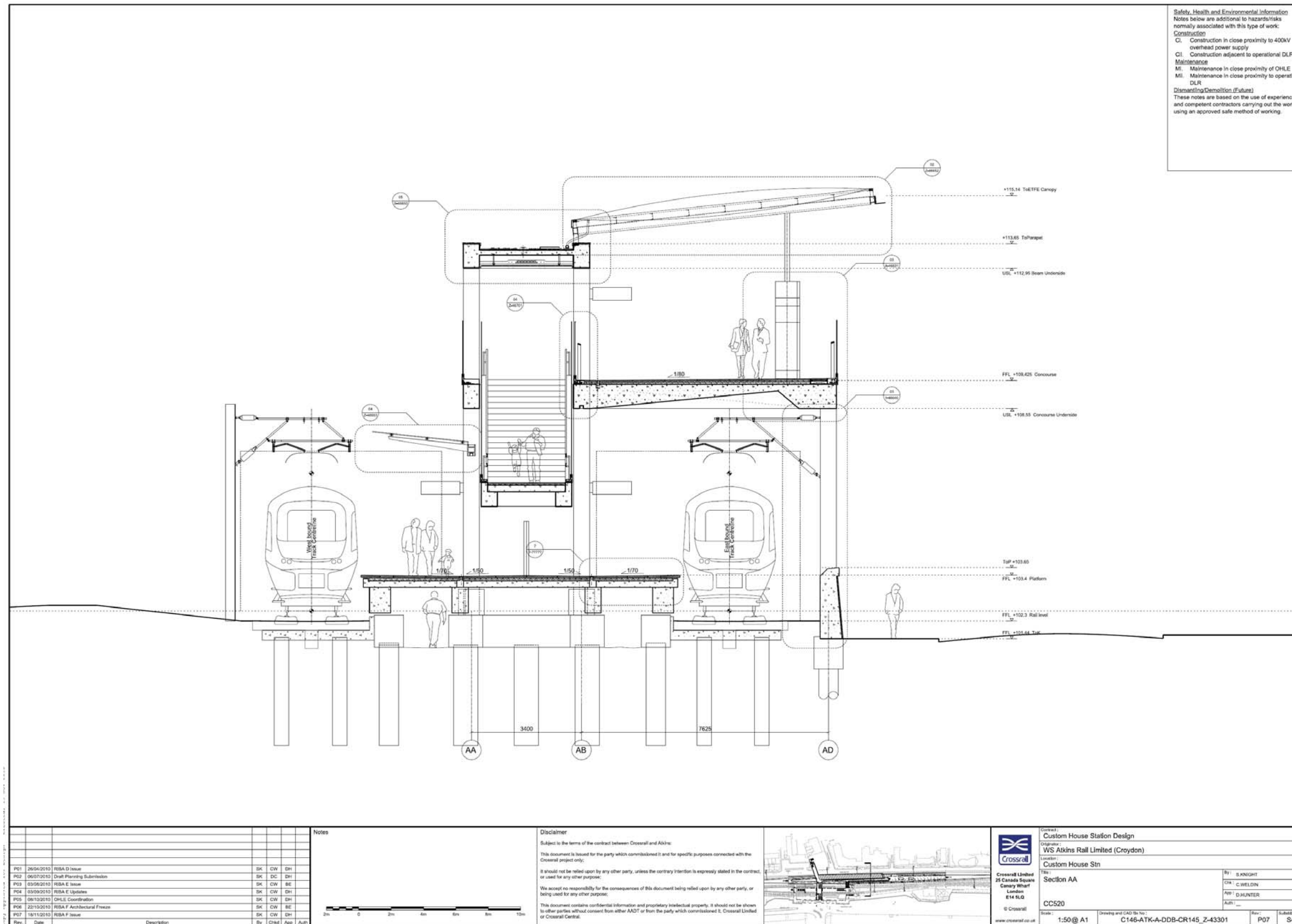
C146-ATK-T-DDA-CR145_1-01020 Custom House Worksite locations



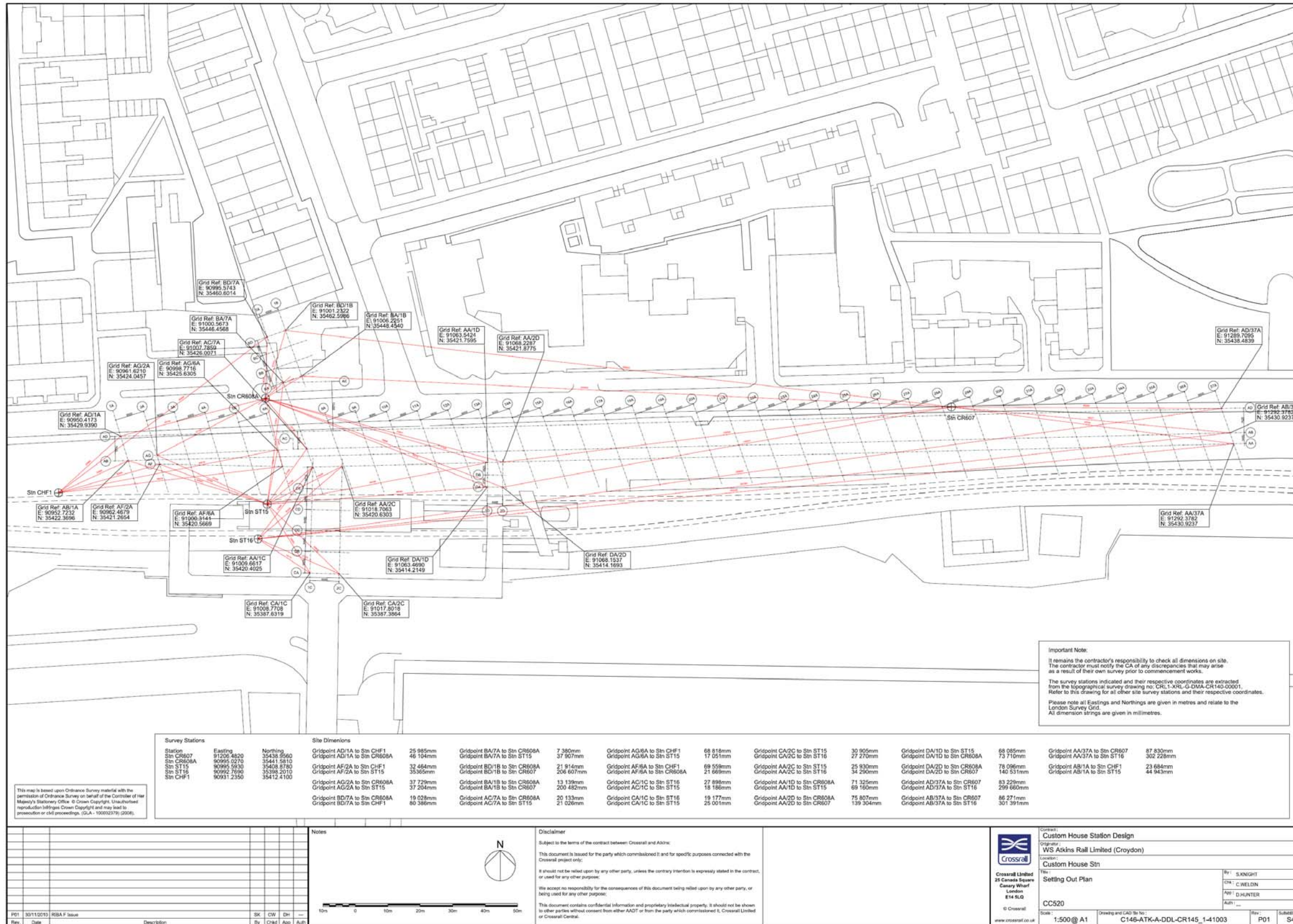
C146-ATK-A-DDA-CR145_1-42100 Proposed Plan (w)



C146-ATK-A-DDA-CR145_1-42101 Proposed Plan (E)



C146-ATK-A-DDB-CR145_Z-43301 Proposed Section



Important Note:
 It remains the contractor's responsibility to check all dimensions on site. The contractor must notify the CA of any discrepancies that may arise as a result of their own survey prior to commencement works.
 The survey stations indicated and their respective coordinates are extracted from the topographical survey drawing no. CRL-1-XRL-G-DMA-CR14G-00001. Refer to this drawing for all other site survey stations and their respective coordinates.
 Please note all Eastings and Northings are given in metres and relate to the London Survey Grid.
 All dimension strings are given in millimetres.

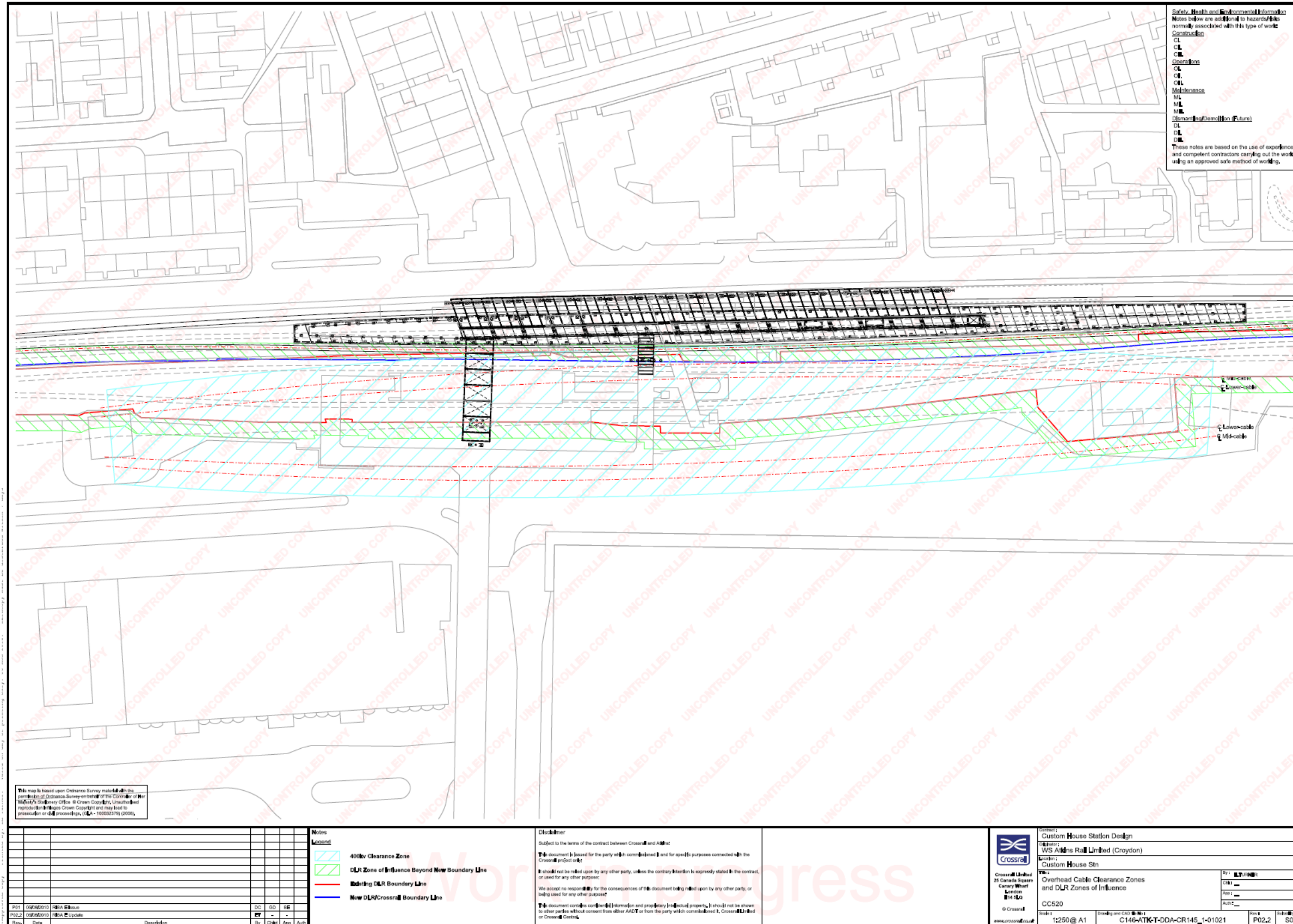
Station	Eastings	Northings	Gridpoint AD1/A to Stn CHF1	Gridpoint BA7/A to Stn CR608A	Gridpoint BA7/A to Stn ST15	Gridpoint AG6/A to Stn CHF1	Gridpoint AG6/A to Stn ST15	Gridpoint CA2/C to Stn ST15	Gridpoint DA1/D to Stn ST15	Gridpoint DA1/D to Stn CR608A	Gridpoint AA3/7A to Stn CR607
Stn CR607	91205.4820	35438.9560	46 104mm	7 380mm	37 907mm	68 816mm	17 051mm	30 905mm	73 710mm	68 085mm	87 830mm
Stn CR608A	90995.0270	35441.5810	32 464mm	21 914mm	206 607mm	69 559mm	21 669mm	34 290mm	78 096mm	140 531mm	302 228mm
Stn ST15	90995.5830	35408.8780	35 365mm	13 139mm	200 482mm	27 898mm	18 186mm	71 325mm	83 229mm	299 666mm	23 684mm
Stn ST16	90992.7690	35398.2010	37 729mm	20 133mm	21 026mm	19 177mm	25 001mm	69 160mm	86 271mm	301 391mm	44 943mm
Stn CHF1	90991.2350	35412.4100	19 028mm	80 386mm				139 304mm			

Notes

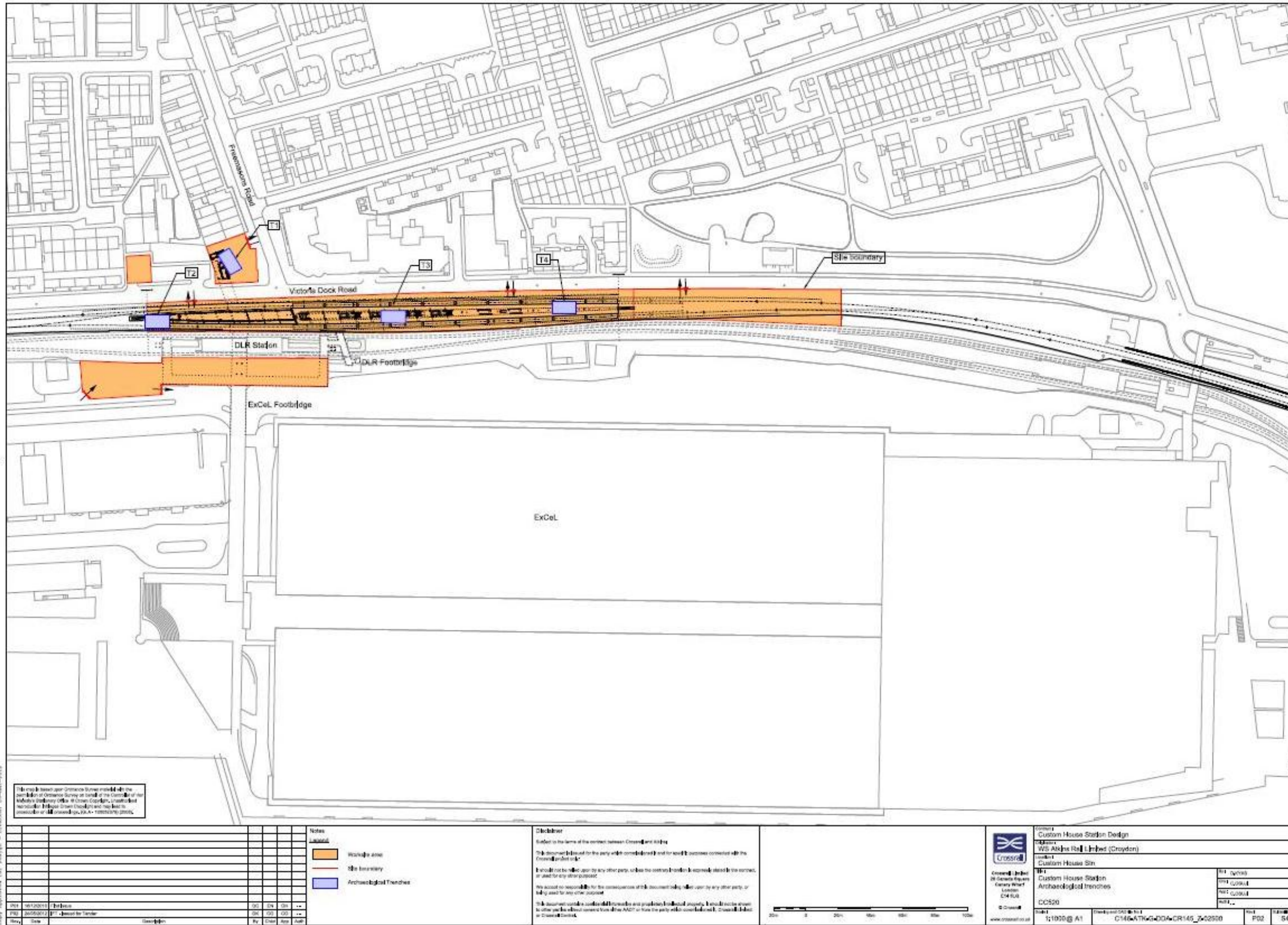
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Project Information
 Custom House Station Design
 Originator: WS Atkins Rail Limited (Croydon)
 Custom House Stn
 Setting Out Plan
 Scale: 1:500 @ A1
 Drawing and CAD File No: C146-ATK-A-DDL-CR145_1-41003
 Rev: P01
 Submittal: S4

C146-ATK-A-DDL-CR145_1-41003 Setting-out plan and survey stations



Drawing C146-ATK-T-DDA_CR145_1-01021 DLR zone of influence, 400Kv clearance zone and DLR boundary line

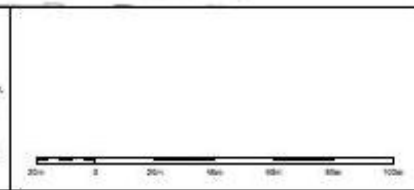


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Rev	Date	Description	By	Check	App'd
001	18/12/2011	For Issue	GD	GD	GD
002	20/05/2012	For Issue for Tender	GD	GD	GD

Notes
Worksite area
Site boundary
Archaeological Trenches

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 Crossrail Limited 20 Canary Wharf London E14 4JG	Project Custom House Station Design Location WS Atkins Rail Limited (Croydon) Station Custom House Stn	Rev 001 002 003 004
	Sheet T1 Custom House Station Archaeological trenches CC520	Rev 001 002 003 004
Scale 1:1000 @ A1	Drawing Code C146-ATK-G-DDA-CR145_Z-02500	Rev F02 54

Indicative Trench Layout for Archaeological Evaluation Trenches (DWG No. C146-ATK-G-DDA-CR145_Z-02500)



Annex 4 Health and Safety requirements:

Annex 4.1 Designers Risk Assessment and CDM requirements

Please refer to Package Work Order C263 Works Information Chapter 3. Key construction risks relating to working constraints are provided in the RIBA F constructability report.

Below is the Designers Risk Control Log Summary

Activity	Health Risk	ERIC	Possible Measure	Control	Responsibility
General Working Site	All following	E	Site Specific Induction, toolbox talks etc.		<i>Main Contractor</i>
		R	Contractors' Method Statements and Risk Assessments to be approved in writing prior to working. All site staff to confirm that they have read and understood MS and RA		<i>Designer Main Contractor Archaeological Contractor</i>
		I	Zoning of site activities to prevent unnecessary overlap of working areas		<i>Designer Main Contractor Archaeological Contractor</i>
		C	Ensure all site staff are competent and aware of risks (e.g. CSCS cards)		<i>Main Contractor Archaeological Contractor</i>
	Contact with plant/machinery, trips, falls,	E	Zoning of site activities to prevent unnecessary overlap of working areas		<i>Designer Main Contractor Archaeological Contractor</i>
		R	Minimum PPE to be worn at all times to include Hi-Visibility clothing, Hard Hats, site safety boots, safety glasses, gloves.		<i>Main Contractor Archaeological Contractor</i>
		I	Zoning of site activities to prevent unnecessary overlap of working areas		<i>Designer Main Contractor Archaeological Contractor</i>



Activity	Health Risk	ERIC	Possible Measure	Control	Responsibility
	Contaminated land/disease etc	C	Minimum PPE to be worn at all times to include Hi-Visibility clothing, Hard Hats, site safety boots, safety glasses, gloves.		<i>Main Contractor Archaeological Contractor</i>
		E	Geotechnical reports indicate risk of contamination due to previous site use as railway. Asbestos to be identified and removed by specialist clearance contractors prior to demolition of Barge Public House		<i>Main Contractor</i>
		R	Geotechnical reports indicate risk of contamination due to previous site use as railway. Appropriate PPE to be provided by <i>Archaeological Contractor</i> as required.		<i>Archaeological Contractor</i>
		I	Any areas of contamination identified during excavation are to be reported and remedial measures put in place prior to further excavation.		<i>Main Contractor Archaeological Contractor</i>
		C	Staff required to wash hands before ingestion of food/drink etc.		<i>Main Contractor Archaeological Contractor</i>
			Welfare for hygiene etc. is to be provided by Main contractor at Archaeologist site office. To include washing facilities		<i>Main Contractor</i>
Deep	Falls from height,	E	n/a		



Activity	Health Risk	ERIC	Possible Measure	Control	Responsibility	
excavation Archaeological contractors will require access to deep excavations	tripping etc. Objects falling from height.	R	Dedicated Egress – ramping with edge guard is preferred option.		<i>Main contractor</i>	
		I	n/a			
		C	Deep excavation signs			
	Burial from spoil or loose material falling into the trench	E	Working direction is to be controlled, with spoil delivered to a defined area or areas within the trench to be removed by machine directly into muck-away vehicles		<i>Designer Main Contractor Archaeological Contractor</i>	
		R	Two routes are specified into trench (specific locations to be determined by <i>Main Contractor</i>)		<i>Designer Main Contractor</i>	
		I	n/a			
		C	No spoil to be placed within 2m of trench edge		<i>Main Contractor Archaeological Contractor</i>	
		E	n/a			
	Plant and Machinery	Proposed Archaeological contractor's working route towards proposed location of plant. Risk of contact with excavating machine arm, crushing etc.	R	Appropriate PPE to be provided		<i>Archaeological Contractor</i>
			I	Ensure dedicated pedestrian routes away from arc of machine working		<i>Main Contractor</i>
C			Employ banksman		<i>Main Contractor</i>	
E			n/a			
Site Traffic	Risk of injury or death from contact with moving vehicles	E	Proposed working and storage area for <i>Archaeological Contractor</i> to be located away from site traffic routes		<i>Designer Main Contractor Archaeological Contractor</i>	
		R	n/a			



Activity	Health Risk	ERIC	Possible Measure	Control	Responsibility
		I	Controlled crossing points and separation of pedestrian/site traffic routes		<i>Main Contractor</i>
		C	n/a		
Use of hand tools	Possible injury resulting from use of hand tools, e.g. mattocks, trowels, spades	E	n/a		
		R	Appropriate training and PPE to be provided		<i>Archaeological Contractor</i>
		I	n/a		
		C	n/a		
Adverse Weather	Changeable ground conditions leading to trips and falls etc.	E	n/a		<i>Archaeological Contractor</i>
		R	Use of Youngmans boards or similar is to be specified for the transportation of spoil where appropriate		<i>Main Contractor</i>
		I	Appropriate finishing to egress ramps (e.g. compacted hardcore/rubble to provide sufficient purchase, edge guard etc.)		<i>Main Contractor</i>
		C	Appropriate PPE to be provided for adverse weather working		<i>Archaeological Contractor</i>
	Adverse weather conditions may require use of electrical equipment powered by generators (e.g. pumps, temporary lighting etc), with accompanying associated risks for electrocution etc.	E	n/a		



Activity	Health Risk	ERIC	Possible Measure	Control	Responsibility
		R	Energy Supply methods and risk assessment to be detailed in Contractor's method statements		<i>Main Contractor</i>
		I	n/a		
		C	Only staff with appropriate training are to operate generators and other electrically operated equipment (for example pumps)		<i>Archaeological Contractor</i>
<p>Buried utilities/services</p> <p>Existing utilities plan indicates main utilities corridors are routed primarily through road surfaces and are not present within area of proposed evaluation.</p> <p>A concentration of basement rooms with utilities are identified at barge Public House. These should be removed by demolition.</p>	<p>Hazardous contact with buried services e.g. electrical shock, gas leakage/explosion, contamination through contact with sewage etc.</p>	E	<p>This area is to be excluded from the archaeological design and identified on plan.</p> <p><i>Main Contractor</i> to confirm that appropriate action has been taken to decommission services prior to archaeological investigation.</p> <p><i>Main Contractor</i> to identify location of utilities/services in Method Statement and on plan.</p>		<p><i>Designer</i></p> <p><i>Main Contractor</i></p>
		R	n/a		
		I	Surface sweep (e.g. CAT scan) to be undertaken prior to excavation by <i>Main Contractor</i> .		<i>Main Contractor</i>
		C	Banksman to be employed to watch for possible buried services/utilities		<i>Main Contractor</i>
			Appropriate PPE measures as outlined above for contamination		<p><i>Main Contractor</i></p> <p><i>Archaeological Contractor</i></p>
<p>A concentration of basement</p>	<p>Contamination through contact with</p>	E	n/a		
		R	n/a		



Activity	Health Risk	ERIC	Possible Measure	Control	Responsibility
rooms Toilet block indicated on existing plans for Barge Public House.	sewage etc.	I	Main Contractor to identify location of utilities/services in Method Statement and on plan.		Main Contractor
		C	Surface sweep (e.g. CAT scan) to be undertaken prior to excavation by Main Contractor.		
			Banksman to be employed to watch for possible buried services/utilities		Main Contractor
			Appropriate PPE measures as outlined above for contamination		Main Contractor Archaeological Contractor
High Voltage Over head Cables	High voltage cables overhang from DLR to south of main site	E	n/a		
		R	n/a		
		I	Main Contractor to identify location of exclusion zones in Method Statement and on plan.		Main Contractor
		C	Risks of high voltage cables are to be made clear to all site workers during induction		Main Contractor
Natural Methane	May be present in areas of peat.	E	n/a		
		R	Avoid creating confined spaces where methane could accumulate		Main Contractor
		I	Ensure gas monitors are provided, and training for use, where appropriate		Main Contractor Archaeological Contractor
		C	Appropriate PPE measures as outlined above for contamination		Main Contractor Archaeological Contractor



Activity	Health Risk	ERIC	Possible Measure	Control	Responsibility
Unexploded ordnances (UXO)	Records show there is a low risk	E	Main Contractor to employ UXO specialist to undertake site survey and probe for UXO		Main Contractor
		R	Briefing by UXO specialist to site staff where appropriate.		Main Contractor
		I	Potential UXO to be reported immediately to site manager and isolated. Any works halted.		Main Contractor
		C	Following identification Authorities to be informed. Procedures for remediation as set out in Main Contractor's method statement to be enacted		Main Contractor



Annex 4.2 Archaeological Contractors Risk Assessments and Health and Safety Plans

Please refer to Package Work Order C263 Works Information Chapter 3

Annex 4.3 Archaeological Contractor's Safety Audits, Safety Inspections, Reporting of Accidents

Please refer to Package Work Order C263 Works Information Chapter 3

Annex 4.4 Personal Protective Equipment (PPE)

Minimum personal PPE will consist of:

- Hi Visibility Vest (in the appropriate colour for the nature for the Worksite);
- Hard Hat;
- Gloves;
- Safety glasses;
- Laced boots with ankle support, steel insoles and toe caps (rigger boots are not permitted on Crossrail Sites);

Additional PPE which may be required for Custom House Worksites:

- Protective disposable contamination suits for work on rail sites or other identified contaminated areas (Annex 4, 4.5)

Annex 4.5 Labelling of Hazardous Substances, Contaminated Land

Please refer to Package Work Order C263 Works Information Chapter 3

Annex 4.6 CRL Health and Safety Management System, CRL Drugs and Alcohol Policy

Please refer to Package Work Order C263 Works Information Chapter 3

Annex 4.7 CRL and work on Network Rail Land

Please refer to Package Work Order C263 Works Information Chapter 3



Annex 5 Environmental protection requirements

Please refer to Package Work Order C 263 Works Information Chapter 4.



Annex 6 Programme and order of work for implementation of works and integration with other activities

Approved programme information will be included here once it has been provided by the C520 Main Contractor.

Annex 7 Enabling and temporary works design requirements, attendances and implementation

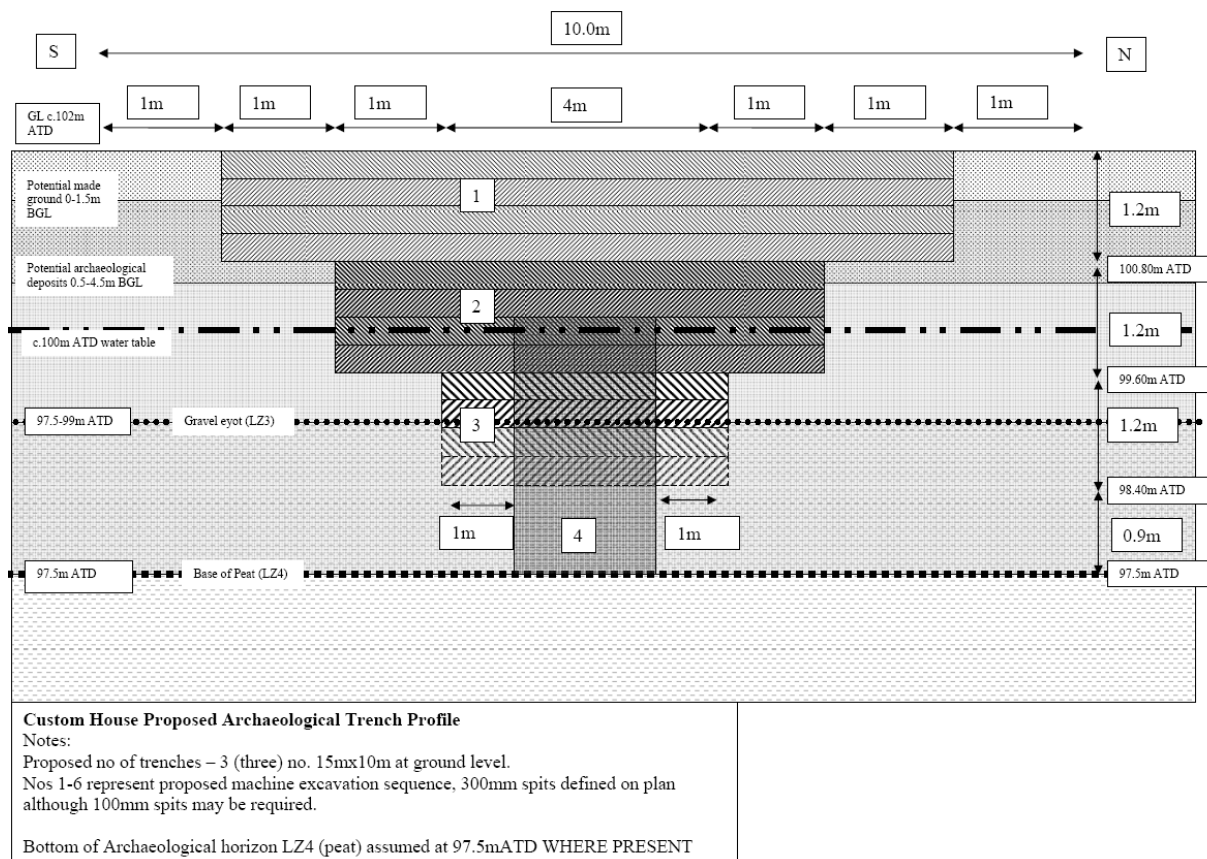
Enabling works and temporary works requirements are outlined in the Constructability report for RIBA F (CRL document reference C146-ATK-C-RGN-CR145-00007). Please refer additionally to Package Work Order C 263 Works Information Chapter 1 and 2.

The C520 *Main Contractor* will be required to establish trial trench design in line with on site Health & Safety requirements and to excavate the trial trenches under supervision of the C263 Archaeological Contractor. A clear operating area will be defined for use by the *Archaeological Contractor*, without adjacent demolition or construction. The *Archaeological Contractor* shall be consulted before the *Main Contractor* undertakes any activity in the area, except those essential activities required to enable the archaeological investigation.

