



C405 Paddington Station

SS-WSI Addendum for Archaeological General Watching Brief during Bulk Excavation of the Crossrail Paddington Station Box

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1 Introduction

This document provides details for the archaeological general watching brief (GWB) required during the C405 bulk excavation of the Crossrail Paddington station box. The Crossrail Paddington station box will be situated to the southwest of the existing Paddington Station between ch 1250 – 1580. The new station will comprise a large underground box situated beneath Eastbourne Terrace and Departures Road, between Praed Street to the southeast and Bishop's Bridge Road to the northwest (Figure 1). This document sets out the location, scope and archaeological recording required.

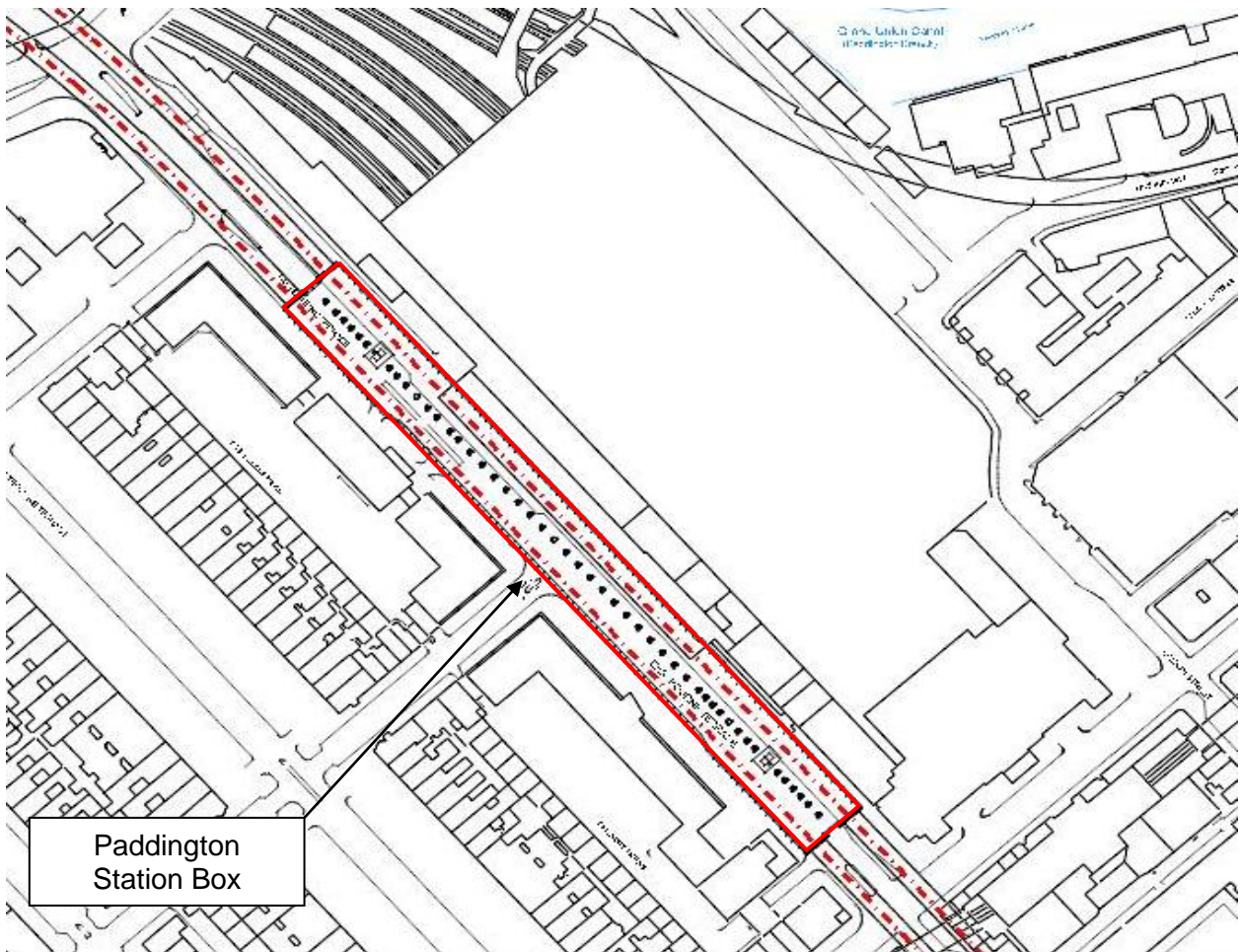


Figure 1: Location of the Paddington Station Box (Image © 2012 Bluesky Digital Globe and © 2012 Google)

This document has been prepared as an addendum to the Site Specific Written Scheme of Investigation (SS-WSI) for Paddington Station (Document No. C130-SWN-Z-RSI-B071-00001_Rev9.0).

The requirement for these archaeological mitigation works was identified in the SS-WSI and has been informed by the recently completed Trial Trench Evaluation. This has been reported in an interim report prepared by the archaeological contractor C254 Oxford Archaeology (Document No. C254-OXF-T1-RGN-CRG03-50098).

This SS-WSI Addendum should be read in conjunction with:

- the Paddington Station SS-WSI and the (Document No. C130-SWN-Z-RSI-B071-00001_Rev9.0)
- the draft Works Package Plans (WPP) WPP 091-Eastbourne Terrace Reduced Dig (Document No. C405-SKC-O1-GMS-B071_WS077-50063)
- WPP 158 -Main Box Excavation (to Concourse Level Soffit); (Document No. C405-SKC-O1-GMS-B071_WS077-50061).

This SS-WSI Addendum sets out the requirements of the C405 Main Contractor (Section 4) and the requirements of the C254 Archaeological Contractor (Section 5).

1.1 Geology and Topography

The geology and topography of the area surrounding Paddington Station are described in Section 2.5 of the SS-WSI. The underlying solid geology comprises London Clay overlain by superficial Lynch Hill terrace gravels which have been recorded at a height of c.123mATD to 123.5mATD in Eastbourne Terrace and Praed Street, respectively. The superficial River Terrace Deposits vary in thickness across the site.

1.2 Archaeological and Historical Background

The archaeological and historic background for Paddington Station has been presented in the archaeological Detailed Desk Based Assessment for Paddington Station (Crossrail 2008a. Document No. CR-SD-PAD-EN-SR-00002) and Section 2.6 of the of the Paddington Station SS-WSI (Document No. C130-SWN-Z-RSI-B071-00001_Rev9.0).

1.3 Previous Works

A number of previous archaeological investigations have been undertaken during the enabling works and C251 Utility Diversions including archaeological watching briefs during the Package 16, 17a and PAD-0122 ground investigations, utility diversion and utility corridor works, and EDF utility diversion.

In several locations along Eastbourne Terrace and Departures Road, Brick Earths of the Langley Silt complex have been recorded overlying the terrace gravels at a height of approximately 123m ATD. More recent deposits of modern made ground and overburden seal the Brick Earth at depths of up to 4.5 metres and are in turn sealed by the modern road surface.

An archaeological watching brief (XRK09) during EWMA ground investigation surveys in Departures Road under package PAD-0122 identified a possible Pleistocene horizon 0.10m thick, comprising silty sand and gravel at c.120.58m ATD in a single trial pit (Trial Pit 1). This deposit has been identified as having a low potential to contain Palaeolithic remains, although no Palaeolithic material was recovered during the watching brief. The horizon was sealed by a layer of colluvium or made ground c.1m thick of probable post-medieval date which was in turn overlain by c.2.0m of post-medieval and modern made ground (Crossrail 2010).

Alluvial clays that may be associated with a former tributary of the Westbourne have also been identified in several boreholes (Crossrail 2008, p.13) and during the archaeological watching brief on the guidewall trench in Departures Road (C254-OXF-T1-RGN-CRG03-50098; p5).

