



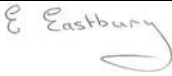


# C261 ARCHAEOLOGY EARLY EAST

## Method Statement Archaeological Evaluation at Instone Wharf Limmo Peninsula (XRW10)

**Document Number: C261-MLA-X-RGN-CR140-50092**

### Document History:

Revision:	Date:	Prepared by:	Checked by:	Approved by:	Reason for Issue:
1.0	15.03.12	Craig Halsey	Ian Grainger	Elaine Eastbury	For PC Review
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2a. Stakeholder (Principal Contractor) review required? YES  NO

(If NO, strike out sections 2a & 2b and go to section 3)


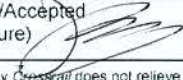
This document has been reviewed by B. GUILLAUME in the capacity of Environment Manager for coordination, compliance, integration, and acceptance as a safe system of work, output, control, sequence. This document is acceptable for transmittal to Crossrail for no objection to the works being executed as described.

Sign: Bruno Guillaume Name: B. GUILLAUME Date: 9/5/2012

2b. Review by Stakeholder (if required):

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

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## Note for Readers

Various readers of this method statement and risk assessment are likely to be directly interested in different parts of the document. The following table is intended to help readers identify which sections cover their main interests.

<b>Reader's main interest</b>	<b>Most relevant sections</b>
Principal Contractor	2.1, 2.3 3.1 4 5 15 16 17 21 22
<b>Health, Safety, &amp; Environment</b>	15 17 21 22
<b>Contractual</b>	1.1 2 4 7 8 10 14 18 19 20
<b>Archaeological methodology</b>	1 3 5 6 9 10 11 12 13

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## 1 Introduction

Following a phase of archaeological evaluation and watching brief carried out between August and December 2010, and work currently underway to mitigate the impact of the Crossrail Limmo Peninsula shafts (Access and Auxiliary), additional archaeological evaluation is required for proposed work at Instone Wharf. These are to be carried out on this site by C261 Museum of London Archaeology (MOLA). The requirements are set out in an Addendum to the Limmo Peninsula Crossrail Site-specific Written Scheme of Investigation (Addendum SS-WSI – Crossrail, February 2012, Document No C123-XRL-T1-TPL-RGN-CR144\_SH011\_500001 Revision 1.0), which is read in conjunction with the original WSI (SS-WSI – Crossrail, April 2011, Document No C123 JUL-T1-TPL-CR144\_SH011\_Z-00001 Revision 9.1)

The task which this method statement covers is:

Task	Principal Contractor	Provisional Programme (see also section 4.6)
<ul style="list-style-type: none"> <li>• <del>Auxiliary Shafts at Limmo Peninsula (Mitigation) and Sewerage Treatment Tanks – General Watching Brief</del></li> </ul>	C305 Dragados Sisk jv (DSJV)	Completed
<ul style="list-style-type: none"> <li>• <del>Non-listed Built Heritage – walkover</del></li> </ul>	As above	Completed
<ul style="list-style-type: none"> <li>• Conveyor Link Limmo to Instone Wharf limited excavations – General Watching Brief</li> </ul>	As above	TBC
<ul style="list-style-type: none"> <li>• Instone Wharf Two Archaeological trial Trenches within the footprint of the muck pit – Archaeological Evaluation</li> </ul>	As above	TBC

Table 1 Task information

This Method Statement has been developed in conjunction with the Principal Contractor, who will be responsible for ensuring that the archaeological works are carried out as specified. It has been prepared incorporating information from the *C305 DSJV Method Statement, Archaeological Trial Trench Evaluation at Instone Wharf, Doc No. C305-DSJ-C4-GMS-CRG03-59007*.

The purpose is to identify the extent and survival of archaeological remains and to mitigate the impact of the construction works. This will be achieved through a programme of archaeological evaluation by trial trenching. If the project design or scope/method of working is subject to changes during the works, the method statement will be updated and re-issued to the Project Archaeologist and CDM Advisor for approval, in accordance with the specified document control procedures (see 8).

## **1.1 Site Description**

The Limmo Peninsula shaft site lies east of the lower part of the River Lea, and west of Victoria Dock Road/Silvertown Way/Dock Road, National Grid Reference 539480 180980. It consists of two main areas, a storage/treatment compound for excavated material from tunnelling from the Limmo Peninsula shaft, and a conveyor for excavated material leading south to a barge loading facility at Instone Wharf at the mouth of the Lea. It is the conveyor and wharf area that are the concerns of this Method Statement.

## **1.2 Geological and Topographical setting**

The geological and topographical setting was covered in detail in the WSI (Crossrail 2011, See 3.2) and is summarised below.

The site lies at the mouth of the River Lea, as it joins the Thames, within the alluvial floodplain of the River Lea and within the wider alluvial floodplain of the River Thames. Recent migration of river meanders may have removed earlier Holocene deposits.

## **1.3 Archaeological, Geoarchaeological, and Historic Background**

Package 19A boreholes CH80 adjacent to the TBM spoil storage pit and CH81 and CH82 on the spoil barge loading wharf identified a sequence of made ground deposits to a depth of between 99.90m ATD (5.50m below existing ground level) and 98.72m ATD (6.50m below existing ground level) overlying natural early historic and Holocene alluvium. This suggests that the area of Instone Wharf was either raised to form part of the Lea/Thames river defences or reclaimed and raised for the construction of Thames Ironworks.

The earliest alluvial deposits identified within the Limmo Peninsula have been identified as possible Allerød deposits of late Upper Palaeolithic date at a depth of c. 94.63m ATD. The deposits overlay the natural Pleistocene gravels and were sealed by Holocene deposits in the form of fine to medium sands with granular flint and gravel. Historic alluvial layers were identified at between 97.8m to 102.35 ATD although no archaeological remains dating from the prehistoric to medieval period have been identified to date. It is likely that the area of the Limmo Peninsula worksite remained marshland during these periods (Crossrail 2011a).

Recent discovery of a fragment of 13th- to 15th-century clinker-built boat upstream at the Limmo Peninsula, at 96.35m ATD, indicate the potential for finds of all periods within the recent alluvium. The main 19th-century brick remains observed in the Auxillary Shaft watching brief were between 103 and 104m ATD and they were set on grouped wooden piles up to 5m deep.



## **2 Interfaces and Communication Plan**

### **2.1 Interface with Project Archaeologist**

The Method Statement will be submitted to the Crossrail Project Archaeologist and Crossrail Safety/CDM Advisor for approval. Any comments will be incorporated. Regular progress reports will be submitted to the Project Archaeologist and will be augmented by progress meetings and site visits when required, in order to optimise communications and feedback.

### **2.2 Interface with C263 Contract Administrator**

MOLA shall submit costings and timesheet reports in accordance with the C263 Contract to the Contract Administrator.

### **2.3 Interface with Principal Contractor**

MOLA has liaised with the Principal Contractors (C305–DSJV) to prepare this Method Statement. MOLA has also received a copy of the principal contractors Method Statement (*Archaeological Trial Trench Evaluation at Instone Wharf, Doc No. C305–DSJ–C4–GMS–CRG03–59007*). The archaeological investigations take place during main works and will be undertaken under the auspices and supervision of the Principal Contractor. This interface extends to joint Health and Safety planning under CDM requirements. MOLA will provide the Principal Contractor with all necessary information to support site start-up (eg names of staff for inductions), health and safety planning; and (if required) to support the Principal Contractor's Permits to Dig. The majority of this information will be contained in this Method Statement. MOLA will liaise with the Principal Contractors regarding access, order of works, programme and commencement date. The Principal Contractor shall give MOLA 4 weeks notice of the start date.

### **2.4 Interface with the Project Design Team**

MOLA shall liaise with the Project Design design archaeologist, to implement the correct archaeological design specification, described in the SS-WSI (Section 1 above).

### **2.5 Interface with External Consultees**

The project archaeologist shall liaise with GLAAS/English Heritage to inform them of the archaeological works.

### 3 Scope of Works

#### 3.1 Planned Fieldwork Events

This Method Statement sets out the methodology and health and safety requirements for archaeological mitigation work to be carried out in advance of construction of the conveyor and muck pit at Instone Wharf.

The mitigation strategy for the site is *preservation by record*, and further work will be informed by the results of the evaluation.

#### 3.2 Confirmation of Methods and Standards

The archaeological fieldwork and reporting will be conducted in accordance with the following guidance and standards:

- Crossrail Environmental Minimum Requirements (Crossrail 2008)
- Crossrail Archaeology Generic Written Scheme of Investigation (draft July 2009)
- Crossrail, June 2009, Archaeology Specification for Evaluation & Mitigation (including Watching Brief) (Document Number: CR-PN-LWS-EN-SP-00001)
- Crossrail C123 Intermediate Shafts, Addendum to SSWSI: Trial trench evaluation and detailed excavation – Limmo Peninsula Shaft C123-JUL-T1-RGN-CR144\_SH011\_Z-0002 Revision 3.0 (2010)
- Crossrail C123 Intermediate Shafts, Addendum to: Limmo Peninsula Shaft Site-Specific Written Scheme of Investigation C123-JUL-T1-TPL-CR0144\_SH0011\_Z-00001 Revision 9.1 (2012)
- English Heritage, July 2009, Standards for Archaeological Work, London Region, External Consultation Draft
- English Heritage Centre for Archaeology Guidelines, Environmental archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation (2002)
- English Heritage, 2004, Geoarchaeology: using earth sciences to understand the archaeological record
- Institute for Archaeologists (IFA) Standards and guidance for watching briefs and field evaluation (IFA 2001a and 2001b)
- Museum of London Archaeological Site Manual (1994)
- Museum of London General Standards for the preparation of archaeological archives deposited with the Museum of London (1998)
- United Kingdom Institute for Conservation's Conservation Guidelines No. 2

### **3.3 Aims and Objectives**

The overall objectives of the investigation are to establish the nature, extent and state of preservation of any surviving archaeological remains that will be impacted upon by the development.

#### **3.3.1 Site Specific Research Aims**

The following site specific research aims were specified in the WSI Addendum (Crossrail 2012, Par 2.1.2, p5):

- Expose, investigate and record structural elements of the Thames Ironworks Ship Building and Engineering Company that occupied the site between 1846 and 1912 AD. Surviving structural remains relating to the Thames Ironworks have been positively identified within the Limmo Peninsula Shaft worksite by previous archaeological evaluation and recording work at between 102.50-103.50m ATD (Crossrail, 2011a; Document No. C261-MLA-X-RGN-CR140-50034, see also latest information from the Auxillary Shaft WB above)
- Investigate, retrieve soil samples and record the Thames floodplain alluvial sequence on the site.

#### **3.3.2 Relevant Regional Research Aims**

In addition to the site specific research aims, the site has potential to address several regional research aims identified in the regional research agenda 'A Research Framework for London Archaeology', Museum of London, 2002. The regional research themes considered relevant to achieving an understanding are as follows (page numbers in brackets):

- The significance of geomorphology, palaeoecology, ecosystems and climate, hydrology, and vegetation and faunal development, on human lives (p 79);
- London's hydrology, river systems and tributaries particularly the role of the River Thames, as boundary, communication route, resource, ritual focus etc, in shaping London's history, and the relationships between rivers and floodplains (p 79);
- The relationship between landscape, river and settlement, and the influences of the River Thames in particular on communications and social interaction (p 79); and
- The development of London's Docklands and Waterways (p 82).

### **3.4 Event Codes**

The sitecode is **XRW10**

## **4 Site Management Plan**

### **4.1 Tools and Equipment**

Tools and equipment appropriate for the archaeological works will be ordered by the Supervising Archaeologist and delivered to site by the MOLA Equipment Officer from the MOLA central store. See Section 21.8.2 for details.

### **4.2 Training and Certification**

MOLA provides Safety Training for its staff as follows

- Induction Training for all staff (undertaken on joining MOLA, and as appropriate on individual projects).
- General H&S Training for supervisory staff (an H&S awareness course General at Field and Support Staff).
- Specialist H&S Training (designed to cover specialist areas and to update professional knowledge; as appropriate to deployment)

All MOLA staff on site will be competent to carry out their archaeological work. On site all staff will be supervised by a competent person (see 4.3).

