Let me know if you would like to see additional requirements and I hope that the scope of works is acceptable.

Looking forward to your reply.

Kind regards,

Osric

Dr Osric Tening Forton

BSc MSc PGCert PhD MCIWEM C.WEM CEnv CSci
Consultant, Land Quality
Environment & Nature

T +44 (0)207 631 5291
osric.forton@ramboll.co.uk

From: Ivens, Rob [mailto:Rob.Ivens@camden.gov.uk]
Sent: 28 November 2011 19:34
To: Osric Forton
Subject: RE: Kings Cross P1 Desk Study DONE MAO 17/10

Sorry for the short answeres this site is very difficult to interpret the most usdefull information we have is the historical maps and I would refer you to those.

Rob Ivens
Contaminated Land Contractor

Telephone: 020 7974 2990

From: Ivens, Rob
Sent: 28 November 2011 19:31
To: 'Osric.Forton@ramboll.co.uk'
Subject: RE: Kings Cross P1 Desk Study DONE MAO 17/10

I apologise for the delay in responding.

Unfortunately without an 8 figure grid reference the site is almost impossible to accurately identify however I

- Any records of contamination/pollution incidents on the sites; the council does not keep these specific records

- Any records of landfills/Made Ground;- the area appears to be former railway land

- Any records of complaints about the site e.g. odour, noise, nuisance; we can not check these records without a postal address

- Any Part B processes; 3 concrete batching plants are located near york way

- Have the two sites or any part of their surroundings been screened for the presence of Contaminated Land under Part IIA of Environmental Protection Act 1990?;

The whole area would be regarded as potentially contaminated and would probably be subject to a condition – depending on the use.

- Have the two sites or any part of their surrounding been designated as Contaminated Land under Part IIA of the Environmental protection Act 1990?;

What two sites only one is marked- No sites are currently determined near st pancras

- Are the sites or any part of the two sites been scheduled for investigation for Contaminated;

No sites are currently scheduled near st pancras

- Land under Part IIA of the Environmental Protection Act 1990?; and

- Are there any records of ground investigations at the site or its immediate surroundings which the council hold?

We do not have these records available to distribute

- Any specific requirements or guidance which Camden Council may have related to the management of ground contamination hazards and risks within the King Cross Central development site.

The made ground is likely to be contaminated please carry out an appropriate unbiased assessment

Rob Ivens
Contaminated Land Contractor

Telephone: 020 7974 2990

From: Arthur, Anona
Sent: 10 October 2011 12:43
To: Planning and Public protection
Subject: FW: Kings Cross P1 Desk Study DONE MAO 17/10

Hi please put on flare and allocate to me thanks

Anona Arthur
Enviromental Health Officer

Telephone: 020 7974 2990

From: Osric Forton [mailto:Osric.Forton@ramboll.co.uk]
Sent: 10 October 2011 12:33
To: Arthur, Anona
Cc: 006727 - Kings Cross P1
Subject: Kings Cross P1 Desk Study

<<6727_KingsCrossP1sitelocation.pdf>>

Dear Anona,

Good morning. We are currently pulling together a desk study with a phase I ground contamination risk assessment for the Kings Cross P1 site (see site location plan attached). We are keen to understand the environmental setting of the site and would be grateful if you could provide use with details of the following:

- Any records of contamination/pollution incidents on the sites;
- Any records of landfills/Made Ground;
- Any records of complaints about the site e.g. odour, noise, nuisance;
- Any Part B processes;
- Have the two sites or any part of their surroundings been screened for the presence of Contaminated Land under Part IIA of Environmental Protection Act 1990?;
- Have the two sites or any part of their surrounding been designated as Contaminated Land under Part IIA of the Environmental protection Act 1990?;
- Are the sites or any part of the two sites been scheduled for investigation for Contaminated;
- Land under Part IIA of the Environmental Protection Act 1990?; and
- Are there any records of ground investigations at the site or its immediate surroundings which the council hold?
- Any specific requirements or guidance which Camden Council may have related to the management of ground contamination hazards and risks within the King Cross Central development site.

We will be grateful if you could provide any other information that will be helpful in adequately characterizing the site and informing our approach to the redevelopment of the site.

Thank you very much for your help and please do not hesitate to contact me if you have any further questions.

PS – Once we complete the Phase I Risk Assessment

Kind regards,

Osric

Dr Osric Tening Forton

BSc MSc PGCert PhD MCIWEM C.WEM CEnv CSci

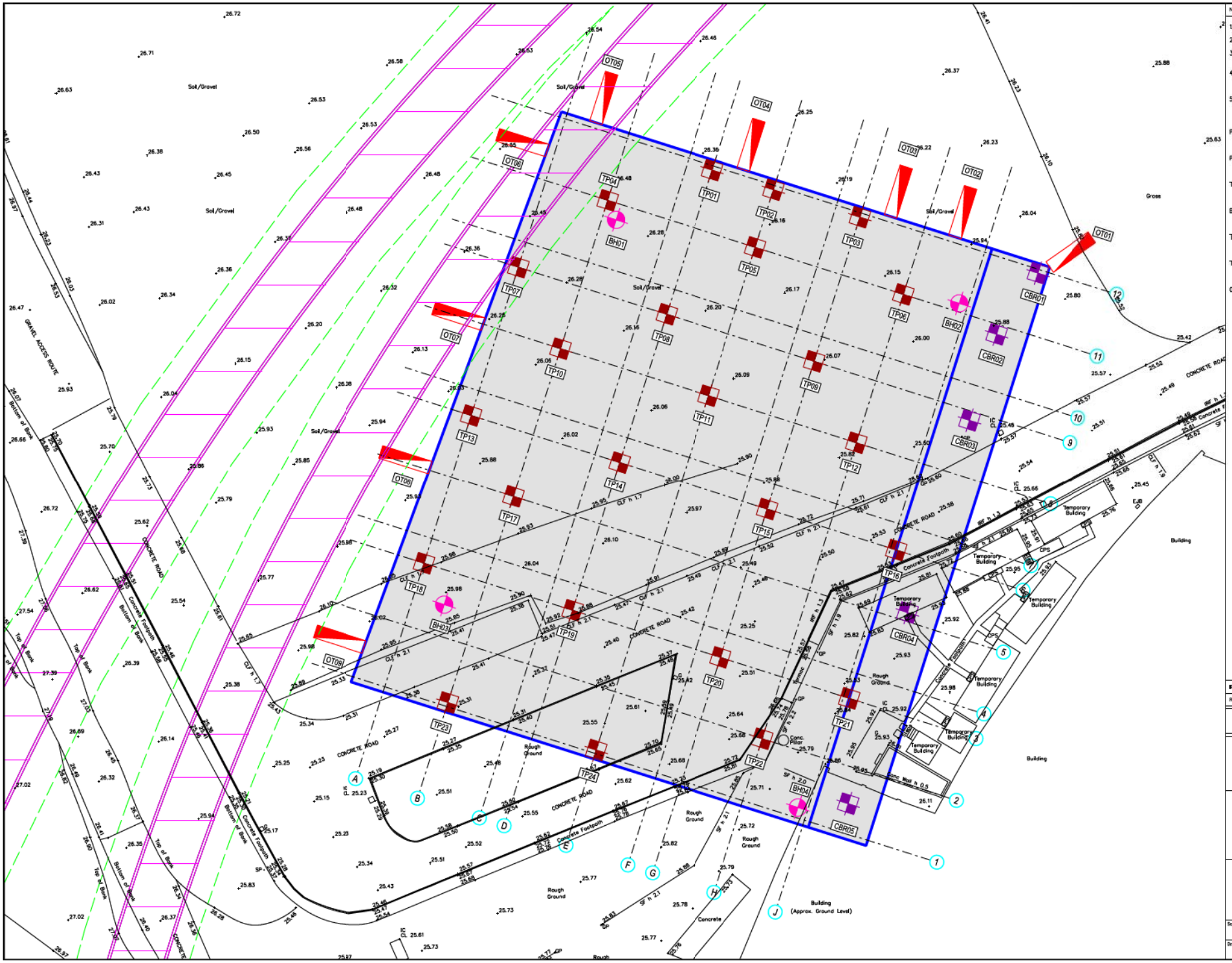
Consultant, Land Quality

Environment & Nature

T +44 (0)207 631 5291

osric.forton@ramboll.co.uk

Ramboll UK
60 Newman Street
London
W1T 3DA
www.ramboll.co.uk

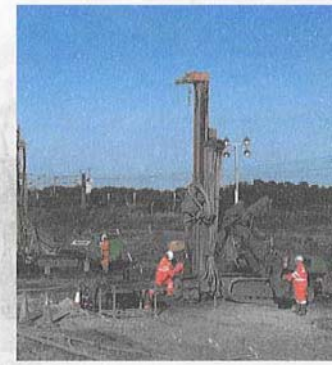

Notes
1. DO NOT SCALE FROM THIS DRAWING
2. ALL DIMENSIONS ARE IN MILLIMETRES U.N.O.
3. ALL HEIGHTS ARE IN METRES ABOVE ORDNANCE DATUM U.N.O.
4. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS
5. NO EXPLORATRY WORKS TO BE UNDERTAKEN WITHIN A 10m ZONE OF THE CTRL ZONE FENCE
P1 SITE BOUNDARY
PROPOSED THAMES LINK 2000
THAMES LINK 2000 EXCLUSION ZONE
BOREHOLES
TRIAL PITS
TRIAL PITS WITH CBR'S
OBSERVATION TRENCH
P1 INFORMATION 28/11/11 Rmax OF SC
Rev Description Date By Chk App
INFORMATION
KINGS CROSS BUILDING P1
RAMBOLL
tel 020 7631 5291 fax 020 7323 4646 london@ramboll.co.uk www.ramboll.co.uk
P1 PROPOSED EXPLORATORY HOLE LOCATION PLAN
Scale: NTS @ A3
Date: NOV 11
Drawn: Rmax
Checked: OF
Drawing No. 6727/YE/008
Rev. I01

APPENDIX C: SITE INVESTIGATION FACTUAL REPORT

THIS APPENDICES INCLUDES THE SITE INVESTIGATION FACTUAL REPORT AS PREPARED BY BAM RICHIES, THE GROUND INVESTIGATION CONTRACTOR, APPOINTED TO UNDERTAKE THE INTRUSIVE WORKS

ONLY THE EXPLORATORY HOLE LOGS ARE INCLUDED IN THIS REPORT. THE COMPLETE GROUND INVESTIGATION FACTUAL REPORT IS PROVIDED UNDER A SEPARATE COVER.

Factual Geotechnical Report



4805
King's Cross Building P1

Final Report

CONTENTS

Control Sheet

Contract No: 4805

Report Status: Final

Issued to: 01 Carillion

Site
Kings Cross Building P1
Kings Cross Central
Kings Cross
London

Client:
Carillion Plc
Carillion Building
Regeneration House
Wharf Road
London
N1C 4UZ

Copy No: 00

Report Status	Prepared / Amended by:	Checked by:	Approved by:	Date:
Draft	J Hidalgo Souto	J Elson	N Greally	July 2012
Draft rev01	J Elson	J Elson	N Greally	July 2012
Final	R Stewart	J Elson	N Greally	August 2012

1.0 Introduction

The contents of this report relate to a ground investigation completed at the Kings Cross Central redevelopment in the Borough of Camden, London at National Grid Reference TQ 299 837.

The investigation was commissioned in order to ascertain information on ground conditions, ground contamination, substructure obstructions and infrastructure works. The scope of the works included:-

- the sinking of four (4) exploratory boreholes to determine the general sequence of strata and composition of any expected Made Ground and natural ground below;
- the excavation of nine (9) trial trenches in order locate the existing services on Goods Street and Canal Street to west and north of the site and to determine the general sequence of strata;
- hand digging twenty four (24) exploratory holes to a maximum depth of 4.5mbgl to determine the general sequence of strata, contamination and composition of any expected Made Ground and natural ground below;
- five (5) TRL probes (correlated to CBR values);
- laboratory testing on samples from exploratory holes to determine the geotechnical and chemical properties of the strata;
- the installation of standpipes with gas taps and piezometers within the cable percussive boreholes to enable the long term monitoring of gas and ground water levels;
- the production of a factual report on the findings.

The investigation and report was commissioned on behalf of Carillion.

2.0 Brief Description of the Site

The site is located within the King's Cross Central Development in the Borough of Camden, London. The National Grid Reference of the site is approximately TQ 299 837

See Figure 1 for a Site Location Plan.

3.0 Published Geology

It is understood from the available information* that the site is underlain by the following:-

Stratum	Description
Topsoil / Made Ground	Variable sand, gravel, and clay layers
London Clay Formation	Clay, silty in parts.
Lambeth Group	Clay with sandy silt.
Upper Chalk	Chalk, white, nodular and soft with flint seams.

* British Geological Survey, North London, England and Wales Sheet 256, Bedrock and Superficial Deposits.*

4.0 Fieldwork

4.1 Introduction

All fieldwork was carried out within normal working hours between the 1st May and the 6th June 2012. The works were carried out in accordance with BS 5930:1999 'Code of practice for site investigations'.

4.2 Exploratory Hole Positioning and Surveying

All exploratory holes were jointly positioned by representatives from BAM Ritchies and Ramboll or Carillion. Following completion of the works all exploratory holes locations were surveyed by BAM Ritchies.

The coordinates and levels for the exploratory holes are on the appropriate logs and sketches contained within Appendices 1.0, 2.0 and 3.0 of this report.

4.3 Clearance of Services

Clearance of sub-surface utilities was carried out by Carillion. All known services were marked on the surface. The position of each exploratory hole was scanned with a Radiodetection RD4000 Cable Avoidance Tool [CAT] prior to any form of excavation.

An inspection pit was also carried out at each borehole location to locate any otherwise undetected services. The inspection pit details are noted on the corresponding borehole logs contained within Appendix 1.0 of this report.

4.4 Machine Excavated Trial Pits

Twenty four (24) trial pits were excavated by JCB 3CX to a maximum depth of 4.5mbgl. Environmental, bulk and disturbed samples were taken as each trial pit was progressed.

An approved engineering geologist logged the trial pits. Engineers' logs, photographs and sketches are presented within Appendix 3.0 of this report.

4.5 Hand Excavated Observation Trenches

The length of each trial trench was scanned with a 'CAT3+' Cable Avoidance Tool together with associated signal generator prior to excavation. All known services were marked on the surface.

An approved engineering geologist logged the entire length of the trial trench detailing strata encountered and services found.

Engineers logs, photographs and sketches can be round in appendix 2.0.

A TRL probe was used to determine CBR values at five (5) trench locations. The TRL probe results are in Appendix 4.0.

4.6 Cable Percussive Boreholes

A total number of four (4) exploratory boreholes were undertaken using the cable percussive method to a maximum depth of 63.5mbgl.

Open U100 samples of nominal 100mm diameter were taken at 1m intervals to 5mbgl and every 1.5m thereafter, when these were not possible bulk samples were taken at similar intervals. These were alternated with SPT tests at set intervals, from ground level to final depth.

Small-disturbed samples were taken from the SPT split spoon sampler.

In addition, bulk and disturbed samples were taken as the borehole progressed. Water samples were taken whenever water was struck during the drilling.

An approved engineering geologist logged the borehole arisings. Engineers' logs are presented within Appendix 1.0 of this report.

5.0 Summary of Ground Conditions Encountered

The ground conditions encountered during the investigation can generally be summarised as follows:-

Exploratory Hole No.	MADE GROUND : (mbgl)	Weathered London Clay (mbgl)	London Clay Formation (mbgl)	Lambeth Group (mbgl)			Upper Chalk Member (mbgl)
				Lower Mottled Beds	Upnor Formation	Thanet Sands	
BH1	0.0-3.80	-	3.80-38.00	38.00-54.00	54.00-58.00	58.00-61.60	61.60-63.50
BH2	0.0-2.90	2.90-10.20	10.20-40.00	-	-	-	-
BH3	0.0-3.00	3.00-12.50	12.50-40.00	-	-	-	-
BH4	0.0-4.00	4.00-12.70	12.70-40.00	-	-	-	-
TP01	0.0-2.20	-	-	-	-	-	-
TP02	0.0-2.80	2.80-4.10	-	-	-	-	-
TP03	0.0-2.70	2.70-3.35	-	-	-	-	-
TP05	0.0-3.05	-	-	-	-	-	-
TP06	0.0-1.90	-	-	-	-	-	-
TP07	0.0-2.30	2.30-3.30	3.30-3.60	-	-	-	-
TP08	0.0-2.70	2.70-3.20	-	-	-	-	-
TP09	0.0-2.75	2.75-3.30	3.30-3.70	-	-	-	-
TP10	0.0-2.80	2.80-3.60	-	-	-	-	-
TP11	0.0-3.50	3.50-4.70	-	-	-	-	-
TP12	0.0-2.50	-	-	-	-	-	-
TP12A	0.0-2.90	2.90-3.85	-	-	-	-	-
TP13	0.0-2.10	2.10-2.90	-	-	-	-	-

TP14	0.0-2.80	2.80-3.60	-	-	-	-	-
TP15	0.0-2.70	2.70-4.50	-	-	-	-	-
TP17	0.0-2.65	2.65-3.50	-	-	-	-	-
TP18	0.0-1.70	-	-	-	-	-	-
TP18A	0.0-2.05	2.05-3.00	-	-	-	-	-
TP19	0.0-2.35	2.35-3.10	-	-	-	-	-
TP21	0.0-3.25	3.25-3.90	-	-	-	-	-
TP22	0.0-1.80	-	-	-	-	-	-
TP24	0.0-1.50	-	-	-	-	-	-
TP24A	0.0-1.70	-	-	-	-	-	-
TP24B	0.0-2.30	2.30-3.00	-	-	-	-	-
OT01	0.0-1.00	-	-	-	-	-	-
OT02	0.0-1.20	-	-	-	-	-	-
OT03	0.0-1.20	-	-	-	-	-	-
OT04	0.0-1.20	-	-	-	-	-	-
OT05	0.0-1.20	-	-	-	-	-	-
OT06	0.0-1.20	-	-	-	-	-	-
OT07	0.0-1.00	-	-	-	-	-	-
OT08	0.0-0.40	-	-	-	-	-	-
OT09 L1	0.0-0.95	-	-	-	-	-	-
OT09 L2	0.0-0.95	-	-	-	-	-	-

6.0 Monitoring and Instrumentation

6.1 Monitoring

The incidence of groundwater was noted during the course of drilling/excavation of each exploratory hole. The ground water observations are displayed in the tables below as well as on the relevant exploratory hole logs contained within Appendix 1.0, 2.0 and 3.0 of this report.

Borehole Number	Depth groundwater encountered (mbgl)	Depth groundwater rose to after 20 minutes (mbgl)
BH1	None encountered during drilling	
BH2	1.80	1.8
	31.5	31.2
BH3	None encountered during drilling	
BH4	10.4	9.9

Exploratory Hole Number	Depth groundwater encountered (mbgl)
TP01	1.1
TP02	1.6 and 4.10
TP03	2.10
TP05	2.80
TP06	0.95
TP07	3.50
TP08	2.75
TP09	2.75
TP10	None encountered during excavation
TP11	1.60
TP12	None encountered during excavation
TP12A	None encountered during excavation
TP13	None encountered during excavation
TP14	3.60
TP15	None encountered during excavation
TP17	2.20
TP18	None encountered during excavation
TP18A	1.70

TP19	None encountered during excavation
TP21	3.25
TP22	None encountered during excavation
TP24	None encountered during excavation
TP24A	None encountered during excavation
TP24B	None encountered during excavation
OT01	None encountered during excavation
OT02	None encountered during excavation
OT03	None encountered during excavation
OT04	None encountered during excavation
OT05	None encountered during excavation
OT06	None encountered during excavation
OT07	None encountered during excavation
OT08	None encountered during excavation
OT09 Log 1 and 2	None encountered during excavation

6.2 Instrumentation

In order for others to carry out long term groundwater and gas monitoring the following installations were put in place:

Borehole Number	Type of Installation	Depth of Installation and Response Zone
BH1	50mm standpipe and gas tap	Install depth 3.5mbgl, response zone from 0.5mbgl to 3.5mbgl
	19mm piezometer	Install depth 40.0mbgl, response zone from 39.75mbgl to 40.25mbgl
	19mm piezometer	Install depth 61.0mbgl, response zone from 60.75mbgl to 61.25mbgl
BH2	50mm standpipe and gas tap	Install depth 2.5mbgl, response zone from 0.5mbgl to 2.5mbgl
	19mm piezometer	Install depth 30.0mbgl, response zone from 29.0mbgl to 31.0mbgl
BH3	50mm standpipe and gas tap	Install depth 3.0mbgl, response zone from 0.5mbgl to 3.0mbgl
	19mm piezometer	Install depth 20.0mbgl, response zone from 19.5mbgl to 20.5mbgl
BH4	50mm standpipe and gas tap	Install depth 4.0mbgl, response zone from 0.5mbgl to 4.0mbgl
	19mm piezometer	Install depth 10.0mbgl, response zone from 9.75mbgl to 10.25mbgl

7.0 Laboratory Work

7.1 Geotechnical Testing

A programme of geotechnical and geochemical testing was scheduled by Ramboll and carried out on selected samples by BAM Ritchies, Geolabs Ltd, and Chemtest. All testing was undertaken in accordance with BS 1377:1990 'Methods of test for soils for civil engineering purposes' and other relevant, current standards as appropriate.

The laboratory testing results are presented within Appendix 5.0 of this report.

In addition to the laboratory tests results presented within Appendix 5.0, a further round of geotechnical tests were scheduled on the 5th July 2012. The results were unavailable at the time of printing of this report; details of the outstanding test results from the additional laboratory test schedules is detailed below:

Exploratory Hole No.	Depth	Tests Scheduled
BH1	55.00m	Sieve Analysis, Pipette Sedimentation, Shear Box
BH1	57.00m	Shear Box
BH1	60.00 – 60.45m	Sieve Analysis, Shear Box
BH1	61.50 – 61.95m	Sieve Analysis

8.0 Computerised Processing Of Factual Data

A specialist computer software package was used in order to allow data logging to produce factual data in the Data Interchange Format, as specified by Association of Geotechnical & Geoenvironmental Specialists in 'The electronic transfer of geotechnical & geoenvironmental data from ground investigations', 3rd Edition 1999. These include:-

- Holebase 3.1 [borehole logs]

9.0 References

[a] BS 5930:1999, +A2:2010 'Code of practice for site investigations', British Standards Institution, London.

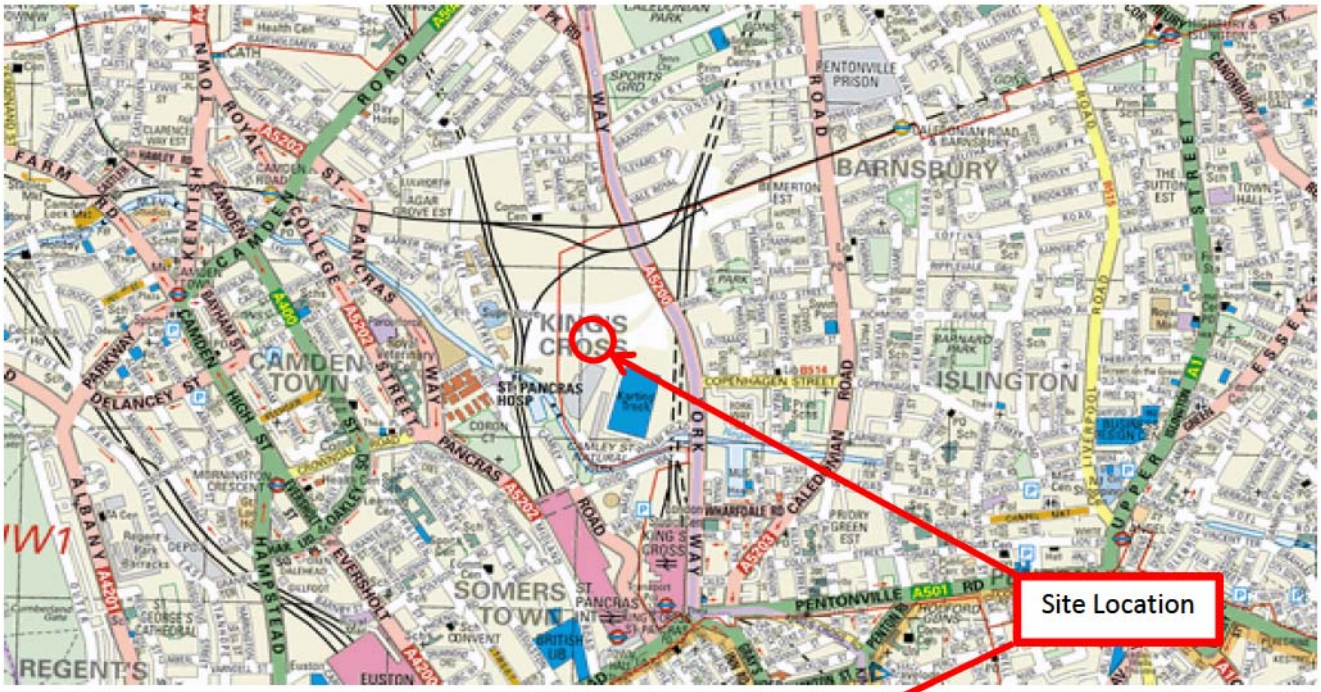
[b] BS EN ISO 22476-3: 2005 Geotechnical Investigation and testing – Field testing – Part 3 Standard penetration test, British Standards Institution, London.

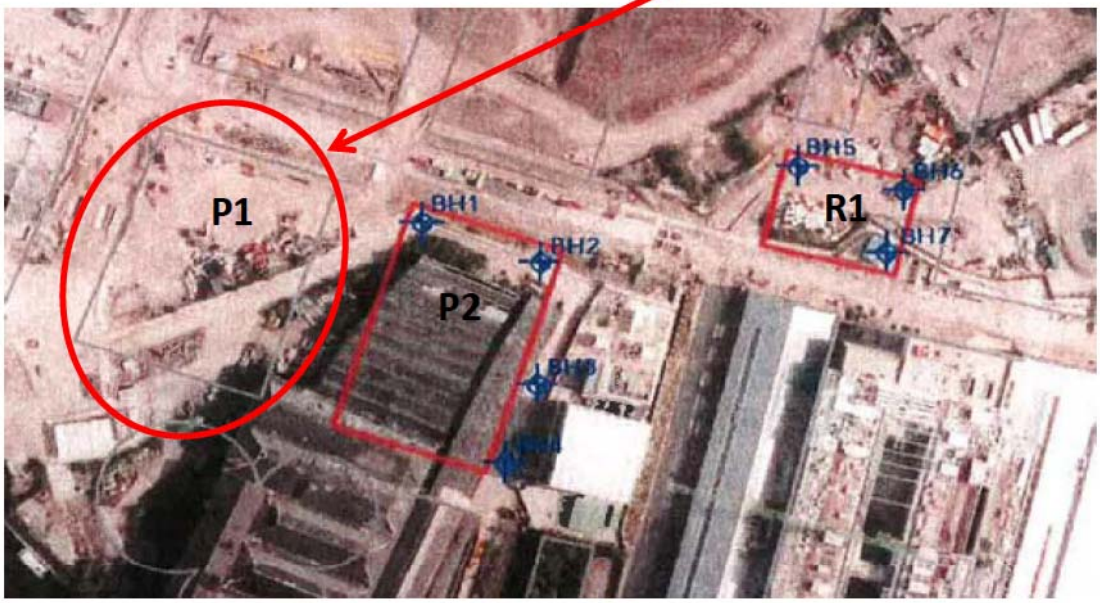
[c] BS 1377:1990 'Methods of test for Soils for civil engineering purposes', Parts 1-9, British Standards Institution, London.

[d] Association of Geotechnical & Geoenvironmental Specialists, 'The Electronic Transfer of Geotechnical & Geoenvironmental Data from Ground Investigations', 4th Edition, 2010.

[e] BUILDING P1, KING'S CROSS CENTRAL, Contract Documents for Ground Investigation for King's Cross Central Partner Limited December 2011.

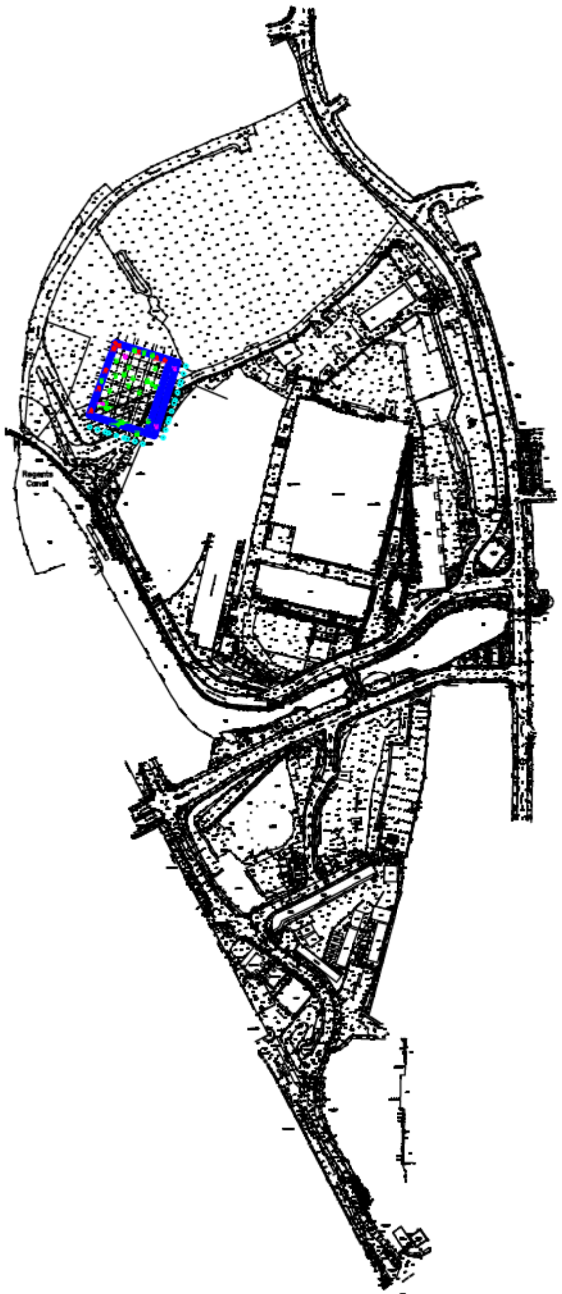
FIGURE 1.0 – Site Location Plan





Notes:	Title: **Figure 1 - Site Location Plan**		bam ritchies	
	Prepared: DL	Drawn: DL	Contract: 4805 Kings Cross Building P1	Scale: NTS
Licence Number 100040086	Approved: JE	Date: Jun-12	Drawing No: 4805.Fig01	Revision: 00

FIGURE 2.0 – Hole Location Plan



STANDARD ABBREVIATIONS

OTHER ABBREVIATIONS

LEGEND

DRAWING ISSUE STATUS

Issue	Details	By	Date
A	ORIGINAL ISSUE OF PHASE 1	PCA	[illegible]
B	AREAS NORTH OF GOODS WAY ADDED	PCA	[illegible]
C	CANAL AREA ADDED	PCA	[illegible]
D	AREAS NORTH OF GOODSWAY ADDED	PCA	[illegible]
E	GOODSWAY EXTENSION ADDED	PCA	[illegible]
F	GOODSWAY KERB LINE REVISED	PCA	[illegible]
G	ADDITIONAL CANAL & GRANARY AREAS	PCA	[illegible]
H	WESTERN RANGE ADDED	PCA	14/03/2007
I	CONTROL ADDED	PCA	[illegible]

SHEET LAYOUT

THIS SURVEY HAS BEEN CARRIED OUT TO AN ACCURACY CONSISTENT WITH A PRESENTATION SCALE OF 1:200 INTERROGATED DIMENSIONS WILL BE WITHIN THE TOLERANCE ASSOCIATED WITH THIS AND SMALLER SCALES ONLY.

THE SURVEY GRID SHOWN ON THIS DRAWING HAS BEEN FIT TO ORDNANCE SURVEY (OS) NATIONAL GRID WITH A SCALE FACTOR OF 1 CENTRED AT [illegible]. FIT WAS OBTAINED BY GPS OBSERVATIONS.

HEIGHTS ARE ABOUT ORDNANCE SURVEY NEWLYN DATUM, LEVELLED FROM ORDNANCE SURVEY BENCH MARK VALUE [illegible] LOCATED AT BRIDGE ON GOODS WAY.

ALL QUOTED DIMENSIONS ARE IN METRES

DRAWING UNITS ARE METRES

ARGENT ESTATES LTD

5 ALBANY COURTYARD
PICCADILLY
LONDON
W1J 0HF

KINGS CROSS CENTRAL

SITE SURVEY

SURVEYED AND DRAWN BY

Plowman Craven

141 Lower Luton Road
Harpenden
Hertfordshire
AL5 5EQ

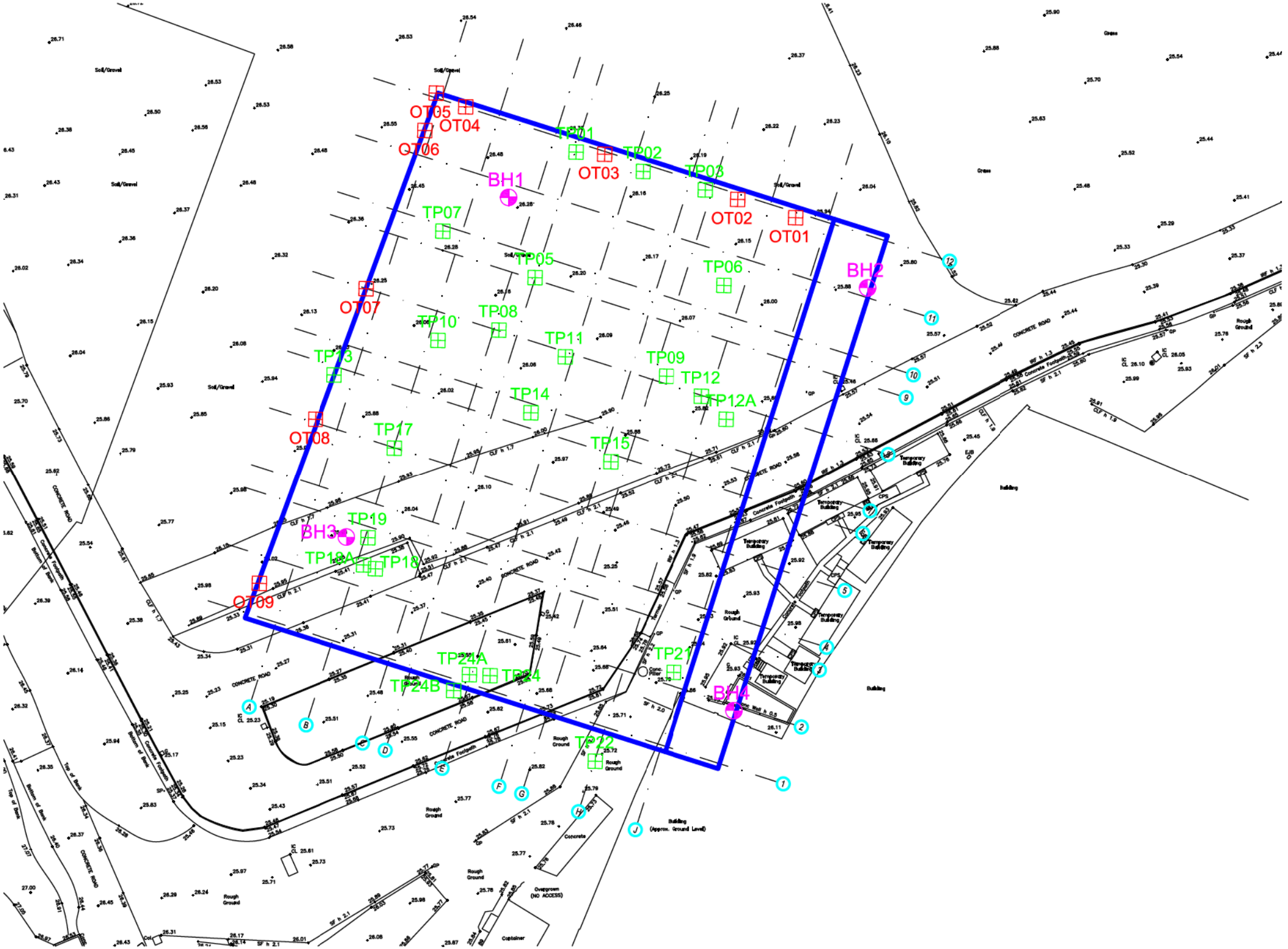
+44(0)1582 765566 info@plowmancraven.co.uk
+44(0)1582 765370 www.plowmancraven.co.uk

PRESENTATION SCALE 1:200

DATE OF ISSUE APRIL 2007

PCA JOB No. 16531 CHECKED PCA

DRAWING No. 16531-3 ISSUE I


OT05
OT04
OT06
TP01
TP02
OT03
TP03
BH1
OT02
OT01
TP07
TP05
TP06
BH2
OT07
TP10
TP08
TP11
TP13
TP09
TP12
TP12A
TP14
OT08
TP17
TP15
TP19
BH3
TP18A
TP18
OT09
TP21
TP24A
TP24
TP24B
BH4
TP22
Soil/Gravel
Grass
CONCRETE ROAD
Concrete Footpath
Temporary Building
Rough Ground
Building
Overgrown (NO ACCESS)
Container
Concrete
Conc. Pillar
Top of Bank
Bottom of Bank

APPENDIX 1.0 – Cable Percussive Logs

Borehole Log

Status: Final

BH1

Sheet 1 of 7

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 26.282mOD

Coordinates: 529965.85E 183750.78N

Description	Depth (m)	O.D. Level (m)	Type	Depth (m)	Test Results	Casing (Water) Depth (m)
MADE GROUND: Soft greyish brown and black slightly sandy gravelly CLAY. Gravel is angular to rounded fine and medium flint brick concrete wood plastic metal and sandstone.			B D	0.50-1.00 0.50		
MADE GROUND: Granite cobbles underlain with mortar/lean mix. (Chiseling)	1.50	24.78	B	1.50-3.80		
MADE GROUND: Soft greyish brown with black slightly sandy very gravelly CLAY. Gravel is angular to rounded fine and medium flint brick concrete slate wood and metal fragments.	2.15	24.13				
Firm to stiff yellowish brown CLAY. (Weathered London Clay) ...from 3.8 to 6.95mbgl, with frequent grey veining.	3.80	22.48	D ES U D SPT(C) D	3.80 4.00 4.00-4.45 4.45 5.00 5.00	N=17 (1,2,3,4,5,5)	4.00
...from 6.95 to 7.10mbgl, small gravel sized selenite crystals.			U D SPT(S) D B U D	6.50-6.95 6.95-7.00 8.00 8.00-8.45 8.50-9.00 9.50-9.95 9.95-10.05	N=16 (1,3,3,3,4,6)	4.00

Installations

Borehole continued on next sheet

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client: Carillion plc
Consultant: Ramboll UK Ltd
Dates Drilled: 18/05/2012-06/06/2012
Plant: Dando 3000
SPT Hammer: 005
Date Printed: 10/08/2012
Drilled By: DS
Logged By: DL
Checked By: JE

Remarks: 2no. 19mm standpipe piezometers installed: tip depths 40m and 61m. 1no. 50mm standpipe with gas tap installed: slotted from 0.5m - 3.5m. Backfill as follows: GL - 0.5m bentonite, 0.5m - 3.5m filter gravel, 3.5m - 39.75m bentonite, 39.75m - 40.25m filter sand, 40.25m - 60.75m bentonite, 60.75m - 61.25m filter sand, 61.25m - 63.5m bentonite.

bam ritchies

Borehole Log

Status: Final

BH1

Sheet 2 of 7

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 26.282mOD
Coordinates: 529965.85E
183750.78N

Description	Depth (m)	O.D. Level (m)	Sample / Test Type	Sample / Test Depth (m)	Test Results	Casing (Water) Depth (m)
Remaining Detail : 9.95m - 12.30m : ...from 9.95mbgl, becoming randomly fissured with light brown and orangish brown partings.			SPT(S)	11.00	N=29 (3,4,6,7,8,8)	4.00
			D	11.00-11.45		
	12.30	13.98	D	12.30		
Firm to stiff dark grey randomly fissured CLAY. (London Clay)			U	12.50-12.95		
			D	12.95-13.10		
...from 14.0mbgl, frequent white and light grey silt? filled tubes (<2x5mm scale).			SPT(S)	14.00	N=45 (3,4,7,9,18,11)	4.00
			D	14.00-14.45		
...from 15.1 to 15.3mbgl, light grey weak claystone.			D	15.10-15.50		
			D	15.50-15.95		
...from 15.95mbgl, with occasional light grey fine and medium sandy lenses.			D	15.95-16.10		
			SPT(S)	17.00	N=32 (3,5,5,7,9,11)	4.00
			D	17.00-17.45		
			U	18.50-18.95		
			D	18.95-19.10		

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client: Carillion plc
Consultant: Ramboll UK Ltd
Dates Drilled: 18/05/2012-06/06/2012
Plant: Dando 3000
SPT Hammer: 005
Date Printed: 10/08/2012
Drilled By: DS
Logged By: DL
Checked By: JE

Remarks:

Borehole Log

Status: Final

BH1

Sheet 3 of 7

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 26.282mOD
Coordinates: 529965.85E
183750.78N

Description	Legend	Depth (m)	O.D. Level (m)	Sample / Test Type	Sample / Test Depth (m)	Test Results	Casing (Water) Depth (m)	Installations
Firm to stiff dark grey randomly fissured CLAY. (London Clay)				SPT(S)	20.00	N=38 (2,5,7,10,9,12)	4.00	
				D	20.00-20.45			
				U	21.50-21.95			
				D	21.95-22.10			
				SPT(S)	23.00	N=43 (8,8,10,10,11,12)	4.00	
				D	23.00-23.45			
				U	24.50-24.95			
				ES	24.95			
				D	24.95-25.10			
				B	25.50-25.70			
				SPT(S)	26.00	N=46 (6,8,9,10,12,15)	4.00	
				D	26.00-26.45			
				U	27.50-27.95			
				D	27.95-28.10			
				SPT(S)	29.00	N=42 (6,10,9,10,11,12)	4.00	
				D	29.00-29.45			

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client: Carillion plc
Consultant: Ramboll UK Ltd
Dates Drilled: 18/05/2012-06/06/2012
Plant: Dando 3000
SPT Hammer: 005
Date Printed: 10/08/2012
Drilled By: DS
Logged By: DL
Checked By: JE

Remarks:

bam ritchies

Borehole Log

Status: Final

BH1

Sheet 4 of 7

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 26.282mOD

Coordinates: 529965.85E 183750.78N

Description	Depth (m)	O.D. Level (m)	Sample / Test Type	Sample / Test Depth (m)	Test Results	Casing (Water) Depth (m)
Firm to stiff dark grey randomly fissured CLAY. (London Clay)						
...from 30.5 and 31.1mbgl, becoming non fissured and sandy. Sand is light grey fine and medium.			U	30.50-30.95		
			D	30.95-31.10		
			SPT(S)	32.00	N=48 (7,10,11,12,12,13)	4.00
			D	32.00-32.45		
			U	33.50-33.95		
			D	33.95-34.10		
			SPT(S)	35.00	N=50 (8,8,12,12,15,11)	4.00
			D	35.00-35.45		
			U	36.50-36.95		
...from 36.9 to 37.1mbgl, becoming non fissured and sandy. Sand is light grey fine and medium.			D	36.95-37.10		
	38.00	-11.72	SPT(S)	38.00	50/225mm (7,12,15,17,18)	
Stiff multicoloured CLAY. (Lambeth Group - Lower Mottled Beds)			D	38.00		
			D	38.00-38.45		
			ES	39.50		
			U	39.50-39.95		
			D	39.95-40.10		

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client: Carillion plc

Consultant: Ramboll UK Ltd

Dates Drilled: 18/05/2012-06/06/2012

Plant: Dando 3000

SPT Hammer: 005

Date Printed: 10/08/2012

Drilled By: DS

Logged By: DL

Checked By: JE

Remarks:

bam ritchies

Borehole Log

Status: Final

BH1

Sheet 5 of 7

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 26.282mOD

Coordinates: 529965.85E 183750.78N

Description	Depth (m)	O.D. Level (m)	Sample / Test Type	Sample / Test Depth (m)	Test Results	Casing (Water) Depth (m)
Remaining Detail : 39.95m - 39.95m : ...from 39.95mbgl, becoming dark brown, reddish brown and grey with occasional yellow.			B	41.00-42.00		
			SPT(S)	41.60	50/225mm (7,14,12,17,21)	
			D	41.60		
...from 42.45mbgl, becoming light grey with occasional yellow.			D	42.45		
			U	42.50-42.95		
			EW	44.00		
...from 44.5mbgl, becoming purple with light grey and yellow. ...from 44.5mbgl, becoming purple with some light grey, reddish brown and yellow.			SPT(S)	44.50	N=50 (7,11,12,12,16,10)	
			D	44.50-44.95		
			U	46.00-46.40		
...from 46.5mbgl, becoming reddish brown, yellow and light blue.			D	46.45-46.55		
			SPT(S)	47.50	50/225mm (10,15,19,18,13)	
			D	47.50-47.95		
...from 47.8mbgl, becoming light grey and dark yellow with occasional reddish brown.			ES	49.00		
			U	49.00-49.45		
...from 49.0mbgl, becoming yellowish brown with abundant light grey veining.			D	49.45-49.55		

Installations

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client: Carillion plc
Consultant: Ramboll UK Ltd
Dates Drilled: 18/05/2012-06/06/2012
Plant: Dando 3000
SPT Hammer: 005
Date Printed: 10/08/2012
Drilled By: DS
Logged By: DL
Checked By: JE

Remarks:

bam ritchies

Borehole Log

Status: Final

BH1

Sheet 6 of 7

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 26.282mOD

Coordinates: 529965.85E 183750.78N

Description	Legend	Depth (m)	O.D. Level (m)	Sample / Test Type	Sample / Test Depth (m)	Test Results	Casing (Water) Depth (m)	Installations
Stiff multicoloured CLAY. (Lambeth Group - Lower Mottled Beds)				SPT(S)	50.50	50/0mm (25,50)		
				D	50.50-50.95			
...from 50.5mbgl, becoming slightly reddish dark brown with light brown and light grey partings.				D	51.00			
				U	52.50-52.95			
				D	52.95-53.10			
Probably dense dark greenish grey clayey SAND. Sand is fine and medium. (Lambeth Group - Upnor Formation)		54.00	-27.72	SPT(S)	54.00	50/150mm (8,17,21,28,1)		
				B	54.00-55.00			
...from 54.0mbgl, becoming stiff dark green very sandy CLAY. Sand is fine to coarse.				D	54.00-54.45			
				D	55.00			
				ES	55.50			
				U	55.50-55.95			
Probably medium dense dark grey gravelly fine and medium SAND. Gravel is rounded fine to medium black flint. (Lambeth Group - Upnor Formation)		57.00	-30.72	SPT(S)	57.00	50/75mm (9,16,29,21)		
				B	57.00-57.50			
				D	57.00			
Probably medium dense dark grey fine to medium SAND. (Lambeth Group - Thanet Sand)		58.00	-31.72					
				SPT(S)	58.50	50/75mm (25,50)		
				ES	58.50			
				D	58.50-58.95			

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client:	Carillion plc
Consultant:	Ramboll UK Ltd
Dates Drilled:	18/05/2012-06/06/2012
Plant:	Dando 3000
SPT Hammer:	005
Date Printed:	10/08/2012
Drilled By:	DS
Logged By:	DL
Checked By:	JE

Remarks:

Borehole Log

Status: Final

BH1

Sheet 7 of 7

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 26.282mOD
Coordinates: 529965.85E
183750.78N

Description	Legend	Depth (m)	O.D. Level (m)	Sample / Test Type	Sample / Test Depth (m)	Test Results	Casing (Water) Depth (m)	Installations
Probably medium dense dark grey fine to medium SAND. (Lambeth Group - Thanet Sand)				SPT(S) D	60.00 60.00-60.45	50/75mm (19,6,50)	58.50	
Probably medium dense subangular to rounded medium flint GRAVEL. (Bullhead Beds)		61.60	-35.32	SPT(S) D	61.50 61.50-61.95	50/100mm (19,6,30,20)	(40.00) 58.50	
		61.80	-35.52	D	61.80			
Recovered as structureless CHALK composed of compact, cream, slightly gravelly SILT. Occasional angular fine flint fragments. (Upper Chalk)				SPT(S) ES D	62.50 62.50 62.50-62.95	50/75mm (10,15,40,10)	(40.00) 58.50	
				D	63.00			
Borehole Complete at 63.50 m		63.50	-37.22	SPT(S) D	63.50 63.50-63.95	50/125mm (12,13,37,13)	(40.00) 58.50	

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client: Carillion plc
Consultant: Ramboll UK Ltd
Dates Drilled: 18/05/2012-06/06/2012
Plant: Dando 3000
SPT Hammer: 005
Date Printed: 10/08/2012
Drilled By: DS
Logged By: DL
Checked By: JE

Remarks:

bam ritchies

Borehole Log

Status: Final

BH2

Sheet 1 of 5

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 25.862mOD

Coordinates: 530011.03E 183739.42N

Description	Depth (m)	O.D. Level (m)	Sample / Test Type	Sample / Test Depth (m)	Test Results	Casing (Water) Depth (m)
MADE GROUND: Probably medium dense brownish grey sandy GRAVEL. Gravel is angular to rounded fine and medium flint brick concrete, rare plastic and metal.	0.50	25.36	B D	0.50-1.00 0.50		
MADE GROUND: Probably medium dense light grey Subangular to rounded medium dolomite GRAVEL.	1.00	24.86	D	1.00		
MADE GROUND: Probably medium dense brownish grey and reddish brown slightly clayey sandy GRAVEL. Gravel is angular to rounded fine and medium flint brick concrete plastic wood and metal.	1.50	24.36	SPT(S) D	1.50 1.50	N=13 (3,2,2,2,3,6)	
	2.10	23.76	D B	2.00 2.10-2.40		
MADE GROUND: Probably medium dense brownish grey and yellowish brown slightly clayey sandy GRAVEL. Gravel is angular to rounded fine and medium flint brick concrete. Rare olyster shell at 1.70mbgl.	2.40	23.46	SPT(S) ES D	2.50 2.50 2.50-2.95	N=5 (2,2,2,1,1,1)	2.50
MADE GROUND: Concrete (obstruction).	2.90	22.96	D	2.90		
MADE GROUND: Multicoloured slightly sandy GRAVEL. Gravel is angular to rounded fine to coarse brick concrete with some flint.	3.90	21.96	U D	3.50-3.95 3.95-4.10		
Firm dark greyish brown mottled black slightly gravelly CLAY. Gravel is subrounded medium flint. Organic odour noted.			SPT(S) ES D	4.50 4.50 4.50-4.95	N=14 (2,2,3,3,3,5)	4.50
Firm yellowish brown light brown and grey veining slightly gravelly CLAY. Gravel is weak, off white, rounded, fine, occasionally medium. (Weathered London Clay)	5.40	20.46	D	5.40		
Firm yellowish brown and light brown randomly fissured CLAY. Frequent grey partings. (Weathered London Clay)			U D	6.00-6.45 6.45-6.55		
...from 7.0mbgl, black specs on (<8mm dia) on partings. Occasional medium gravel sized pockets of selenite crystals.			D SPT(S) D	7.00 7.50 7.50-7.95	N=18 (1,2,3,3,6,6)	6.00
			U	9.00-9.45		
			D	9.45-9.55		
			D	9.80-9.90		

Borehole continued on next sheet

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
03/05/12	1.80	20	1.80	-	

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client:	Carillion plc
Consultant:	Ramboll UK Ltd
Dates Drilled:	14/05/2012-17/05/2012
Plant:	Dando 3000
SPT Hammer:	005
Date Printed:	10/08/2012
Drilled By:	DS
Logged By:	DL
Checked By:	JE

Remarks: 1no. 19mm standpipe piezometer installed: tip depth 30m. 1no. 50mm standpipe with gas tap installed: slotted from 0.5m - 2.5m. Backfill as follows: GL - 0.5m bentonite, 0.5m - 2.5m filter gravel, 2.5m - 29m bentonite, 29m - 31m filter sand, 31m - 40m bentonite.

bam ritchies

Borehole Log

Status: Final

BH2

Sheet 2 of 5

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 25.862mOD

Coordinates: 530011.03E
183739.42N

Description	Depth (m)	O.D. Level (m)	Sample / Test Type	Sample / Test Depth (m)	Test Results	Casing (Water) Depth (m)
Remaining Detail : 9.80m - 9.90m : ...from 9.8 to 9.9mbgl, weak claystone (drillers description).	10.20	15.66	D	10.20		
			SPT(S)	10.50	N=24 (3,5,6,5,6,7)	6.00
			D	10.50-10.95		
Firm dark grey randomly fissured CLAY. (London Clay)			B	11.00-12.00		
			U	12.00-12.45		
			D	12.45-12.55		
...from 12.5 to 14.0mbgl, with sandy partings and medium gravel sized pockets of light and dark grey fine and medium sand.			SPT(S)	13.50	N=34 (5,6,7,7,10,10)	6.00
			D	13.50-13.95		
...at 22.5mbgl, rare fine pyrite.			U	15.00-15.45		
			D	15.45-15.55		
			SPT(S)	16.50	N=36 (3,4,6,9,11,10)	6.00
			D	16.50-16.95		
...from 17.7 to 18.0mbgl, weak claystone (drillers description).			B	17.70-18.00		
			U	18.00-18.45		
			D	18.45-18.55		
			SPT(S)	19.50	N=31 (4,5,6,6,8,11)	6.00
			D	19.50-19.95		

Installations

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client: Carillion plc
Consultant: Ramboll UK Ltd
Dates Drilled: 14/05/2012-17/05/2012
Plant: Dando 3000
SPT Hammer: 005
Date Printed: 10/08/2012
Drilled By: DS
Logged By: DL
Checked By: JE

Remarks:

bam ritchies

Borehole Log

Status: Final

BH2

Sheet 3 of 5

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 25.862mOD
Coordinates: 530011.03E
183739.42N

Description	Depth (m)	O.D. Level (m)	Sample / Test Type	Sample / Test Depth (m)	Test Results	Casing (Water) Depth (m)
Firm dark grey randomly fissured CLAY. (London Clay)						
			B	20.80-21.00		
...from 20.8 to 21.0mbgl, weak claystone (drillers description).			U	21.00-21.45		
			D	21.45		
			SPT(S)	22.50	N=47 (2,4,8,9,14,16)	6.00
			ES	22.50		
			D	22.50-22.95		
			U	24.00-24.45		
			D	24.45-24.50		
			SPT(S)	25.50	N=42 (4,6,7,10,11,14)	6.00
			D	25.50-25.95		
			U	27.00-27.45		
			D	27.45-27.55		
			SPT(S)	28.50	N=45 (5,8,9,11,12,13)	6.00
			D	28.50-28.95		

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client: Carillion plc
Consultant: Ramboll UK Ltd
Dates Drilled: 14/05/2012-17/05/2012
Plant: Dando 3000
SPT Hammer: 005
Date Printed: 10/08/2012
Drilled By: DS
Logged By: DL
Checked By: JE

Remarks:

bam ritchies

Borehole Log

Status: Final

BH2

Sheet 4 of 5

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 25.862mOD
Coordinates: 530011.03E
183739.42N

Description	Legend	Depth (m)	O.D. Level (m)	Sample / Test Type	Sample / Test Depth (m)	Test Results	Casing (Water) Depth (m)	Installations
Firm dark grey randomly fissured CLAY. (London Clay)				U	30.00-30.45			
				D	30.45-30.55			
...from 30.45mbgl, becoming sandy. Sand is light grey fine and medium.				SPT(S)	31.50	N=50 (6,8,10,13,13,14)	6.00	
				D	31.50-31.95			
				U	33.00-33.45			
				D	33.45-33.55			
				SPT(S)	34.50	N=39 (6,9,11,12,12,4)	6.00	
				D	34.50-34.95			
				U	36.00-36.45			
				D	36.45-36.55			
...from 36.45mbgl, frequent off white silt? filled tubes (<1x5mm).				SPT(S)	37.50	N=51 (10,11,14,13,19,5)	6.00	
				D	37.50-37.95			
				B	38.00-39.00			
				U	39.00-39.45			
Stiff reddish brown and grey with some		39.45	-13.59	D	39.45-39.55			

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
17/05/12	31.50	20	31.20	-	

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client: Carillion plc
Consultant: Ramboll UK Ltd
Dates Drilled: 14/05/2012-17/05/2012
Plant: Dando 3000
SPT Hammer: 005
Date Printed: 10/08/2012
Drilled By: DS
Logged By: DL
Checked By: JE

Remarks:

bam ritchies

Borehole Log

Status: Final

BH2

Sheet 5 of 5

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 25.862mOD

Coordinates: 530011.03E
183739.42N

Description	Legend	Depth (m)	O.D. Level (m)	Sample / Test			Casing (Water) Depth (m)	Installations
				Type	Depth (m)	Test Results		
yellowish brown CLAY.		40.00	-14.14					
Borehole Complete at 40.00 m								

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client:	Carillion plc
Consultant:	Ramboll UK Ltd
Dates Drilled:	14/05/2012-17/05/2012
Plant:	Dando 3000
SPT Hammer:	005
Date Printed:	10/08/2012
Drilled By:	DS
Logged By:	DL
Checked By:	JE

Remarks:

bam ritchies

Borehole Log

Status: Final

BH3

Sheet 1 of 5

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 25.984mOD

Coordinates: 529945.44E 183708.02N

Description	Depth (m)	O.D. Level (m)	Type	Depth (m)	Test Results	Casing (Water) Depth (m)
MADE GROUND: Soft brownish grey and yellowish brown slightly sandy gravelly CLAY. Gravel is angular to rounded fine and medium brick flint and concrete.			B	0.00-1.20		
			D	1.00		
	1.20	24.78	ES	1.20		
MADE GROUND: Tarmac.	1.30	24.68	D	1.20-1.65		
			B	1.30		
MADE GROUND: Concrete underlain with granite cobbles.	1.70	24.28	B	1.60		
			SPT(S)	2.00	N=7 (2,2,1,2,2,2)	2.00
MADE GROUND: Probably medium dense dark grey slightly clayey sandy GRAVEL. Gravel is angular to rounded fine and medium flint and brick.	2.20	23.78	ES	2.00		
			D	2.00		
			D	2.00-2.45		
			B	2.20		
			D	2.20		
MADE GROUND: Firm greenish grey mottled black slightly gravelly CLAY. Gravel is subangular to rounded fine brick and flint. (Reworked Alluvium)	3.00	22.98	B	3.00		
			D	3.00		
			U	3.00-3.45		
			D	3.50		
Firm yellowish brown with some light brown and grey veining CLAY. Occasional iron staining. (Weathered London Clay)			SPT(S)	4.00	N=10 (1,2,2,2,3,3)	4.00
			D	4.00		
			D	4.00-4.45		
			D	5.00		
			U	5.00-5.45		
...from 5.5mbgl, becoming a darker shade of yellowish brown and randomly fissured.			D	5.50		
			SPT(S)	6.00	N=12 (1,2,3,3,3,3)	4.50
			D	6.00		
			D	6.00-6.45		
			B	7.00-7.40		
...from 7.0 to 7.4mbgl, weak light grey claystone.			D	7.00-7.40		
			SPT(S)	7.50	N=19 (2,2,3,5,5,6)	4.50
			D	7.50-7.95		
			U	9.00-9.45		
			D	9.50		

Borehole continued on next sheet

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client: Carillion plc

Consultant: Ramboll UK Ltd

Dates Drilled: 15/05/2012-22/05/2012

Plant: Dando 2000

SPT Hammer: 004

Date Printed: 10/08/2012

Drilled By: GT/PM

Logged By: DL

Checked By: JE

Remarks: 1no. 19mm standpipe piezometer installed: tip depth 20m. 1no. 50mm standpipe with gas tap installed: slotted from 0.5m - 3m. Backfill as follows: GL - 0.5m bentonite, 0.5m - 3m filter gravel, 3m - 19.5m bentonite, 19.5m - 20.5m filter sand, 20.5m - 40m bentonite.

bam ritchies

Borehole Log

Status: Final

BH3

Sheet 2 of 5

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 25.984mOD
Coordinates: 529945.44E
183708.02N

Description	Legend	Depth (m)	O.D. Level (m)	Sample / Test Type	Sample / Test Depth (m)	Test Results	Casing (Water) Depth (m)	Installations
Firm yellowish brown with some light brown and grey veining CLAY. Occasional iron staining. (Weathered London Clay) ...from 10.5 to 12.5mbgl, becoming greyish brown with frequent yellowish brown partings.				SPT(S) D	10.50 10.50-10.95	N=24 (3,3,4,6,7,7)	4.50	
				U	12.00-12.45			
Firm to stiff dark grey slightly sandy CLAY. Sand is light grey fine and medium. (London Clay)		12.50	13.48	D	12.50			
				SPT(S) D	13.50 13.50-13.95	N=26 (3,4,5,6,6,9)	4.50	
				U	15.00-15.45			
...from 15.5mbgl, becoming randomly fissured.				D	15.50			
...from 16.0 to 16.5mbgl, weak light grey claystone.				B	16.00-16.50			
				SPT(S) ES D	16.50 16.50 16.50-16.95	N=25 (2,4,5,5,7,8)	4.50	
				U	18.00-18.45			
				D	18.50			
				SPT(S) D	19.50 19.50-19.95	N=30 (3,5,7,7,8,8)	4.50	

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client: Carillion plc
Consultant: Ramboll UK Ltd
Dates Drilled: 15/05/2012-22/05/2012
Plant: Dando 2000
SPT Hammer: 004
Date Printed: 10/08/2012
Drilled By: GT/PM
Logged By: DL
Checked By: JE

Remarks:

bam ritchies

Borehole Log

Status: Final

BH3

Sheet 3 of 5

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 25.984mOD
Coordinates: 529945.44E
183708.02N

Description	Legend	Depth (m)	O.D. