



Crossrail Archaeology Framework

### C254 Archaeology West. Site Code - XSE 10

### Paddington Integrated Project (PIP), Paddington Station, London W2, Archaeological Fieldwork Report

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## SUMMARY

*A programme of archaeological investigations were undertaken by Oxford Archaeology/Ramboll UK (OAR), in the vicinity of Paddington Station, City of Westminster, London W2. The intermittent watching brief works, which were carried out as part of the Paddington Integrated Project (PIP) Crossrail works, commenced in September 2010 and continued through to July 2012.*

*Deposits of Brickearth were observed during the bulk excavation of the Triangle Site (east of Bishops Bridge). This geological deposit was seen overlaying an extensive (up to 2.5 m thick) sequence of gravels. These deposits were identified as Pleistocene river terrace deposits (Lynch Hill Gravels), which form part of the natural geology in this part of London.*

*Several brick built structures and other remains associated with the Great Western Railway's Paddington Goods Yards and Paddington Station were recorded during the project, including sections of a cobbled roadway made up of granite setts, uncovered beneath the modern concrete slab at the Triangle Site and at the eastern end of the Upper London Street Deck Site.*

*Other archaeological works included the monitoring of the demolition of the Milk Ramp, retaining walls and the removal of an extensive cobbled surface during utility trench works behind Platform 12.*

*All of these remains were integral elements of the Paddington Station complex and part of what was an important component of the Great Western Railway and one of the earliest major railway termini to survive in Britain.*

## 1. INTRODUCTION

### 1.1 Scope of Work

- 1.1.1 Oxford Archaeology/Ramboll UK (OAR), who were previously known as Oxford Archaeology/Gifford (OAG), were commissioned by Crossrail Ltd to undertake a programme of archaeological works in the vicinity of the Crossrail Paddington Station, London W2. (Hereafter the Site). Centred on TQ 2653 8136.
- 1.1.2 The Crossrail Paddington Station will be located between chainage.1250 –1580, south west of the existing Railway Terminus. The new Crossrail station will be formed of a large underground box constructed beneath Eastbourne Terrace and Departures Road with Praed Street to the south east and Bishops Bridge Road to the north-west. As part of the scheme, the taxi rank formerly in Departures Road was transferred to a new purpose built site, the Paddington Integrated Project (PIP), situated to the north west of Network Rail's Mainline and London Underground's (LU) Hammersmith and City Line Paddington Station (Figure: 1).



1.1.3 The Paddington Integrated Project (PIP) was established to deliver an integrated proposal for the northern part of Paddington Station. The PIP works occupy an area on the north side of the mainline Paddington Station, which consists of:

- The London Underground Hammersmith and City Line Paddington Station (under license to London Underground from Network Rail (NR));
- The Triangle Site (Upper and Lower) – bounded by Bishops Bridge Road Bridge, the towpath of the Grand Union Canal/Paddington Basin, the Hammersmith and City Line and;
- The remainder of the Site, which forms part of the existing NR freehold (primarily as the London Street Deck site).

1.1.4 The PIP scheme comprised the construction of the following:

- A new taxi facility on the London Street Desk, replacing the former taxi facility in Departures Road. This included a Vertical Circulation Core (VCC) at the eastern London Street end connecting the new taxi facility to the eastern end of NR's Paddington Station adjacent to Platform 12
- A ramp from Bishop's Bridge Road Bridge to provide access to the new taxi facility;
- A reconstructed LUs Hammersmith and City Line Paddington Station;
- Improved pedestrian access to NR's Paddington Station from the canal towpath including a new entrance that also provides access to the redeveloped Hammersmith and City Line station and;
- Provision to accommodate a future commercial development over the ramp, part of the redeveloped Hammersmith and City Line station and other parts of the Triangle Site.



## 1.2 Planning Background

- 1.2.1 Paddington Station is a Grade I listed building of exceptional national significance (Figure: 2). It is acknowledged as a masterpiece of Victorian architectural and engineering achievement, and represents one of Brunel's most important works. The whole of Paddington Station is listed and its curtilage extends throughout the station itself, Departures Road and the London Street Deck. The international significance of the Great Western Railway and Paddington Station is reflected in the fact that it is deemed worthy of consideration for UNESCO World Heritage Site status in 1999.
- 1.2.2 The overall framework within which archaeological work was undertaken is set out in the Environmental Minimum Requirements (EMR) for Crossrail (3rd draft November 2007) and confirmed in the Crossrail Act 2008.
- <http://www.legislation.gov.uk/ukpga/2008/18/schedule/7>
- 1.2.3 The requirements being progressed follow the principles of Planning Policy Guidance Note 16 on archaeology and planning (1990), superseded by PPS5 as of 23 March 2010. Accordingly the nominated undertaker or any contractors will be required to implement certain control measures in relation to archaeology before construction work begins.
- 1.2.4 The strategy for archaeological works was set out in the Crossrail Generic Written Scheme of Investigation (WSI) (14022008-44ES-P2Z1); it presented the strategy for archaeological design, evaluation, mitigation, analysis, dissemination and archive deposition that will be adopted for design and construction of Crossrail. The Generic WSI provides a general statement of objectives, standards and structure for the planning and implementation of archaeological works.
- 1.2.5 Crossrail produced a Site Specific Written Scheme of Investigation (SSWSI) for the Site (C131-MMD-T1-RGN-B071-00002, and addendum C131-MMD-T1-RGN-B071-00003). The practical methods of realising the requirements of the SSWSI were set out in OAG's Archaeology Method Statement (C254-OXF-W-GMS-CRG03-00001; OAG16188.R02) which was approved by Jay Carver, the Crossrail Project Archaeologist.
- 1.2.6 The archaeological work, which ran concurrently with the main contractor works (Contracts C271 and C272), began in late September 2010 and lasted until July 2012. The work comprised a series of intermittent archaeological investigations (General and Targeted Watching Briefs). These took place during below ground excavations for ground reduction, utility diversions and foundation inspections.
- 1.2.7 The 'Specification for Evaluation and Mitigation (CR-PN\_LWS\_EN\_SP\_0001; section 7.H.4)' defines the general and targeted watching brief work designations:
- i) *A General Watching Brief shall comprise observation and recording of the Principal Contractor's works without constraint on their working methods.*
  - ii) *A Targeted Watching Brief shall comprise observation and recording of the Principal Contractor's works with specific operations carried out under the supervision of the Archaeology Contractor. Under Targeted Watching Briefs, the Archaeology Contractor may impose constraints on, or require changes to, the Principal Contractors' or his sub-contractor's method of working to enable the archaeological investigation to take place alongside construction works.*





- iii) *Targeted Watching Briefs shall be used for areas of known occasional, dispersed features, which are either not considered to be of sufficient significance to warrant archaeological investigation in advance of construction, or where access prior to construction has not been possible and where, as a result, there is a possibility of unexpected discoveries.*
- iv) *Except in cases where unexpected, potentially nationally important, archaeological remains are discovered, the Targeted Watching Brief shall be designed and implemented so as to avoid adverse impact on the construction programme, wherever practicable.*

1.2.8 The Principal Contractor was required to make allowance in their activity programme for the completion of any Targeted or General Watching Briefs as set out in the SSWSIs

1.2.9 Targeted Watching Brief and General Watching Brief investigations were required for the following works:

**General Works:**

- Service diversion and utility works;
- Construction of worksites (including the set up for enabling works at London Street Deck). Prior to the commencement of the main construction works at Paddington, the London Street Deck was modified to become the new, permanent taxi rank. To improve access onto the deck, a new bridge was built, from the west end of the deck up to Bishop's Bridge, a connection for which provision was made as part of the recent Bishop's Bridge replacement scheme (not part of the Crossrail project).
- During the C272 Main Works Package in the London Street Deck area, (Platform 12 and Vertical Circulation Core works) the intrusive construction activities included; excavation of the escalator and lift shaft bases; thickened slabs along new wall lines; new drainage runs; and new manholes/inspection chambers, which all disturbed or removed sections of a granite sett surface laid during the 1908-1912 construction of the Milk Ramp and Fourth Span works.



***Triangle Site:***

1.2.10 Works here required the observation of general ground reduction following the construction of a retaining wall and capping beam. The ground needed to be reduced by up to 6 m.

***London Street Deck:***

1.2.11 As noted, the granite sett surface identified in package 16A trial pits in the “back of house area” to the north of Platform 12, fell within the curtilage of the Grade I listed Paddington Station structure (Figure: 2). The granite sett surface was therefore itself considered to be listed (David Keeley, Crossrail Historic Building Specialist, pers.com).

1.2.12 The works in the London Street Deck area included the following elements:

- Excavation of the escalator base (as shown on construction drawings C131-MMD-ADDA-B071\_2-43102, C131-MMD-S-DDA-B071\_3-32103 and sections C131-MMDA-DDB-B071\_Z-44304 and C131-MMD-A-DDB-B071\_Z-44318);
- Excavation of the lift shaft bases (as shown on construction drawings, C131-MMD-ADDA-B071\_2-43102 and C131-MMD-S-DDA-B071\_3-32103);
- Construction of thickened slabs along new wall lines (as shown on construction drawing C131-MMD-S-DDA-B071\_3-32102 to 4 and sections C131-MMD-A-DDBB071\_Z-44301 to 4, C131-MMD-A-DDB-B071\_Z-44309, C131-MMD-A-DDBB071\_Z-44312, and C131-MMD-A-DDB-B071\_Z-44318); and
- Laying of new drainage and the construction of new manholes/inspection chambers (as shown on construction drawings C131-MMD-P-DDA-B071\_2-43116 and C131-MMD-P-DDA-B071\_2-43117).



## 2. LOCATION, TOPOGRAPHY AND GEOLOGY

- 2.1.1 The PIP Site is located to the north of Network Rail's Mainline Paddington Station. The Site stretches from Bishops Bridge Road in the west to London Street in the east.
- 2.1.2 To the south, the eastbound line of London Underground's Hammersmith and City line and a brick built terrace wall ran along the Triangle Site's southern boundary. Whilst Platform 13 of Network Rails Paddington Station formed the boundary of the London Street Site. To the north, the Site is separated from the towpath of the Paddington Basin branch of the Grand Union Canal by a brick wall.
- 2.1.3 Across the Paddington area there is an overall slope south towards the River Thames, with a local more southwest trend towards the shallow valley of the River Westbourne. The north to south Thames slope is reflected in the drop along Eastbourne Terrace from 128m above Tunnel Datum (ATD where the Tunnel Datum is calculated as being 100m above Ordnance Datum e.g. 1m aOD = 101m ATD) in the northwest. To c.125.4m ATD in the southeast.
- 2.1.4 Incremental development and redevelopment of the site since the mid 1800s has resulted in the highly varied topography of the Site.
- 2.1.5 The Triangle Site is currently arranged on two levels. The upper level covers about two thirds of the area and is approximately at the same level as London Street at c. 128 m ATD. The lower level is approximately 6m lower (122 m ATD) and at a similar level to the platforms of the Hammersmith and City Line Station to the south.
- 2.1.6 According to Brindle (Brindle 2004, 17, 111), Paddington Station was built in a pre-existing depression or cutting. The almost continuous development and of the station since the 1840s has resulted in the currently arrangement of two distinct levels - the upper level, Eastbourne Terrace / London Street is the same level as the surrounding area. However along its northern side it drops down to a lower level. Departures Road which is approximately 4.6m lower (c. 125m ATD) and at a similar level to the platforms of the Network Rail Railway Terminus / Hammersmith and City Line Station to the south.
- 2.1.7 The British Geology Society Drift edition map of the area (Sheet 256, North London) shows that Lynch Hill River Terrace Gravel's, dated to between 250,000 and 350,000 years B.P (Marine Isotope Stage 10-8), overlie much of the Paddington area including the Site. The Thames Valley contained a number of substantial gravel terraces deposited by the river during successive glaciations (between approximately 450,000 to 50,000 years ago). One such substantial terrace plateau, the Lynch Hill phase, crosses the Paddington area in an east-west direction at around 125 m ATD
- 2.1.8 The main River Terrace sequences in the Paddington area are however more complex as they are crossed by tributaries of the Thames. These include the River Westbourne, a north bank tributary of the River Thames which starts on Hampstead Heath. This river, which now runs through an underground culvert, is of considerable antiquity and together with its associated alluvial fills may have originally developed in conjunction with the glacial phases of the Thames. The former above ground course of the River Westbourne lies beneath Westbourne Terrace / Gloucester Terrace some 200 m to the west of the Site.



- 2.1.9 The River Terrace deposits are overlain by brickearth deposits locally known as the Langley Silts (Bridgland, 1994). The Langley Silts overlie more than one gravel body in the Thames valley and are therefore of a wide variety of ages, but have been known to be associated with Palaeolithic archaeology (Gibbard, 1985; Wymer, 1968).
- 2.1.10 Some 800 m to the west of the Site, a sedimentary sequence associated with cool climate waterlain deposition was recorded by OAR during work at the Crossrail Royal Oak Portal site (Westbourne Park/Royal Oak Portal-C254-OXF-T1-RGN-CRG03-50047 and C254-OXF-T1-RGN-CRG03-50082, Lord Hill's Bridge - C254-OXF-T1-RGN-CRG03-50116 and C254-OXF-T1 RGN-CRG03-50193).
- 2.1.11 These deposits, which contained an assemblage of around 100 identifiable large 'cold stage' mammal bones (reindeer and bison), have been dated to the later parts of Marine Isotope Stage (MIS) 5 continuing into MIS 4. The richest faunal horizon at Royal Oak Portal is dated to 68.8ka B.P (MIS 4), whilst the underlying sediments range in age from 80.6ka to 88.1ka B.P. (Bates *et al* 2014, 54-55). Bates has described the Royal Oak Portal site as being of "regional and national importance" (*ibid*).
- 2.1.12 A range of geotechnical investigations were undertaken as part of the 1992 Crossrail Investigation, with further works in 1993 and 2006. The various geotechnical investigations have shown a sequence of multiple "made ground" layers overlying River Terrace deposits which in turn overlie deposits of Eocene London Clay.
- 2.1.13 In places the River Terrace deposits were overlain by a layer of, what the excavator's called brickearth and "a layer of dark grey alluvial clay at a height of 122.21 m ATD, probably relating to either a tributary of the Westbourne channel or an adjacent pond", (C130-SWN-Z-RSI-B071-00001 Section 2.55).
- 2.1.14 Within the area of the Lawn Concourse in Paddington Station itself, construction appears to have caused considerable truncation. The basements of Macmillan House appear to have truncated the upper natural geological and later deposits down to the London Clay at a height of between 118 and 120 m ATD (Paddington Scheme Design Report Document: CR-SD-PAD-CE-RT- 00002).
- 2.1.15 A series of test pits (TP6, TP7, TP9 and TP10) and one self-boring pressure meter (SBP1) ground investigation works have recorded around the Paddington Site itself. CLRL have also provided additional information from (CPTu3-CPTu8), and trial pits (TP78-TP84, TP76A, TP77A and TP82A) carried out by Soil Mechanics in 1993 as well as the results of boreholes for the Telstar House Development (BH1). In none of these exploratory holes were alluvium deposits encountered.
- 2.1.16 These investigations showed that the superficial River Terrace Deposits varied in thickness across the area. Generally the River Terrace Deposits appeared to be thickest to the east of the main Crossrail Paddington Station Box site becoming progressively thinner towards the west.

### 3. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND



- 3.1.1 The archaeological and historical development of the Paddington worksites has been set out in the Detailed Desk-based Assessment (DDBA) undertaken for Paddington Station (Crossrail, 2008a: CR-SD-PAD-EN-SR-00002). This study, which included a historic map regression exercise, is partly summarised below. Additional information is partly from the more recent Archaeology Site Specific Written Scheme of 2010a: (C131-MMD-T1-RGN-B071-00002, rev. 2).
- 3.1.2 There is limited evidence of human activity in the area from the Prehistoric, Roman and Medieval periods and the area appears to have been essentially rural in character.

#### **Prehistoric:**

- 3.1.3 To date, research has not located any evidence of prehistoric deposits within the location of Paddington Station. However, the landscape of the area during the prehistoric period would have been dominated by the valley of the River Westbourne, which ran to the west of the Site. This would have provided a background for hunter-gatherer activity and occupation during this period. Most of the evidence for such activity will be masked by later fluvial deposition.
- 3.1.4 Isolated finds of Palaeolithic axes (c. 450,000-12,000 B.C) are commonly recovered from River Terrace Gravel deposits elsewhere in London. Whilst in 1925 an assemblage of worked flint, Levallois type flakes and cores, along with remains of auroch (*Bos Primigenus*), were recovered next to a former course of the River Westbourne in Hyde Park at a height of 113.41m ATD (Dewey 1926, 73-5).
- 3.1.5 Little evidence remains of early farming and land use dating to the late Prehistoric period has been found in the area, and what has been recovered is piecemeal in nature.

#### **Roman:**

- 3.1.6 The Roman city of *Londinium* lay approximately 6 km to the east of the Site. *Londinium* was served by a series of roads, two of which are in the vicinity of the Site. Bayswater Road is aligned on Roman Stane Street, approaching London from Chichester (*Noviomagus Reginorum*) in the southwest (MLO14883; MLO11208). The Paddington Station is also located to the north west of the *Via Trinobantia* which ran from London to the town of Silchester (*Calleva Atrebatum*) along what is now Oxford Street. To the east present day Edgware Road follows the line of Roman Watling Street.
- 3.1.7 Previous archaeological field work and research has suggested that there are no known Roman remains in the immediate locality of the Paddington Station. During this period it seems that area would have been an open agricultural landscape. However, Roman occupation sites were often located at the intersection of roads and bridging points (i.e. Marble Arch or Bayswater).

#### **Anglo-Saxon and Medieval:**

- 3.1.8 No Saxon or Medieval remains have been found close to the Site. The trading port of Saxon *Lundenwic* (the successor to Roman *Londinium*) was located around the Strand and Aldwych c. 4 km to the south east of the Site.



- 3.1.9 The earliest evidence of settlement in the area comes from the name itself; *Padintune* or *Padda's tun* (farm), seen in a charter of Westminster Abbey compiled after the Norman Conquest. Paddington is not mentioned in Domesday Book.
- 3.1.10 The land of Hyde Park and surrounding regions, including the River Westbourne, formed the Saxon agricultural lands of *Eia*, which was bequeathed by Geoffrey de Mandeville to Westminster Abbey in 1086. The land to the north of the former *Eia* estates was owned by the Bishops of London. At this time Paddington appears to have been a small settlement around a central green (Paddington Green). Neither courts nor a manor house were recorded in the area during the Middle Ages.

### **Post-Medieval:**

- 3.1.11 Land use in the area gradually changed in the Post-Medieval period with urbanisation spreading out from the City of London and Westminster. The Paddington area was not immune from this and gradually evolved from a rural medieval village into a suburb of London. During the 17<sup>th</sup> century it was still a small settlement centred on a village green. It is unlikely that the late medieval hamlet of Paddington extended much further than the north and north east fringes of present day Paddington Green. A probable medieval chapel stood a short distance to the north of the Green (Elrington *et al*, 1989: 185). In 1664 just over fifty households were assessed for Hearth Tax in Paddington Green, with a further eighteen recorded at the satellite settlement at Westbourne Green (*Ibid*, 181). The medieval chapel was demolished and replaced by the new church of St. James at the end of the 1670s (*ibid*: 233).
- 3.1.12 During the 18<sup>th</sup> century the area became increasingly built up with the addition of a number of large houses, including Westbourne Manor and Westbourne Park, set in extensive grounds. The infrastructure of the area also underwent an evolution with an upgrade in the road system, including a number of toll roads (The Harrow Road).
- 3.1.13 In the 1740s the main settlement in the area was still centred on Paddington Green and along the nearby Edgware Road with smaller collections of dwellings around Westbourne Green and at Bayswater (Bayswatering) where the Uxbridge Road (Bayswater Road) crossed the River Westbourne.
- 3.1.14 Apart from some building next to St. George's burial ground at Paddington Green, little further change took place until the 1790s. In 1795 there were estimated to be only 340 houses in the parish. Most of the area was given over to grassland, providing grass and hay for the dairy farmers who supplied London with milk. (Elrington *et al*, 1989 182). Its rural charms much appreciated by artists Westbourne Green "*had a very refined air in 1795 and was considered a beautiful rural place until 1820*" (*ibid*, 1989 182, 199).

### **Modern (Pre Railway):**

- 3.1.15 More rapid development occurred in the 19<sup>th</sup> century with housing spreading into the area from the already built up areas to the south and east. Development of the area was further speeded up with the construction of the Grand Junction Canal (Regent Canal) at the turn of the 19<sup>th</sup> century, this event greatly contributed towards the transformation of the area from a series of secluded hamlets to crowded suburb.



- 3.1.16 The Paddington branch of the canal and the Paddington Basin were opened in 1801, the latter lined by wharves and warehouses on its north and south banks (*ibid* 174-180, 233-241). Within four years the Grand Junction was connected to the Grand Union Canal, turning it into a navigable waterway that eventually ran across the northern suburbs of London as far east as the River Lea.
- 3.1.17 The development of the nearby stretch of the River Westbourne, which until 1844 supplied the Bayswater area with water, had begun in 1439. With the building of a conduit to take water to City of London (MLO 56870, 52002) in the vicinity of Craven Terrace (formally Conduit Street) and Gloucester Terrace. The Westbourne, which until the middle of the 19<sup>th</sup> century was called Bayswater Rivulet (Elrington *et al* 1984, 174), is still shown as open in Crutchley's c. 1829 map (Brindle 2004, 17 fig. 2.4). The construction of the Grand Junction Canal was followed by the construction of the Great Western Railway (GWR) from the late 1830s; both of these had a considerable impact on the area. The final canalisation of the Westbourne into the Ranelagh Sewer in the 1870s was also a significant event at the time.
- 3.1.18 A footpath ran east from Westbourne Green to Paddington Green in 1746, but this was cut short by the construction of the Grand Junction Canal in 1801. This had the effect of angering the vestry as reported in the Victorian County History Volume 9. (Elrington *et al* 1984, 175). The path became known as Bishops Walk in 1828. This path connected to land acquired for the '*...depot and lines of the G.W.R. Co., which in 1837 undertook to construct a road, including a viaduct over the railway and a bridge over the canal.*' (Ibid: 176). This became known as the Bishop's Road and then as Bishop's Bridge Road in 1938.
- 3.1.19 The construction of the Grand Junction Canal (renamed the Grand Union Canal in 1929) was followed by the construction of the Great Western Railway (GWR) from the late 1830s; both of these had a considerable impact on the area. The final canalisation of the Westbourne into the Ranelagh Sewer in the 1870s was also a significant event at the time.

### **Development of Paddington Station:**

#### **1838-1854:**

The first Paddington Station was first opened for the GWR in 1838 as a temporary terminus immediately to the west of Bishop's Walk, which was replaced by a new road (Bishop's Road) and a new brick built bridge (Figure: 6). Access to the station was from an open yard to the east of the station/bridge. With passengers entering the station through the arches of the Bishop's Bridge itself. The large irregularly shaped entrance yard stood in a large hollow, in the area now occupied by the present station buildings (Brindle 2004, 20-21, figs. 2.7 and 2.9). In early pictures of the first station, a brick built retaining wall separating it from Eastbourne Terrace is shown, whilst to the north an earth bank is shown slopping up to the level of the Grand Junction Canal (Brindle 2004, 24, figs. 2.12 and 2.13). Roads were made leading down into the yard from London Street and Conduit Street (Praed Street).

#### **1854-1900:**



- 3.1.20 The first Paddington Station was demolished in c.1853 and was replaced by the present station built on the site of the former entrance yard and goods depot. The Goods Depot was relocated to the west of Bishop's Bridge road on the site of the earlier station, and accessed via a goods ramp that connected to London Street, in the east, and to Bishop's Bridge Road in the west, via a side road to the north.
- 3.1.21 The new Paddington Station was planned and designed by the GWR Company Engineer, Isambard Kingdom Brunel, with architectural assistance from Matthew Digby Wyatt. The new station was built between 1851 and 1854 by Fox Henderson and Co, who had previously overseen the building of the Crystal Palace in Hyde Park. Work also commenced on the Great Western Hotel (now the Hilton London Paddington) outside the station facing on to what was then called Conduit Street East (now Praed Street). The station, inspired by a forerunner at Munich and by the Crystal Palace, was 700ft (215m) long and 238ft (73m) wide. The station opened for Departures on 16 January 1854 and for Arrivals on 29 May 1854, at which time the original station to the west of Bishops Bridge was demolished.
- 3.1.22 London Street was an early street alignment, pre-dating the construction of Paddington Station. Greenwood's map of 1824 shows London Street running on a north west to south east alignment joining South Wharf Road mid-way. Following the construction of the 1854 station, London Street marked its northern boundary. Access was provided from the hotel building into the station on the south side of London Street, with the change in street level necessitating the insertion of an approach ramp. An exit was also provided from Bishops Road Bridge this led eastwards down onto London Street.
- 3.1.23 Paddington had its first major addition in the 1860s when the world's first underground railway opened in 1863. The Metropolitan Railway, which initially ran between Paddington and Farringdon, had its western terminus at a station called Bishop's Road (now the Hammersmith and City Line's "Paddington"), built at the north east end of the Bishop's Bridge. In 1868 a second station, originally called Praed Street Station (renamed Paddington in 1948) was built opposite the Great Western Royal Hotel when the Metropolitan Railway was extended by a new line from Paddington to South Kensington.
- 3.1.24 On the completion of the 'circle' line in 1884, trains at first were run alternately by its two owners, the Metropolitan and the Metropolitan District or District Railway companies. Later District Line trains ran on the inner rail and Metropolitan trains, clockwise, on the outer rail. Electric trains were introduced in 1905 by the Metropolitan, which soon afterwards took over the sole working of the 'Inner circle'.
- 3.1.25 It was during this phase of development that the triangular formation of the western section of the Site began. A new side road connected to Bishops Bridge Road ran parallel to its east, projected perpendicularly to the south west before sweeping back on itself in a triangular shape towards the Goods Ramp, which sloped down to the west beneath the bridge. The new ramps were supported by brick vaults, some of the remnants of which were still extant at the beginning of the Crossrail Project. These vaults were originally stables for horses that worked on the Goods Yard to the west. The southern extent of the canal embankment was replaced with a retaining structure and the High Level Coal Depot with associated tracks. This was then enclosed from the canal towpath to the north by a brick wall, sections of which are still extant.





- 3.1.26 Increase in rail traffic led to the quadrupling of the GWR mainline track out to Slough in 1879. An additional Arrivals platform was provided in 1878 to cope with the additional traffic, the new platform replaced carriage sidings which had stood on the northern side of the station. Further extensions and platforms were required on the north side. To facilitate these, the original brick arches of the Bishops Bridge Road were taken down and replaced by a new long span girder bridge allowing the re-arrangement of the track.
- 3.1.27 The rapid development of the railway network in the 19<sup>th</sup> century brought about numerous changes. The installation and adaptation of the area to the north of Platform 12, for the transshipment of milk, was a direct result of the railways effectively bringing places closer.
- 3.1.28 The use of Paddington Station for transporting milk had begun much earlier as evidenced from several documents, including an agreement between GWR and William Henry Smith & William Lethbridge, (news vendors carrying on business such as W. H Smith & Son), for use of a portion of the milk platform on down side of Paddington Station in 1868 (GWR Co records at WSHC = 2515 210 Box 1 / 2). The milk had come from stations between London and Plymouth. In the early 20<sup>th</sup> century the amount of milk being brought into London by rail was rising rapidly. The city was growing and farmers were pushed further away from the centre of London. The coming of the railways meant that milk could be transported long distances quickly and therefore it could stay fresh for a longer time.

**1900-1929:**

- 3.1.29 A major programme of improvements of 1906-16 included rebuilding of the approach over-bridges with large steel spans. As part of this programme the original brick arches of the Bishop's Bridge Road were taken down allowing the re-arrangement of the track into the terminus.
- 3.1.30 Between 1909 and 1916 three new platforms were provided (Numbered 10, 11 and 12). Platform 12 was set aside for the transport of milk and parcels. These works involved the re-alignment and cutting back of London Street and the provision of an additional fourth span to the north side of the station in 1912-6.
- 3.1.31 As part of the extensive modifications to the station, the Arrivals side of the station was changed considerably, the original Arrivals Ramp was removed and cab ramp access was moved to the western end of the platforms via two separate ramps. The first providing access to the original platform area, the second giving access to the new platforms. Both ramps were accessed from the newly re-aligned London Street.
- 3.1.32 As part of the modifications on the north side of the station, new rail access for parcels and milk was provided alongside the new fourth span. These lines were set beneath London Street, with the road raised upon a steel frame with fireproof jack arch structure. At platform level a special sunken roadway was provided, to allow the easy loading of wagons with milk churns taken from the train, across the platform and onto the wagon without having to be lifted (Matthews 1917, 175).
- 3.1.33 Surface access from Platform 12 was provided by a steel frame ramp, the Milk Ramp, which emerged along the north side of London Street at the junction with South Wharf Road. This was in-laid with channel irons to guide wagons, and a stone sett surface to provide foot-holds for horses (*ibid*)



- 3.1.34 In 1908 the high level coal depot between the Paddington Station and Paddington basin was closed together with London Street. The London Street Deck and “Arrivals” side above was demolished and the near end of the Mint Stables and the London Street area was excavated down to platform level and a new concrete retaining wall built towards the canal.
- 3.1.35 Following this the cast-iron columns supporting Brunel's roof were replaced with the present steel ones in 1922-4; those in the north Cab-Road had already gone in 1916. This work was designed by Company Engineer W.W Grierson and erected by the Cleveland Bridge Company. Further extensive works designed by P. A. Culverhouse and Raymond Carpmael were undertaken after 1929 and complete by 1934. These included a new parcels depot, a new footbridge link across all platforms and the lengthening of platforms under new canopies. The Bishops Road Station was also remodelled to provide additional platforms. The Bishop Road Goods Depot, the original terminus building of 1834-8, was demolished in 1925 and a new Goods Depot building beneath a single span erected.
- 3.1.36 A major rebuilding programme of 1930-34 followed the Development (Loan Guarantees and Grants) Act of 1929, designed to alleviate unemployment. The works included the extension of the platforms, the construction of 'The Lawn' as a passenger concourse (now redeveloped) and the building of two new office blocks and the extension of the Great Western Hotel (now the Paddington Hilton).
- 3.1.37 The Bishop's Bridge Road Underground Station was completely rebuilt and reoriented in order to increase the number of platforms. It was during this period that the station lost its name and was incorporated into Paddington Station. These works resulted in the demolition of the vaulted access road that ran parallel to Bishops Bridge Road and connected to the Goods Ramp in a triangular formation and with it a large majority of the dining rooms and stable structures located beneath the roadways. A new taxi ramp was then built and orientated northwest to southeast and was constructed on concrete piers over the top of the northern platform and track of the Hammersmith and City Line. To the north of this, a new Goods Ramp was built in the place of the existing one which necessitated the truncation and re-fronting of the stables to the north along with the demolition and alteration of numerous vaults below.
- 3.1.38 These alterations also resulted in the construction of the Shunt Tunnel. The tunnel was used as an engine spur in conjunction with the construction of LU's new Paddington Station that replaced Bishops Bridge Station. The tunnel housed electric locomotives, which were used to take over from the steam engines on their approach to the underground network to the east.
- 3.1.39 The theme of incorporating structures within ramps and bridges continued with the 1930s improvements with a number of rooms being constructed underneath the new Goods Ramp. The functions of these rooms were similar to those that preceded it with men's dining rooms and kitchens.
- 3.1.40 With changes in transportation, the need for horses was reduced and as such the stables were no longer used for their original purpose, being utilised instead as stores, sculleries, lavatories and other associated uses. During this period the majority of vaults were internally altered, this predominately took the form of their internal layouts being completely encased in concrete and original stone setts being removed. The only vaults to escape this treatment were Vaults 7-9 located to the east.



- 3.1.41 Modifications and extensions to the Bishops Road Station in between 1929 and 1934, and the extension of the Metropolitan Line, brought further changes to the London Street Deck. The more significant being the large Bowstring Girder that was erected at the western end of the station to carry London Street over the re-aligned and extended Bishops Bridge Tunnel. The provision of better freight facilities at the new Bishops Bridge Goods Depot made the Milk Platform redundant and the Milk Ramp was consequently closed and truncated, the lines being converted to use for new suburban passenger services. The void was infilled with concrete and a new road surface created.
- 3.1.42 Following the covering of the Milk Ramp, the area above was used for the 'New Transport Service Station', which sat on the London Street Deck. This long, single storey building housed a Washing Shed and a Repair shop, presumably relating to the provision of motorised wagon services from Paddington Station. An inspection pit was added within the Repair Shop, cut into the brick arches over the Milk Ramp and through the existing retaining wall.
- 3.1.43 These alterations included the siting of a petrol tank on the Milk Ramp, accessed from the building above via a manhole cover. This necessitated the reinforcement of the central element of the Milk Ramp, to support the additional loads of the tank and its contents. Similarly the guttering from the new building ran into downpipes which continued through London Street Deck and were attached to the stanchions below. With the Milk Ramp now redundant, the sunken roadway between the ramp and Platform 12 was infilled to provide more a general purpose space.

**Post 1940:**

- 3.1.44 During the Second World War Paddington Station was hit a number of times by enemy action and parts of the departures side buildings were destroyed, including parts of the departures side Cab Roof canopy. The buildings were partly rebuilt in the Post War years but the original Paxton Roof over the cab-road (Departures Road) was totally removed and replaced by the current metal clad roof.
- 3.1.45 During 1968-9 British Rail implemented numerous alterations to the station including substantial alterations, replacements and renewal of the train shed roof. In 1985 British Rail moved its Western Region headquarters to Swindon and, as a result, GWR's old offices were refurbished for commercial letting. The platforms during this period were also shortened to make the concourse more spacious. Further restoration works to the train sheds occurred between 1985 and 1993 and a new service yard was created within the area of the redundant Milk Platform, separated from Platform 12 on the north side of the station. All taxi and other drop off traffic had been relocated to the south, "Departures Side" (Departures Road) by 1985, by which time a paper handling and parcels depot (Red Star) was erected on the London Street Deck (giving rise to the alternative name Red Star Deck).
- 3.1.46 The middle to late 20<sup>th</sup> century saw numerous changes in and around the Triangle Site area. The Goods Depot that the Goods Ramp once served was slowly phased out of use between the 1970s and 1980s and with it the use of the vaults and rooms beneath the ramp. Bishop's Bridge was demolished in 2005 to incorporate a wider structure to ease traffic movement.



3.1.47 With the end of steam traction in the late 1960s the station was cleaned up, and the concourse was enlarged in 1968-9 and again in the 1970s. The approach tracks were again re-laid and re-signalled in 1992-4 and at the same time the Brunel engine shed roof was progressively repaired and decorated.

### 3.2 Map Regression

3.2.1 A more general historic map regression exercise, to put the Paddington site into context, was undertaken as part of the DDBA for Paddington Station, the results are summarised below.

#### **Rocque's map of 1746:** (Section 4.1 Crossrail 2008)

3.2.2 Shows the Crossrail Site located within a field system south of Westbourne Green Village. The line of the River Westbourne is shown as a shaded line to the west of what is now Paddington Station. A pest house ("Lord Craven's Pest House") is shown at Craven Hill to the west of the Westbourne. A lane named the "Green Lane" runs to the north of the study area. No structures are shown in the area of Crossrail construction activity.

#### **Greenwood's map of 1824:** (Plate A in Crossrail 2009d)

3.2.3 Nearly 100 years later this map shows considerable development in the area, with the construction of the Grand Junction Canal to the north and west of the Crossrail Site. Westbourne Road (now Westbourne Terrace) and London Street are in place as is Praed Street (also called Conduit Street). A lane or footpath, called "Bishop's Walk", is shown running along the line of the present Bishop's Bridge Road before crossing the Grand Junction Canal (Regents Canal) with a bridge. The area between London Street and Westbourne Street is shown as open fields surrounded by hedges and crossed by footpaths. Two unnamed, possibly unmade, streets are shown on the area now covered by the station, one runs from the Westbourne Street to South Wharf Road to the south of Paddington Basin another is shown running north from the junction of London Street and South Wharf Road to the Harrow Road. The banks of Paddington branch of Grand Junction Canal/Regents Canal and the Paddington Canal Basin shown as being built up.

3.2.4 The River Westbourne is still evident although a culvert has been constructed to divert it under the canal. A number of reservoirs and water works are shown to the immediate south of Praed Street /Conduit Street and in the area now covered by St. Mary's Hospital. Aside from two small-unnamed structures shown to the south east of the bridge crossing the southern Grand Junction Canal at the northern end of Bishop Bridge Road, no other buildings are shown within the area effected by the Crossrail scheme.



**Stanford's map of 1862:** (Plate B in Crossrail 2009d)

- 3.2.5 Less than 40 years after Greenwood, Stanford's 1862 map shows the extensive development across the entire Paddington Station area, with road construction and housing surrounding the Site. The railway station and its hotel have been constructed between Eastbourne Terrace and the Grand Junction Canal. An associated Goods Depot is shown to the west of Bishop's Bridge Road with a connection to a Rail Coal Depot and canal side Coal Wharf to the north of the passenger terminus. Two parallel east-west railway lines are shown in the coal depot.
- 3.2.6 The River Westbourne is no longer visible having been set into an underground conduit. The street layout, which remains today, has been more or less established by this time.

**Ordnance Survey Map 1872:** (Figure: 15 in Crossrail 2010a).

- 3.2.7 The 1872 Ordnance Survey map shows dense housing surrounding Paddington Station. The Triangle Site and upper London Street Deck is covered with the Great Western Coal Depot. A series of east-west running railway tracks is shown running from the goods yard to the west of the Bishop's Road Bridge passing beneath the bridge and ending close to the eastern end of the Site in two turntables. Three unnamed buildings are shown standing adjacent to the turntables close to the London Street corner of the Site. In the northwest corner a ramp is shown running down to the trackside beneath the Bishops Road Bridge.

**Ordnance Survey Map 1914:** (Figure: 16 in Crossrail 2010a).

- 3.2.8 There is no great difference between the 1872 and 1914 Ordnance Survey maps in terms of changes to street layouts and the physical structure of Paddington Station. However the railway lines, turntables and buildings at the eastern end of the Great Western Coal Depot had been removed.

### 3.3 Map Regression Summary

- 3.3.1 The map regression exercise demonstrated that until the beginning of the 19<sup>th</sup> century the area remained essentially rural in nature and was not extensively developed. The spread of London west and northwards and the construction of the Grand Junction Canal had begun to change the nature of the area at the beginning of the 19<sup>th</sup> century. However it was the building of the Great Western Railway through to Paddington from the late 1830s, followed by the construction of the present Paddington Station in the 1850s which had the most impact on the study area. The diversion of the River Westbourne into culverts and below ground conduits has also extensively modified the landscape although to a lesser degree.



### 3.4 Previous Archaeological Works

#### **1990 to 2000:**

- 3.4.1 A number of investigations occurred throughout this period. The construction of the Paddington Railway Station resulted in the deposition of several metres of overburden onto the area of the new Crossrail Station.
- 3.4.2 Two investigations in 1990 and 2000, within Paddington Goods Yard, London Street, approximately 290 m to the north of the Site, encountered only London Clay at existing ground level, just beneath the modern road/pavement (archaeological site codes PGY90, PYD00) (Figure:7 in Crossrail 2010c). The 1990 results also revealed that the London Clay had been truncated by the railway cutting and there were also remains of wooden piling, possibly from Brunel's 1838 GWR terminus.
- 3.4.3 In 1998, at 12-20 Praed Street, c. 550m to the east, works revealed the overlying Lynch Hill Gravels (site code PRA98) indicating a higher potential for archaeology. These Lynch Hill gravels have historically been rich sources of Palaeolithic finds, although research within the immediate vicinity of Paddington Station has not located any evidence of Palaeolithic or prehistoric activity.

#### **2009 Watching Brief:**

- 3.4.4 A number of trenches were subject to archaeological observation work around the Paddington Station area, to the south and west. The works were part of the monitoring of utilities and services and the verification of their locations. The works included Trenches 3, 5 11, 21 and 22 (see Figure 7 Crossrail 2010c). The trenches generally uncovered modern disturbance, occasional in situ Victorian remains, and, where depth was reached, the natural geology consistent with the Langley Silt Complex Brickearth of the British Geological Survey.

#### **London Street Deck Area:**

- 3.4.5 Three trial pits excavated as part of the Package 16A ground investigation revealed evidence for a granite sett floor surface surviving within the curtilage of the listed station structure. The trial pits (TP527, TP543 and TP544) were located in the "back of house area" to the north of Platform 12, in the vicinity of the former Milk Ramp. The three trial pits revealed a uniform stratigraphic sequence of "Made ground" bisected by the granite setts surface which survive at c.1 m below the existing ground level and overlie a strong concrete slab.
- 3.4.6 Building Recording Investigation and Surveys One on the London Deck in 2009 (CR-DVPAD- X-RT-00062) and one on the Milk Ramp itself in 2010 (Crossrail 2001.C131-MMD-T1-RAN-B071-00001 Rev. 1.2). These were undertaken as part of the agreed works derived from a specification (CR-SD-WES-CN-AE-00005) prepared as a requirement of the Heritage Agreements between the Statutory Undertaker the City of Westminster and English Heritage.



- 3.4.7 The purpose of the works was to create an accurate record and thorough understanding of the structural elements that were to be affected by the Crossrail scheme works. Non-Listed Buildings: Work was also undertaken on the non-listed built heritage and an English Heritage Level 2 Survey was carried out on; the late 19<sup>th</sup> century vaulted stable block; the truncated Goods Ramp (and rooms below) with its stone setts still extant; and the 1930s Shunt Tunnel engine spur.
- 3.4.8 An addition piece of Non-Listed Buildings work was undertaken by OAR at the request of Crossrail in 2012. This work comprised the recording of a section of previously unrecorded wall in the “back of house area” of Platform 12. The results of which are recorded within this report as Addition Works (Section 6.5).

### 3.5 Conclusions of the Desktop Study

- 3.5.1 The results of the archaeological and historical research undertaken for the Paddington Station, in relation to the construction of Crossrail and its associated activity, showed that the area remained as open fields up until the middle of the 19<sup>th</sup> century, when rapid housing growth and transport construction occurred. It is this transport construction which has contributed to the truncation of archaeological deposits, through road construction, the construction of Paddington Station and the associated rail infrastructure.

### 3.6 Archaeological Potential

- 3.6.1 Generally, it was concluded within the desktop study that there was:
- Low potential for the recovery of Palaeolithic remains in the area. Such features and *artefacts, if they survive, are likely to be of low importance if they are re-deposited but possibly of high importance if they remain in situ;*
  - *A high potential for Post-Medieval archaeology relating to the construction of Brunel’s Railway to be located within the construction area and of earlier railway works in general. Where this can be positively dated to be part of Brunel’s construction these remains are likely to be of moderate to high importance;*
- 3.6.2 Within PIP itself boreholes demonstrated that no archaeological deposits survived in the Lower Triangle, but that the Upper Triangle had not been significantly truncated by the incremental development in the area.
- 3.6.3 It concluded that *The Upper Triangle therefore demonstrates a potential for post-medieval archaeology relating to the industrial development of the site, including the construction of the Grand Union Canal, Brunel’s Railway and the Great Western Coal Depot. There is also a potential for earlier archaeological deposits from the Prehistoric to Medieval periods cut into the Brickearth deposits.*



## 4. RESEARCH AIMS AND OBJECTIVES

4.1.1 The overall objectives of all the investigations were to: *establish the character, nature, date, extent and state of preservation of any surviving archaeological remains that would be impacted upon by the development* and to contribute to the research themes as outlined in documents such as 'A Research Framework for London Archaeology 2002' (Nixon et al, 2003, as included in the 'Assessment of Archaeology Impacts Technical Report', Crossrail 2005).

4.1.2 The SSWSI (Doc Ref: C131-MMD-T1-RGN-B071-00002) and the addendum (Doc Ref: C131-MMD-T1-RGN-B071-00003), contain a number of research and work objectives. These are outlined below:

- *To identify the extent, depth, date and state of preservation of any archaeological remains within the area of proposed ground reduction works;*
- *Excavate and record those archaeological deposits for analysis and dissemination;*
- *To record the landscape development (i.e. land construction) through assessment of the soil stratigraphy, including the definition of any survival Brickearth deposits;*
- *To define levels of landscape change due either to environment and climate or human interaction;*
- *To define and record the development of Brunel's railway and associated works;*
- *To define and record surviving elements of Victorian vernacular architecture both above and below ground;*
- *To determine the significance of the non-listed built heritage, and;*
- *Identify and record the extent and survival of any archaeological remains, in particular those associated with the construction of the Grand Union Canal and Great Western Railway (including the Upper Goods Yard and GWR Coal Depot). That would be removed by ground reduction of the Upper Triangle Site from c.129 m ATD 125 m ATD.*





## 5. INVESTIGATION METHODOLOGIES

### 5.1 Introduction

- 5.1.1 A broad summary of the methods employed during the project is described below, as well as any significant variation or clarification of the agreed methodology.
- 5.1.2 Initially the program of works included an evaluation through test pits in the area of the Upper Triangle Site as per the SSWSI for PIP, (C131-MMD-T1-RGN-B107-00002). However, a Targeted Watching Brief was substituted instead as a result of discussions held. This was a design change from the proposed trial trench evaluation (PSC04 Activity ID AAPIP10150, SSWSI). The English Heritage Greater London Archaeological Advisory Service (GLAAS) officer for the City of Westminster was consulted and accepted the design change and targeted watching brief methodology.

### 5.2 Watching Brief Methodology

- 5.2.1 A Watching Brief, as defined in the Generic WSI, is '*a programme of archaeological monitoring (i.e. observation, investigation and recording) which is carried out by a suitably qualified archaeologist during site investigations (e.g. geotechnical test pits, boreholes and utilities trial trenches) and construction works*'. The purpose of the watching brief was to identify the potential of any archaeological remains that were uncovered in the course of the works and record them appropriately (as far as was reasonably practicable).
- 5.2.2 There was the stipulation that '*except in cases where unexpected, potentially nationally important, archaeological remains are discovered, the targeted watching brief shall be designed and implemented so as to avoid adverse impact on the construction programme, wherever practicable*', (Specification for Evaluation and Mitigation (CR-PN\_LWS\_EN\_SP\_0001; section 7.H.6).
- 5.2.3 OAR undertook watching brief works in areas of ground disturbance which potentially contained archaeological remains as set out in the SSWSI and when informed by either the works programme or by on site contractors. The scope of attendance included any activities (including those associated with site set-up and demolition) undertaken by the Principal Contractor that involved the removal of modern material, "Made ground" and topsoil, subsoils, and superficial geological deposits such as alluvium and colluvium.
- 5.2.4 OAR provided a core of appropriately experienced archaeologists commensurate with the scale and nature of the Principal Contractor's works. They undertook the observations and required investigations to the utmost of their ability, within the constraints of the project.
- 5.2.5 The following observations were recorded on a daily basis.
- The Event Code and location of the area observed;
  - The date of the observation;
  - Personnel employed on site;
  - A description of the construction works observed;



- Any relevant works sub-contractor and personnel undertaking and supervising the construction activity;
  - Depths and extents of excavation works observed;
  - A measure of confidence that any archaeological remains would have been observed and reasons;
  - The areas and horizons (both those containing archaeological or remains of quaternary geological importance and those which do not) unaffected by construction activity (with special reference to archaeological sites identified for preservation in situ);
  - The reasons why any particular area of the works was not observed, and noting those areas not subject to disturbance from construction;
  - Location and description of any archaeological remains; and
  - Location and description of any modern remains.
- 5.2.6 The Watching Brief has resulted in the preparation of an ordered archive, which will be incorporated into the Post-excavation works and into publication of the project results.

### 5.3 Techniques for Watching Brief Work

- 5.3.1 The techniques outlined below were utilised when appropriate, which was when significant archaeological remains were uncovered, when time constraints permitted and when it was safe to do so.
- 5.3.2 The watching briefs aimed to include archaeological supervision during the initial removal of overburden/ topsoil/ subsoil followed, as necessary, by localised hand inspection, and assessment by the on-site archaeologists. An appropriate sample was excavated from cut features and other archaeological remains of importance. Sampling of cut features included feature inter-sections to establish relative chronologies. The extent of sampling was determined by OAR in liaison with the Project Archaeologist (and as discussed with the relevant local authority and English Heritage, and a Quaternary specialist, if necessary). As an example works included; the sample excavation of a selected number of deposits (both layers and negative, cut features); recording of structural remains and drawn sections and profiles.
- 5.3.3 All work was done with the aim of recovering sufficient information to determine function, form, and date.
- 5.3.4 Heights for all deposits have been related to approved Permanent Ground Markers (PGMs) or approved Ordnance Survey Bench Marks (OSBM), where reasonably accessible.
- 5.3.5 It was frequently not possible to clean and record the archaeological profile of geotechnical test pits, due to health and safety or access constraints. Every effort was made to establish the presence or absence of archaeological deposits and by establishing a height for significant deposits, including the depth of modern intrusions, key stratigraphic components and natural deposits.

#### **Triangle Site: (Figure: 3)**



- 5.3.6 Within this area the capping beam and retaining wall were constructed and following this ground reduction was undertaken from c.129 m ATD to 125 m ATD. The Principle Contractor (Carillion), using a 20 tonne 360° tracked excavator fitted with a toothless grading bucket, removed Modern overburden in stages.
- 5.3.7 Supervised excavation proceeded in level spits of a maximum thickness of 500 mm, until either; the first archaeological horizon; the surface of the Langley Silts; or 125 m ATD was encountered.
- 5.3.8 Following the investigation and recording of any archaeological horizons, present, machine excavation of the Upper Triangle Site proceeded through the sequence of "Made ground". An as clean as possible excavated surface was achieved, at the top of the Langley Silts, and the horizon inspected archaeologically for any features truncating these natural deposits.

#### **London Street Deck (Red Star Deck) Site: (Figures: 4 and 5)**

- 5.3.9 In this area of the Site, two main activities took place; the deconstruction of the present redundant 'buried', now obscured Milk Ramp that formed part of the Upper London Street Level works; and the installation of below ground drainage at the lower level, located at the rear of Platform 12.

#### ***Milk Ramp Works:***

- 5.3.10 The demolition of the Milk Ramp followed on from a Building Recording program (reported in document No.C131-MMD-T1-RAN-B071-00001).

#### ***Drainage Works:***

- 5.3.11 All the drainage insertion trenches had their surfaces and underlying concrete slabs cut out and removed by the Principal Contractor. The modern slab and preparation deposits were then removed using a 3 tonne, 360° mechanical excavator; the methodology being dictated by the Principal Contractor's Method Statement. This element of the works did not require permanent archaeological supervision.
- 5.3.12 Subsequent to this initial breaking out phase, archaeological supervision was dependent on the rate of works. Where work was rapid and ongoing, the archaeological presence was more extensive, than when work progressed at a slow rate. The intermittent presence was sufficient since the majority of the investigations took place once the trenches has been opened and not during the installation of shoring.
- 5.3.13 The granite setts that required recording were found at c. 1-1.2 m below the current ground surface and once located and revealed they were manually cleaned, photographed, planned and recorded.
- 5.3.14 Investigation and recording work was done as part of the ongoing process and every effort was made to conduct the archaeological elements alongside the contractors' work so that there was no stoppage time for archaeological reasons. The density of archaeological remains and their level of significance meant that this was entirely possible.



- 5.3.15 The order in which the trenches were excavated was dictated, purely, by the programme of works, with no archaeological input.
- 5.3.16 Health and Safety considerations were of paramount importance in conducting all fieldwork. Safe working practices overrode archaeological considerations at all times. The trenches were often restricted in terms of space due to their locations and the proximity to existing structures such as Platform 12. The often-restricted size of the trenches meant that there were constraints of depths that could be reached.

#### **Additional Works (Platform 12):**

- 5.3.17 At the request of Crossrail Ltd, John Boothroyd of OAR undertook an English Heritage Building Recording Level 2 Survey on a previously unrecorded wall located within the heritage deed of Paddington Station (Figure: 4). This was undertaken prior to demolition of the wall as part of the PIP redevelopment of the retail services/storage area on the northeast side of Platform 12. The wall was part of the listed station defined within the Heritage Deed for the Paddington Station London Street Deck. The results of the survey are included within this report (see below 6.5).

## **5.4 Recording Standards**

- 5.4.1 The archaeological remains were recorded to best practice standards, (see below), recognising the special circumstances of a watching brief, which demand flexibility in order to achieve archaeological objectives and requirements within the construction environment.
- 5.4.2 The recording included a written record of individual context descriptions on appropriate pro-forma; a drawn record where appropriate; finds retrieval and photography.
- 5.4.3 The drawn record incorporated, plans and section drawings of appropriate features, structures and individual contexts (1:50 1:20 or 1:10). Isolated archaeological remains (artefacts) were spot located in plan and a height provided where applicable. Deposits that regular in plan (pits and ditches) were located either though co-ordinates, or added to existing plans, and were annotated with dimensions.
- 5.4.4 The photographic record consisted of digital and 35 mm formats. The photographic record included photographs of archaeological features, appropriate groups of features, structures, and quaternary deposits, as encountered and shot to illustrate work in progress. The archived photographs include an appropriate graduated scale, a north arrow, and a header board detailing (as a minimum) the event code and context/feature number.
- 5.4.5 All structures, deposits and finds were recorded by OAR according to current best practice and accepted professional standards (see OA Fieldwork Manual 1992, Museum of London Archaeological Site Manual 1990), and as outlined in:
- Paddington Station and Paddington Integrated Project (PIP). Site-Specific Archaeological Written Scheme of Investigation (SSWSI). Document No: C131-MMD-T1-RGN-B071-00002
  - C131 – Paddington Integrated Project - Addendum to WSI: Archaeological Targeted Watching Brief at the PIP Triangle Site: C131-MMD-T1-RGN-B071-00003, rev. 2



- Archaeology West – Contract No. C254, Archaeological Works at Paddington Integrated Project, Archaeology Method Statement, Document No: OAG16188.R02 (CRL no. C254-OXF-W-GMS-CRG03-00001)
- Archaeological Generic Written Scheme of Investigation, Document No: CR-PN-LWS-EN-SY-00001, 7 July 2009 (AWSI)
- Archaeology Specification for Evaluation and Mitigation (including Watching Brief), Document No: CR-PN-LWS-EN-SP-00001, 26 June 2009, (ASEM)
- Works Information (Volume 1 - General), Document No: CR-SD-PRW-X-RT-00151, 5 June 2009 (WIV1)
- Works Information (Volume 2 - Particular), Document No: CR-SD-PRW-X-ITT-00001, 13 July 2009 (WIV2)
- Crossrail standards and specifications;
- Institute for Archaeologists – Standard and Guidance for archaeological excavation, 2008 (revised);
- Institute for Archaeologists – Standard and Guidance for an archaeological watching brief, 2008 (revised);
- Museum of London collections and archive policies and guidance;
- English Heritage – Geoarchaeology, 2007;
- English Heritage - Archaeological Science at PPG16 interventions: Best Practice Guidance for Curators and Commissioning Archaeologists, 2003;
- GLAAS Archaeological Guidance Papers 1999;
- Corporation of London archaeology guidance – Planning Advice Note 3, 2004; and
- Museum of London Archaeology Service site recording manual (MOLA 1994));

## 5.5 Survey Work

- 5.5.1 The nature of the works was entirely observational and the interventions were located to a horizontal accuracy of +/-500 mm in relation to the detail illustrated in the contract drawing(s)
- 5.5.2 The positions of the trenches and survey points were verified by the on-site archaeologist through discussion and observation. In this way it was possible to ensure that all trench or excavation limits, and significant archaeology detail were surveyed 'as dug', before leaving the site. A repetition of surveying the interventions was deemed redundant. This therefore meant that data management of raw survey was not necessary.
- 5.5.3 Heights for all deposits, as obtained from the site surveyor, have been related to approved Permanent Ground Markers (PGMs) or approved Ordnance Survey Bench Marks (OSBM), where reasonably accessible. Levelling accuracy between OSBMs/PGMs and site Temporary Bench Marks (TBMs) were within 10 mm/k: where 'k' is the total distance levelled in kilometres.



## 5.6 Finds Collection and Retention

- 5.6.1 All Finds were treated in accordance with the relevant guidance given in the IFA *Standards and Guidance for Archaeological Field Evaluation* (revised 2001). The UK Institute of Conservators Guidelines *Conservation Guideline No 2* and the Museums and Galleries Commission's *Standards in the Museum Care of Archaeological Collections* (1991), excepting where they are superseded by statements made below.
- 5.6.2 All artefacts from excavated contexts were retained, except those from features or deposits of obviously recent date. No finds were, however, discarded without the prior approval of the Crossrail Project Archaeologist. In such circumstances, sufficient artefacts were retained in order to elucidate the date and/or function of the feature or deposit.
- 5.6.3 All retained artefacts were, as a minimum, washed, weighed, counted and identified. Any artefacts requiring conservation or specific storage conditions were dealt with immediately in line with First Aid for Finds (Watkinson & Neal, 1998).

## 5.7 Environmental Sampling

- 5.3.1 A strategy for sampling archaeological and environmental deposits was developed in consultation with OA's environmental department and was set out in OAR's Archaeology Method Statement (C254-OXF-W-GMS-CRG03-00001; OAG16188.R02).

# 6. RESULTS

## 6.1 Introduction

- 6.1.1 The scope of the watching brief works around the PIP Site varied in type, size and duration. But in all cases the archaeological recording was aimed to be; consistent; of the highest standards; and integrate with the whole project. However, the logistics and health and safety of some elements of the work, did preclude the highest level of recording if physical access to areas was limited.
- 6.1.2 The results are presented below and are collated in terms of the type of work done, based on geographical location. Related features and remains are linked throughout. Where contexts could be identified between the investigations they have been done so and the phases referred to are those determined by the larger scale excavation works, where applicable.
- 6.1.3 Within each individual area the results are presented as a single chronological narrative describing its chronological development with the earliest first and the most recent last.
- 6.1.4 Context numbers are shown in brackets in the text.
- 6.1.5 Although a number of features and deposits did not contain dating material they have been phased on the basis of their stratigraphic and spatial associations.
- 6.1.6 All periods of activity where identified are shown in Figures 2-4 and phased where possible.



- 6.1.7 Detailed summaries of the archaeological features and deposits are presented in Appendix 1 and full details are available in the fully cross-checked project archive.
- 6.1.8 There were variations in what was recorded primarily due to; the depths achieved; weather conditions; manner of work i.e. manual or mechanical; localised truncations; and whether the area had been recently subjected to disturbance. By this it is suggested that the later trenches may have had less integrity than the earlier ones. Where the term 'Made Ground' has been used this refers to highly mixed deposits; mixed in terms of colouration, texture and composition. The deposits termed 'Made Ground' result from recent ground disturbances primarily the installation of services and utilities throughout the later quarter of the 20<sup>th</sup> century and beginning of the 21<sup>st</sup> century, and as such are of no archaeological significance.

## 6.2 Constraints

- 6.2.1 The major constraints on the excavation work and thus the integrity of the stratigraphical record were from three sources.
- 6.2.2 The first was the level of visibility. The amount of visible archaeology was dependant on how the trench was dug, whether shoring was put in place and the restriction on time in order to clean and observe sections. This also related to the depths achieved; weather conditions; manner of work i.e. manual or mechanical
- 6.2.3 A second main issue was the degree of truncation; from later features cutting earlier ones; from previous services; and from the ongoing digging of these diversions, the later trenches may have had less integrity than the earlier ones.
- 6.2.4 Health and Safety issues also imposed a number of constraints, during the demolition of the Milk Ramp conditions meant that physical safe entry was not possible
- 6.2.5 Finally there may be stratigraphical variations in what was recorded due to differences in staffing. This was kept to a minimum but there was still the potential for similar or dissimilar features to be equated or not matched. The high degree of truncation and disjointed areas of stratigraphical data, meant that deposits had to be closely examined in the field to ensure that those equating each other were certain, since they may not have been physically joined. This was not always possible when the interval in work was months in some instances.
- 6.2.6 Despite this the provision and method of excavation were deemed suitable and appropriate.



### 6.3 Triangle Site

- 6.3.1 The earliest deposits observed in this area were a series of horizontally banded sands, fine sandy clays and gravels (2045 through to 2064). These deposits were over 1.1m thick in total and were part of the Lynch Hill Gravel complex which we know from the British Geological Survey forms the underlying Drift Geology in this part of London. The geology, when not truncated, was expected at between 118 and 120m ATD. The upper level 2041, of this sequence of natural geological deposits was a compact, mid orange sandy clay containing coarse gravel gravels (Plate: 1). These deposits were sealed by a sequence of clay layers with sandy layers interspersed between (2018, 2014, 2029, 2030 and 2031). These brickearth deposits were up to 1m thick in total and were seen across much of the western end of the Site (Plates: 1 and 2).
- 6.3.2 In the northwest corner of the Triangle Site, these natural deposit were truncated by a series of large brick built structures (2021) (Figure: 3. Plates: 3 and 4). The roofs and backs of which were revealed running east to west along the Site's southern edge. The walls of these apsidal structures were constructed of dark red frogged bricks, 230mm x 110mm x 60mm in size. The walls themselves were over 2.2m in height. For the most part the bricks were laid in an English Bond. The uppermost part of the wall had a 200mm thick cement render applied to it (Plate: 3). The rear profile showed that the wall stepped out by one header width, presumably to provide additional support. In the westernmost apsidal wall, a ceramic drain appeared to have been inserted through the wall, probably at a later date.
- 6.3.3 Each of the apsidal bays was 5m in width and between the bowed walls were short stretches of straight walls, all keyed in together. Parts of several rear-projecting walls were seen between the bays. These walls were not extensive and formed another element of support works constructed contemporaneously.
- 6.3.4 The construction cut (2020) of these structures truncated the southern area of natural Geological deposits to at least 125m ATD.
- 6.3.5 These vaults were sealed by a layer of track ballast (2009). This levelling deposit was composed of a dark grey sandy gravel, which was rich in coal fragments and ashy debris. There were also a scatter of small iron fragments and conglomerations amongst the material. This deposit was seen not across most of the Triangle Site but was limited to the area above the brick vaults 2021.
- 6.3.6 Across most of the rest of the Triangle Site a series of wide spread layers resulting from dumped material and levelling were observed above the natural Geology. The earliest (2008) was a mottled gleyed clay with a slight humic content, which may be the uppermost surviving natural horizon or part of a buried soil. This was sealed by (2016), a thin layer of loose cement. Which was in turn covered by 2017 a compact re-deposited gleyed clay makeup layer. These deposits were sealed by a 0.4m thick makeup" layer (2005) which appeared across most of the Triangle Site and was similar to 2009.





- 6.3.7 An external cobbled surface (2011) set in a bedding layer of sand and a concrete sub base (2013) lay above this deposit (Figure: 6 Plate: 11). This surface covered most of the eastern part of the Site and was possibly the same surface as 2089 in the Upper London Deck section of the Site. Surface 2011 sloped from a central point downward to the northwest and southeast. It extended to the east right up to the eastern limits of the Triangle Site, where it started to slope down to the southeast down a partly demolished ramp which was seen to be totally artificial in nature. Made up of a very mixed deposit re-deposited clay, gravels, rubble and track ballast. This ramp also contained several sections of ex situ iron rail which by its profile was of the Brunel Bridge Rail type (Plate: 12).
- 6.3.8 The surface was made up of single course of rectangular granite setts 400mm x 300mm and 250mm thick, these were all laid on bed and were arranged with their long axis of aligned northeast to southwest. A linear area of cobbles; aligned perpendicular to the main expanse, formed part of a central east-west aligned drainage gully.
- 6.3.9 All of the granite setts were laid directly onto a concrete foundation (2013), which in turn was laid on a bedding layer of dark yellow to light brown clayey silt with gravel inclusions.
- 6.3.10 At the western end of the Triangle Site a small rectangular brick built structure [2025] was revealed at a height of 128.1m ATD (Figure: 3; Plates: 5 –6). Aligned northwest to southeast, it measured 5.8m x 3.05m and was over 0.55m in height. The structure was formed by 4 conjoined walls, each 0.33m wide, visible at a height of 128.1m ATD. The walls were built of mixed yellow and light red coloured frogged, machined made bricks. The bricks measured 230mm x 113mm x 80mm. A single course of grey engineering bricks ran along the inner faces of the walls. These were slightly larger than the red and yellow bricks and unfrogged, but were also machine made. There were no manufacturers' stamps in any of the bricks. All of the bricks were laid in English Bond courses and bonded with hard light grey cement.
- 6.3.11 Less than 1m to the northeast, a smaller brick built structure [2028] was found. Square in plan and 0.75m x 0.75m in size. The building materials and style were similar to 2025 and the two may be contemporary. It is thought that 2028 was part of a manhole and drainage feature (Figure: 3; Plate: 7). The brick structures 2025 and 2028 were dug into the underlying makeup deposit (2005).
- 6.3.12 Towards the western end of the Site, the upper granite setts (2011) of the cobbled surface were missing, with only the underlying concrete sub base (2013) surviving intact. Here a sterile "pea grit" gravel bedding layer overlay the lower cobbled surface. This was covered by a layer of concrete (2004) which was in turn covered by another layer of yellow "pea grit" gravel (2003). These deposits acted as the sub base and bedding layers for an extensive area of granite setts (2002). Which were uncovered lying directly beneath the modern overburden (Figure: 6. Plates: 10-11). This external cobbled surface was restricted to the northwest corner of the Site and was seen across whole width of the Site alongside the Bishop's Bridge.
- 6.3.13 The rectangular setts themselves were aligned with their long axis southwest to northeast and were slightly larger than 2013, measuring 300mm x 240mm and 150mm thick.



- 6.3.14 These setts formed a cobbled surface over 10m in length and 8m wide. The surface sloped down from south to north. Two linear areas of setts aligned perpendicular to the main expanse of cobbles functioned as wheel ruts and corresponded to the location of an underlying drain on the northern side.
- 6.3.15 Along its southern edge the cobble surface was some 500mm higher (128.60m ATD). This area of the Site was separated by a small north to south aligned terrace wall (2010) (Figure: 3 and 6). The higher level of cobbles overlay the roofs of the brick built vaults 2021.
- 6.3.16 The latest archaeological features seen in this part of the Site were parts of a concrete slab (2000) and a Tarmac roadway (2001). The surface in this part of the Site until the Crossrail scheme took over the area in 2010.

## 6.4 London Street Deck

### Lower London Street Deck

- 6.4.1 The works in the back of house area to the rear of Platform 12 involved the excavation of trenches for the installation of new drainage, lift shafts and escalators.
- 6.4.2 The earliest feature uncovered in these trenches was an extensive surface made up of a cobbled surface (2065) with a sand bedding layer (2066) over a concrete sub base (2067). This surface covered most of the area to the rear of Platform 12 and was revealed at an approximate depth of 1m below the present surface (122.7m ATD). The cobbled surface consisted of a densely laid horizontal single layer of granite setts. These were mostly rectangular in plan and laid with their long axis aligned perpendicular to the platform alignments. The setts were on average 200mm x 100mm x 130mm thick. The individual blocks were tapered in profile and set in a moderate amount of bitumen / tar. These aspects helped prevent the blocks from working loose from the overall surface and allowed a certain amount of expansion and contraction. Granite setts, although labour intensive to install provide a long term, easily repairable, hard wearing surface. The cobbles were set on a mid orange sand bedding layer (2066) which was an imported sterile "builder's sand". The sand would have aided the bedding of the cobbles allowing a small amount of movement and allowed some degree of drainage below the relatively impervious surface of the setts themselves. This bedding layer overlay a solid, 0.3m thick concrete slab (2067), which formed the sub base for the cobbled surface (Figure: 7. Plates:13-16).
- 6.4.3 Towards the eastern end of the works, where a new manhole (NS3) was excavated, the granite sett surface 2065 was seen to have a linear band of setts aligned northwest to southeast delineating two different areas. The more northerly area had a slight camber to it. This linear stretch of setts may have marked where wheels were expected to run, and added surface water runoff rather than drainage feature. There was no evidence for a specific drainage feature beneath them.



- 6.4.4 The cobbled surface was overlain by a sequence of earlier horizontal deposits (2074, 2073, 2072, 2071, 2070 and 2069) that included a deposit of black ashy track ballast (2072), which in areas contained fragments of asbestos (Figure: 7. Plate: 13). This levelling deposit was truncated by a number of late 20<sup>th</sup> century drainage features, including ceramic and plastic pipes and brick manholes. These recent features were sealed by was an extensive area of disturbance seen across the whole southern side of the Site. This disturbance was filled with a rubble backfill contained fragments of modern bricks, sandstone blocks and occasional iron objects.
- 6.4.5 The latest features seen in this area was a 0.16m thick concrete slab (2068) and its bedding layer (2069).

#### **Upper London Street Deck**

- 6.4.6 On the Upper London Street Deck a cobbled surface (2089) made up of rectangular granite setts was uncovered covering much of the southeast end of the Site (Figure: 4; Plates: 23 and 29). This surface was covered by a concrete slab (2091) which formed the most recent roadway on this part of the Site.
- 6.4.7 This granite sett surface may have been a continuation of similar cobbled surfaces seen in the Triangle Site to the west (2002 and 2011). The individual granite setts were rectangular in plan and were 300mm x 150mm. The area of setts was seen to extend over at least 33m x 18m and abutted the Grade I Listed building retaining wall, along the northeast side of the Site.
- 6.4.8 A similar cobbled surface (2090) was uncovered beneath the present roadway at the junction of London Street and Winsland Street.

#### **Milk Ramp Dismantling**

- 6.4.9 The demolition of the Milk Ramp was monitored by OA/R. However Health and Safety issues restricted this work. The work described in this report followed on from two early phases of building recording work on the London Red Star Deck and the Milk Ramp which produced the following reports;(Red Star Deck-CR-DVPAD-X-RT-00062 Milk Ramp- C131-MMD-T1-RAN-B071-00001). The Milk Ramp report has subsequently been updated by OA and reissued.
- 6.4.10 The milk ramp comprised a short ramp following the eastern boundary of the station. It sloped down to the northwest in a 1 in 10 slope, and was closed off at street level and truncated to the south by a floating surface. The ramp was constructed on a simple metal frame grid (2084) with northeast - southwest metal girders supported on a large northwest –southeast girder on the western side and brick retaining wall on the eastern. The ramp itself was formed by two longitudinal I beam steel girders which were supported on Rolled Steel Joists (RSJs) running south-west, away from the ramp. Support was also provided by four steel stanchions, which formed part of the steelwork support of the London Street Deck itself. Which was itself supported on a steel frame comprising longitudinal steel beams and cross girders (Plates: 19-22) with intervening brick jack arches (2082).
- 6.4.11 The surface of the Milk Ramp was made of granite cobbles (2080) arranged in three linear panels with slightly raised smooth concrete pavements either side (Plate: 24).



- 6.4.12 The surface side panels were laid in a series of concentric arcs of setts. The central panel was laid in rows of setts with every third row being raised by c. 500mm. This allowed traction to be gained going up the slope and helped prevent vehicles rolling back.
- 6.4.13 Although granite is a hardwearing surface material. There was evidence of linear wheel ruts where it had it being worn into by wheels. To cause such damage, these were presumably metal rimmed.
- 6.4.14 The cobbled surface was truncated by two later features (2081). A large metal petrol tank in a brick bund / interceptor tank along with an inspection pit (Plate: 25).
- 6.4.15 The lower part of the Retaining Wall showed where the Milk Ramp had continued further south-east before being truncated and left hanging. This section of the wall also had striations roughly parallel with the ramp surface seen in the white tile wall finish (Plates: 26-27). The upper corners of vehicles scraping along the wall probably caused these.

## 6.5 Additional Works

### Non-listed Built Heritage Assessment and Recording Platform 12

- 6.5.1 A 4.46m long and 3.32m high wall formed from both white glazed bricks and blue bricks with a wooden moulding running along the top was recorded running northeast – southwest. This wall abutted a northwest – southeast wall which had been identified and recorded during a previous built heritage recording (C131-MMD-T1-RAN-B071-00001) (Figure: 5).
- 6.5.2 The lower half (1.47m) of wall was formed of standard blue bricks constructed in bond form of alternating rows of headers above headers and stretchers, with an ash rich cement mortar. The upper half (1.85m) was formed of glazed white ceramic bricks in the same bond and mortar (Plates: 26 and 27).
- 6.5.3 A double steel door was located at the southwest end of the wall, topped by a concrete lintel. From ground level to the start of the lintel a variation in the bond is observable, consisting of one brick being laid so its rowlock end is exposed, this occurs in every other row. At the northeast end of the wall a large mechanical roller door has been installed (Plate: 28). The interior of the wall could not be observed due to a plasterboard covering allowing the area could be used as storage. Only the very top of the return wall could be observed which was covered in wooden cladding which showed no detail of the original construction, the wooden moulding running along the top did not continue. The wall is constructed in a style contemporary with the redevelopment of Paddington Station in the early 20<sup>th</sup> century, including the construction of Platforms 10 – 12. Previous building recording work at the PIP Site (C131-MMD-T1-RAN-B071-00001) identified several walls formed of both blue bricks and white glazed bricks including the main retaining wall.
- 6.5.4 Despite this indication of a contemporary date the wall is suspected to be later addition. As no evidence of the wall being ‘keyed’ into the larger northwest -southeast wall it would appear that this later wall forms an extension to the previous structure and was constructed to be aesthetically consistent with its surrounding. It is not known how much later this wall is constructed, or if the materials are reclaimed from elsewhere.



- 6.5.5 The wall appears to have been altered at least twice, initially for inclusion of the double steel doorway, alteration identifiable through the variation in the brick bond. Then again for the inclusion of the roller door.



## 6.6 Finds

### Pottery

- 6.6.1 A total of 19 sherds of pottery weighing 418g were recovered from three contexts (2085, 2007 and 2008). These were “Victorian” though the sherds retrieved from 2007/2008 may be as early as the 17<sup>th</sup> century. The character of the material is entirely domestic. In general the pottery is in a fragmentary but fairly fresh condition with some quite large fresh sherds present.
- 6.6.2 All the pottery was examined and spot-dated during the present assessment stage. For each context the total pottery sherd count and weight were recorded on an Excel spreadsheet, followed by the context spot-date which is the date-bracket during which the latest pottery types in the context are estimated to have been produced or were in general circulation. Comments on the presence of datable types were also recorded, usually with mention of vessel form (jugs, bowls etc.) and any other attributes worthy of note (e.g. decoration etc.).
- 6.6.3 Context (2085) produced parts of three 19<sup>th</sup> century vessels of mass-produced Staffordshire type. The character and decoration of the two dish rims suggests a date of c. 1860-1900. The vessels include most of a plain teapot in Rockingham-type brown earthenware (ROCK). Also a dish rim in transfer-printed whiteware (TPW) and a dish rim in refined whiteware with a painted border (REFW PNTD). Contexts 2008 and 2007 also produced one pottery sherd each.
- 6.6.4 No further work on the assemblage is recommended.

### Ceramic Building Material (CBM)

- 6.6.5 The works produced just two pieces of CBM weighing 89g from a single context (2076). These have not been separately catalogued but are fully described here. The two joining pieces come from a single flat roof tile in a hard dense and fairly sandy bright orange fabric with darker red-brown surfaces. The tile is fairly battered and worn and the sanded underside is partly covered with a rusty concretion containing flecks of charcoal or coal. There are also small patches of grey cement adhering here and there - including the broken edges. One of the broken edges has a slight upturn suggesting the tile had an upright flange along one side - it might be from the flattened side of a pan tile? The character of the piece suggests a later 19<sup>th</sup> or 20<sup>th</sup> century date.
- 6.6.6 No further work is recommended.

### Miscellaneous Finds

- 6.6.7 There are four objects all from context 2085:
- 6.6.8 Pig tibia cut or sawn at distal end. Animal was less than 3 years old. L: 154mm (ID by Lena Strid).
- 6.6.9 Small fragment of thin iron sheet or plate. It has one curved edge suggesting it may be part of a disc. There is also part of a circular cut-out or hole. Function uncertain. L: 49mm; W: 40mm.



- 6.6.10 Small jar with screw thread for screw cap closure. Complete. Machine moulded. Amber glass. Embossed numbers on base probably mould or design numbers. Has dried remains of contents dark pink in colour. 20<sup>th</sup> century or later in date. Ht: 81mm; D: 50mm.
- 6.6.11 Milk bottle, complete. Embossed twice on shoulder: "Golden Seal | MILK". Small embossed legend on neck: "BRITISH PATENT NOS. 430600 420839/1933 | 2 UGB". Colourless glass. Machine moulded. Bottle form suggests mid-20<sup>th</sup> century in date confirmed by patent date of 1933. Manufactured by United Glass Bottle (UGB). Ht: 218mm; D: 78mm. "Golden Seal" was a brand of Express Dairies.

## 6.7 Environmental Sampling

- 6.7.1 Due to the absence of suitable deposits, no environmental samples were taken.

## 7. PHASING

- 7.1.1 Broad phasing has been ascribed to the deposits and structures encountered during the works on the basis of relative stratigraphy and finds uncovered, these were used in conjunction with cartographic and documentary evidence. The results are presented below in chronological order.
- 7.1.2 The timeline for PIP Site is based on the major influences on the railway network and activity at Paddington Station. Prior to this the major influence in the area was the construction of the Paddington branch of Grand Junction Canal and the Paddington Basin.
- 7.1.3 Aside from obvious Geological deposits, brickearth and Pleistocene sands and gravels, no pre railway features or deposits were identified within the scope of this project as the various cuttings associated with the construction and development of the railway and Underground and its associated structures i.e. station, goods yards, shunt tunnel etc. appear to have removed all of the pre modern deposits on the Site.
- 7.1.4 Six periods are outlined.
- Phase 0- Natural Drift Geology
  - Phase 1a- 1838 – 1851 Early Railway and Brunel Era
  - Phase 1b- 1851-1892 Second Paddington Station
  - Phase 2- 1892 – 1923 Pre-Grouping Era
  - Phase 3-1923 – 1939 Grouping Era – Big Four
  - Phase 4- 1939 - 1993 Second World War and Nationalised Era
  - Phase 5- 1993 – Current Privatisation Era



## 7.2 Triangle Site

### Phase 0- Natural Drift Geology

- 7.2.1 Deposits that were confidently identified as *in situ* natural geology were seen in the areas where the deepest work was undertaken, mostly at the western end of the Site (Plates: 1 and 2). The geological sequence in this area of London should consist of clayey brickearth; overlying sandy gravels of the Lynch Hill series; which overlie London Clay.
- 7.2.2 Areas of the paler brown to blue brown coloured silty clay, brickearth, (Langley Silts), were seen at variable depths. Below this were the various deposits forming the Lynch Hill Gravels. The London Clay was not seen on the Site.
- 7.2.3 A total of 27 deposits were identified as “natural geology” although a number of the upper deposits which provisionally identified as “brickearth” could in fact be re-deposited natural derived from deep excavations, dumping or levelling deposits set down to even out the Site in the early modern period.

### Phase 1a- 1838-1851

- 7.2.4 This phase accords with the first Paddington Station. At this time plans show that the PIP site was located to the northeast of the original entrance to Paddington station, partially on the embankment, which separated the goods shed and station’s Entrance Yard from the canal to the north (Figure: 13 in Crossrail 2010c). Several of the upper layers which appeared to be natural contained pottery including deposit 2007, which has been spot dated to between 1750 and 1900, and from layer 2008 which has been dated to between 1700-1850. This suggests that these deposits were related to the initial levelling of the area for the first Paddington Station. Plans and pictures of the first station’s Entrance Yard and Bishop’s Bridge entrance from the 1840s (Brindle 2004. Figures. 2.9, and 2.13, 21-24). Show a partly tree clad, earthen slope leading up from the entrance Yard to the level of the Grand Junction Canal, some of these deposits are almost certainly part of this slope perhaps partly generated from the excavation of the Grand Junction Canal in 1801.

### Phase 1b -1851-1892

- 7.2.5 After the demolition of the first Paddington Station and the construction of the present station on the former station’s Entrance Yard and good shed in the 1850s. The GWR Paddington Goods Depot was relocated to the west of Bishop’s Bridge road and accessed via a goods ramp that connected to London Street in the east and to Bishop’s Bridge Road in the west via a side road, “Goods Depot Approach” running roughly where the northern most line of the present day Hammersmith and City Line tracks. To the north a long rectangular shaped yard with three parallel east to west railway tracks is shown right up against the Paddington Basin arm of the Grand Junction Canal (Figure: 14 in Crossrail 2010c). This is the GWR coal depot which was linked to the high-level goods yard to the west.
- 7.2.6 Part of the high- level yard was built to handle the GWR’s substantial coal trade which rose from 4350 tons a month to London in 1845 to 1,000,000 tons a year in 1900 (Brindle 204, 128). Much of the trade was with the Ruabon Coal Company of South Wales.





- 7.2.7 A c. 1870 drawing of one of their offices sited in the high-level goods yard is shown in Brindle (*ibid* fig. 7.33 129). The brick structure 2025 uncovered during the watching brief could possibly be the remains of this office, the size looks about right. However Brindle does not say where this building was exactly nor is it shown on the earliest maps of the Site i.e. Stanford's 1862 map and so this hypothesis must remain speculative.
- 7.2.8 The high-level goods yard was connected to the mainline tracks to the west via a long viaduct which was supported on decorated iron columns and ran north-south across the main GWR goods depot (Brindle 2004 fig.7.32 128). The viaduct and goods depot have long since been demolished, the viaduct in the 1920s and most of the goods yard and station in the 1970s, and the Paddington Central Development's Kingdom Street and Sheldon Square presently stand on the site. The high-level goods depot and the GWR coal depot were both at the same level and were joined by a road which run beneath the Bishop's Bridge.
- 7.2.9 By 1863 the layout of the Triangle Site had changed due to the construction of Bishops Bridge Station directly to the southwest of the PIP Triangle Site. It was during this phase of development that the triangular formation of the Site began. A new side road connected to Bishops Bridge Road ran parallel to its east, projected perpendicularly southwest before sweeping back on itself in a triangular shape towards the goods ramp which sloped beneath the bridge (Plate B in Crossrail 2009d). The new ramps were supported by a series apsidal brick vaults, the remnants of which (context 2021) were recorded during the watching brief. These vaults were originally stables for horses that worked on the goods yard to the west.
- 7.2.10 The southern extent of the canal embankment was replaced with a retaining structure and a high-level coal depot with associated tracks. This was then enclosed from the canal towpath to the north by a stock brick wall, sections of which are still extant.

### **Phase 2- 1892-1923**

- 7.2.11 Documentary evidence shows that the area to the north of the Mainline Station was highly modified between 1909-1916, as result of the expansion of the mainline Paddington Station northwards. Parts of the high-level coal depot were closed in 1908 (Brindle 2004. 60-61) and remodelled from 1909 onwards. These modifications appear to have removed most if not all of the earlier remains, i.e. the tracks, turntables and surface, of the eastern half of the Great Western Coal Depot shown in the pre-1914 maps of the area (Figure: 16 in Crossrail 2010c). The area covered by the Triangle Site appears to have remained relatively intact with the railway lines but not the turntables still shown on the OS map.
- 7.2.12 A cobbled surface (2001 and 2011) uncovered during the watching brief is not dated but may have been lain following the remodelling of the coal depot. Two parallel railway tracks are shown on the 1914 OS map running east-west along the length of the Triangle Site and a small unnamed structure is also shown in the northern edge. The structure may be the weighing machine (W.M.) which corresponds roughly to where structure 2025 was found.



7.2.13 No traces of these railway tracks were found within or beneath either of the cobbled surfaces. This almost certainly means that the surface dating from this time had, at the very least, been partly if not wholly taken up and re-laid when the tracks were removed. This makes it unlikely that either of the two cobbled surfaces seen during the watching brief in this part of the Site are from this period.

### **Phase 3- 1923-1939**

7.2.14 Major alterations occurred to the Triangle Site occurred in the 1930s when LU's Bishops Bridge Road Station was completely rebuilt and reoriented in order to increase the number of platforms. It was at this period that the LU station lost its name and was incorporated into Paddington Station. These works resulted in the demolition of the vaulted service road that ran parallel to Bishops Bridge Road and connected to the goods ramp in a triangular formation. In its place a new taxi ramp was built and orientated northwest to southeast and was constructed on concrete piers over the top of the northern platform and track of the Hammersmith and City Line. To the north of this a new goods ramp was built in the place of the existing one which necessitated the truncation and re-fronting of the vaulted stables to the north. These structures and numerous other structures located to the west and east were then used as coal stores, sculleries and mess rooms (Figure: 17 and 18 in Crossrail 2010c).

7.2.15 This period also saw the rebuilding of the GWR goods depot to the west of Bishop's Bridge, which was cleared in stages from 1925. The works involved the removal of the high-level goods yard to the west of the bridge and the demolition of the viaduct connecting the high level yard and depot to the mainline tracks.

7.2.16 At the eastern limits of the Triangle Site a substantial brick and concrete tunnel was built in the 1930s this shunt tunnel, which ran southwest to northeast, was used as an engine spur in conjunction with the construction of the new LU Paddington station that replaced Bishops Bridge Station. The tunnel housed electric locomotives used to take over from the steam engines on the underground section of the Hammersmith and City Line. The top of the shunt tunnel's construction cut was observed by OAR during the works (2034).

7.2.17 Various other elements seen in the watching brief are attributed to this period. The majority of the cobbled surface seen in the watching brief almost certainly dates to this period. The cobbled surface seen below the overburden east of Bishop's Bridge (at a lower level) is representative of this earlier era of road surfacing before the widespread use of tarmac. There were two periods of setts being laid, with 2011 being the earliest, and 2002 being a later repair or relaying of the area. The granite setts required a greater investment of time in terms of producing the setts and then having to individually lay each one, manually into a bedding layer. Although the surfaces could become uneven the setts themselves were extremely hardwearing and could aid drainage.

7.2.18 A tarmac road surface (2001) was seen at the western end of the Triangle Site and overlay the granite sett surfaces 2002 and 2011. Tarmac was an accidental discovery in 1901 by Edgar Purnell Hooley (Tarmac Ltd 2010). This material proved to be a more easily laid surface for roads and repairs and by 1926-26 190 miles of arterial roads had been laid with tarmac



7.2.19 A rectangular structure, 2025, of mixed red and yellow “London Stock bricks” was seen on the northeast side of the Site and could relate to the feature shown on the 1914 and 1930 maps and plans (Figures 16 and 17 in C131-MMD-T1-RGN-B071-00002). The structure appeared to have been contemporary with the granite cobbled surface. The use of this building is unknown although a larger structure, the police hut, appears in roughly the same spot on plans of the Site from the 1960s. (Figure 18 in C131-MMD-T1-RGN-B071-00002). A subsidiary brick built feature (2028) is likely to have been an associated drain or chamber.

#### **Phase 4- 1939-1993**

7.2.20 There were numerous changes in and around the Triangle Site in the latter half of the 20<sup>th</sup> century. The goods station and yards that the goods ramp once served and which stood to the west of Bishop’s Bridge was incrementally shut down between the 1970s and 1980s.

7.2.21 Only one feature was thought to date to this period, the disturbance associated with the partial removal of an earlier brick structure 2025. This involved the demolition and truncation (2039) and then the reinstatement of the area using concrete (2038), but not the granite cobbled surface.

#### **Phase 5- 1993-Present**

7.2.22 The major development during this period was that Bishop’s Bridge was demolished in 2005 to incorporate a wider structure to ease traffic movement.

7.2.23 This phase consisted of the present road surface and the underlying bedding material (2000 and 2033).

### **7.3 London Street Deck**

#### **Phase 0- Natural Drift Geology**

7.3.1 No deposits dating to this phase were encountered during the works at the London Street Deck.

#### **Phase 1 (a-b) - 1830-1892**

7.3.2 This phase accords with the first station and the construction of the second station at Paddington no artefactual material or structural remains dating to this phase were encountered during the works at the London Street Deck.

#### **Phase 2- 1892-1923**



- 7.3.3 The majority of the remains seen in the watching brief could be dated to this period. Including the Milk Ramp, the surface of the Upper Deck and the cobbled surface (2065) in the lower Deck/Platform 12 area. Documentary evidence show that London Street Deck was constructed between 1911-1916, as part of the extensive modifications and expansion that Paddington Station underwent during the early part of the century. These modifications appear to have removed most if not all of the earlier remains in this area i.e. the tracks, turntables and surface of the eastern half of the Great Western Coal Depot shown in the pre-1914 maps of the area (Figure: 16 in Crossrail 2010c). At this time London Street was diverted to allow the creation of a fourth span to the mainline station to accommodate additional platforms for freight traffic. The design package included a high level deck supporting the road above, over the new platforms and associated spaces. The lower level was lit by light wells built into the deck's upper surface.
- 7.3.4 At platform level Platform 12 was designed and reserved for the shipment of milk and parcels. The Deck and Milk Ramp's location on the periphery of the station, meant that the movement of goods could be completed away from the main passenger concourse.
- 7.3.5 A special sunken roadway was built at platform level to allow the easy loading of wagons with milk churns taken directly from the trains, across the platform and onto wagons without having to lift them. Access from this lower area up to the surface at London Street level was achieved through the Milk Ramp built on the site of the PIP Vertical Circulation Core. The ramp, which was built into the deck, comprised a cobbled surface that rested on arched brickwork supported on a network of iron girders RJS and stanchions. The cobbled surface was inlaid with channel irons to guide wagons. The use of granite setts at this time suggests that exceptionally heavy traffic was anticipated because there was the alternative of Tarmac, which had been discovered in 1901. The construction of the Milk Ramp is typical of its date with a simple grid pattern of steel girders and RSJs and riveted steel stanchions.

### **Phase 3- 1923-1939**

- 7.3.6 The provision of better freight facilities at the GWR's Bishops Bridge Goods Depot resulted in the Milk platform going out of use by 1934 and Platform 12 being turned over to passenger use. The Milk Ramp itself was altered and was closed by the localised extension of the road surface on the deck level. The light wells were also infilled, so that the space below became lit by electric lighting.
- 7.3.7 Following the covering of the Milk Ramp, the area above was used for the 'New Transport Service Station', which sat on the London Street Deck. This long, single storey building housed a Washing Shed and a Repair shop and was designed for the motorised wagon services from Paddington Station. An inspection pit was added within the Repair Shop, cut into the brick arches over the Milk Ramp and through the existing retaining wall. These alterations included the siting of a petrol tank on the Milk Ramp, accessed from the building above via a manhole cover. This necessitated the reinforcement of the central element of the Milk Ramp, to support the additional loads of the tank and its contents. Similarly the guttering from the new building ran into downpipes which continued through London Street Deck and were attached to the stanchions below. With the Milk Ramp now redundant, the sunken roadway between the ramp and Platform 12 was infilled to provide more of a general purpose space. The area continued to be used as a holding area for the taxis and commercial vehicles serving the station.



- 7.3.8 Parts of the cobbled surface uncovered during the watching brief in the Upper London Street Deck area almost certainly date to this event. One other feature recorded during the watching brief is thought to date to this period, the disturbance associated with the insertion of the petrol tank and its surrounding brick interceptor tank (2082 and 2083). This involved the demolition of parts of the cobbled surface of the Upper Deck and the arched brickwork elements of the Milk Ramp.

#### **Phase 4- 1939-1993**

- 7.3.9 For much of this period the London Street Deck remained in used as a taxi holding area.
- 7.3.10 In 1982, the Red Star Parcels depot was built on this site and the taxi holding area, fuelling point and parking area were relocated at nearby Royal Oak. The corrugated steel clad Red Star/Lynx building stood on the deck until recently.

#### **Phase 5- 1993-Present**

- 7.3.11 This phase consisted of the present road surfaces and their underlying bedding material.

## **8. ASSESSMENT OF THE RESULTS**

### **Relative Completeness:**

- 8.1.1 Across most of the Site, only the lowest deposits appear to have survived intact. The uppermost sequence appears to have been cut through by modern services and had been truncated during the construction of the terrace on which the former GWR Goods Yard/Coal Yard stands. This terracing appears to have removed any potential Holocene and any Pre Modern deposits from the top of the archaeological sequence.
- 8.1.2 Of the structural remains recovered, the cobbled roadway of the GWR Coal Yard had been partly removed. Although the cobbles in the upper London Deck and at the Platform 12 level were mostly intact. The apsidal brick structures uncovered in the Triangle Site appeared to have survived intact, whilst the smaller brick structures to the north had been damaged, but not so much that their form was obscured. Although not enough remained to be able to guess at their function.

### **Condition:**

- 8.1.3 The surviving features deposits and artefacts encountered were all in a reasonable state of preservation.

### **8.1.4 Rarity:**

- 8.1.5 There are some heritage remains which are so scarce that all surviving examples, which retain some potential, should be preserved. This cannot be said for the remains uncovered at the PIP Site. The remains have instead been preserved by record, rather than *in situ*.
- 8.1.6 On the whole the uncovered remains cannot be regarded as rare. There are other examples of similar remains both visible as extant structures and as below ground features.



8.1.7 However, the structures at PIP were all integral parts of the GWR's London operations. Particularly the GWR's pioneering use of the railway to transport coal, which remained the capital's main source of heating until the passing of the Clean Air Act in the late 1950s, and dairy products from the West Country to the capital. The importance of this trade to the GWR is illustrated by the construction of a specific milk platform to the west of Platform 1 at Paddington Station and the Milk Ramp on the northern side of the mainline station.

8.1.8 The remains at PIP therefore played an important part in the workings of the goods arm of the GWR in London during the later part of the 19<sup>th</sup> and early part of the 20<sup>th</sup> centuries and of the development of the GWR in particular.

**Group Value:**

8.1.9 As a group the value of the remains recorded at Paddington PIP is low to moderate. They contribute to the history of Paddington Station and the GWR as a whole. The Upper and Lower London Street Deck represents a tangible example of the station's historic development during the early 20<sup>th</sup> century, being contemporary with the construction of the fourth span of the mainline station shed. Whilst the remains at the Triangle Site are the last surviving remains of the goods yards and GWR coal depot both of which were initially designed by Brunel although much altered later.

8.1.10 The development of the railway system in the 19<sup>th</sup> century, of which the GWR was an important part, meant that goods and raw materials could be moved further, cheaper and quicker than previously. With all its obvious benefits to London both as the capital of Britain and as the capital of the British Empire. Allowing coal and agricultural produce to be shipped into the capital.

8.1.11 The railway's ability to bring in and take out vast amounts of materials and goods from the capital was, when coupled with the expansion of London's docks, a key factor in London's rapid expansion as the world's largest mercantile city. Putting it on to the road to becoming a "world city".

8.1.12 The remains found at PIP all relate to this movement of goods and freight into London and as such offer the chance to increase our understanding of how this part of the GWR's operations was organised and developed over time.

8.1.13 The GWR is acknowledged as one of the most innovative railways both in Britain and the world. The international significance of the GWR is reflected in the fact that it was deemed worthy of consideration for UNESCO World Heritage Site status in 1999.

## 8.2 Results in Relation to Investigation Aims and Objectives

8.2.1 Each component of the Paddington Integrated Project had specific aims that were established as part of the framework of investigation. Alongside this were general site objectives into which all the work could filter information, these have been stated in Section 4.

To reiterate, the primary objective of all the investigations were to:

- *Establish the character, nature, date, extent and state of preservation of any surviving archaeological remains that would be impacted upon by the development. And to: Excavate and record those archaeological deposits for analysis and dissemination.*



More specifically it sought to:

- *Record the landscape development (i.e. land construction) through assessment of the soil stratigraphy, including the definition of any survival Brickearth deposits;*

and;

- *To define levels of landscape change due either to environment and climate or human interaction;*

- 8.2.2 The archaeological works carried out by OAR in the vicinity of the future Crossrail PIP Site demonstrated the survival of modern remains throughout the area. These remains, which were recorded by OAR, were exclusively associated with the GWR and Paddington Station. Remains include a series of cobble roadways and a small brick built building, as well as a series of vaults running along the southern edge of the Triangle Site. Much of the underlying archaeological deposits beneath the cobbled road appeared to be sub base and levelling deposits, for these surfaces or were used to level out the local topography, during the development of the area as a Coal Yard from the middle of the 19<sup>th</sup> century. A process which involved the building up and terracing of this part of the Site which from early pictures (Brindle 2004, Fig. 2.9) had been an open earthen embankment sloping up some 6m from the entrance yard of the first Paddington Station up to the Grand Junction Canal.
- 8.2.3 Most of the eastern end of the Site was subsequently completely altered. With any traces of the original landscape and any remaining 19<sup>th</sup> century structures being completely dug away during the remodelling of the northern side of Paddington Station at the beginning of the 20<sup>th</sup> century.
- 8.2.4 Deposits that were confidently identified as *in situ* naturally accumulated brickearth were uncovered during bulk excavations in The Triangle Site. These deposits overlay a series of sands and gravels. Which were identified as parts of Pleistocene River Terrace Complex (Lynch Hill Gravels), which we know forms part of the natural geology in this part of London. No artefacts or ecofacts were visible in these any of these geological deposits.
- *To define and record the development of Brunel's railway and associated works;*
- 8.2.5 Aside from some deposits, which could relate to the terracing of the western end of the Site during the establishment of the GWR high-level coal yard in the 1850s. None of Brunel's works were uncovered during the work. None of the original elements of the depot had survived the whole scale remodelling of the area by the GWR in the late 19<sup>th</sup> century or 20<sup>th</sup> century.
- *To define and record surviving elements of Victorian vernacular architecture both above and below ground;*
- 8.2.6 Some of the remains recorded at the Triangle Site were built during the Victorian era. These included the apsidal brick vaults, which from documentary sources appear to date from 1863 although they were extensively altered during the re-modelling of the Triangle Site in the 1930s. The small building and the cobbled surfaces could be Victorian although from cartographic and documentary sources they appear more likely to date to the early 20<sup>th</sup> century or 1930s.



8.2.7 In the parts of Site occupied by the London Street Deck no remains dating to the Victorian Era (1837-1901) were uncovered during the Crossrail works. Any traces of the original landscape and any remaining 19<sup>th</sup> century structures had been completely dug away during the remodelling of the northern side of Paddington Station between 1909 and 1914.

- *To determine the significance of the non-listed built heritage,*

8.2.8 A number of structures including; a series of apsidal vaulted structures and foundations of two brick built buildings were uncovered and recorded in the Triangle Site. The remains of two phases of an extensive cobbled roadway was also discovered at this part of the Site. Whilst in the Upper and Lower London Street Deck area, sections of granite cobbles were also uncovered. These represented the remains of the early 20<sup>th</sup> century surface of the Deck, Milk Ramp and milk churn loading area at the Platform 12.

8.2.9 None of these remains appear to date from the initial construction of the Paddington complex which took place in the late 1830s. Instead they appear to date from the development of the Site as a high-level coal storage and transfer depot by the GWR from the 1850s until the 1920s and as an area for the transfer of milk churns from rail to road from the 1900s. Both parts of the Site had undergone considerable development over the years. I.e. the vaults had been shortened when the LU station was redeveloped at the end of the 1920s. The remains uncovered reflect this and are therefore an interesting record of the Site's evolution and the rise and fall of the GWR's freight/goods operations in the capital. As such they are important to our understanding, of not only the history of what is one of the earliest major railway termini to survive in Britain, but of the development of London as a whole. They are therefore of some significance.

and;

- *Identify and record the extent and survival of any archaeological remains, in particular those associated with the construction of the Grand Union Canal and Great Western Railway (including the Upper Goods Yard and GWR Coal Depot). That would be removed by ground reduction of the Upper Triangle Site from c. 129m ATD 125m ATD.*

8.2.10 A number of remains of the GWR coal depot were uncovered during the watching brief. Including a row of intact apsidal brick vaults beneath the goods yard ramp, which was also uncovered, several overlaying cobbled surfaces were also revealed as was the foundations of a brick built building. All of these were parts of the coal depot/goods yard. Beneath these several layers of "made ground" were revealed. These probably relate to the terracing of the former earthen bank, which is shown on early pictures of the eastern entrance of the first Paddington Station. Beneath these, the deposits appeared to be in situ natural geology. All of these remains were recorded by OAR prior to their removal during the ground reduction of the area by the Principal Contractor.

### 8.3 Potential

8.3.1 The monitoring work at Paddington PIP forms a minor contribution to the existing comprehensive history of Paddington Station. It illustrates the physical environment of the Station resulting from the changes which are largely visible in the documentary sources.





## 9. CONCLUSIONS

- 9.1.1 The archaeological works carried out by OAR in the vicinity of the Crossrail PIP Site demonstrated the partial survival of historic structures and surfaces exclusively, associated with the GWR and Paddington Station.
- 9.1.2 The archaeological evidence appears to correspond with the early cartographic and documentary sources, indicating a gradual development of the area from the beginning of the 19<sup>th</sup> century followed by rapid growth from the 1840s after the construction of the GWR railway and Paddington Station. It has also corroborated the results found in the associated evaluations and excavations in the area. Although the maps and plans already examined provide a relatively detailed external plan for the structures found at PIP. The archaeological works undertaken by OAR have provided important information on the materials used, the construction techniques employed in their construction. The works have also given us some idea as to the general layout of the GWR coal depot and of the internal layout of a range of structures associated with the workings of the GWR Paddington Milk Ramp and the stations northern freight area (Platform 12). The results of the works chart the development of the Site area from the late 19<sup>th</sup> century early 20<sup>th</sup> century to the present day. Much of the remains of the 19<sup>th</sup> - early 20<sup>th</sup> century goods yard have long ago been removed. The work at PIP therefore represented an opportunity to record vestiges of the Stations history.
- 9.1.3 The results of the watching brief works have identified and recorded a number of interesting features associated with this development and with the construction of the GWR and Paddington Station.
- 9.1.4 At the Triangle Site remains include a series of 19<sup>th</sup> century apsidal brick vaulted cellars running along the southern edge of the Site, as well parts of several phases of the cobbled surface of the former GWR Coal Depot/High Level Goods Yard and Exit Ramp leading down from Bishops Bridge Road.
- 9.1.5 The majority of the remains seen in the London Street Deck could be dated to 1909-1916. A period when the northern part of Paddington Station was extensively remodelled. This included a new access ramp from Platform 12 up to the surface at the London Street level this was achieved through the Milk Ramp; a cobbled surface that rested on arched brickwork supported on a network of iron girders RJS and stanchions.
- 9.1.6 Finally the changeover of the London Deck and Triangle Site from a railway coal depot and goods yard to a more mixed use as a vehicle waiting area, through to the Site's occupation by Crossrail Ltd, was also evident.

## 10. PUBLICATION AND DISSEMINATION

- 10.1.1 The remains uncovered during the project are not of sufficient significance to warrant further publication. Although they are to be incorporated in a stand-alone publication on the railway remains uncovered during the Crossrail project.



## 11. ARCHIVE DEPOSITION

- 11.1.1 The complete project archive includes paper context records and indices, permatrace drawings, both black and white and colour photographs, digital plans and photographs, artefacts, ecofacts and sieved residues. A full list is given in Appendix 5. These will be prepared following the guidelines set out in *Environmental Standards for the Permanent Storage of Excavated Material from Archaeological Sites* (UKIC 1984, Conservation Guidelines 3) and *Guidelines for the Preparation of Excavation Archive for Long-term Storage* (Walker 1990).
- 11.1.2 The digital data will be temporarily stored on the server at OA South, which is backed up on a daily basis. For long term storage of the digital data CDs/DVDs will be used and will include the reports, plans, scanned images and digital photographs. Each disk will be fully indexed and accompanied by the relevant metadata as provenance.
- 11.1.3 The project archive and finds are currently held at the offices of Oxford Archaeology (south) in Osney Mead, Oxford, under the site code XSE10.
- 11.1.4 It is anticipated that in due course, with the agreement of CRL, the archive and finds will be deposited with LAARC (London Archaeological Archive and Research Centre).  
At:  
Mortimer Wheeler House  
46 Eagle Wharf Road  
London N1 7ED  
Tel: 020 7410 2200  
<http://www.museumoflondonarchaeology.org.uk>
- 11.1.5 Copies of the report will be lodged with English Heritage Greater London Archaeological Advisory Service, GLHER (Greater London Historic Environment Record), the City of Westminster and Westminster City Archives.
- 11.1.6 All dry and stable finds will be packaged according to the Museum of London's specifications, in either acid-free cardboard boxes, or in airtight plastic boxes for unstable material. Each box will have a compiled list of its contents and the boxes will in general contain only one type of material e.g. bone or ceramic.
- 11.1.7 It is anticipated that, subject to agreement with the landowner, the finds will also be deposited with LAARC.



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## APPENDIX 1: ARCHAEOLOGICAL CONTEXT INVENTORY

Context	Type	Category	Description	Period
2000	Deposit	Road	Modern Road, concrete slab	5
2001	Deposit	Road	Tarmac Road	3
2002	Deposit	Surface	Granite Setts	3
2003	Deposit	Layer	Makeup - Bedding Layer	3
2004	Deposit	Foundation	Concrete Bedding	3
2005	Deposit	Layer	Makeup/Levelling	1A
2006	Deposit	Layer	Makeup/Levelling	3
2007	Deposit	Layer	Makeup/Levelling	1A
2008	Deposit	Layer	Redeposited Clay	1A
2009	Deposit	Layer	Makeup/Levelling	1B
2010	Structure	Wall	Retaining Wall	3
2011	Deposit	Surface	Granite Setts	3
2012	Cut	Wall	Construction cut for 2010	3
2013	Deposit	Layer	Bedding Layer/Makeup	3
2014	Deposit	Natural Feature	Geology	0
2015	Deposit	Layer	Makeup/Levelling	1A
2016	Deposit	Layer	Cement	1A
2017	Deposit	Layer	Makeup/Levelling	1A
2018	Deposit	Natural Feature	Geology, Brickearth	0
2019	Deposit	Fill	Clinker rich backfill of construction cut	1B
2020	Cut	Foundation	Construction cut for 2021	1B
2021	Structure	Arched Vault	Arched, Apsidal brick vaults	1B
2022	Deposit	Drain	Drain backfill	3
2023	Deposit	Drain	Backfill	3
2024	Cut	Drain	Construction Cut	3
2025	Structure	Wall	Rectangular shaped, brick built structure	3
2026	Cut	Wall	Construction cut	3
2027	Deposit	Wall	Backfill In 2026	3
2028	Structure	Drain	Square Brick Drain / Chamber	3
2029	Deposit	Natural Feature	Geology	0
2030	Deposit	Natural Feature	Geology	0
2031	Deposit	Natural Feature	Geology	0
2032	Deposit	Layer	Makeup/Levelling	3
2033	Deposit	Layer	Bedding–Makeup	5
2034	Deposit	Wall	London Underground's Shunt Tunnel	3
2035	Cut	Wall	Construction Cut for 2034	3
2036	Deposit	Wall	Backfill	3
2037	Deposit	Layer	Bedding–Makeup	3
2038	Deposit	Foundation	Concrete Slab	4



Context	Type	Category	Description	Period
2039	Cut	Foundation	Demolition Interface	4
2040	Cut	Surface	Interface for bedding and Granite Setts	3
2041	Deposit	Natural Feature	Geology	0
2042	Cut	Surface	Interface for bedding and Granite Setts	3
2043	Deposit	Natural Feature	Geology	0
2044	Deposit	Natural Feature	Geology	0
2045	Deposit	Natural Feature	Geology	0
2046	Deposit	Natural Feature	Geology	0
2047	Deposit	Natural Feature	Geology	0
2048	Deposit	Natural Feature	Geology	0
2049	Deposit	Natural Feature	Geology	0
2050	Deposit	Natural Feature	Geology	0
2051	Deposit	Natural Feature	Geology	0
2052	Deposit	Natural Feature	Geology	0
2053	Deposit	Natural Feature	Geology	0
2054	Deposit	Natural Feature	Geology	0
2055	Deposit	Natural Feature	Geology	0
2056	Deposit	Natural Feature	Geology	0
2057	Deposit	Natural Feature	Geology	0
2058	Deposit	Natural Feature	Geology	0
2059	Deposit	Natural Feature	Geology	0
2060	Deposit	Layer –Makeup	Makeup/Levelling	3
2061	Deposit	Natural Feature	Geology	0
2062	Deposit	Natural Feature	Geology	0
2063	Deposit	Natural Feature	Geology	0
2064	Deposit	Natural Feature	Geology	0
2065	Deposit	Surface	Granite cobbles	2
2066	Deposit	Layer	Makeup. Sand bedding for 2065	2
2067	Deposit	Foundation	Concrete sub base for 2065	2
2068	Deposit	Foundation	Concrete modern slab	3
2069	Deposit	Layer	Makeup rubble rich	3
2070	Deposit	Layer	Makeup levelling. Track ballast, silt sand	3
2071	Deposit	Layer	Makeup levelling. Track ballast, silt	3
2072	Deposit	Layer	Makeup clinker and ash	3
2073	Deposit	Layer	Makeup grey silty sand	3
2074	Deposit	Layer	Makeup levelling ballast rich silt sand	3
2075	Cut	Modern	Modern	5
2076	Deposit	Modern	Mixed modern fill	5
2077	Cut	Services	Modern service	5
2078	Deposit	Services	Modern backfill	5
2079	Group	Road	Granite cobbles. Milk Ramp	2/3
2080	Deposit	Surface	Concrete with granite setts, part of Ramp	2/3
2081	Structure	Tank	Rectangular Concrete and brick	4



Context	Type	Category	Description	Period
2082	Structure	Arches	Brick arched base of Upper Deck	2
2083	Cut	Tank	Cut for tanks	4
2084	Structure	Iron Structure	Iron frame and support of ramp	2
2085	Deposit	Layer	Makeup. Track ballast	2
2086	Deposit	Layer	Makeup levelling gritty sand	2/3
2087	Deposit	Layer	Fe rich deposit	2/3
2088	Deposit	Layer	Makeup over granite setts 2065	2/3
2089	Deposit	Surface	Granite cobbles Upper deck	2/3
2090	Deposit	Surface	Granite cobbles Upper deck	2/3
2091	Deposit	Surface	Concrete slab	3



**APPENDIX 2: FINDS**

Context	Spot -Date	No.	Weight	
2007	1750-1900?	1	34g	Worn PMR ?bowl sherd with interior greenish-brown glaze
2008	1700-1850?	1	4g	Chinese porcelain (CHPO) dish/bowl footring with overall grey-blue glaze int. & traces darker line dec. white ext.
2085	c.1860-1909	17	380	<p>3 vessels.</p> <p>Includes 15 sherd from a single teapot in glazed dark brown earthenware of Rockingham-type (ROCK); comprises 4 joining lid-seated rim sherds, 1 complete handle, base missing.</p> <p>1x flanged dish rim in transfer-printed whiteware (TPW) with black border of stylised 'laurel' leaves and outer black edge line.</p> <p>1x dish rim refined whiteware with border of 2 fine red lines and one inner black painted line (REFW PNTD), latter rim heavily crazed and stained black</p>
<b>Total</b>		19	418	



### **APPENDIX 3: SUMMARY OF SITE DETAILS**

**Client Name:** Crossrail Ltd

**Site Name:** Paddington Integrated Project (PIP) Watching Briefs

**Site Code:** XSE10

**Grid Reference:** LSG (TQ 2653 8136)

**Type of investigation:** Watching Briefs

**Date and duration of project:** Intermittently between; 21/9/10 and 12/7/2012

**Location of archive:** The archive is currently held at OA, Janus House, Osney Mead, Oxford, OX2 0ES, and will be deposited with the Museum of London in due course.



## APPENDIX 4: SMR / HER / OASIS RECORD FORMS

# OASIS DATA COLLECTION FORM: England

[List of Projects](#) | [Manage Projects](#) | [Search Projects](#) | [New project](#) | [Change your details](#) | [HER coverage](#) | [Change country](#) | [Log out](#)

## Printable version

**OASIS ID: oxfordar1-218423**

### Project details

Project name	Paddington PIP, London
Short description of the project	A programme of archaeological investigations were undertaken by Oxford Archaeology/Ramboll UK (OAR), in the vicinity of Paddington Station, City of Westminster, London W2. The intermittent watching brief works, which were carried out as part of the Paddington Integrated Project (PIP) Crossrail works, commenced in September 2010 and continued through to July 2012. Deposits of Brickearth were observed during the bulk excavation of the Triangle Site (east of Bishops Bridge). This geological deposit was seen overlaying an extensive (up to 2.5 m thick) sequence of gravels. These deposits were identified as Pleistocene river terrace deposits (Lynch Hill Gravels), which form part of the natural geology in this part of London. Several brick built structures and other remains associated with the Great Western Railway's Paddington Goods Yards and Paddington Station were recorded during the project, including sections of a cobbled roadway made up of granite setts, uncovered beneath the modern concrete slab at the Triangle Site and at the eastern end of the Upper London Street Deck Site. Other archaeological works included the monitoring of the demolition of the Milk Ramp, retaining walls and the removal of an extensive cobbled surface during utility trench works behind Platform 12. All of these remains were integral elements of the Paddington Station complex and part of what was an important component of the Great Western Railway and one of the earliest major railway termini to survive in Britain.
Project dates	Start: 21-09-2010 End: 12-07-2012
Previous/future work	Not known / No
Any associated project reference codes	XSE 10 - Sitecode
Type of project	Recording project
Site status	Listed Building
Current Land use	Transport and Utilities 2 - Other transport infrastructure
Monument type	GRADE 1 LISTED BUILDING Post Medieval
Significant Finds	POTTERY Post Medieval
Significant Finds	CBM Post Medieval
Significant Finds	METAL Post Medieval
Significant Finds	GLASS Post Medieval
Investigation type	"Watching Brief"
Prompt	Environmental Minimum Requirements for the Crossrail Bill

### Project location

Country	England
Site location	GREATER LONDON CITY OF WESTMINSTER PADDINGTON BAYSWATER AND KNIGHTSBRIDGE Paddington PIP, London
Study area	9000.00 Square metres
Site coordinates	TQ 2653 8136 51.5164781003 -0.176232853282 51 30 59 N 000 10 34 W Point

### Project creators

Name of Organisation	Oxford Archaeology/Ramboll (OAR)
Project brief originator	Crossrail
Project design originator	Oxford Archaeology/Ramboll (OAR)
Project director/manager	R. Brown
Project supervisor	Oxford Archaeology
Type of sponsor/funding body	Crossrail

### Project archives

Physical Archive recipient	Museum of London
Physical Archive ID	XSE10
Physical Contents	"Animal Bones","Ceramics","Glass","Metal"
Digital Archive recipient	Museum of London
Digital Archive ID	XSE10
Digital Contents	"other"
Digital Media available	"Images raster / digital photography","Survey","Text"
Paper Archive recipient	Museum of London
Paper Archive ID	XSE10
Paper Contents	"Stratigraphic"
Paper Media available	"Context sheet","Matrices","Photograph","Plan","Report","Section","Survey "

### Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	Paddington PIP, London W9, Archaeological Fieldwork Report
Author(s)/Editor(s)	Evans, G.
Date	2015
Issuer or publisher	Crossrail

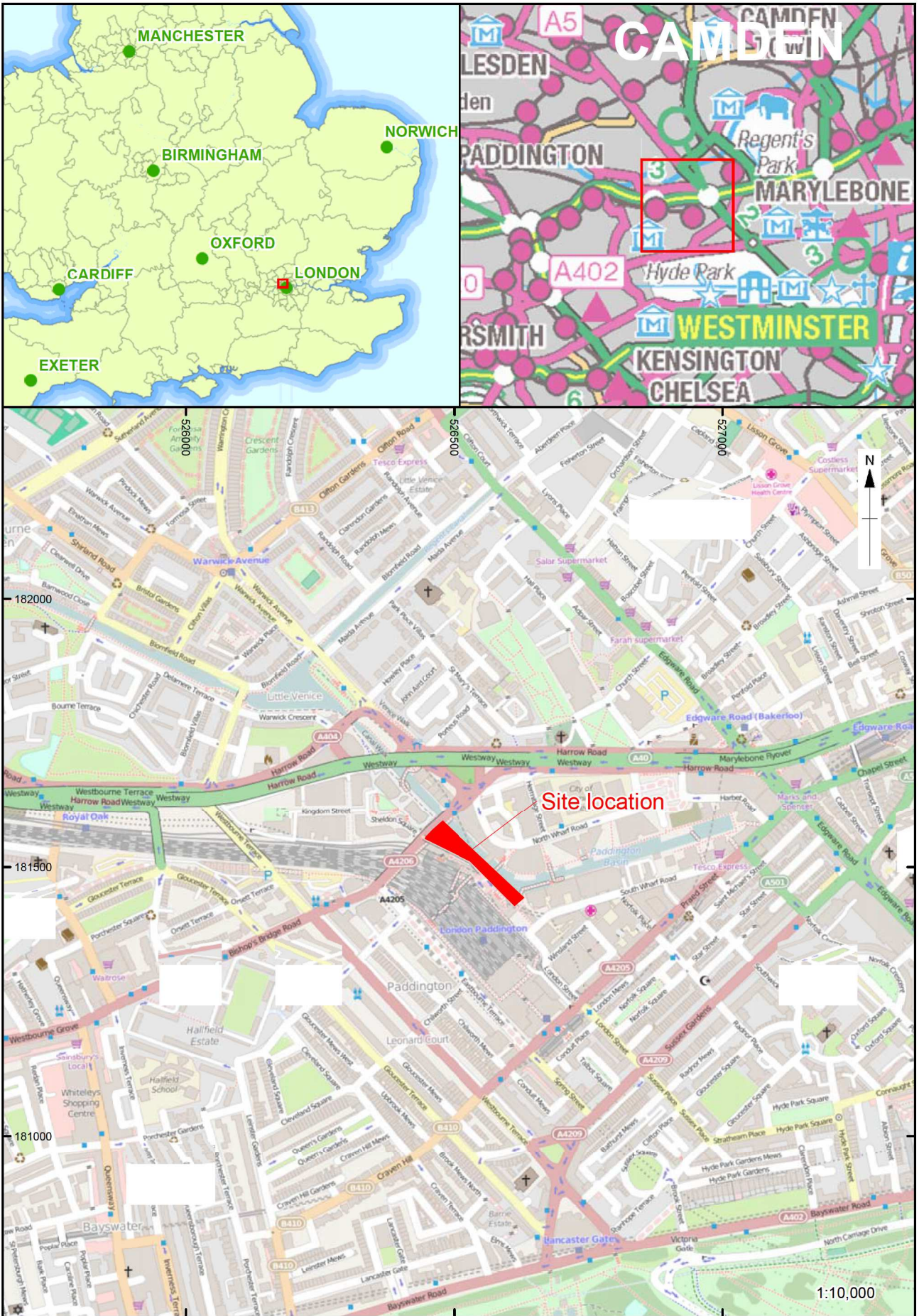
Place of issue or publication	Oxford
Description	Client report
Entered by	Susan Rawlings ( <a href="mailto:susan.rawlings@oxfordarch.co.uk">susan.rawlings@oxfordarch.co.uk</a> )
Entered on	20 July 2015

## OASIS:

Please e-mail [Historic England](#) for OASIS help and advice

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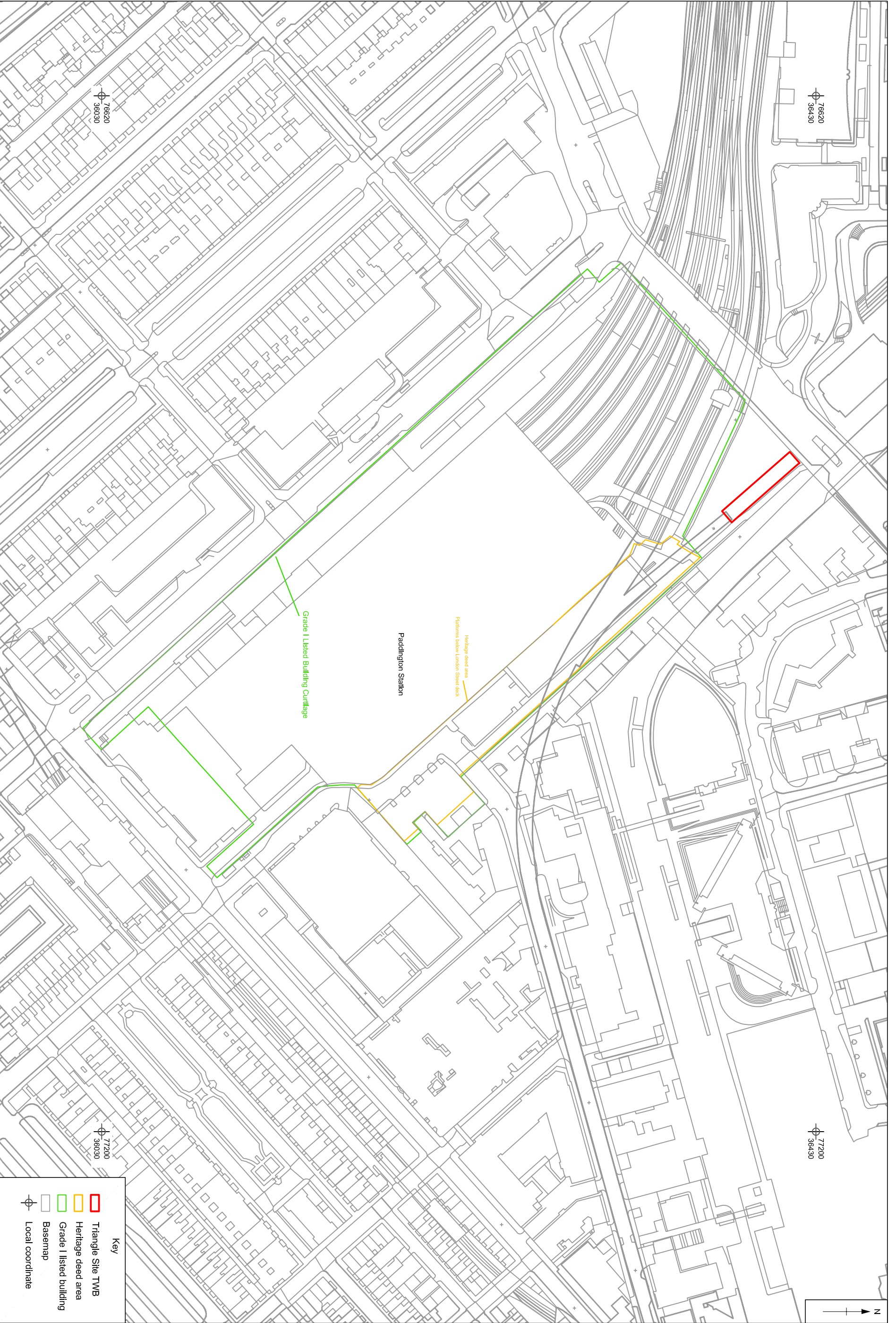
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Figure 1: Site location



0 100 m  
Scale at A3 1:2000

**Key**

- Triangle Site TWB
- Heritage dead area
- Grade I listed building
- Basemap
- Local coordinate

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Figure 2: Area of the Grade I Listed Building Curtilage

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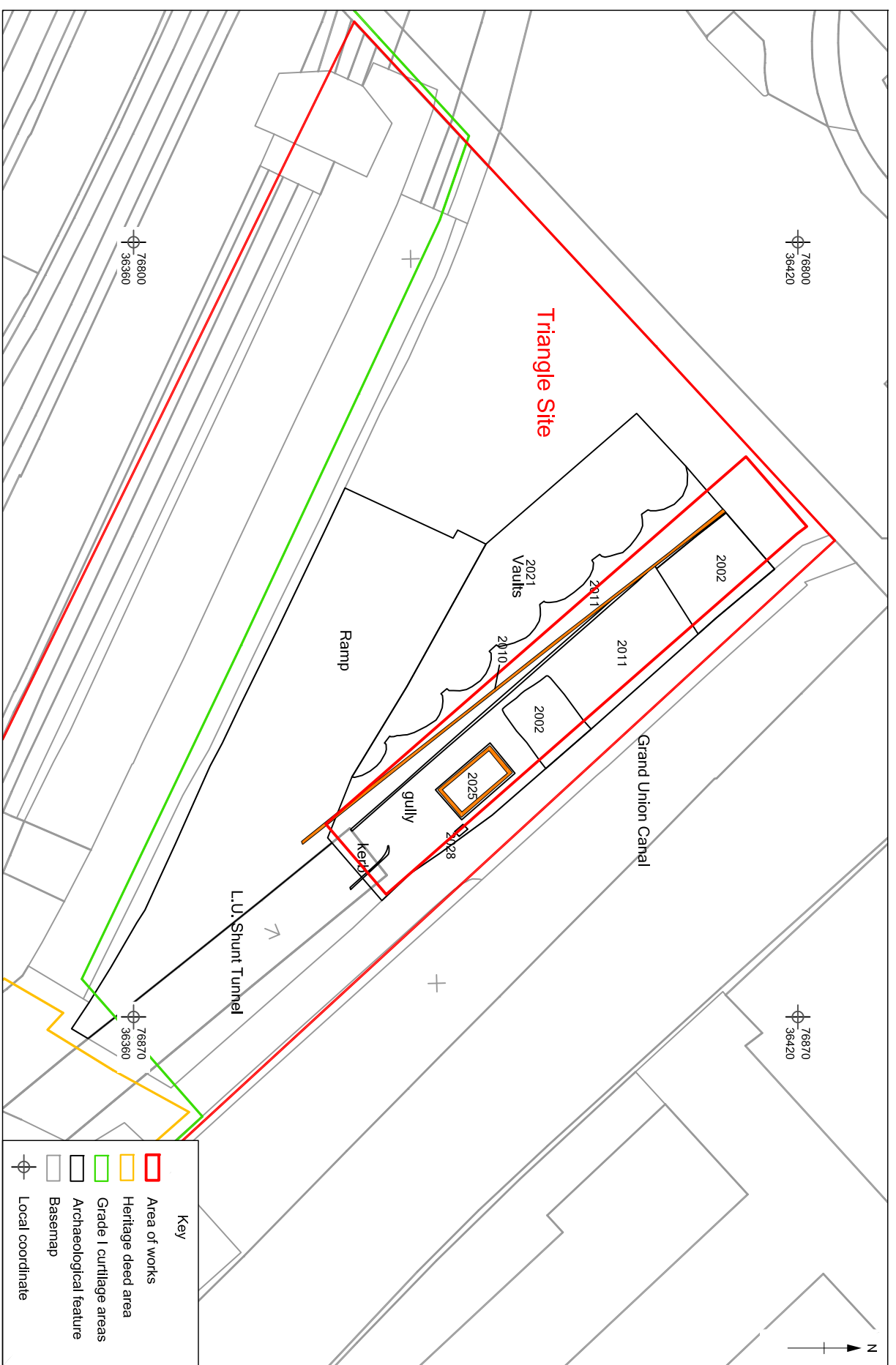


Figure 3: Plan of Triangle Site showing location of main features found

Scale at A4 1:500

0 20 m

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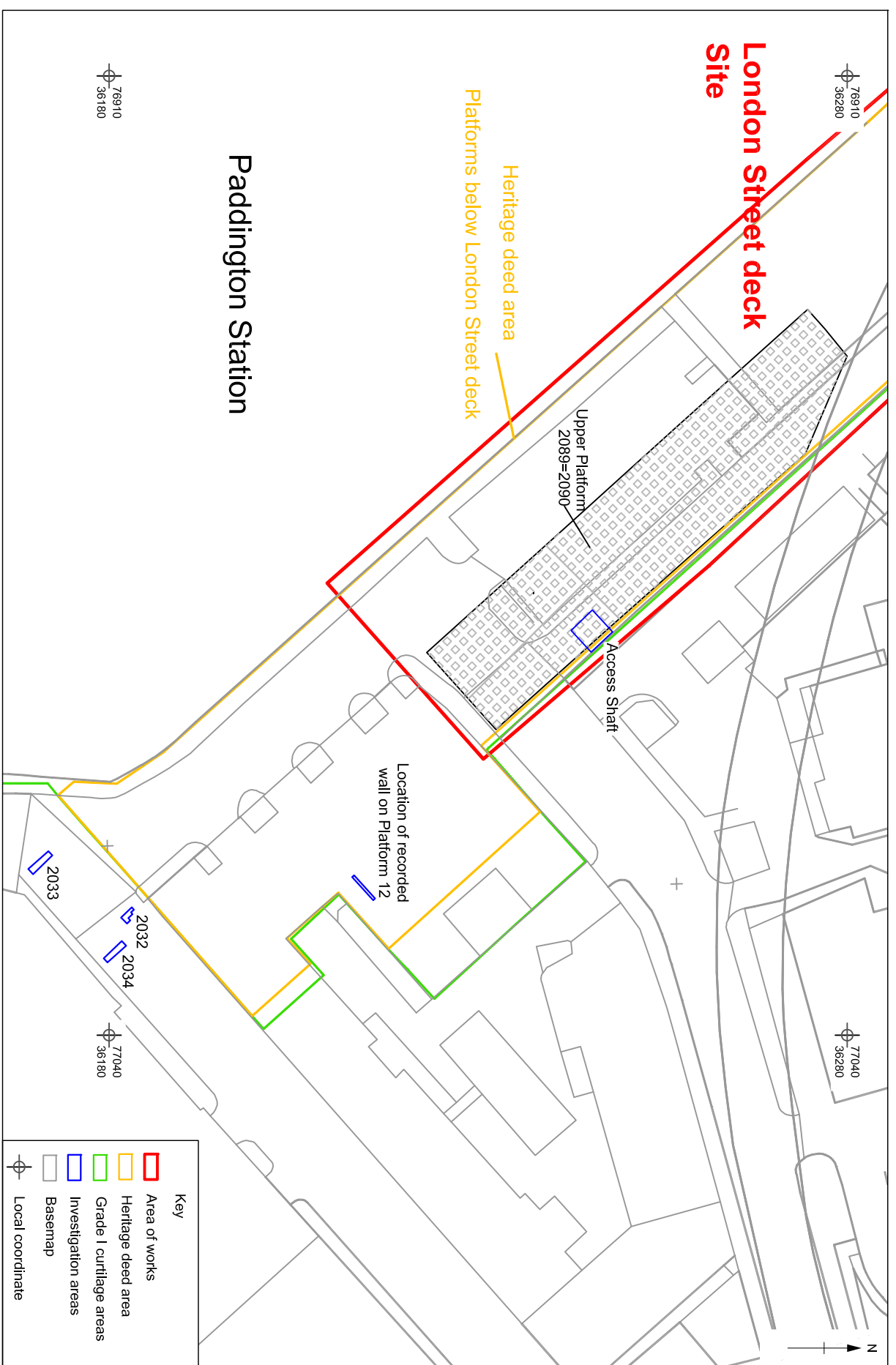
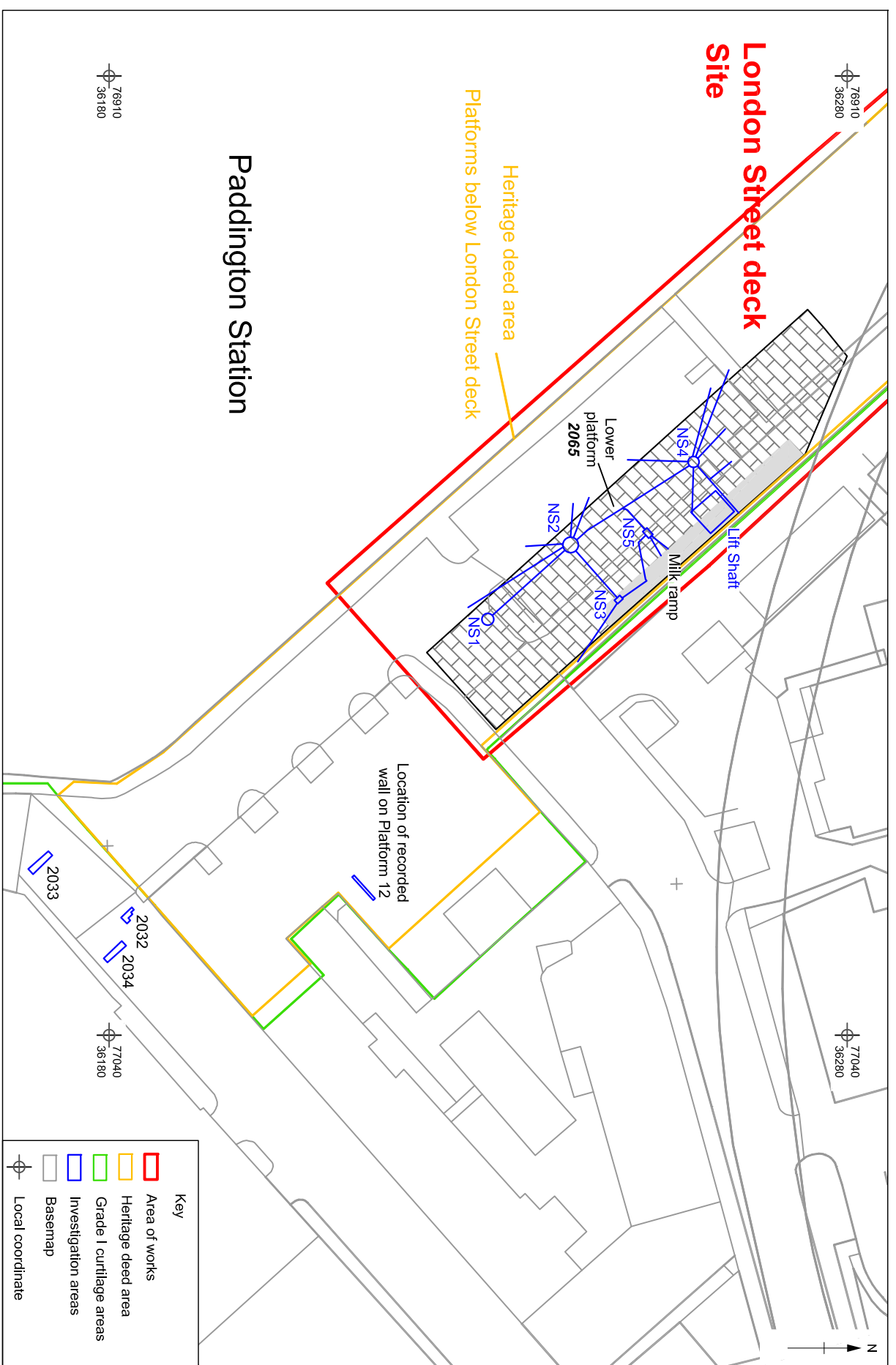


Figure 4: Plan of Upper London Street deck showing location of main features found

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Key	
<span style="border: 1px solid red; display: inline-block; width: 15px; height: 10px;"></span>	Area of works
<span style="border: 1px solid orange; display: inline-block; width: 15px; height: 10px;"></span>	Heritage deed area
<span style="border: 1px solid green; display: inline-block; width: 15px; height: 10px;"></span>	Grade I curtilage areas
<span style="border: 1px solid blue; display: inline-block; width: 15px; height: 10px;"></span>	Investigation areas
<span style="border: 1px solid grey; display: inline-block; width: 15px; height: 10px;"></span>	Basemap
<span style="display: inline-block; width: 15px; height: 10px; border-left: 1px dashed grey;"></span>	Local coordinate

Figure 5: Plan of Lower London Street Deck showing location of main features found

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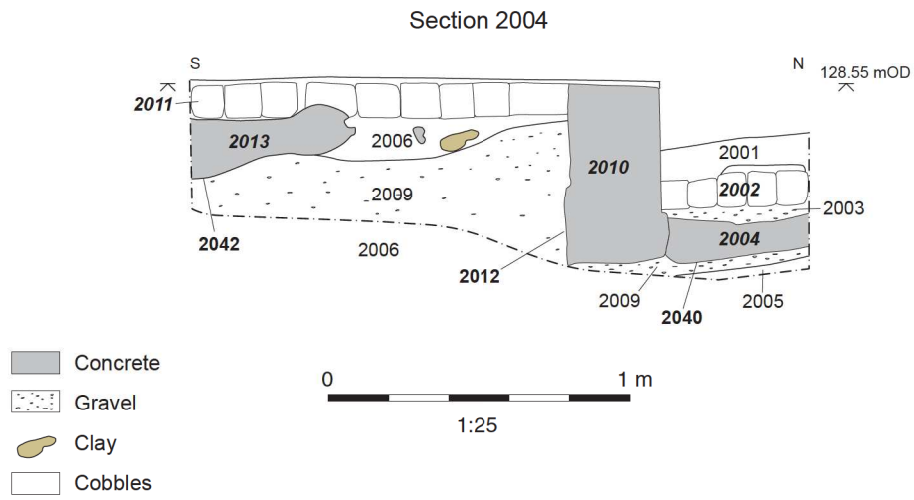


Figure 6: Triangle Site: west facing section beneath cobbled surfaces 2011 and 2002 showing wall 2010 and underlying deposits

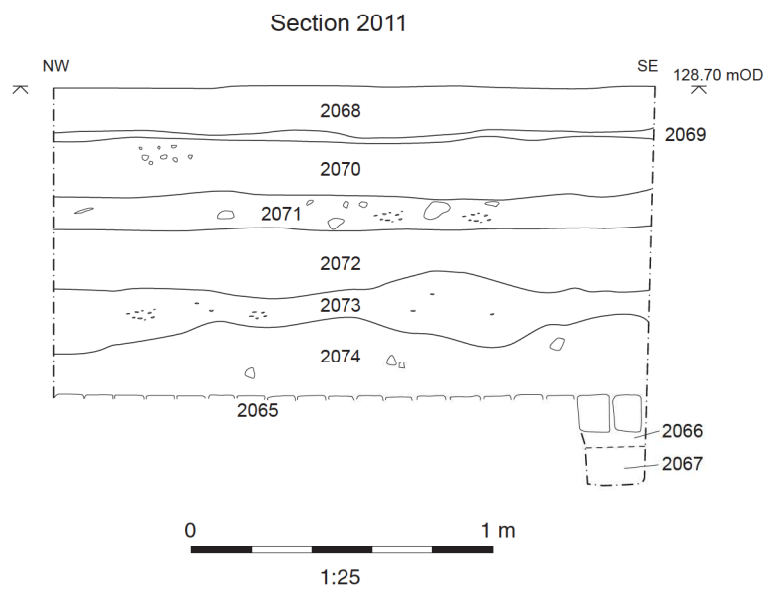


Figure 7: London Street Deck Site: section showing cobbled surface 2065 and overlying deposits



Plate 1: Section through the Natural Geology. Looking east showing Pleistocene sands and gravels under brickearth



Plate 2: Section through "makeup" deposits below granite setts and the underlying brickearth



Plate 3: Apisidal rear faces of the stable block walls 2021. Looking south-east



Plate 4: Removal of the walls of 2021. Looking north-west



Plate 5: Structure 2025. Looking south-east



Plate 6: Structure 2025. Looking south-west



Plate 7: Structure 2028. Looking south-east



Plate 8: Cobbled surface 2002, looking south-east





Plate 9: Cobbled surface 2011. Looking north



Plate 10: Cobbled surface 2011 at northern edge of Site



Plate 11: Surface 2011, close up section. Looking north-west

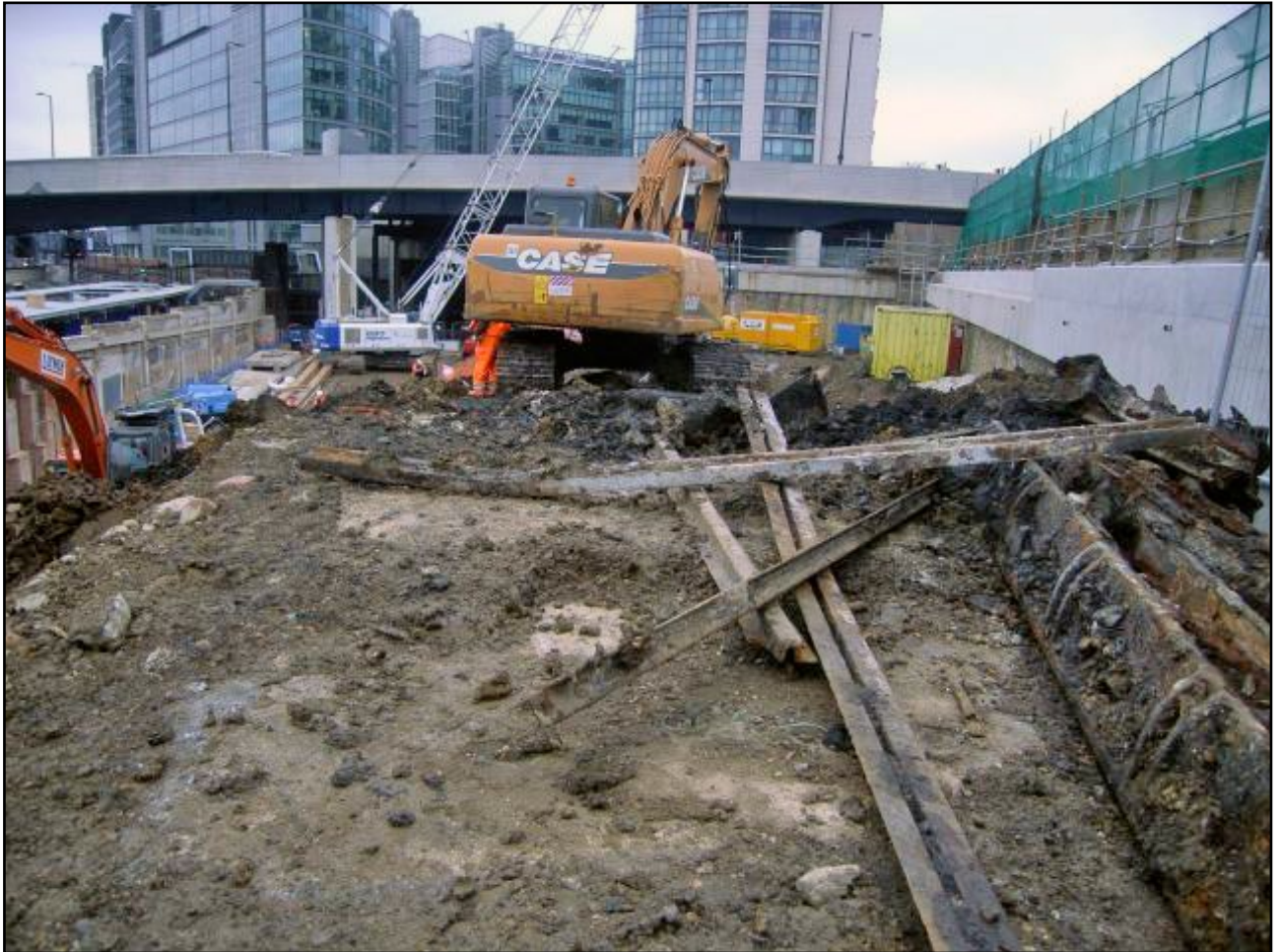


Plate 12: Lengths of ex-situ Bridge rails within body of ramp

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Plate 13: Section showing the sequence of deposits beneath concrete slab on to cobbled surface 2065



Plate 14: Surface 2065, sample area, Looking north-east



Plate 15: Surface 2065, sample area, Looking north-west



Plate 16: Surface 2065 showing drainage gully



Plate 17: View of the Milk Ramp showing cobbled surface 2080

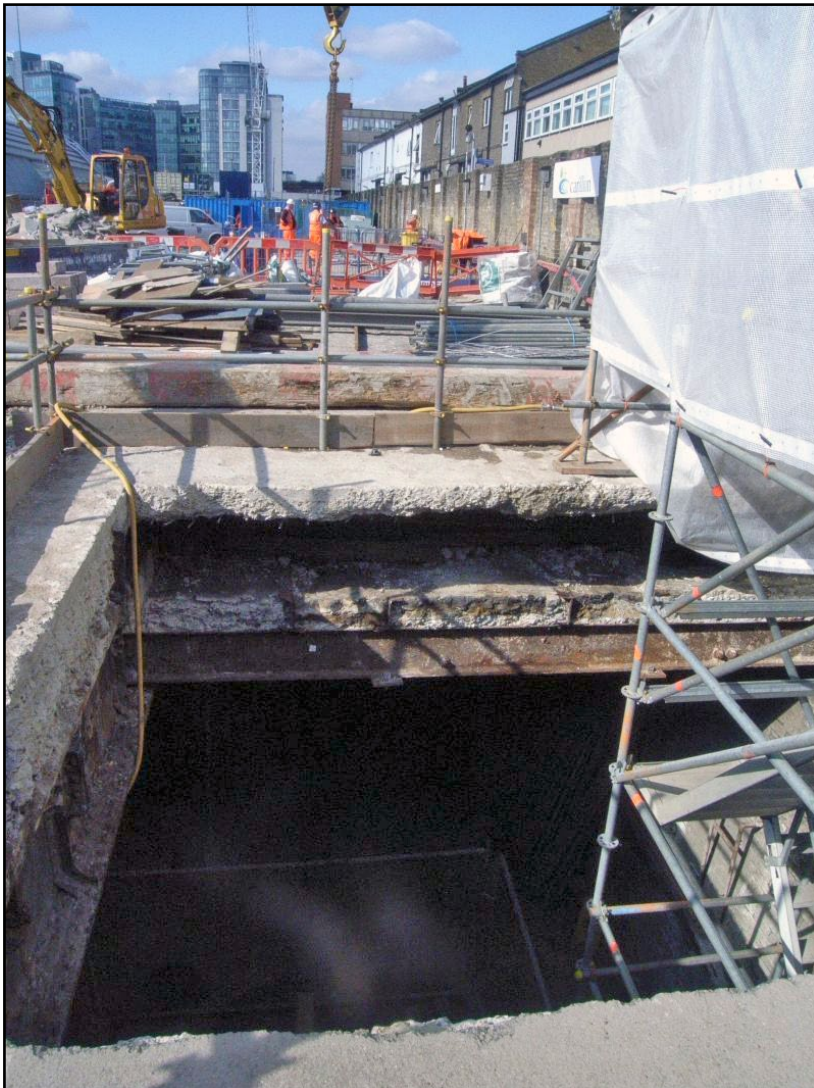


Plate 18: General View of the Upper Deck in the area of the Access Shaft



Plate 19: Section at the point where the Milk Ramp meets the London Street Upper Deck



Plate 20: Steel girders within Milk Ramp and northern wall of Ramp. Looking north



Plate 21: Supporting stanchion of Milk Ramp/Red Star Deck



Plate 22: Continuation of the same iron ceiling and support structures on Platforms 11 and 10



Plate 23: The northern part of the cobbled surface 2089 of Red Star Deck.



Plate 24: Worn linear groove in the cobbled surface of Milk Ramp. A iron rail is to the right





Plate 25: Petrol tank and bund wall truncating the Milk Ramp during dismantling



Plate 26: Lower section of Retaining Wall with scars of vehicle impacts



Plate 27: Overall View of Wall



Plate 28: Variation in Brick Bond Associated with Steel Roller Door



Plate 29: Cobbled surface 2089 of London Street/Red Star Deck