

DESIGN PACKAGE C122 BORED TUNNELS

ADDENDUM TO WSI: CUSTOM HOUSE STATION ARCHAEOLOGICAL TRENCHES 2 – 4 (C315 EARLY WORKS)

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1 Introduction

This document provides details of the archaeological works required to mitigate impacts of surface rail construction activities on potential buried archaeological resources at Custom House Station. It sets out the location and recording activities required for three archaeological evaluation trenches, numbered Tr2, Tr3 and Tr4 (see Figure 1).

This document has been prepared as a specification for C315 who have been contracted to excavate 3 of the 4 archaeological trenches ahead of main construction. The remaining archaeological trench (Tr1) and non-listed built heritage (NLBH) works detailed in the Written Scheme of Investigation for Custom House Station (C146-ATK-T1-RGN-CR145-00003) still form part of the requirements for C520 main construction works. The three trenches discussed in this document are located along the main tunnel route adjacent to DLR Custom House station. In order to reduce programme and delay risk associated with main construction works these trenches have been brought forward from the main C520 programme.

This document is an addendum to the Written Scheme of Investigation for Custom House Station (C146-ATK-T1-RGN-CR145-00003) and should be read in conjunction with that document. The core change to this WSI has been to reduce the number of total trenches from 5No. to 4No.

This document outlines the requirements of the *Main Contractor* (Section 3) and the requirements of the *Archaeological Contractor* (Section 4) specific to taking forward the early works of excavating these 3 trenches separate to the main works.

2 Scope of Works

2.1 Aims of the Watching Brief

The overall aim of the archaeological works is to document the nature of the potential buried archaeology and to record and sample the buried geoarchaeological environment. Further details can be found within the Custom House WSI.

Figure 1 below shows the location of the three trenches (trenches 2-4) to be excavated by C315 in addition to the C520 trench (trench 1) located along the alignment.

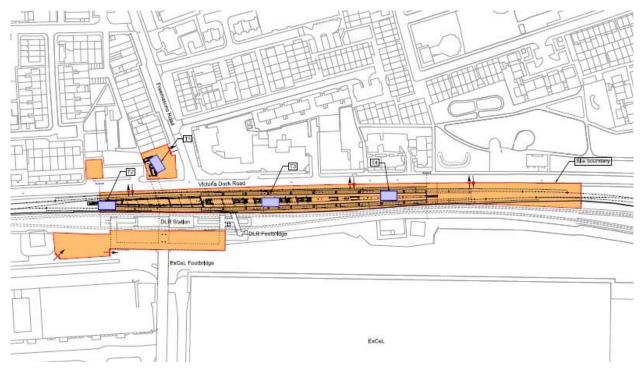


Figure 1. Site Plan

2.2 Site Specific Aims

The following site-specific research aims can be found in the WSI. They include:

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?

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3 Specific Requirements for the Main Contractor (C315)

3.1 Archaeological Trench Evaluation

- **3.1.1** Three trenches located along the surface rail alignment have been brought forward from the main C520 programme in order to reduce risk and delays to that programme. The NLBH and Trench 1 works will still be carried out as part of the main C520 programme.
- 3.1.2 The *Main Contractor* shall excavate three No. trial trenches on behalf of Archaeological Contractor C263 (see Figure 2). These shall be excavated at between 100mm and 300mm spits. The trenches to be excavated are numbered Tr.2 through to Tr.4 on Figure 1.
- 3.1.3 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 2). If Option 1 is not suitable due to space restriction, Option 2 is an alternative suitable method (see figure 3). 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.
- 3.1.4 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.
- 3.1.5 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.
- **3.1.6** 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.

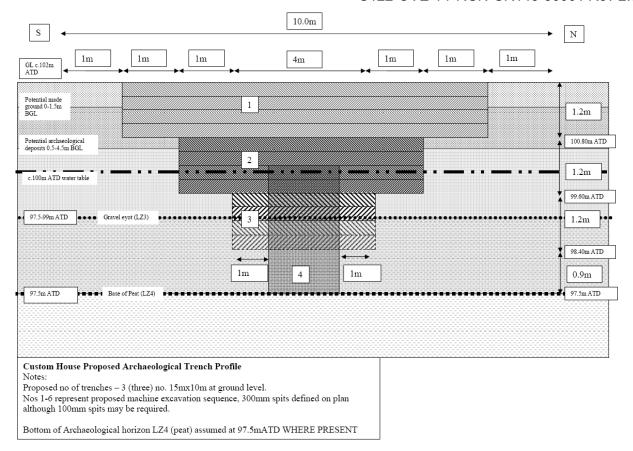


Figure 2: Option 1-Proposed excavation method for Archaeological Evaluation trial trenches