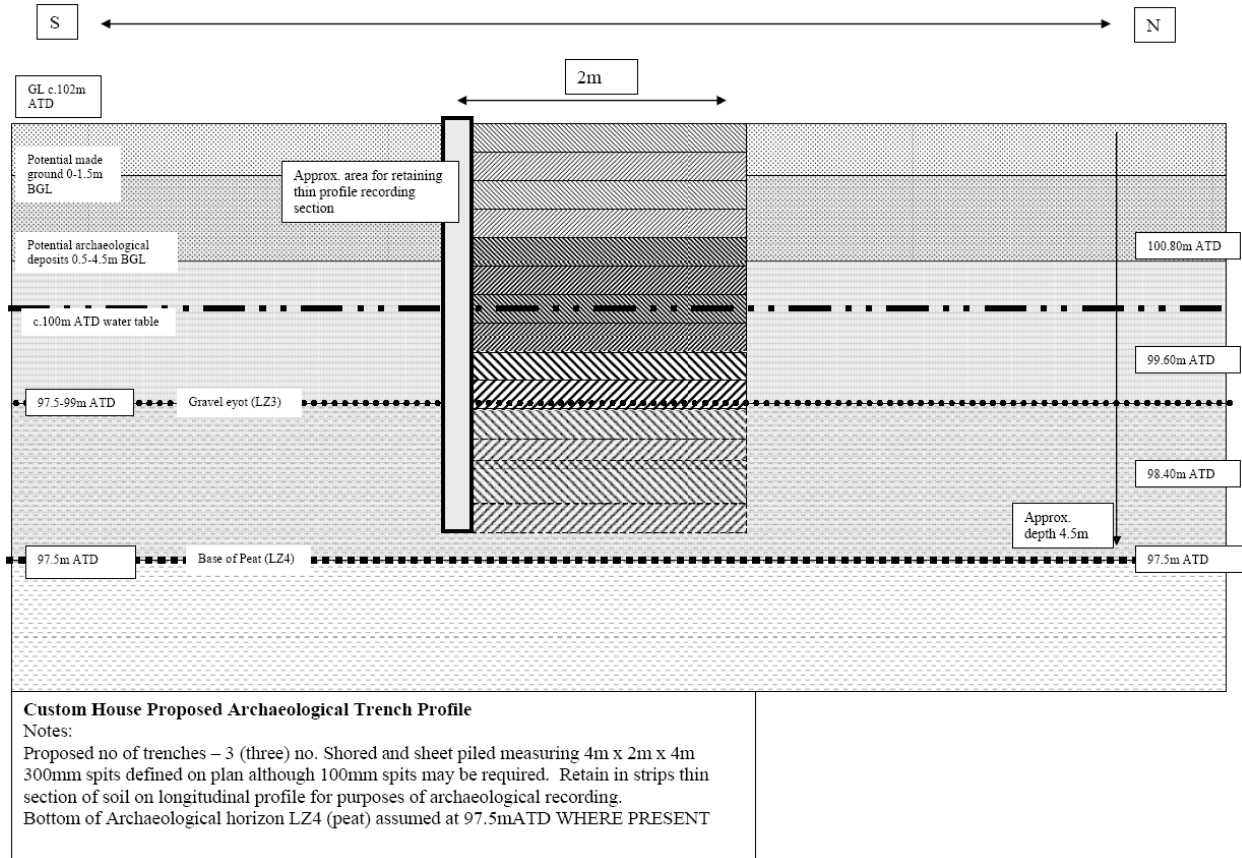
The provision of a sump will be required for the purposes of controlling dewatering.

Modern overburden will be removed by the *Main Contractor* by machine in horizontal spits under archaeological supervision by the *Archaeological Contractor* (C254) to expose any surviving natural geology or archaeological layers. The *Main Contractor* will be required to backfill the site to required Crossrail engineering standards, with appropriate backfill material.

The two proposed excavation methodologies for the archaeological trial trenches are described at Section 5.3 of this SS-WSI. Figures 7 and 8 showing the proposed trench profiles are included here for reference.



Option 1-Proposed excavation method for Archaeological Evaluation trial trenches



Option 2- Proposed excavation method for Archaeological Evaluation trial trenches



Annex 8 Security requirements

Please refer to Package Work Order C 263 Works Information Chapter 3



Annex 9 Need for screening or other protective works

Please refer to Package Work Order C 263 Works Information Chapter 4



Annex 10 Procedure for notification of the Discovery of Human Remains

Please refer to Chapter 7.3 in this document.



Annex 11 Procedure for notification of the Discovery material falling under the Treasure Act 1996

Please refer to Chapter 7.4 in this document



Annex12 Procedure for notification of major unexpected discoveries

Please refer to Chapter 7.2 in this document