The presence of horizons of probable Pleistocene deposits with the potential to contain Palaeolithic remains or Pleistocene faunal remains have been identified during archaeological watching brief (XRK09) which monitored the PAD-0122 ground investigations in Departures Road (Figure 2). This identified a horizon 0.10m thick, comprising silty sand and gravel at



c.120.58m ATD. Laminated sands and silty gravels have also been identified during the current MacMillan House basement clash watching brief (ibid.).

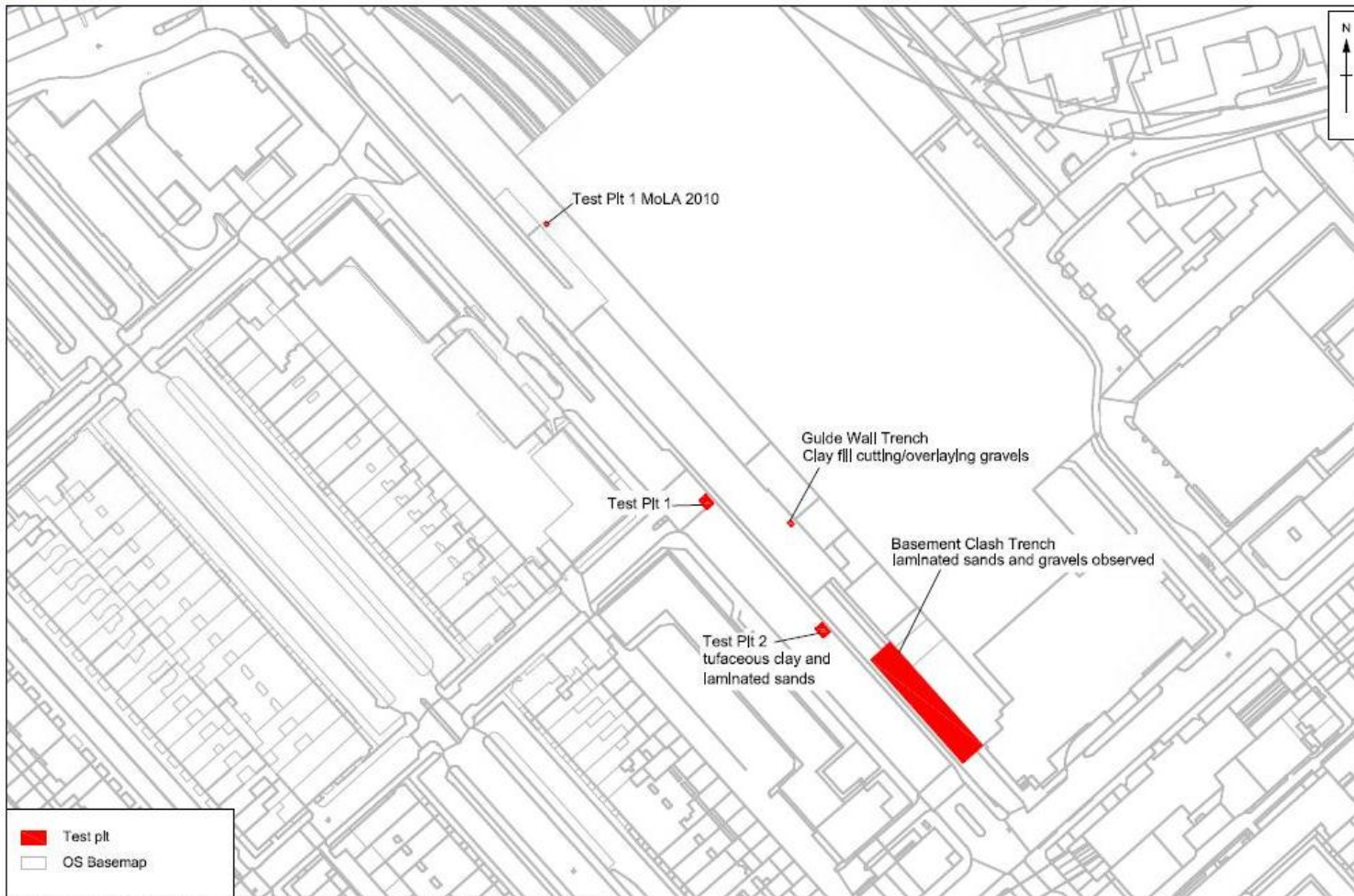
The archaeological trial trench evaluation completed by C254 Oxford Archaeology identified several deposits which have the potential to contain archaeological remains (Oxford Archaeology/Ramboll, 2012; Document No. C254-OXF-T1-RGN-CR03-50098).

In Trench 1 in situ Brick Earth deposits of the Langley Silt complex were recorded at a height of 123.47m ATD.

Trench 2 recorded probable Pleistocene deposits comprising a layer of stiff-brown, tufa rich lay at 121.95m ATD which overlay fine sands at 121.24m ATD (Oxford Archaeology/Ramboll, 2012 p.5).

These deposits suggest that a topographic feature of Pleistocene date may be present within the south-eastern section of the Paddington station box. These deposits are also identified as having the potential to contain preserved archaeological remains of Pleistocene date. This could Palaeolithic artefacts and faunal remains, and possibly other environmental indicators.

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Figure 1: Trench location plan and location of observations of potential pleistocene deposits

Figure 2: Locations at which potential Pleistocene deposits have been observed (after Oxford Archaeology/Ramboll, 2012; Figure 1)

Aims of the proposed investigation

The overall aims of the archaeological watching brief are to identify and record the location and extent of any surviving Pleistocene deposits and the extent and survival of any archaeological remains contained within them.

1.4 Site Specific Aims

The specific aims of the archaeological GWB are to:

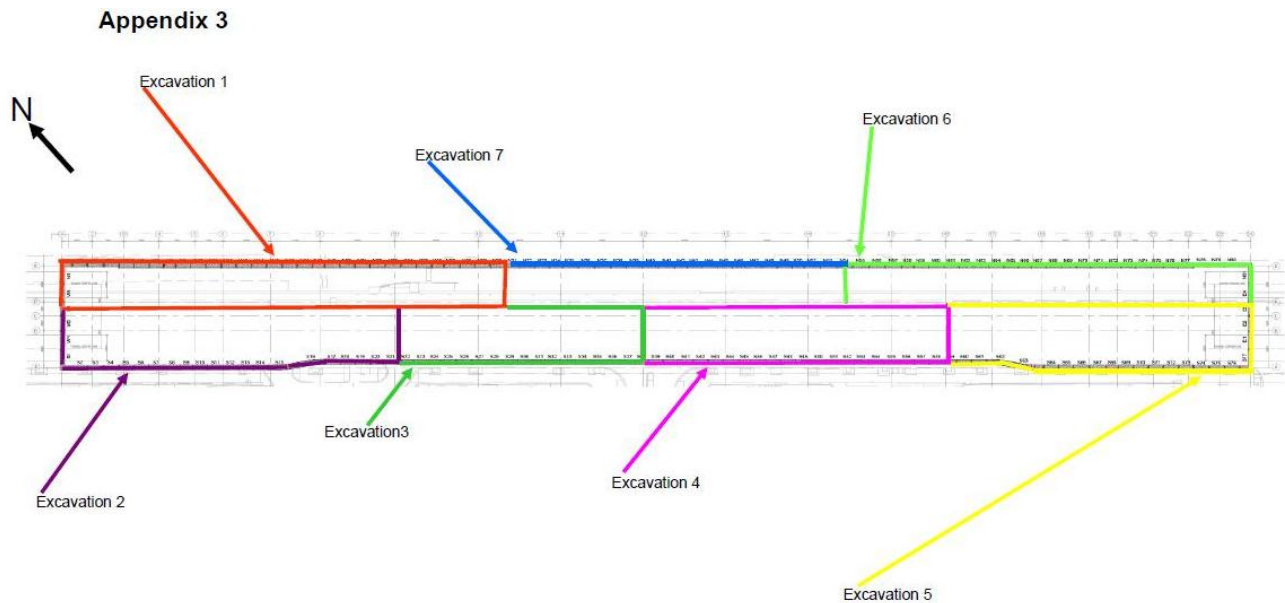
- to confirm the presence/absence, extent, depth, date, state of preservation and significance of Pleistocene deposits within the area of the Paddington Station Box;
- to confirm the presence/absence, extent, depth, alignment and significance of any topographic features of Pleistocene date within the area of the Paddington Station Box and ;
- and
- to identify and record the extent, depth, plan, form, state of preservation and significance of potential Palaeolithic artefacts, faunal remains or other environmental indicators surviving within the Pleistocene deposits.