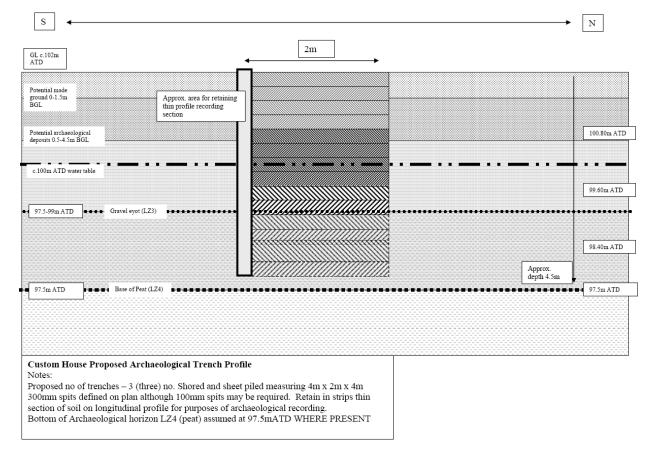


Figure 3: Option 2- Proposed excavation method for Archaeological Evaluation trial trenches

3.1.7 Trench Evaluation Procedure

3.1.8 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*;

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• Provide further technical advice to the *Archaeological Contractor* as maybe required to safely complete the works.

3.2 Site Accommodation and Facilities

The *Main Contractor* shall 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; and,
- Secure storage facilities for tools, finds etc.

3.3 Healthy by Design

Additional considerations for provision of a safe working environment are given in Appendix B – 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)

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4 Instructions to C263 *Archaeological Contractor* and Specification

4.1 Archaeological Trench Evaluation

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.

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.

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.

4.2 Deliverables

The required deliverables, including *Archaeological Contractor's* Method Statement, Site Monitoring and Progress Reports, Site Archives, Interim Statement, Survey Report, Fieldwork Report, SMR Report, Summary Report and Post-Excavation Assessment are set out in Sections 8 and 9 of the Written Scheme of Investigation for Custom House Station (C146-ATK-T1-RGN-CR145-00003) and in the C263 contract requirements.



5 Programme

A start date for archaeological trench evaluation is likely to the 4th QTR 2012.

The timetable involved in the archaeological trench evaluation is set out as:

- · Main Contractor take possession of site;
- Trench excavation of Trenches 2 to 4 under Archaeological supervision, 2 3 weeks;
- Post excavation activities: This will involve interim reporting after seven days and postexcavation reporting and analysis as required.



6 References

2011 Design Package C146 Custom House Station Site Specific Archaeological Written Scheme of Investigation, document reference number: C146-ATK-T1-RGN-CR145-00003

Healthy By Design: A guide for Crossrail Design Teams, document reference number: CR-XRL-Z7-XCS-CR001-0001