For certain specific aspects of MOLA work only those members of staff with the relevant training and certification will be allowed to undertake them. These include Cable and Pipe/Underground Service Location, Chainsaw use, Confined Spaces and Power Auger use. However, apart from Confined Spaces, it is not anticipated that this will be required on this site.

MOLA staff who need to enter the shaft area will have confined spaces training, and hold a current certificate.

All MOLA staff have passed a CITB Health and Safety Test to operative level and will carry the CSCS card on site at all times (CSCS, Construction Related Organisation CRO White Card for Archaeological Technician, Code 5363; other cards are available for site visitors etc).

All MOLA staff will have their MOLA ID cards with them (see 21.6.1).

### **4.3 Site Monitoring**

The MOLA supervisor (Grade 4 or 5) will be monitored by the MOLA Contracts Manager (Elaine Eastbury, BSc) or Assistant Contracts Manager (Nicholas Elsdon, BSc) via site visits, as and when required, in order to provide advice and support to the MOLA Supervisor. The MOLA H & S Compliance Manager, Ian Grainger, and if required their Advisor (Hascom) will also regularly monitor the site.

#### 4.4 Progress Reporting

MOLA has agreed a programme of weekly written progress reports and progress meetings (if appropriate) with the Project Archaeologist. MOLA shall provide information describing progress on-site to date, the processing of samples and artefacts and feedback from initial assessment, and a BMOS report (see 15.6).

#### 4.5 Resource Plan

##### **General Watching Briefs**

- The watching briefs will be supervised by a MOLA Supervisor (Grade 4 or 5) assisted by members of the MOLA field team (Grade 6 – currently envisaged as 1–2 people) with support from MOLA Geomatics and Photographic team members when required. Other archaeological specialists (Grade 8, eg geoarchaeologists or osteologists), may be called in if necessary.

Staff will be drawn from the pool of CVs submitted to Crossrail for approval.

The named Supervisor will be confirmed to Crossrail and the Principal Contractor in advance. Other staff and specialists will be assigned when required. For the evaluation and watching brief the following staff may be allocated.

- Sam Pfizenmaier, BA (Hons) [*to be confirmed when a firm start date is known*], Senior Archaeologist, overall responsibility for site supervision and conduct of the fieldwork.

Direct Line (office)

020 7410 2231

Mobile

077 38 883 738

And/or

- Robert Hartle, BA (Hons), MA [*to be confirmed when a firm start date is known*], Senior Archaeologist, overall responsibility for site supervision and conduct of the fieldwork.

Direct Line (office)

020 7410 2238

Mobile

07730 646060

- Graham Spurr, BSc (Hons), MSc [*to be confirmed when a firm start date is known, will change during project*], Senior Geoarchaeologist, responsibility for Geoarchaeology and environmental recording and sampling, and specialist advice to the Senior Archaeologist, via visits as required.

Direct Line (office)

020 7410 2232

Mobile

07939659057

All archaeological staff are direct MOLA employees, ordinarily full time.

#### **4.6 Programme**

The programme is shown in Table 1 in section 1.

#### **4.7 Working Hours**

The working hours on this site, as specified in the DSJV method statement (November 2011), will be:

- Monday to Thursday: 08:00 to 18:00
- Friday: 08:00 to 17:00

MOLA was informed by the Principal Contractor (20/01/12) that they had been given consent to excavate the shafts in extended hours (07:00 – 22:00 Monday to Friday).

MOLA will provide a site attendance when required during these specified periods, so that all the relevant Principal Contractor's ground works defined in this MS are monitored and recorded.

## **5 Fieldwork Methodology**

### **5.1 General Evaluation Methodology**

The Principal Contractor will be responsible for maintaining a safe method of working as per the Permit to Dig. The following method is proposed, subject to review in the light of ground conditions encountered. In particular use of the benching-in method will depend on ground stability, water ingress. It is proposed to excavate two archaeological evaluation trenches within the footprint of the muck pit. The location of the trenches is illustrated in Fig 1. The location of the trenches will be set out by the Principal Contractors surveyors. The details for each trench are set out below. The method of excavation for each trench is illustrated in Fig 2.

#### **Trench 1**

Trench 1 is located at the northern end of the muck pit. The trench will be excavated after the installation of the sheet piling. The installation of the sheet piling will be monitored under general watching brief conditions. This will provide MOLA with a window on the deposits likely to be encountered during the trench excavation.

The excavation will extend from 106m ATD, to the formation level at 102m ATD. The sequence is expected to consist of c 3m of made ground overlying alluvium that measures up to 5m in thickness. An area 30m long and 10m wide will be excavated under targeted watching brief conditions through the made ground deposits. Any structural remains encountered within the made ground will be recorded appropriately as set out below.

If the surface of the alluvium is encountered, a trench measuring 30m long by 4m wide will be excavated within the footprint of the muck pit. Sections will be cleaned, examined, sampled and recorded for geoarchaeological purposes. If necessary, auger holes will be drilled in the base of the trench to record and sample the alluvial sequence. The depth of trenching and augering will not exceed the formation level (i.e 102m ATD)

#### **Trench 2**

Trench 2 is located at the southern end of the muck pit and will be excavated prior to the installation of the sheet piling. The trench will extend from 105m ATD to the formation level of 101m ATD. The sequence is expected to consist of c 3m of made ground overlying alluvium that measures up to 5m in thickness. The base of the dig will measure 20m long by 4m wide.

To achieve the required depth the trench will be undertaken as a benched excavation, with steps measuring 1m deep and 1m wide. The upper footprint of the trench will measure 10m wide by 26m long. The excavation will proceed under the supervision of the attending Senior Archaeologist.

Any structures encountered in the made ground will be recorded appropriately. If alluvial deposits are encountered, sections will be cleaned, examined, sampled and recorded for geoarchaeological purposes. If necessary, auger holes will be drilled in

the base of the trench to record and sample the alluvial sequence down to formation level. The depth of trenching and augering will not exceed the formation level (i.e 101m ATD).

If structural remains of the iron foundry are encountered within the made ground (cf. structural remains of the steelworks were found at 103m – 104m ATD in the Auxillary Shaft), the following procedures will be adopted.

- Rapid clean up, assessment and recording will take place to determine nature, extent, date and significance.
- All substantial and/or significant structural remains will be left *in situ* at the evaluation stage pending agreement of a mitigation strategy.
- Selective locations will be chosen for a deep access (if feasible), for example blank areas or modern intrusion.
- Machine *sondage* into those locations to test deeper levels (if safe to do so and if feasible for machine to gain access).

## **5.2 Evaluation Recording Methods**

The archaeological remains will be recorded to best practice standards, in order to achieve archaeological objectives. The site recording will include as a minimum:

- The written record of individual context descriptions on appropriate pro-forma sheets.
- The drawn record: including, plans and section drawings of appropriate features, structures and individual contexts (1:10, 1:20 or 1:50). 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.
- A stratigraphic matrix of the sequence of deposits and structures encountered in each trench will be produced.
- The photographic record: photographs taken with a digital camera of resolution of 12 megapixel or greater, providing similar resolution to a conventional 35mm SLR. The photographic record will include photographs of archaeological features, appropriate groups of features, structures, and quaternary deposits. Each photograph will be recorded on site using a proforma photographic record sheet, showing image number, area/test pit, context number(s), subject/description, direction of view, and date. In addition, appropriate record photographs will be undertaken to illustrate work in progress.
- Levels on plans, sections and other fieldwork records shall be related to OS datum.
- The location of all evaluation trenches, temporary grids and baselines will be electronically surveyed by MOLA Geomatics staff. After fieldwork a digital trench location plan will be produced.
- Other appropriate drawn and written records will be produced (for environmental sampling etc.). General Watching Brief Methodology



### 5.3 General Watching-Brief Methodology

A general watching brief is required on excavations for construction of a conveyor to Instone Wharf (Table 1 above), below generic archaeological monitoring methodology is described.

A general watching brief consists of a basic monitoring presence to observe the works carried out either by the Principal Contractor or their sub-contractor without constraint on their working methods (Crossrail 2009 Archaeology Specification for Evaluation & Mitigation (including Watching Brief) CR-PN-LWS-EN-SP-0001, version 3). This includes making a basic record of notes, measurements, drawings and photographs consistent with an observation role; eg depth, character, date and survival/truncation of deposit sequence, height of natural geology. Monitoring and recording during a general watching brief will generally be made by observation from ground level. During a general watching brief MOLA staff will only enter the trench or area of excavation by agreement with the Principal Contractor or their sub-contractor (providing that there is proper access and that it is safe to do).

Generally monitoring will only be undertaken when areas or trenches have been dug down the level of potential archaeological interest. For this reason, a flexible approach will be taken and kept under review. The monitoring presence may alternate between full and part-time depending upon the Principal Contractor's programme (eg the nature and intensity of ground works) and the archaeological results. For example, any areas where the Principal Contractor's works prove to be of insufficient depth to affect significant archaeological deposits will be scoped out of the Watching Brief. The MOLA Experienced or Senior Archaeologist undertaking the monitoring will make an appraisal inspection during the Principal Contractor's initial breaking out, removal of overburden etc. in order to determine at what depth the relevant deposits (if present) occur.

If potentially significant (but localised) remains are exposed, such that they cannot be recorded adequately under basic monitoring, then the status of the fieldwork event will be reviewed by Project Archaeologist and it may be redefined as a Targeted Watching Brief. This redefinition if authorised by the Project Archaeologist would permit additional resources in terms of staff and attendance to allow for more intensive recording.

No human remains are anticipated on this site, however, In the event of *in-situ* human remains being uncovered during excavations, the excavation will cease. Then the remains will be cleaned and recorded by MOLA staff. At this point in terms of Crossrail archaeological procedure the site would be upgraded to a targeted watching brief. The decision to either excavate or remove any *in-situ* remains encountered in any structural test pits or service trenches at this stage will be made on an individual basis in conjunction with the Project Archaeologist. Any ex-situ human bones discovered will be collected, bagged up, examined by the Osteologist and reburied in the test pit in which they were found before it is backfilled. It is assumed that any excavated spoil that may possibly contain disarticulated human remains will be used to backfill the test pit or trench from which it was derived and will not be removed from site.

### 5.4 Watching Brief Survey and setting out method

MOLA will obtain from either the design archaeologist, the Principal Contractor or Crossrail's survey department the locations and values of the project level datums in the area of the site.

MOLA surveyors will normally survey to LSG grid local baselines, or the features, as appropriate to the remains encountered. In some circumstances, it may be appropriate and more efficient for the Principal Contractor's surveyors (if they are available) to survey MOLA temporary baselines. This will be determined by liaison between MOLA and the Principal Contractor.

MOLA will obtain from the Principal Contractor or design archaeologist CAD plans to London Survey Grid of the shaft as-dug. See also 13.

## **5.5 Watching Brief Recording Methods**

The archaeological remains will be recorded to best practice standards, in order to achieve archaeological objectives. The site recording will include as a minimum

- The written record of individual context descriptions on appropriate pro-forma sheets.
- The drawn record, including: plans and section drawings of appropriate features, structures and individual contexts (1:10, 1:20, or 1: 50). 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.
- A stratigraphic matrix of the sequence of deposits and structures encountered in each trench will be produced.
- The photographic record: photographs taken with a digital camera of resolution of 12 megapixel or greater, providing similar resolution to a conventional 35mm SLR. The photographic record will include photographs of archaeological features, appropriate groups of features, structures, and quaternary deposits. Each photograph will be recorded on site using a proforma photographic record sheet, showing image number, area/test pit, context number(s), subject/description, direction of view, and date. In addition, appropriate record photographs will be undertaken to illustrate work in progress.
- Levels on plans, sections and other fieldwork records shall be related to OS datum.
- The location of all evaluation trenches, temporary grids and baselines will be electronically surveyed by MOLA Geomatics staff. After fieldwork a digital trench location plan will be produced.
- Other appropriate drawn and written records will be produced (for environmental sampling etc).

## 6 Geoarchaeological investigation methodology

Geoarchaeology is the study of soils and sediments in either a natural or anthropogenic context, that either contain human cultural material or are contemporary with human habitation within the region being studied (ie the Pleistocene/Lower Palaeolithic and later). It can include techniques of landscape reconstruction such as palaeobotany etc.

At the Instone Wharf site there is likely to be a geoarchaeological component to the work. This is predicted to include sampling of the alluvial sequence exposed within the trench sections with bulk samples and/or monolith tins. Geoarchaeological auger holes may also be required at the base of the trench to sample and record the full alluvial sequence down to the level of the floodplain gravels. This work will be conducted under the geoarchaeological and palaeoenvironmental sampling strategy (archaeological science strategy) for the Limmo site.

### 6.1 Sampling strategy for Limmo Peninsula

The most likely methods required within the sampling strategy for Instone Wharf include sampling of the Holocene peats and estuarine clays by bulk sample and monolith tin. The deposits will be characterised according to standard sedimentary criteria to ascertain the mode of deposition. Radiocarbon samples may be taken from key stratigraphic horizons.

#### General Methodology

The Contract Manager and MOLA Supervisor will ensure the following with the support of a MOLA Environmental Archaeologist / Geoarchaeologist

- That a range of suitable samples are collected from the site for the recovery of an appropriate range of environmental evidence that will contribute to the research strategy that underpins the requirement for excavation and recording.
- That the environmental procedures outlined in the *Archaeological Site Manual* (MoL 1994) and *Environmental archaeology*
- *a guide to the theory and practice of methods, from sampling and recovery to post-excavation* (English Heritage 2002) are followed.
- That general bulk samples, 40 litres in size (20L if waterlogged) will be the standard samples taken and that the processing methods are designed to recover a wide a range of materials from the same deposit in a single sample. In addition, as a number of post-excavation analytical techniques will be employed on the material recovered, a number of different sampling approaches will be required. These might include
- gridded/spatial bulk samples, to sample horizontal stratigraphy where it survives (i.e. floor layers), the sample size will depend on feature; column bulk samples (c 2-20L) to sample ditches, deep refuse deposits and natural deposits; spot samples for dating; monolith and micromorphology samples to recover *in-situ* blocks of sediments or complex strata.

Sample	Sampled by	Material	Processing
Hand	archaeologist	Human Bone	Hand washing
Collected	archaeologist	Large/small mammal, bird, fish	Power hosed
Bulk (general 40 litre sample)	archaeologist	Large/small mammal, bird, fish, reptile, amphibian, marine molluscs, eggshell, plant macrofossils	Flotation or wet sieving
		Insects	Paraffin flotation
		Artefacts	Hand Washed
Column bulk (20 litre)	Archaeologist on advice of geoarchaeolo gist	Freshwater and terrestrial molluscs, ostracods	Disaggregated and wet sieved
Monolith	geoarchaeologist	Sediments	Laboratory cleaning
		Pollen and Diatoms	Sub-sampled for external Specialist
Kubiena	geoarchaeologist	Soils/complex strata	External Specialist
Spot/Grab	archaeologist	Coprolites, unidentified organic materials	Specialist
	geoarchaeologist	Pollen, diatoms, ostracods, forams, radiocarbon	Sub-sampled from augerhole cores for external specialists

- The sampling strategy will be monitored throughout the excavation and adapted in light of the preservation and the type of features encountered. A MOLA Environmental Archaeologist/Geoarchaeologist will undertake site visits to provide advice and additional advice will be sought from the EH Regional Archaeological Science Advisor when necessary. A MOLA Environmental Archaeologist/Geoarchaeologist will be on site during any visit made by the EH Regional Archaeological Science Advisor.
- As a general policy, uncontaminated negative features will be bulk sampled and bone collected by hand. Horizontal stratigraphy if it survives will be sampled on a spatial basis where appropriate. Unstratified contexts, make-up layers and contexts thought to have a high degree of residual or intrusive material will not be sampled. Bulk samples may also be taken to recover artefacts such as evidence for metalworking and/or other industrial activity.

## **7 Deliverables and Submission Programme**

MOLA shall provide the following reports in accordance with the C261 Contract to the Project Archaeologist

- Organisation of site monitoring visits, as and when requested by the Principal Archaeologist
- A weekly illustrated progress report to the Project Archaeologist.
- A survey report will be produced within 2 weeks of the completion of fieldwork if the surveying is undertaken by C261. If the principal contractor undertakes the surveying a survey report will not need to be produced. However, the results will be presented within the fieldwork report and certified by C261 as correct.
- A Fieldwork Report will be prepared within 6 weeks if required. In this case it may be necessary to incorporate the results after other fieldwork on the Limmo Peninsula site has been completed.
- MOLA will complete an SMR (OASIS) Summary Sheet for the works (i.e. one per fieldwork event). The Summary Sheet will be included in the Fieldwork Report if required.
- A Summary report of no more than 500 words for the works shall be prepared by MOLA for submission to the Project Archaeologist for subsequent publication within London Archaeologist.

If DSJV are to do the survey a survey report from C261 is not required but the location of the results will be reported in the fieldwork report based on data supplied by DSJV and certified by MOLA as correct.

## **8 Document Control and Record Keeping**

MOLA will access the Crossrail document control system for transmitting reports and other deliverables. The primary report deliverables) will be submitted to the Project Archaeologist (and Crossrail CDM Advisor in the case of Method Statements) in draft form (Version 1.0). Any tracked changes or comments added by the Project Archaeologist and/or Crossrail CDM Advisor will then be incorporated and future dated versions (2.0 etc) will be returned via the document control system accompanied with the appropriate Checklist with Contractor's responses.

## **9 Artefact Recovery and Conservation**

Sampling strategies will be developed on a site specific basis to meet the objectives stated in the Crossrail Site-specific WSI (see 3.3); and the following professional standards, in consultation with appropriate specialists

- MOL Archaeological Finds Procedure Manual (2006)
- Relevant English Heritage Centre for Archaeology Guidelines eg on Environmental Archaeology (English Heritage 2002)
- Guidelines of the Society of Museum Archaeologists for the Selection, Retention and Dispersal of Archaeological Collections (SMA 1993).
- IFA Guidelines to the standards for recording human remains (2004)

- Minimum Standards for the Processing, Recording, Analysis and Publication of Post-Roman Ceramics produced by the Medieval Pottery Research Group Occasional Paper 2, (Slowikowski, A, Nenck, B. and Pearce, J 2001)

## **9.1 Finds**

In general all material from stratified archaeological deposits is retained unless it is clearly residual or part of a large but routine assemblage, in which case samples of both typical and diagnostic items are retained.

Due allowance will be made for occasional specialist attendances which may be needed on and off-site to complete the investigation to the appropriate specified standard. These would only be called upon on a case-by-case basis, if significant structures or strata are revealed. Such attendances may include artefact conservation, photography, surveying, environmental sampling, finds assessment, geoarchaeology and scientific dating. MOLA has a full range of in-house specialists and can therefore deploy such resources at short notice, if needed, eg to advise on sampling strategies.

All finds and samples will be treated in a proper manner and to Museum of London standards. They will be exposed, lifted, cleaned, conserved, marked, bagged and boxed in accordance with the guidelines set out in the United Kingdom Institute for Conservation's Conservation Guidelines No. 2 and the Museum of London's Standards for the Preparation of Finds to be permanently retained by the Museum of London. Metal objects will be x-rayed and appropriate objects then selected for conservation.

### **9.1.1 Retention and Disposal**

The finds retrieval policies of the Museum of London will be adopted. An adequate and representative sample of finds and deposits will be retained as advised by appropriate MOLA specialists who will be available to attend site as required (see 11.1).

## **10 Treasure**

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

To protect the finds from theft, MOLA 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, MOLA shall ensure, on liaison with the Project Archaeologist that adequate site security is provided by the Principal Contractor.

## **11 Archaeological Science Strategy**

Where necessary, the strategy for sampling archaeological and environmental deposits and structures (which can include soils, timbers, animal bone and human burials) will be developed by MOLA in accordance with English Heritage and IFA guidelines. Advice will be sought from appropriate MOLA specialists and if

additionally required from English Heritage. Subsequent on-site work and assessment of the processed samples and remains will be undertaken by MOLA Specialists.

If necessary, samples for absolute dating such as C14 or timber samples for dendrochronology will be submitted to nominated MOLA external laboratories. This will only be done with the prior approval of the Project Archaeologist where there are particular research objectives to be addressed by such dating.

See 6.1 for the site-specific sampling strategy.

### **11.1 Specialist Strategy**

An appropriate programme of ceramic dating and study of other excavated artefactual and environmental materials will be undertaken by MOLA Specialists as their contribution to the Fieldwork Report.

### **11.2 Excavation and Recording of Human Remains**

The required methodology for human remains is set out in detail in the SS-WSI and the MOLA Framework Method Statement (Technical Submission 2.4, section 4.6) and is not repeated here.

It is not likely that human remains will be present in this part of the Limmo site. If human remains are found, the Project Archaeologist will be contacted, and if instructed them, a Ministry of Justice licence obtained by MOLA.

Any *in situ* human remains will be recorded to watching brief standard (cleaned, location recorded and photographed), and lifted, in accordance with the standards in section 3.2. Any re-deposited, disarticulated human bones will be collected, examined briefly by the Osteologist, bagged, labelled and removed with the articulated bone (it is not predicted that there would be large quantities of such remains; if there were, a different strategy would be agreed with the Project Archaeologist). The advice of a MOLA Osteologist will be sought where the nature of a deposit containing human remains is ambiguous.

## **12 Archiving and Dissemination Method**

The required methodology for off-site work including specialist method statements, assessment, analysis, publication and archive is set out in the SS-WSI and is not repeated here.

The site-specific post-excavation, publication and archive requirements will be agreed in conjunction with the Project Archaeologist in the light of the overall approach being developed for the Crossrail project (eg publication format and the extent to which individual sites may be grouped spatially or thematically; and degree to which the archive will be systematised and deposited as a single whole).

## **13 IT Capability – Digital Survey Recording, Data Capture and Curation**

The required methodology for IT (including site survey) will be carried out in accordance with the C261 Contract and project standard survey requirements.

- See section 5.4 for general survey methodology.
- For General Watching Briefs it is proposed that Principal Contractor's surveys assist with the location of temporary base lines and the plotting of significant archaeological features where appropriate.
- Upon completion of the fieldwork a Site Survey Report will be compiled.

## **14 Additional Details**

### **14.1 Standards and Guidance**

See Section 3.2.

### **14.2 Unexpected and Nationally-important remains**

In cases where unexpected discoveries cannot be preserved in situ (not possible in the Shaft), the response plan would revert to the normal Crossrail mitigation strategy of further archaeological investigation (preservation by record). The aim would be a rapid and commensurate response, targeted to just those remains unavoidably affected by the works. Recording and sampling methods would also be proportionate to the significance of the remains. Additional archaeological resources would be deployed to achieve this, in order to minimise the delay to the Principal Contractor's works. With flexibility and good communication it is often possible for the development works to continue in other areas while localised discoveries are recorded, however, for the Shaft, it is likely that such archaeological works would delay sinking the shaft. *However, the mitigation strategy for the shaft is intended to remove the need for such additional archaeological interventions, which are therefore unlikely to be required.*

### **14.3 Progress Photographs**

In addition to the archaeological photography specified in the SS-WSI and this Method Statement MOLA will submit a monthly professional photographic record of the progress of the archaeological scope of works. The photographs from the sites in this method statement will form part of the 30 required each month across the whole of the C261 contract.

### **14.4 Management of Consents**

MOLA will liaise with the Employer and Principal Contractor regarding supply of any necessary information in support of required consents, eg road closures, Permit to Dig.



In general separate consents for archaeological works are unlikely to be required, the possible exception being human remains. In the event of the unexpected discovery of human remains on site, MOLA will obtain a Burial Licence from the Ministry of Justice, if so instructed by the Project Archaeologist.

## 15 Health and Safety

### 15.1 CDM Responsibilities and Reporting

- MOLA will be supporting and reporting to the Principal Contractor and to the Crossrail Project Archaeologist and CDM Co-ordinator
- MOLA will be implementing archaeological designs in the SS-WSI prepared by the appropriate FDC consultant, therefore not acting as CDM Designer under the Construction (Design and Management) Regulations 2007.