2 Scope of Works

The general construction methodology and scope of the C405 bulk excavation of the station box are set out in the Works Package Plans WPP 091-Eastbourne Terrace Reduced Dig (Document No. C405-SKC-O1-GMS-B071_WS077-50063) and WPP 158 -Main Box Excavation (to Concourse Level Soffit); (Document No. C405-SKC-O1-GMS-B071_WS077-50061).

Excavation of the station box will be undertaken using a top down method and in several stages to allow the roof slab, intermediate, concourse and sub-platform slabs to be constructed as excavation progresses.

The excavation of the station box will also be phase along its length as shown in Figure 3 below.



Reduced Dig Proposed Sequence

Figure 3: Paddington station box reduced excavation sequence (CSJV 2012; Ix 3 draft WPP 091-Eastbourne Terrace Reduced (Document No. C405-SKC-O1-GMS-B071_WS077-50063).

Initially surface ground level will be reduced to c.124m ATD. A piling mat will be laid and plunge columns will be installed along the centre of the station box's long axis (Grid Line C). This work shall not require archaeological monitoring.

The results of the previous archaeological investigations have identified Brick Earth and potential Pleistocene deposits with the potential to contain archaeological remains between c.123.5 and c.120m ATD.

A general watching brief (GWB) will be carried out by Oxford Archaeology C254 for the following stages of C405 main contractors excavation sequence;

- excavation from 124m ATD for the roof slab formation level at 122.0m ATD; and
- excavation below the roof slab to around 119.50m ATD.

The GWB will initially be required across the full extent of the station box (see Figure 2) in order to define, where possible, the extent in plan of the Brick Earth and probable Pleistocene deposits.

Once the extent of these deposits has been established, the area required for the GWB will be reviewed in consultation with Crossrail's Project Archaeologist and reduced as appropriate.

Bulk excavation following the installation of the station roof slab (i.e. below 122m ATD) will be enclosed and will start from 'mole holes' located at the openings in the roof slab. The general



excavation methodology until sufficient depth has been reached for the full use of plant will comprise the face excavation of material during which a safe working excavation face no greater than 45° will be maintained (CCSJV 2012, p. 8).

It is acknowledged that this is not the optimum excavation methodology for the identification, investigation and recording of archaeological remains in plan.

Consequently there may be a need to review the effectiveness of the GWB with Crossrail's Project Archaeologist and the C405 Main Contractor once this stage of the bulk excavation is underway.

In the event that significant Palaeolithic finds or Pleistocene faunal remains are discovered during the GWB the C254 Archaeological Contractor will inform the Project Archaeologist and C405 Main Contractor. The C405 Main Contractor shall stop to enable the archaeological remains to be assessed as per Section A.6 *Hold/Inspection Points* of the WPP (CSJV 2012b; p.13).

Should the archaeological remains be nationally or regionally significant e.g. *in situ* assemblages of Palaeolithic worked flint or coherent assemblages of Pleistocene faunal remains, it may be necessary to implement an alternative working method to allow the investigation to proceed.

In this event it may be necessary to change the methodology from GWB to detailed excavation.

[Note : In such an event the procedures for Potentially Nationally Important Remains and the Notification of Major Unexpected Discoveries set out in Section 7 and Annex 12 of the Paddington Station SS-WSI (Document No. C130-SWN-Z-RSI-B071-00001_Rev9.0) and Managing Unexpected Discoveries in Section 6.5 of the Archaeology Generic Written Scheme of Investigation (Document No. CR-PN-LWS-EN-SY-00001) will be followed].

3 Specific Requirements for the C405 Main Contractor

3.1 Site Accommodation and Facilities

The C405 Main Contractor shall provide the following site accommodation facilities for the use of the C254 archaeologists (1 or 2 people in core team), inclusive of any hard standing and services required:

- Welfare and mess facilities;
- Male and Female toilets, with drying and washing facilities;
- First Aid;
- Storage for small plant and tools; and
- Temporary office including 1 No. desk space for the use of the C254 lead archaeologist complete with furniture, telephone and internet access.

3.2 General Watching Brief Procedure

Archaeological investigation by General Watching Brief is defined in the Generic WSI (Crossrail 2008b; Document No. CR-PN-LWS-EN-SY-00001).



The C405 Main Contractor will work with the C254 Archaeologist to ensure that the necessary controls are implemented in order to allow archaeological recording to take place to the required standard.

The method of working for the C405 Main Contractor during excavation works shall allow for:

- A safe access and viewing position for the archaeologist to observe the works
- Provide access to the archaeologist to rapidly hand clean, record and take samples if necessary, of the stratigraphic sequence of deposits visible in soil profiles, if it can be made safe to do so
- In the event that archaeological remains are encountered and these require hand excavation and recording, the area surrounding the remains should be demarcated by a safe barrier (e.g temporary fencing) in order to provide a safe working area for the C254 archaeologists and control plant tracking over any exposed archaeology;
- Allow adequate time for any surviving archaeological remains to be investigated and recorded. The duration of any archaeological investigation and recording required may vary dependant on the density and complexity of archaeological remains present. This will be instructed by the Project Archaeologist following discussion with the C405 Main Contractor, and C254 Archaeologist;
- Provide a small excavator to assist the C254 archaeologist with removal of soils if required
- Provide further technical advice to C254 as maybe required to safely complete the works.

4 Specific Requirements for the C254 Archaeological Contractor

The requirements for the C254 Archaeological Contractor are set out below, the full specification for the archaeological investigation and recording that comprise the GWB at Paddington Station are set out in Section 7 of the Paddington Station SS-WSI (C130-SWN-Z-RSI-B071-00001_Rev9.0).

The C254 Archaeological Contractor should be aware that all excavation below the station roof slab will be undertaken within a confined space and that the C405 Main Contractor and Byrne Bros will implement specific health and safety and site entry requirements as set out in the WPP (see Sections A.4.2.1 *Confined Space Working – Initial General Points* and B.0 *Health and Safety Risk Assessment*).

4.1 Archaeological Targeted Watching Brief

The Archaeological Contractor shall:

- Provide an Archaeological Method Statement inclusive of risk assessment and safe method of working and have this reviewed and approved by the Main Contractor prior to issue to Crossrail
- Provide a suitably qualified and competent staff who:
 1. have valid CSCS cards;
 2. are confined spaces trained; and
 3. have been Safety Critical passed by CSJV and Byrne Brothers.



- Provide a suitably qualified archaeologist, experienced in archaeological monitoring and recording and the nature of archaeological deposits which are expected on this site;
- Provide a suitable qualified geo-archaeologist/faunal remains expert experienced in archaeological monitoring and recording and the nature of Pleistocene deposits which are expected on this site; and
- Ensure that during the archaeological GWB the extent of the Pleistocene deposits are mapped and that any surviving archaeological or faunal remains are hand cleaned, defined and sample excavated: sufficient to determine type, plan form and relationships and that these are recorded.

4.2 Deliverables

A weekly written progress report shall be produced throughout the duration of the archaeological monitoring.

Within 2 weeks of the completion of the GWB (unless varied by the Project Archaeologist) the Archaeological Contractor will submit a Survey Report.

Within 7 days of completion of GWB the Archaeology Contractor shall submit an Interim Statement to the Project Archaeologist.

The specific requirements for each of these deliverables are set out in Sections 8.5 to 8.7 of the Paddington Station SS-WSI (Document No. C130-SWN-Z-RSI-B071-00001_Rev9.0).

4.3 Site Archives

The site archive shall be organised to be compatible with other archaeological archives in London.

4.4 Post-excavation

Further information detailing the requirements for post-excavation shall be issued by the Project Archaeologist.

5 Provisional Programme

Programme information for the C405 Paddington Station Box works is provided by the draft Main Box Construction (BLL+_no conveyor) Acceleration Rev 1.0 programme dated 8th November 2012.

An approved construction programme will be issued to C254 prior to the start of works. In the meantime, to aid programming of the GWB the dates from the key excavation activities that will require monitoring are summarised in Table 1 below:

Table 1: Current programme information for key excavation activities

Activity ID.	Activity Name	Duration	Start	Finish
Roof Slab				
West Zone (Grid Line 1-9)				
5602	Excavation 1.825m (124.0 to 122.175m AOD) G/L A-D, 1-9	6 days	01-Mar-13	08-Mar-13
1211471	Excavation 1.825m (124.0 to 122.175m AOD) G/L D-E, 1-9	5 days	10-Mar-13	16-Mar-13
Central Zone (G/L 9-16)				
18604	Excavation 1.825m (124.0 to 122.175m AOD) G/L A-D, 9-16	12 days	08-Mar-13	22-Mar-13
1211481	Excavation 1.825m (124.0 to 122.175m AOD) G/L D-E, 9-16	3 days	22-Mar-13	25-Mar-13
East Zone (G/L 16-24)				
17004	Excavation 1.825m (124.0 to 122.175m AOD) G/L A-D, 16-24	6 days	22-Mar-13	30-Mar-13
1211491	Excavation 1.825m (124.0 to 122.175m AOD) G/L D-E, 16-24	4 days	24-Mar-13	30-Mar-13
Concourse Slab				
West Zone (G/L 1-9/10)				
CS10502	Excavate to u/s prop level – G/L 2-9	36 days	10-Jun-13	22-Aug-13
CS10101	Excavate to underside of intermediate slab G/L 1 to 2/3 (8M) – I/1	3 days	28-Jun-13	03-Jul-13
Central Zone (G/L 9-/10 – 14/15)				
121624	Excavate to u/s prop level – G/L 9-14	36 days	14-Aug-13	01-Oct-13
East Zone (G/L 16-24)				
CS101202	Excavate to u/s prop level – G/L 14-21	36 days	16-Oct-13	02-Dec-13
CS-01310	Excavate to formation level – C/11	5 days	16-Nov-13	22-Nov-13
CS-01340	Excavate to formation level – C/12	5 days	22-Nov-13	29-Nov-13
CS-10501	Excavate to underside of intermediate slab G/L 21 to 24	3 days	28-Nov-13	02-Dec-13

6 References

Crossrail 2008a. Archaeological Detailed Desk Based Assessment Paddington Station, Document Number CR-SD-PAD-EN-SR-00002

Crossrail, 2008b Archaeology Generic Written Scheme of Investigation (CR-PN-LWS-EN-SY-00001)

Crossrail, 2011. Package C130 - Paddington Station Archaeology Site-Specific Written Scheme of Investigation (Document Number: C130-SWN-Z-RSI-B071-00001)

CSJV, 2012a. Works Package Plans WPP 091-Eastbourne Terrace Reduced Dig (Document No. C405-SKC-O1-GMS-B071_WS077-50063) *Draft Work Package Plan*

CSJV, 2012b. WPP 158 -Main Box Excavation (to Concourse Level Soffit); (Document No. C405-SKC-O1-GMS-B071_WS077-50061). *Draft Work Package Plan*

Oxford Archaeology, 2012. Archaeology West – Contract C254 Archaeological Works at Paddington Eastbourne Terrace, Interim Report on Trench Evaluation (Document No. C254-OXF-T1-RGN-CR03-50098))