Appendix A – Archaeological Mapping Information

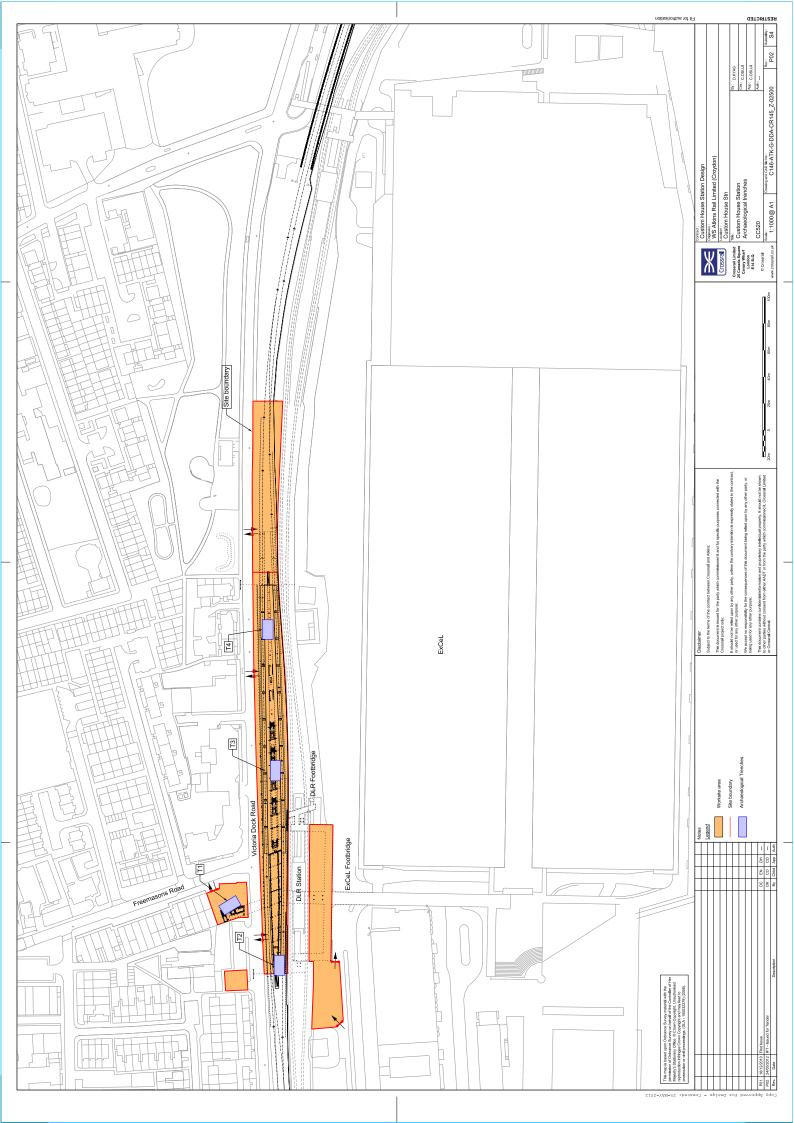
Drawing Site plan C146-ATK-G-DDA-CR145_Z-02500