MOLA will provide

- A current health and safety policy, including defined operational procedures and managerial responsibilities, risk assessment/control, and measures to ensure that a safe method of working is implemented by the archaeological team on site, including appropriate advice and support from office-based managers.
- Adequate safety information in the MOLA site accommodation including the WSI, current Health and Safety Policy, Health and Safety at Law Poster, Data Protection Compliant Accident Book (*in addition to the Principal Contractor's Accident book*), and copies of Public and Employers Liability Insurance. The Supervisory Archaeologist is responsible for ensuring that this information is made available.
- Compliance with current legislation and HSE guidance; including the Construction Design and Management Regulations (CDM) 2007 as a Designer; and the Principal Contractor's Health and Safety Policy, safety inductions and fire and emergency procedures.
- Field staff qualified to operative level (or higher) of the CITB Health and Safety test and therefore eligible to carry a Construction Related Organisation (CRO) White Card for Archaeological Technician (Code 5363).
- Services of a Contract Manager, Project Officer/Assistant Contract Manager, and Supervisory Archaeologist to manage site investigations, including liaison with the Principal Contractor's Health and Safety Co-ordinator and Principal Contractor, attendance at site meetings etc. The Supervisory Archaeologist will act as principal liaison with the Principal Contractor.
- Services of a professional health and safety consultant to attend site when required, in addition to the MOLA H&S Compliance Manager; reporting to the Supervisory Archaeologist and Project Officer, with any concerns or recommendations copied to the Principal Contractor's site manager
- A safety monitoring/reporting procedure. This should include accident reporting by the Supervisory Archaeologist to non RIDDOR and RIDDOR standard and any necessary liaison and follow-up of agreed safety actions with the Principal Contractor's site manager
- All necessary staff supervision, and training, including tool box talks and safety inductions for new staff.
- Attendance at PC daily briefings for all staff on site.

- Personal protective equipment (PPE) as listed in 21.8.3, but not additional PPE required by the Principal Contractor's method of work or Health and Safety plans (see the section below).
- Review and compliance with the Principal Contractor's Construction Phase Plan under the CDM Regulations 2007.
- Trained First Aiders (as appropriate to a watching brief situation), 'Where to get First Aid' poster and a First Aid kit (to be located in the MOLA site accommodation). The Principal Contractor will also have first aid facilities and first aiders on site.

The Principal Contractor will provide

- Overall control and supervision of the site and a safe working environment. The archaeological organisation will be unable to complete the specified works in any area where this is not provided.
- Technical services and attendances to the archaeologists as required. These services may include providing, site accommodation, plant for the excavation of trenches and other equipment such as handrails, shoring, ladders, and any equipment required for confined spaces. These requirements are listed in detail in separate documents.
- Construction Phase Plan.

The CDM Co-ordinator will provide

- Overall co-ordination of health and safety planning and management.
- A communications structure; including contact details for key personnel, meetings, reporting, etc.
- Supply of material information
- eg services and contamination reports; any relevant requirements regarding rights of way, noise, hours of operation, etc.

## **15.2 Rail Sites**

The shaft watching brief area is not a designated rail site.

## **15.3 Highway Sites**

The shaft watching brief area is not on a highway.

## **15.4 Health and Safety Reporting**

Adherence to health and safety procedures will be monitored by the MOLA Health and Safety Compliance Manager, supplemented when required by the MOLA H&S Consultant (Hascom), Contract Manager, Project Officer and Site Supervisor. The

H&S Compliance Manager, and if required the consultant, will attend site for regular monitoring visits and, on each occasion, will supply a report on the archaeological work, containing any necessary health and safety recommendations. This will be forwarded to the Principal Contractor's site manager. Where appropriate to the scale of work, regular on-site progress meetings will be held between MOLA, the Project Archaeologist and the Principal Contractor at which any safety issues may be discussed, agreed and actioned.

## **15.5 Liaison with Principal Contractor**

The MOLA supervisory archaeologist will act as the principal point of contact with the Principal Contractor's site manager throughout the periods of site investigation. Contact details will be exchanged. The supervisory archaeologist will be supported and advised by the MOLA project management team as needed.

### 15.5.1 C261 MOLA Project Management Team Contact Details

- Elaine Eastbury, Contracts Manager

[eeastbury@museumoflondon.org.uk](mailto:eeastbury@museumoflondon.org.uk)

Direct Line: 020 7410 2237

Mobile: 07730 646063

- Nicholas Elsdon, Assistant Contracts Manager

[nelsden@museumoflondon.org.uk](mailto:nelsden@museumoflondon.org.uk)

Direct Line: 020 7410 2282

Mobile: 07872 127296

## **15.6 Behavioural Safety BMOS**

Mobile phones, personal CD players, i-pods and similar will not be used by MOLA staff in archaeological trenches or areas of work. Smoking and naked flames are not permitted in the trenches or areas of work. Alcohol or drugs are not permitted on site. This aspect will be monitored by the MOLA Supervisor and H and S Advisor and reported on in the progress report (see 4.3).

## **16 Emergency Response**

### **16.1 Emergency Preparedness & Response Plan**

An Emergency Preparedness/Continuity Plan has been prepared by MOLA and submitted to Crossrail for approval.

MOLA staff will comply with the Principal Contractor's Emergency Plan.

### **16.2 Training**

MOLA provides Safety Training for its staff as in Section 4.2.

The MOLA Senior Archaeologist will attend all emergency training/inductions on Preparedness/Response Plan provided by the Principal Contractor.

### **16.3 Emergency & Accident Equipment**

- MOLA Archaeologists when working singly on the watching brief tasks will carry a single person First Aid Kit and mobile phone.
- It is expected that the Principal Contractor will also provide basic first aid facilities on site.

### **16.4 Monitoring & Testing**

MOLA staff will comply with Crossrail requirements.

### **16.5 Emergency & Accident Incident Reporting**

All accidents and emergencies must be reported to the Principal Contractor's Safety Manager (Ernie Donnel, 07725 752001), who will call the emergency services, if required. They will also be reported to the Crossrail Helpdesk (24 hour helpline) Call

0345 602 3813 or [helpdesk@crossrail.co.uk](mailto:helpdesk@crossrail.co.uk). In critical situations, MOLA staff will call for an ambulance immediately, and then inform the site emergency controller/site manager.

All accidents and emergencies must be reported to the following personnel at Crossrail and MOLA:

- Linda Muzikants, PDP Project Manager, Crossrail Central, Crossrail Ltd, 25 Canada Square, London E14 5LQ

DD 0203 197 5854

Mobile 0758 020 1733

- Jay Carver, PDP Project Archaeologist, Crossrail Central, Crossrail Ltd, 25 Canada Square, London E14 5LQ

DD 0203 229 9258, Int 2258

Mobile 07870 191 705

- Nick Dyball, CDM Advisor, Crossrail Central, Crossrail Ltd, 25 Canada Square, London E14 5LQ

Mobile 07718 861941

- George Dennis, Senior Contracts Manager, Museum of London Archaeology, Mortimer Wheeler House, 46 Eagle Wharf Road, London N1 7ED

DD 0207 410 2200, Int 2256

- Ian Grainger, H&S Compliance Manager, Museum of London Archaeology, Mortimer Wheeler House, 46 Eagle Wharf Road, London N1 7ED

DD 0207 410 2200, Int 2255

## **17 Environmental Management**

The archaeological works will be carried out whilst the Principal Contractor is in possession of the site. MOLA will therefore request a copy of the Principal Contractor's Environmental Management Plan prior to commencement and will supply any necessary inputs with regard to MOLA works. MOLA will comply with the Principal Contractor's Environmental Management System as documented in their Environmental Management Plan, and contribute to their EMS reporting if required.

If any remedial action is needed, eg controls for dust, water, noise or controlled waste, this will be agreed with and undertaken by the Principal Contractor as part of the required attendances (see 15 and 21.8.1). In addition an updated MOLA corporate Environmental Management Plan is currently being prepared for submission to Crossrail.

The nominated environmental person is

Alison Telfer, atelfer@museumoflondon.org.uk, 020 7410 2276.

### **17.1 Contamination**

MOLA will comply with the Principal Contractor's requirements in relation to any contamination issues. Soil testing has been undertaken and classes material as non hazardous (doc ref: C350-DSJ-C-GMS-CR144\_SH011-50011).

### **17.2 Water Disposal**

The Principal Contractor is responsible for disposal of any ground water pumped from the trenches or other excavations, in accordance with their environmental management plan, with which MOLA will comply.

### **17.3 Site Waste Management Plan**

MOLA staff will adhere to the Principal Contractor's site waste management plan.

It is anticipated that very little waste will be removed from the site from the archaeological works, but any produced will be disposed of by the Principal Contractor in accordance with their Waste Management Plan.

### **17.4 Vehicles/Motorised Equipment**

MOLA staff will liaise with the Principal Contractor to provide safe access and parking for MOLA vehicles if required to attend site.

Once shaft sinking begins, there will be little or no parking on site. Private vehicles are not permitted to enter site. The Principal Contractor has said that they will endeavour to provide a space if possible for occasional visits.

<b>NAME</b>	<b>VEHICLE REG NO</b>
M Cox	KC54 XTZ & DY59 YWB
A Chopping	KC54 XTZ & DY59 YWB
G Spurr	KC54 XTZ & DY59 YWB
H Matthews	EA55 NBJ
S Jones	KC54 XTZ & DY59 YWB
C Drew	KC54 XTZ & DY59 YWB
M Burch	KC54 XTZ & DY59 YWB
V Yendell	KC54 XTZ & DY59 YWB
G Simons	KC54 XTZ & DY59 YWB
<b>CONTACT (All)</b>	<b>020 7410 2200</b>

## **17.5 Other Requirements**

MOLA staff will always be courteous with any members of the public they have dealings with.

## **18 Quality Assurance Plan**

An updated Quality Assurance Plan has been prepared for submission to Crossrail in accordance with the format specified at part 5.4 of the C261 contract. Records will be kept and supplied to Crossrail in accordance with procedures set out in Crossrail Specification CR-PN-LWS-EN-SP-00001, as amplified by the SS-WSI. The MOLA responsible procurement representative is Dawn Jackson, who is a member of the Senior Management Group.

## **19 Community Relations**

MOLA will co-operate with the Principal Archaeologist and Principal Contractor regarding any notified community relations issues in relation to the Construction Community Relations Strategy Framework as defined in the Works Information.

MOLA will in the first instance refer any media enquires or community relation issues to the Crossrail Helpdesk and the Project Archaeologist.



## **20 Responsible Procurement**

An updated Responsible Procurement document was submitted to Alison Jackson, Crossrail on 6th August 2010.

## **21 Health and Safety Method Statement**

### **21.1 Introduction and Purpose**

#### 21.1.1 Project Background

Archaeological investigations are to be carried out on this site by Museum of London Archaeology (MOLA). The requirements are set out in:

- SS-WSI – Crossrail, April 2011, Document No C123 JUL-T1-TPL-CR144\_SH011\_Z-00001 Revision 9.1
- Addendum SS-WSI – Crossrail, February 2012, Document No C123-XRL-T1-TPL-RGN-CR144\_SH011\_500001 Revision 1.0

### **21.2 Scope of Document**

This Method Statement sets out the specific MOLA safe methods of working to be applied to:

- General Watching Brief (Conveyor)
- Archaeological evaluation with the muck pit

This method statement has been developed in conjunction with the Principal Contractors, who will be responsible for ensuring that the archaeological works may be carried out as specified.

### **21.3 Responsible Persons and Site Management**

#### 21.3.1 Site Management

The MOLA Senior Archaeologist/Site Supervisor will ensure that a copy of the MOLA Welfare, Health & Safety Method Statement is made available to the Principal Contractor at the site. Where further changes or additions to the WH&S Method Statement are required and agreed these should be appended to the site master copy by the MOLA Senior Archaeologist/Site Supervisor.

All changes to the WH&S Method Statement will be signed off by the Project Archaeologist, Crossrail H & S Advisor, MOLA Senior Contract Manager and MOLA Field Manager.

### **21.4 Scope of Works**

#### 21.4.1 Proposed archaeological works

The scope of archaeological works is set out in 21.2 above, and in section 1 of the method statement, above.

### **21.5 Methodology, Programme and Sequence**

The programme is set out in Table 1 in section 1 of the method statement, above. The start dates have yet to be confirmed with the principal contractor.

## **21.6 Health and Safety Control Measures**

### 21.6.1 Site Access/Vehicle Movements

On arrival at the site, MOLA staff will sign in, establish contact with the nominated Site Manager (or equivalent) attend any inductions etc. in accordance with the required access procedure for the site (to be notified to MOLA in advance by the Principal Contractor). All MOLA staff working on site will carry identification and CSCS cards.

Safe access routes from the site gate to work Areas and any offices and/or facilities will be erected and maintained at all times throughout the course of the archaeological monitoring of the works by the Principal Contractor.

Access to the shaft will be via a Haki Stair Tower, whose depth will be increased as the depth of the shaft is excavated. At intermittent points prior to the addition of a new section of stairway, a tied and footed ladder will be used (although it may be unnecessary for C261 MOLA staff to use this).

### 21.6.2 Services

The location and making safe of live services before or during archaeological works is the responsibility of the relevant Principal Contractor in control of the site. MOLA staff will exercise care and due diligence and report any discovery of unexpected services or other ground hazards promptly to the Principal Contractor, Project Archaeologist and MOLA H & S Officer.

## **21.7 Safety of Excavations**

### 21.7.1 Entering the trench

- Daily inspections will be carried out by the Principal Contractor before works commence.
- The MOLA site supervisor will check daily that a valid Permit to Enter is in place, before commencing work.
- MOLA staff will not enter any excavation until the Principal Contractor has issued a Clearance to Enter Permit confirming that it is safe to do so, and that there is safe access/ingress to the archaeological investigation areas.
- MOLA Staff will not enter a trench if it is declared unsafe by the Principal Contractor.
- The Principal Contractor will supply attendances as required in 21.8.1.

### 21.7.2 Shoring

- Where required during the evaluation and watching briefs, the trench will be shored in a suitable manner by the Principal Contractor and safe access arranged.

### 21.7.3 Confined Spaces

- The Principal Contractor will confirm with C261 MOLA prior to excavation whether the trenches are defined as a confined space.

### 21.7.4 Machine Excavation

- All machining described in section 5, as specified in the Addendum to the WSI, will be monitored by MOLA Senior Archaeologist/Site Supervisor, but will at all times be under the control of the Principal Contractor.

### 21.7.5 Hand Excavation during Watching Briefs and Evaluation

- Hand excavation will be limited to selected times/areas defined by the MOLA Senior Archaeologist/ Site Supervisor, with the agreement of the Principal Contractor, and will be properly fenced, demarcated and signed.

### 21.7.6 Lone Working

- The monitoring MOLA Supervisor will complete the necessary signing in procedures for each site visit and will also notify the Principal Contractor's Site Manager of their presence conducting single person watching briefs, which works are to be monitored. The MOLA Supervisor will only be providing an attendance to observe, monitor and record the defined Principal Contractor's works and therefore will not be working alone.
- In particular the MOLA Supervisor will not attend works or enter excavations when the Principal Contractor is not present.

### 21.7.7 Contamination

- The Principal Contractor has stated in their method statement that soil testing has been undertaken and classed the material as non-hazardous (DSJV November 2011, p 12 section 33), but PPE is to be worn when excavating. The PPE requirements (DSJV November 2011, p 9 section 19) are stated in section 21.8.3 of this document.
- MOLA will comply with the Principal Contractor's requirements if these conditions change.

### 21.7.8 Unexploded Ordnance

- The MOLA Supervisor shall comply with the PC's rules. If Unexploded Ordnance (UXO) is unexpectedly found the MOLA Supervisor shall inform the PC immediately and withdraw to a safe place outside the area designated by the PC.

### 21.7.9 Site Rules

- All MOLA Staff will comply with the Principal Contractor's site rules, and with the MOLA single person watching brief rules (when applicable).

## **21.8 Planning and Resources**

### 21.8.1 Principal Contractor's Supply of Attendances

The site specific requirements for services, facilities and attendances to be provided by the Principal Contractor, to enable MOLA to undertake the defined archaeological works are set out above. Those items in **bold (21.8.1.1) will be required** for this site

– others may be required (□), depending on site conditions, which will be reviewed on site by the MOLA Supervisor in conjunction with the Principal Contractor's nominated Site Manager (these requirements will be communicated to the Principal Contractor in the event that they are needed):

21.8.1.1 Likely to be required

- **site accommodation and welfare facilities with electricity and water.** To include furnished main base cabin as office/work space; separate male/female changing areas, toilets and washing facilities with water; drying facilities; plus additional steel cabin for secure storage of MOLA PPE, equipment, camera and paperwork and finds. For the basic monitoring component of a small watching brief, these facilities would normally be shared with the Principal Contractor's site establishment and separate work space is not normally required. It is provisionally estimated that accommodation etc for up to 1 to 3 people will be required for the watching briefs.
- **general site security** including hoardings, gateway, warning notices, etc; to create a secure site perimeter, sufficient to prevent unauthorised access. If the Principal Contractor has retained security guards, it is recommended that the archaeological investigation areas be added to their schedule for regular patrols, particularly out of hours.
- **providing safe access** to the site and the specified archaeological investigation areas via separately identified pedestrian routes, signing, safety guard-rails, secure ladders etc. This includes segregating these areas from any vehicles and plant operating nearby eg via a robust physical barrier.
- **locating and making safe any live services or hazardous substances (above or below ground)**, preliminary services searches should be carried out by the Principal Contractor via the statutory undertakers etc, plus on-site inspection and testing where required. Where there is reason to believe from previous uses that the ground or adjacent buildings may be contaminated the Principal Contractor should make arrangements for advance inspection, sampling, testing and where necessary specialist remediation. The results of such surveys should be forwarded to MOLA *prior to commencement on site*. Any identified hazards will be addressed in the health and safety planning. Any unexpected hazards encountered during the investigations will also need to be made safe by the Principal Contractor before archaeological fieldwork may continue. In the event of the accidental disruption of a live service by archaeologists or sub-contractors under archaeological supervision the MOLA supervisor will inform both their project manager and the Principal Contractor and, when appropriate, call the relevant emergency number.
- **supply of plant and equipment;** principally a 360 degree tracked mechanical excavator of minimum 12 ton size; supplied with driver, breaker, toothed digging bucket (if required/permitted by services) and flat-bladed ditching bucket. Other plant such as dumpers, compressor/breakers, hoist and pumps may also be needed.
- **accreditation and supervision of operatives, plant and equipment,** including supply of sufficient qualified banksmen/supervisors to control plant movements and adequate certification for plant and operatives.
- **transport/mounding/storage of spoil** from archaeological investigation areas. This includes removal from site, if necessary.
- **temporary support,** design, installation and maintenance of appropriate temporary support to excavations, where deeper than c 1.2 m (or as required in

unstable ground). This will principally be via the initial concrete ring and installation of subsequent ring segments forming the shaft, but locally within the shaft area may be via benching/battering back and/or shoring, depending on a depth and ground conditions.

- **adequate ventilation** and protection from noise, fumes and dust where plant is in use, especially within confined spaces or standing buildings
- **development of a safe method of working**, archaeologists will not be able to work within excavations whilst attendances (such as installing temporary support or removing spoil) are taking place, and when demolition, construction or heavy plant activity occurs adjacent or overhead.
- **first aid**, provision of first aid facilities, and an emergency plan. On watching briefs with small numbers of staff, MOLA may not be able to supply a qualified first aider. In that case, the services of the Principal Contractor's qualified first aider(s) may be required.
- **Secure storage** for finds, and for tools and equipment.
- **managerial services** – nominated points of contact for Principal Contractor and other key members of development team.
- **technical advice** to be available if required (eg via client or Principal Contractor's consulting engineer) re protection of adjacent streets and buildings, removal of obstructions, depth of excavation, live services etc.
- **pumping-out (dewatering/drainage)**: a suitable method to keep the trenches dry, eg pumping into a previously investigated trench, to create a sump.

#### 21.8.1.2 Unlikely to be required

- **specific site security**: it may be necessary to separately secure individual archaeological working areas via a physical barrier (such as Heras fencing) eg if there are public areas nearby or human remains are encountered.
- other safety measures in deep excavations, including monitoring of air quality and provision of rescue facilities and equipment in any areas defined by the Principal Contractor or MOLA as a Confined Space.
- **site preparation and clearance**. Removal of structures, vegetation, rubbish, spoil heaps, demolition materials, slab, modern obstructions, infill, made ground, etc. as required, prior to and during the archaeological investigation. The majority will be mechanical excavator, under archaeological supervision, but occasional hand work by labourers may be needed (eg clearing individual obstructions or removing spoil from investigation areas if the machine cannot re-enter).
- **temporary roofing (not required)** to archaeological excavations (eg clear plastic sheets on scaffolding frame). Needs to have adequate water drainage and ventilation. Local, portable frames would only be required if significant remains are present. There is no need for routine roofing of all excavation areas.
- **110v. site lighting and power supply** for access routes to excavations, plus individual task lighting within trenches (eg tripod-mounted spotlights) if required. The need for lighting depends on the depth, season and weather conditions or on ambient light level if working inside a shaft or standing building.
- **filling back and reinstatement** upon completion (trenches are normally backfilled, for safety reasons, unless there are client instructions to the contrary).

### 21.8.2 Equipment

Equipment will be supplied by the MOLA equipment central store

- First Aid Kit
- Hand tools, dumpy levels, stationary, grid pegs, digital camera, etc.

Any specialised equipment (such as power augers – *not required or permitted within the Shaft*) will have certification of maintenance kept at MOLA headquarters.

### 21.8.3 PPE

The PPE requirements are stated in the DSJV method statement (November 2011, p 9 section 19).

All MOLA staff are supplied with and will wear or use the following PPE where required and as appropriate:

Safety Helmets (EN397)

Ear Defenders (EN 352-3)

Hi-visibility vests (EN471) – orange

Safety footwear - steel toecap and mid-sole boots and Wellingtons EN345-47 (No riggers are allowed)

Gloves Nitrile, PVC, EN374

Safety spectacles – low impact (EN166)

*If required:* Dust masks plain and valved (EN149 2001)

Additional PPE to the above will need to be supplied by the Principal Contractor

### 21.8.4 Staff

The timing and overall duration of the evaluation and watching brief tasks listed earlier will be determined by the contractor's programme and the nature and extent of any surviving remains. It is envisaged that the Watching Brief will be initially carried out by one MOLA Supervisor, with further archaeologists and/or specialists when required.

The evaluation is likely to require the attendance of one MOLA Supervisor during the initial machining of the trench, with additional staff brought in as required. It is *provisionally* estimated that 1 to 2 archaeologists and specialists might generally be required on site, rising to 1 to 6 if required. MOLA will notify the Principal Contractor if more staff are required.

## 21.9 Briefing Arrangements

### 21.9.1 MOLA Staff Induction – New Starters

- All MOLA staff shall receive a full induction including Health and Safety on commencement of their first day of work with the organisation. A record of the induction is kept.
- The MOLA Supervisor will be briefed by MOLA Contracts Manager/Assistant Contracts Manager on all relevant aspects of work before work commences. This briefing will include all SS-WSI, Method Statements (PC's and including this document).
- The MOLA Supervisor will be responsible for briefing any other MOLA staff on site before they commence work on all aspects of the work and documents.

### 21.9.2 Site Specific Inductions, Tool Box Talks, and Daily Briefings

- Where a site is under the control of a Principal Contractor (as in this case), MOLA staff will attend all initial site inductions and subsequent toolbox talks as required and managed by the Principal Contractor.
- The C305 Principal Contractor will present a daily briefing, before the start of work each day, to all personnel working on site. This will outline the key risks and mitigations identified for the tasks that are planned, and serve to receive feedback on any such issues.
- Irrespective of whether the site is controlled by MOLA or a Principal Contractor, on larger projects eg those with more than 2–3 staff and of a week or longer duration, regular toolbox talks will be given by the MOLA Supervisor or other suitable member of staff using the CITB
- construction site safety tool box talks manual. As a minimum requirement these talks will occur 1–2 times per week and be of 10–15 minutes duration.

## 21.10 First Aid

### 21.10.1 Trained First-Aid Personnel

Where possible with the small numbers of MOLA staff during watching briefs and small evaluations, there will be at least one MOLA Archaeologist who is a qualified First Aider (ie 3 day FA at work course) on site. If not, the Principal Contractor's first aider(s) responsible for the watching brief task(s) will be identified by MOLA at the Principal Contractor's Induction, and their services used if required.

### 21.10.2 First Aid Documents

The MOLA site safety documents will be located with the first aid kit in the site office/mess hut/canteen. The safety documents will include a minimum of

- Current Health and Safety at Law Poster for display where legislation requires
- Accident Book compliant with the Data Protection Regulations (*in addition to the Principal Contractor's Accident book*).
- MOLA Public Liability Insurance & Employers Liability Insurance for display
- Where To Get First Aid poster – to be displayed if required.



- Current MOLA Health and Safety Policy
- A copy of the site Welfare, Health and Safety Method Statement, extracted from the Site WSI, and modified as agreed during the course of the site.

#### 21.10.3 First Aid Equipment

For 1 to 2 person watching briefs, a 'bum bag' will be carried by the MOLA Senior Archaeologist at all times. During larger scale work, a MOLA First Aid kit, of an appropriate size for the site, will be located in the site office/mess hut/canteen.

### **21.11 Accident, Incident, Near Miss and Environmental Incident Reporting**

#### 21.11.1 Reporting of Accidents/Incidents and Dangerous Occurrences

The Reporting of Injuries, Diseases and Dangerous Occurrences (RIDDOR) Regulations, 1995 sets out requirements for the reporting of certain types of accidents. RIDDOR notifiable accidents will be reported immediately by the MOLA site supervisor as specified in Section 16.5 of the method statement, above.

#### 21.11.2 Documentation

In order to identify quickly problem areas and allow corrective action to be taken all accidents, dangerous occurrences and near misses, including those that do not cause injury, will be reported immediately to

Principal Contractor's Site Manager

MOLA supervisor

MOLA H&S Compliance Manager

MOLA Senior/Contracts Manager

Crossrail Project Archaeologist

Crossrail Helpdesk.

The site accident books for *both the Principal Contractor and MOLA* should be filled in giving details of the incident.

#### 21.11.3 Investigation of Accidents and Dangerous Occurrences

MOLA will comply with the Principal Contractor's and Crossrail procedures.

MOLA will also initiate internal procedures as follows

- Initial accident/incident report to MOLA Senior Contract Manager and H&S Compliance Manager and action taken as appropriate.
- Non Riddors investigated by Senior Contract Manager/H&S Compliance Manager.
- Riddors investigated and reported on to Senior Management Consultant by MOLA H & S Consultants.

#### 21.11.4 Key Project Personnel

- George Dennis, Senior Contracts Manager, MOLA
- Elaine Eastbury, Contracts Manager, MOLA
- Nicholas Elsdon, Assistant Contracts Manager, MOLA

### **21.12 Emergency Procedures – Site General**

All MOLA staff will comply with the Principal Contractor's procedures as outlined at the Site Specific Induction.

### **21.13 Emergency Services Contact Details**

#### ***Full A & E at***

Newham General Hospital

Glen Road, London Area, London E13 8SL

020 7476 4000

The MOLA supervisor will dial 999 for fire, ambulance and police in the case of an emergency if the Principal Contractor's Site Manager or his deputy is not present on site.

### **21.14 Route to Hospital**

The Principal Contractor will advise on route to hospital at their site specific induction. The location and directions will also be displayed in the site offices and canteen.

## 22 Risk Assessments

### 22.1 Overall site risk assessment

		<b>SITE RISK ASSESSMENT REGISTER</b>															
<b>For Site: Crossrail, Instone Wharf</b>						<b>Type: Watching Briefs and Evaluation</b>											
<b>Persons Affected</b>				<b>No</b>		<b>Classification</b>				<b>No</b>							
Employees				1–6		Experienced				1–6							
Other workers						Inexperienced											
Public						Disabled											
<b>Known and Suspected Hazards on site (mark as appropriate) and include numbered risk assessment in WSI</b>																	
1 Access	✓			17 Contaminated Land					33 Plant as lifting equipment								
2 Ladders	✓			18 Weil's Disease			✓		34 Human Remains								
3 Plant	✓			19 Psittacosis					35 Public Safety								
4 Dumpers				20 UXO			✓		36 Violence (to Staff)								
5 Scaffolding (inc Towers)				21 Asbestos					37 Chainsaw								
6 Excavations	✓			22 Welfare/housekeeping					38 Power Auger								
7 Work at height	✓			23 Lone working					39 Hand Auger								
8 Slips, Trips, falls	✓			24 Manual Handling					40 Foreshore/water								
9 Underground services				25 Fumes/Gas					41 Adverse Weather								
10 Overhead Power Lines				26 Dust					42 Spoil Mounding								
11 Electrical				27 Noise					43 LPG(Butane)								
12 Fire (inc LPG)				28 Deep Excavations			✓		44 Waste								
13 Confined spaces				29 Power Tools					45 Storage								
14 Breaking Out				30 Vibration					46 Animals								
15 Hand Tools	✓			31 Vehicles					47 Ionising and non-ionising radiation								
16 Spray paint				32 Lifting Equipment( Hoists)					48 OTHER								
<b>Assessment Of Remaining Risk From Specific Risk Assessments Included in WSI With This Register</b>																	
	<b>L</b>	<b>M</b>	<b>H</b>		<b>L</b>	<b>M</b>	<b>H</b>		<b>L</b>	<b>M</b>	<b>H</b>						
1 Access	✓			17 Contaminated Land				33 Plant (lifting)									
2 Ladders	✓			18 Weil's Disease			✓	34 Human Remains									
3 Plant	✓			19 Psittacosis				35 Public Safety									
4 Dumpers				20 UXO			✓	36 Violence (to Staff)									
5 Scaffolding (inc Towers)				21 Asbestos				37 Chainsaw									
6 Excavations	✓			22 Welfare/housekeeping				38 Power Auger									
7 Work at height	✓			23 Lone working				39 Hand Auger									
8 Slips, Trips, falls	✓			24 Manual Handling				40 Foreshore/water									

*Instone Wharf Archaeological Evaluation Method Statement © MOLA 2012*

9 Underground services			25 Fumes/Gas			41 Adverse Weather		
10 Overhead Power Lines			26 Dust			42 Spoil Mounding		
11 Electrical			27 Noise			43 LPG(Butane)		
12 Fire (inc LPG)			28 Deep Excavations	✓		44 Waste		
13 Confined spaces			29 Power Tools			45 Storage		
14 Breaking Out			30 Vibration			46 Animals		
15 Hand Tools			31 Vehicles			47 Ionising/non-ionising rad		
16 Spray paint			32 Lifting Equipment			48 OTHER		

**General Project Controls**

Contracts Manager in over all charge of project is: Elaine Eastbury                      Tel: 020 7410 2237, m. 07730 646063

Supervisor(s) in daily charge of project is: TBC

Number, training and experience of supervisors will be sufficient for the project.

Supervisor(s) holds IOSH Supervising Safely Cert: TBC – but Probable.

All staff will comply with the: MOLA H&S policy, Principal Contractors site rules, all WSIs, Risk assessments, safe systems of work, Permits to work.

All staff will have sufficient training and experience for the tasks they undertake, or be under close supervision.

All staff will be CITB H&S tested and hold a CSCS card appropriate to their profession.

All staff will be fit to undertake their work.

All staff will be inducted on first day of work, briefed on the WSI and the specific hazards and control measures attendant on their work on site.

Tool box talks/staff briefing will be conducted on the hazards and control measures on a regular basis (at least weekly or more frequently if circumstances dictate).

Appropriate PPE to be worn.

First Aid kit on site, First aider/appointed person on site. Nearest accident and emergency unit located and contact numbers obtained.

On General Watching Briefs, Archaeologists will not enter the trench(es) but will observe from the top and record and photograph the brickwork removed by machine.

<p><b>Competent Person(s) appointed to take action:</b></p> <p>Ian Grainger H&amp;S Compliance Manager</p> <p>Contract Manager: Elaine Eastbury</p> <p>Senior Archaeologist – TBC</p> <p>Senior Geoarchaeologist – TBC</p> <p>Crossrail site manager – Juan Azofra</p> <p>Principal Contractor – DSJV Safety Manager Ernie Donnel</p>	<b>All Risk Assessments seen by (initials)</b>	
	<b>PM</b>	<b>Archaeologists</b>
	<b>SA(s)</b>	
	<b>Client</b>	
	<b>Contractor</b>	
	<b>Other</b>	

## 22.2 Specific Risk Assessments

<b>MOLA RISK ASSESSMENT</b>				<b>AREA/TRENCH:</b> Muck pit and wharf side	<b>REFERENCE NO: 0001</b>			
<i>PROJECT: Instone Wharf</i>								
<b>ACTIVITY/TASK/HAZARD:</b> ACCESS				<b>COMPLETED BY:</b> C Halsey	<b>DATE COMPLETED:</b> 25.04.2012			
<b>TO BE READ IN CONJUNCTION WITH:</b> WSI/MS				<b>OVERALL REVIEW DATE:</b> TBC				
Hazards	Initial Risk Rating			Persons Affected	Control Measures	Remaining Risk L/M/H	Action By (initials)	Reviewed/amended On site (date & initials)
	L	M	H					
Fall of persons from height Fall of objects from height Slips Trips falls Collapse of structure	✓ ✓ ✓ ✓			Staff	All access routes will be kept clear of debris/obstructions/hazards. All safe access routes will be clearly sign posted All hazards will be marked and in an exclusion zone All access routes will be well lit. All stepped access will be maintained in good condition All sloping access will be at 45 degrees or less and maintained in good condition. All access routes will be inspected daily, after adverse weather, or when it is altered. The principal contractor will ensure adequate provision is provided for safe access	L	CM & SA	Weekly review required on project by PO/SA or HSM, amend control measures when circumstances change if required
<b>All persons affected by this hazard must be made aware of the contents of this Risk Assessment</b>								

<b>MOLA RISK ASSESSMENT</b>				<b>AREA/TRENCH:</b> Muck pit and wharf side	<b>REFERENCE NO: 0002</b>			
<b>PROJECT: Instone Wharf</b>								
<b>ACTIVITY/TASK/HAZARD:</b> LADDERS				<b>COMPLETED BY:</b> C Halsey	<b>DATE COMPLETED:</b> 25.04.2012			
<b>TO BE READ IN CONJUNCTION WITH:</b> MS				<b>OVERALL REVIEW DATE:</b> TBC				
Hazards	Initial Risk Rating			Persons Affected	Control Measures	Remaining Risk L/M/H	Action By (initials)	Reviewed/amended On site (date & initials)
	L	M	H					
Fall of person from ladder	✓			Staff	Ladders will be of correct length and type	L	CM & SA	Weekly review required on project by PO/SA or HSM, amend control measures when circumstances change if required
Fall of materiel from ladder	✓				Ladders will be subject to daily inspection when in use			
Collapse/slippage of ladder	✓				Ladders will project at least 1.50m above stepping off point.			
Injury to persons below	✓				ladder s will be securely fixed at top and base (where practicable)			
					ladders will be at an angle of 75 degree (1:4 ratio over length)			
					Ladder will be grounded on firm level ground			
					Painted ladders will not be used			
					Damaged ladders will not be used			
					Aluminium Ladders will be used in preference to timber			
					Always make sure that any load can be carried comfortably with one hand free for ladder			
<b>All persons affected by this hazard must be made aware of the contents of this Risk Assessment</b>								

<b>MOLA RISK ASSESSMENT</b>				<b>AREA/TRENCH:</b> Muck Pit and wharf side	<b>REFERENCE NO: 0003</b>			
<b>PROJECT: Instone Wharf</b>								
<b>ACTIVITY/TASK/HAZARD:</b> PLANT				<b>COMPLETED BY:</b> C Halsey	<b>DATE COMPLETED: 25.04.2012</b>			
<b>TO BE READ IN CONJUNCTION WITH: MS</b>				<b>OVERALL REVIEW DATE: 25.04.2012</b>				
Hazards	Initial Risk Rating			Persons Affected	Control Measures	Remaining Risk L/M/H	Action By (initials)	Reviewed/amended On site (date & initials)
	L	M	H					
Persons Struck by Machine	✓			Staff	MOLA staff not certified or trained to operate plant and will not do so. plant operator must be trained and certificated and fit to work and uncertificated drivers will not be allowed to operate plant on site	L	CM & SA	Weekly review required on project by PO/SA or HSM, amend control measures when circumstances change if required
Shovel or load dropping	✓							
Hydraulic fluid spray	✓							
Overturning of machine	✓				Sub contracted plant hire companies to be H&S assessed and audit prior to hire			
Fire/explosion	✓				Plant must be inspected and certificated as fit for use before work commences and plant operator must conduct daily inspection of plant.  Defective plant must not be used and must be service and repair only by qualified contractor.  MOLA staff will not work with or near plant operator obviously under influence of drugs/alcohol or otherwise behaving erratically  All plant operations for MOLA to be under supervision of MOLA supervisor and Trained banks person also where applicable  All staff working near machine to ensure that the operator has seen them and that they are maintaining a safe distance  Separate pedestrian areas and routes to be established and barriered where practicable. Plant to be traffic managed on site e.g.			

				<p>Speed restrictions for JCBs, designated routes and work areas and plant to be switched off and secured when not in use. Particularly overnight/weekends</p> <p>MOLA staff to be briefed on plant operations and changes to those operations</p> <p>Warning signs to be displayed as appropriate</p> <p>Ear defenders to be worn with standard PPE when there are high Noise levels e.g. breaking out operations</p>			
<p><b>All persons affected by this hazard must be made aware of the contents of this Risk Assessment</b></p>							



<b>MOLA RISK ASSESSMENT</b>				<b>AREA/TRENCH: Muck pit and wharf side</b>		<b>REFERENCE NO: 0006</b>		
<b>PROJECT: Instone Wharf</b>								
<b>ACTIVITY/TASK/HAZARD: EXCAVATION AREAS &amp; TRENCHES</b>				<b>COMPLETED BY: C Halsey</b>		<b>DATE COMPLETED: 24.04.2012</b>		
<b>TO BE READ IN CONJUNCTION WITH: MS</b>				<b>OVERALL REVIEW DATE: TBC</b>				
Hazards	Initial Risk Rating			Persons Affected	Control Measures	Remaining Risk L/M/H	Action By (initials)	Reviewed/amended On site (date & initials)
	L	M	H					
Collapse of sides	✓			Staff	<p>Service plans will be consulted prior to commencement where available and appropriate, and measures put in place to avoid, isolate, or decommission live services. Cable location by competent person will be undertaken prior to commencement – see RA 0009</p> <p>A ground Contamination report will be obtained prior to commencement where available and applicable and measures put in place to reduce the risk to staff – see RA 0017</p> <p>A competent person will determine the depth for the installation of shoring/ battering back, shoring will be installed by competent persons and inspected and maintained by them daily/each shift Edge barriers, Access scaffolding/Ladders, will be erected, maintained and inspected by competent persons – see RA 0001, 0002, 0028</p> <p>Appropriate warning and information signs will be displayed</p> <p>All hand tools will be fit for use and visually inspected before use- RA0015</p> <p>All Plant/lifting</p>	L	CM & SA	Weekly review required on project by PO/SA or HSM, amend control measures when circumstances change if required
Striking existing services	✓							
Persons falling in	✓							
Plant, bucket, and materials falling in	✓							
Flooding	✓							
Hazardous atmosphere	✓							
Contaminated soil	✓							

				<p>equipment/power tools will be inspected and certified as fit for use by competent person before use and inspected daily thereafter. The training and certification of plant operators will be checked, prior to the start of work. Uncertificated plant and plant operatives will not be allowed to operate on site (see RA 0003, 0029, 0032, 0033, 0037, 0038)</p> <p>A Pump or pumps will be provided for use where flooding is an issue and will be inspected and certified prior to use.</p> <p>A certified and tested gas monitor will be provided and used where required</p> <p>Designation for Confined space will be assessed prior to commencement and the relevant safety procedures and equipment implemented</p>		
<p><b>All persons affected by this hazard must be made aware of the contents of this Risk Assessment</b></p>						

<b>MOLA RISK ASSESSMENT</b>				<b>AREA/TRENCH:</b> Muck pit and wharf side	<b>REFERENCE NO:</b> 0007			
<i>PROJECT: Instone Wharf</i>								
<b>ACTIVITY/TASK/HAZARD:</b> WORK AT HEIGHT				<b>COMPLETED BY:</b> C Halsey	<b>DATE COMPLETED:</b> 24.04.2012			
<b>TO BE READ IN CONJUNCTION WITH:</b> MS				<b>OVERALL REVIEW DATE:</b> TBC				
Hazards	Initial Risk Rating			Persons Affected	Control Measures	Remaining Risk L/M/H	Action By (initials)	Reviewed/amended On site (date & initials)
	L	M	H					
Falls of Persons	✓			Staff	Safe access ensured by:  Fixed Ladders (RA 0002)  Robust and suitable Edge protection will be provided  Safety harnesses and lanyards will be provided if required and secured to suitable fixed point  Warning signs will be in place  Toe-boards/mesh/chutes will in place to prevent falling debris where appropriate  Workers below will be protected by an exclusion zone if appropriate  Staff will be task briefed before commencement  Staff will be suitable for work at height and comfortable doing so  All equipment will be checked daily/before each shift by competent person	L	CM & SA	Weekly review required on project by PO/SA or HSM, amend control measures when circumstances change if required
Falls of materials and equipment		✓						
Working/Access adjacent to deep trenches								

					Permit to work in operation?			
<b>All persons affected by this hazard must be made aware of the contents of this Risk Assessment</b>								

<b>MOLA RISK ASSESSMENT</b>				<b>AREA/TRENCH:</b> Muck pit and wharf side	<b>REFERENCE NO: 0008</b>			
<i>PROJECT: Instone Wharf</i>								
<b>ACTIVITY/TASK/HAZARD: SLIPS, TRIPS, FALL (On Level)</b>				<b>COMPLETED BY: C Halsey</b>	<b>DATE COMPLETED: 25.04.2012</b>			
<b>TO BE READ IN CONJUNCTION WITH: MS</b>				<b>OVERALL REVIEW DATE: 25.04.2012</b>				
Hazards	Initial Risk Rating			Persons Affected	Control Measures	Remaining Risk L/M/H	Action By (initials)	Reviewed/amended On site (date & initials)
	L	M	H					
Injury to self and others	✓			Staff	All work areas to be kept free of obstruction and debris	L	CM & SA	Weekly review required on project by PO/SA or HSM, amend control measures when circumstances change if required
Dropping of equipment/materiel	✓				All work areas to be well lit			
					All safe pedestrian routes to be sign posted			
					Dangerous areas to be sign posted and subject to exclusion zone			
					All protective barriers to be in place as appropriate			
					All surfaces to be kept level and dry where practicable			
					Staff to be physically fit for the conditions on site			

					<p>All staff to be briefed on safe pedestrian routes and changes thereto</p> <p>All visitors to be inducted and accompanied by site staff</p> <p>Supervisor to assess work in adverse weather – eg heavy rain, snow, ice, high winds etc and suspend work if appropriate</p>			
<p><b>All persons affected by this hazard must be made aware of the contents of this Risk Assessment</b></p>								

<b>MOLA RISK ASSESSMENT</b>				<b>AREA/TRENCH: Muck pit and wharf side</b>	<b>REFERENCE NO: 0015</b>			
<b>PROJECT: Instone</b>								
<b>ACTIVITY/TASK/HAZARD: HAND TOOLS</b>				<b>COMPLETED BY: C Halsey</b>	<b>DATE COMPLETED: 24.04.2012</b>			
<b>TO BE READ IN CONJUNCTION WITH: MS</b>				<b>OVERALL REVIEW DATE: 24.04.2012</b>				
Hazards	Initial Risk Rating			Persons Affected	Control Measures	Remaining Risk L/M/H	Action By (initials)	Reviewed/amended On site (date & initials)
	L	M	H					
Eye Injury	✓			Staff	All hand tools to be bought from reputable supplier and to industry safety standard?	L	CM? PO? SA? PC? C?	Weekly review required on project by PO/SA or HSM, amend control measures when circumstances change if required
Injury to hands, feet limbs and torso	✓				Hand tools to be delivered to site in good condition by equipment officer			
Manual handling/Back injury	✓				Supervisor to inspect tools on delivery			
Direct impact from tool	✓				Appropriate PPE to be worn – eg eye protection and gloves as well as standard PPE			
Impact from flying debris	✓				Staff to be task briefed where			
<b>Covers use of: Mattock, Shovel, spade, pick axe, trowel,</b>								

draw hoe, garden fork, hand shovel, brush, lump hammer, sledge hammer, chisel, bolster and similar simple non mechanical tools					applicable			
					Staff to be fit and able to use tools,  Staff to be experienced in the use of tools			
					Adequate training and supervision to be given to inexperienced staff			
					Adequate breaks/rest periods			
					Manual handling risk assessment?			
<b>All persons affected by this hazard must be made aware of the contents of this Risk Assessment</b>								

<b>MOLA RISK ASSESSMENT</b>				<b>AREA/TRENCH:</b> Muck pit and wharf side	<b>REFERENCE NO:</b> 0018			
<b>PROJECT:</b> Instone Wharf								
<b>ACTIVITY/TASK/HAZARD:</b> WEILS DISEASE (LEPTOSPIROSIS)				<b>COMPLETED BY:</b> C Halsey	<b>DATE COMPLETED:</b> 25.04.2012			
<b>TO BE READ IN CONJUNCTION WITH:</b> MS				<b>OVERALL REVIEW DATE:</b> 25.04.2012				
Hazards	Initial Risk Rating			Persons Affected	Control Measures	Remaining Risk L/M/H	Action By (initials)	Reviewed/amended On site (date & initials)
	L	M	H					
Leptospirosis: bacteria transmitted by rat faeces and urine surviving in standing water, damp ground  Fever like symptoms (leptospirosis) can lead to organ failure/death – Weil's Disease  Transmission	✓			Staff	All staff to be briefed on hazard at general induction and site induction where applicable  All staff to carry HSE G 406 instruction card  All staff will: wear gloves, maintain high standard of personal hygiene, clean and cover any cuts or abrasions promptly with a waterproof plaster and wash hands before eating or drinking	L	CM & SA	Weekly review required on project by PO/SA or HSM, amend control measures when circumstances change if required

via broken skin or ingestion					There will be no eating drinking and smoking outside designated areas,			
Rats also cause:					Welfare facilities will be kept dry, tidy and secure			
Bites and scratches					All food will be kept covered and secure all food			
Damage to food and property					Supervisor will maintain basic visual surveillance of staff for flu like symptoms. Staff to report ill health to supervisor			
					Staff should register with their doctor that they work in environments where Weil's disease may be a problem			
<b>All persons affected by this hazard must be made aware of the contents of this Risk Assessment</b>								

<b>MOLA RISK ASSESSMENT</b>				<b>AREA/TRENCH: Muck pit and wharf side</b>	<b>REFERENCE NO: 0021</b>			
<b>PROJECT: Instone Wharf</b>								
<b>ACTIVITY/TASK/HAZARD: UXO (Unexploded Ordnance)</b>				<b>COMPLETED BY: C Halsey</b>	<b>DATE COMPLETED: 25.04.2012</b>			
<b>TO BE READ IN CONJUNCTION WITH: MS</b>				<b>OVERALL REVIEW DATE: 25.04.2012</b>				
Hazards	Initial Risk Rating			Persons Affected	Control Measures	Remaining Risk L/M/H	Action By (initials)	Reviewed/amended On site (date & initials)
	L	M	H					
Explosion	✓			Staff	Project will be planned to avoid areas of known or suspected UXO presence if possible. The PC will Liaise with/notify MOD, Police, local authority, or others as appropriate before work commences.	L	CM & SA	Weekly review required on project by PO/SA or HSM, amend control measures when circumstances change if required
Fire	✓							
Injury to persons	✓							
Damage to	✓							

property					Follow instructions given by these bodies			
Disruption of locality	✓							
Public anxiety	✓				Site specific induction will be given to all staff working on project to cover the known or suspected UXO risks			
Note UXO includes								
Both British and enemy bombs, shells mines, anti-personnel devices, grenades, bullets, ammunition of all sizes, as duds fired, ordnance discarded/dumped and stored, from any period, not just bombs from the two C20 world wars					The Induction will include photographs and diagrams of suspected ordnance. Photographs and diagrams of suspected ordnance will be prominent on site notice boards			
					Tool box talks will be undertaken to remind staff of hazards			
					Staff will report all discoveries of UXO to supervisor			
					Staff will Vacate area immediately and it will be cordoned off			
					Supervisor will Inform UXO specialist contractor if on site			
					Supervisor will if possible from visibly inspect device from safe distance to make sure its not a known object like a gas cylinder or fire extinguisher			
					Supervisor will inform police, contract manager, and Hand S Manager			
					Supervisor will not to instruct staff to re-enter area until given all clear by competent authority			
					No staff will re-enter area until told it is safe to do so by supervisor			



<b>All persons affected by this hazard must be made aware of the contents of this Risk Assessment</b>								

<b>MOLA RISK ASSESSMENT</b>				<b>AREA/TRENCH: Muck Pit and Wharf side</b>	<b>REFERENCE NO: 0028</b>			
<b>PROJECT: Instone Wharf</b>								
<b>ACTIVITY/TASK/HAZARD: DEEP EXCAVATIONS</b>				<b>COMPLETED BY: C Halsey</b>	<b>DATE COMPLETED: 25.04.2012</b>			
<b>TO BE READ IN CONJUNCTION WITH: MS</b>				<b>OVERALL REVIEW DATE: 06.09.12</b>				
Hazards	Initial Risk Rating			Persons Affected	Control Measures	Remaining Risk L/M/H	Action By (initials)	Reviewed/amended On site (date & initials)
	L	M	H					
Collapse of sides	✓			Staff	Staff will be given a task specific briefing before commencement	L	CM & SA	Weekly review required on project by PO/SA or HSM, amend control measures when circumstances change if required
Striking existing services	✓				Depth at which shoring or battering back of trench must be implemented to be determined by competent person			
Persons falling in	✓							
Plant, bucket, and materials falling in	✓				Shoring or battering back to be undertaken by competent contractor and inspected daily/before each shift			
Flooding	✓				Access ladders/scaffolding must be installed and inspected by competent contractor. Edge protection – eg fixed scaffolding barrier – will be installed around trench by a competent person			
Hazardous atmosphere	✓				'Danger Deep Excavation' Warning signs will be displayed where appropriate ie site boundary/entrance, trench edge protection			
					Where appropriate a fixed			

				<p>hoist will be used to remove spoil rather than a crane or mechanical excavator being used as a hoist.</p> <p>Hoist and plant operators will be briefed on MOLA the works and operating procedures for deep excavations by the supervisor</p> <p>The size and shape of the bucket or skip used for spoil disposal will be suitable for the size of trench, shoring, and other obstructions (eg services)</p> <p>Only staff physically fit and suitable will work in deep excavations</p> <p>The supervisor will carry out basic health surveillance of staff</p> <p>Staff will report all unwell symptom to the supervisor immediately</p> <p>A mechanical pump(s) will be made available where necessary and will be of sufficient power to keep the excavation dry. It will be inspected and maintained by a competent person</p> <p>Gas monitoring equipment will be used where appropriate</p> <p>A Confined Space designation and risk Assessment RA 0013 may be appropriate.</p> <p>Permit to work will be in operation?</p>		
<p><b>All persons affected by this hazard must be made aware of the contents of this Risk Assessment</b></p>						

**Channel Line 1 Programme**  
 Channel Line 1  
 Channel Ltd  
 Channel Wharf to Custom House  
 Ulimo Particulars Worksheet  
 Brisbane Water Proposed Archaeological Trial Trench  
 Location Plan  
 Date: 14/05/2012  
 By: SAOCCOR  
 Scale: 1:500  
 No: 14/05/2012  
 Rev: 1  
 Drawn and C.S. by: CRL-JRL-JDDA-CR144-0028  
 Title: Various @ A1

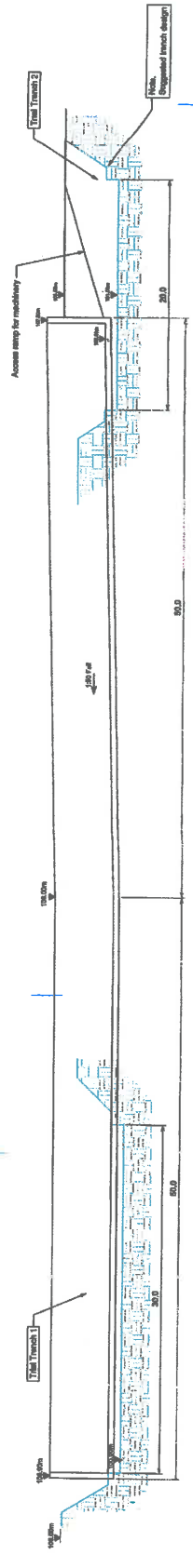
**Channel Line 1 Programme**  
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 Title: Various @ A1

Scale 1:500  
 0 10m 20m 30m 40m 50m 60m  
 Scale 1:200  
 0 10m 20m 30m 40m 50m 60m

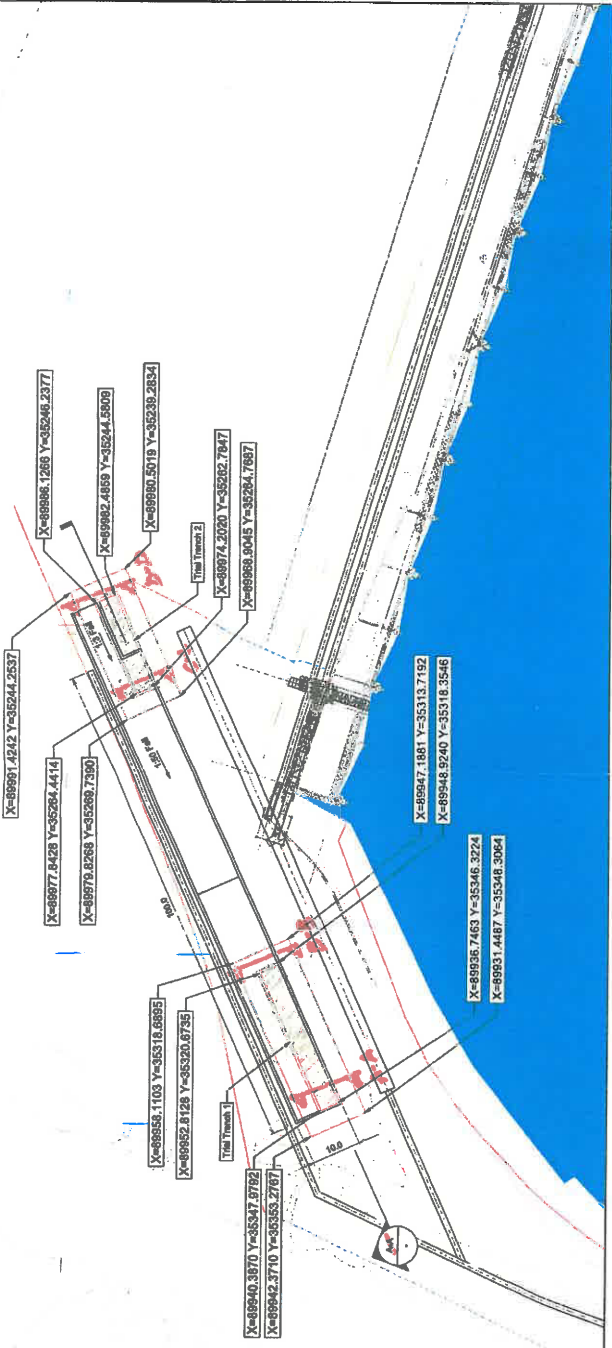
**Notes**  
 1. Confirmation of all survey data must be obtained from the Channel survey team.  
 2. All dimensions are in metres unless specified otherwise.  
 3. All dimensions are in metres unless specified otherwise.

Rev	Date	By	Description
1	14/05/2012	SAOCCOR	Issue for information

**AA - Cross Section**



**Plan 1:500**

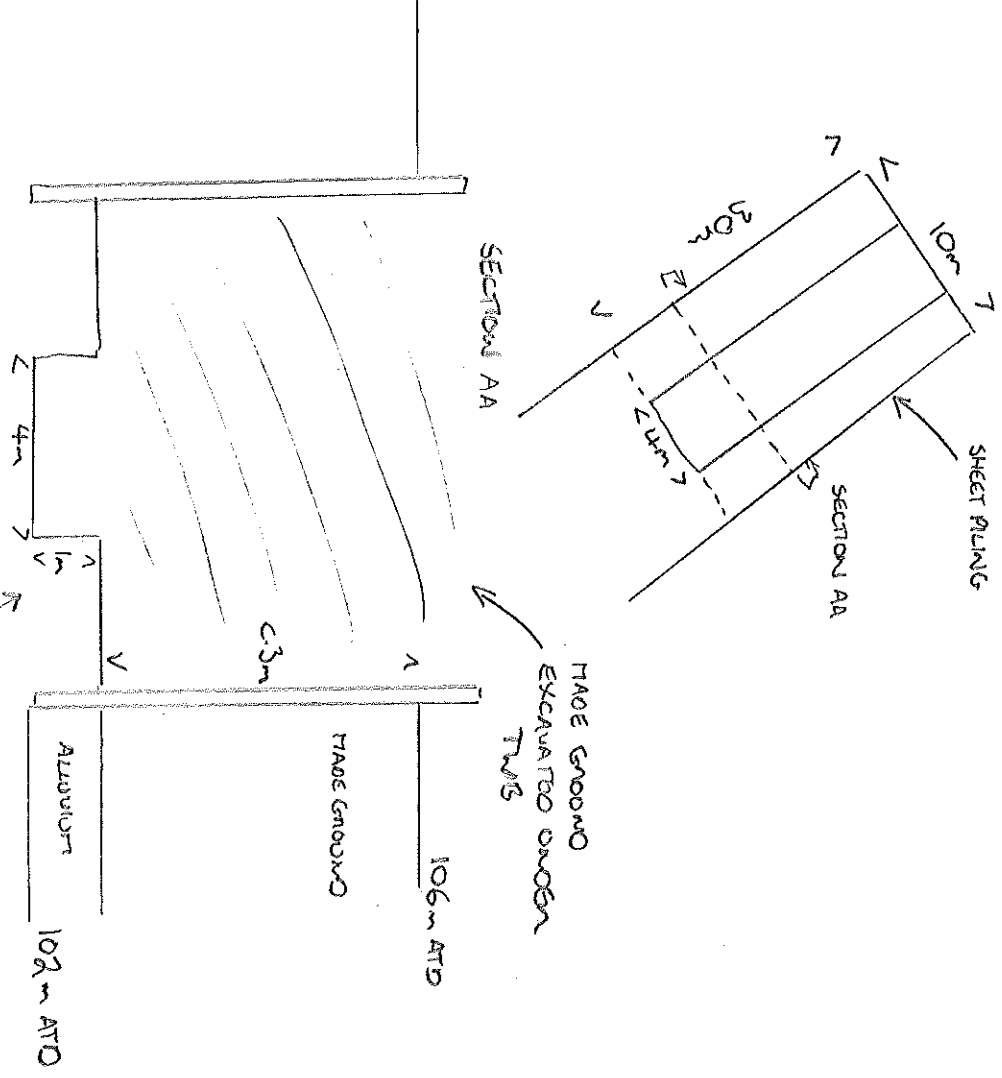


**Notes**

1. Trial Trench 1:  
 10m (L) x 4.0m (W) at base and to a maximum of 100m AFD, 6.0m below ground level
2. Trial Trench 2:  
 20m (L) x 4.0m (W) at base and to a maximum of 100m AFD, 4.5m below ground level

TRENCH 1

N-END OF HOOD PIT  
EXCAVATED AFTER INSTALLATION  
OF SHEET PILING



TRENCH 2

S-END OF HOOD PIT  
EXCAVATED PRIOR TO SHEET PILING  
AS STEPPED TRENCH