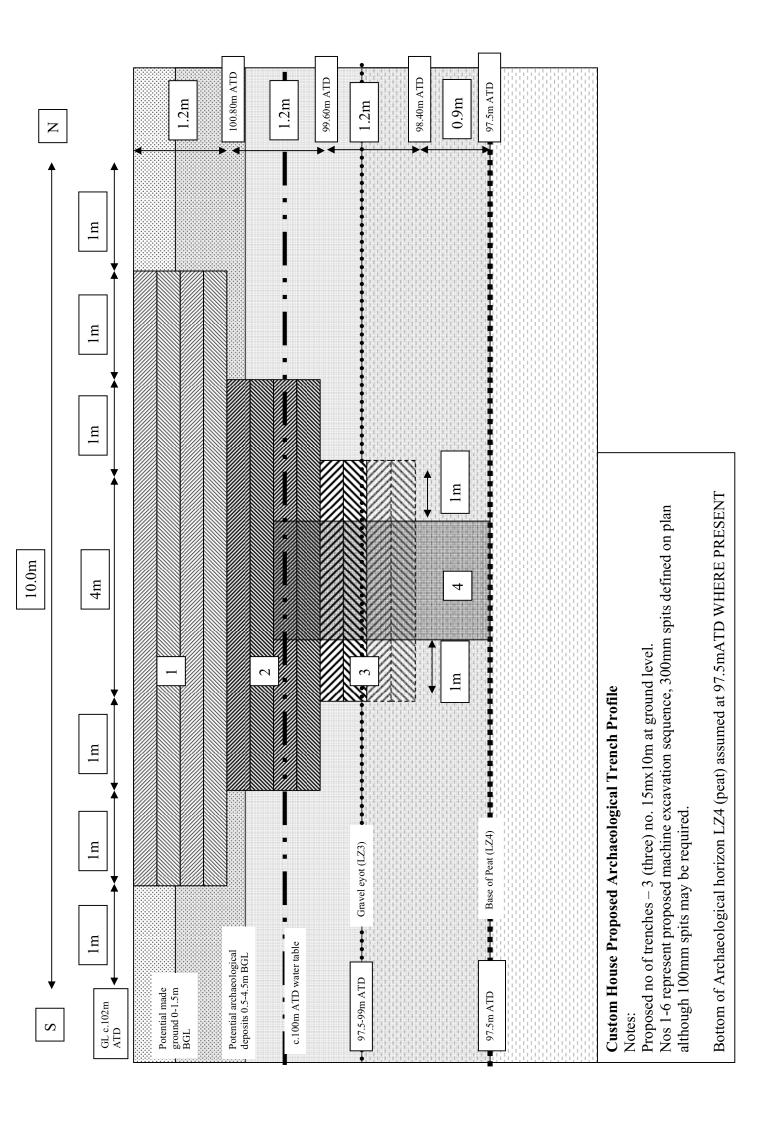
Trench profile

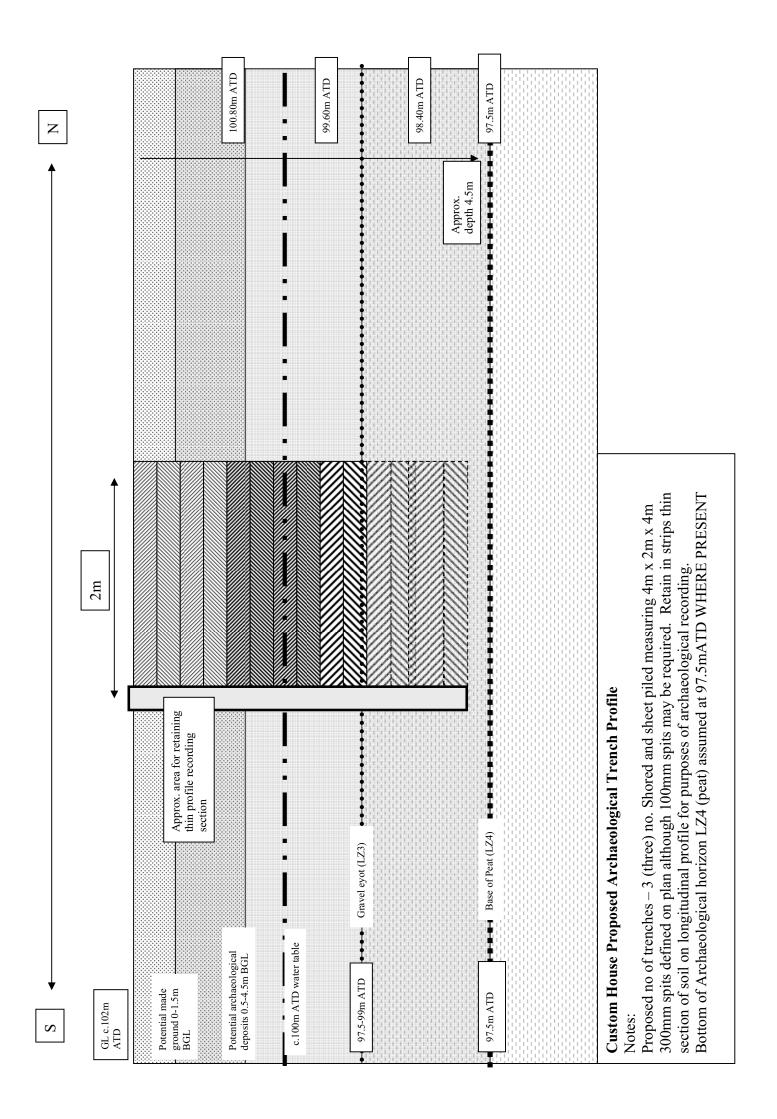
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Appendix B – Designer's Risk Control Log Summary

Significant residual risks have been identified through *Designer's* risk assessment (Eliminate Reduce Isolate Control).

Activity	Health Risk	ERIC	Possible Control Measure	Responsibility
General Site Working	All following	Е	Site Specific Induction, toolbox talks etc.	Main Contractor
	Contact with plant/machinery, trips, falls,	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	Designer Main Contractor Archaeological Contractor
		I	I	Zoning of site activities to prevent unnecessary overlap of working areas
		С	Ensure all site staff are competent and aware of risks (e.g. CSCS cards)	Main Contractor Archaeological Contractor
		E	Zoning of site activities to prevent unnecessary overlap of working areas	Designer Main Contractor Archaeological Contractor
		R	Minimum PPE to be worn at all times to include Hi- Visibility clothing, Hard Hats, site safety boots, safety glasses, gloves.	Main Contractor Archaeological Contractor
		I	Zoning of site activities to prevent unnecessary overlap of working areas	Designer Main Contractor Archaeological Contractor
		С	Minimum PPE to be worn at all times to include Hi- Visibility clothing, Hard Hats, site safety boots, safety glasses, gloves.	Main Contractor Archaeological Contractor



Activity	Health Risk	ERIC	Possible Control Measure	Responsibility
	Contaminated land/disease etc	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	Main Contractor
		R	Geotechnical reports indicate risk of contamination due to previous site use as railway. Appropriate PPE to be provided by Archaeological Contractor as required.	Archaeological Contractor
		I	Any areas of contamination identified during excavation are to be reported and remedial measures put in place prior to further excavation.	Main Contractor Archaeological Contractor
		С	Staff required to wash hands before ingestion of food/drink etc.	Main Contractor Archaeological Contractor
			Welfare for hygiene etc. is to be provided by Main contractor at Archaeologist site office.To include washing facilities	Main Contractor
Deep	Falls from height,	Е	n/a	
excavation Archaeological contractors will	tripping etc. Objects falling from height.	R	Dedicated Egress – ramping with edge guard is preferred option.	Main contractor
require access to deep excavations			Edge Guards/Heras fencing to be specified to provide barrier to deep excavation and prevent falls from objects into trench.	
		I	n/a	
	1	I	<u> </u>	L



Activity	Health Risk	ERIC	Possible Control Measure	Responsibility
		С	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	Designer Main Contractor Archaeological Contractor
		R	Two routes are specified into trench (specific locations to be determined by <i>Main Contractor</i>)	Designer Main Contractor
		I	n/a	
		С	No spoil to be placed	Main Contractor
			within 2m of trench edge	Archaeological Contractor
Plant and	Proposed Archaeological contractor's working route towards proposed location of plant. Risk of contact with excavating machine arm, crushing etc.	Е	n/a	
Machinery		R	Appropriate PPE to be provided	Archaeological Contractor
		I	Ensure dedicated pedestrian routes away from arc of machine working	Main Contractor
		С	Employ banksman	Main Contractor
Site Traffic	Risk of injury or death from contact with moving vehicles	E	Proposed working and storage area for Archaeological Contractor to be located away from site traffic routes	Designer Main Contractor Archaeological Contractor
		R	n/a	
		I	Controlled crossing points and separation of pedestrian/site traffic routes	Main Contractor
		С	n/a	
Use of hand tools	Possible injury resulting from use of hand tools, e.g. mattocks, trowels, spades	E	n/a	

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Activity	Health Risk	ERIC	Possible Control Measure	Responsibility
		R	Appropriate training and PPE to be provided	Archaeological Contractor
		I	n/a	
		С	n/a	
Adverse Weather	Changeable ground conditions leading to	Е	n/a	Archaeological Contractor
	trips and falls etc.	R	Use of Youngmans boards or similar is to be specified for the transportation of spoil where appropriate	Main Contractor
		I	Appropriate finishing to egress ramps (e.g. compacted hardcore/rubble to provide sufficient purchase, edge guard etc.)	Main Contractor
		С	Appropriate PPE to be provided for adverse weather working	Archaeological Contractor
	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	
		R	Energy Supply methods and risk assessment to be detailed in Contractor's method statements	Main Contractor
		I	n/a	



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

Activity	Health Risk	ERIC	Possible Control Measure	Responsibility
		С	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	High voltage cables	E	n/a	
Over head Cables	overhang from DLR to south of main site	R	n/a	
Cubico	to south of main site	I	Main Contractor to identify location of exclusion zones in Method Statement and on plan.	Main Contractor
		С	Risks of high voltage cables are to be made clear to all site workers during induction	Main Contractor
Natural Methane	May be present in	Е	n/a	
	areas of peat.	R	Avoid creating confined spaces where methane could accumulate	Main Contractor
		I	Ensure gas monitors are	Main Contractor
			provided, and training for use, where appropriate	Archaeological Contractor
		С	Appropriate PPE measures as outlined above for contamination	Main Contractor
			above for contamination	Archaeological Contractor
Unexploded ordinances (UXO)	Records show there is a low to moderate 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



Activity	Health Risk	ERIC	Possible Control Measure	Responsibility
		I	Potential UXO to be reported immediately to site manager and isolated. Any works halted.	Main Contractor
		С	Following identification Authorities to be informed. Procedures for remediation as set out in Main Contractor's method statement to be enacted	Main Contractor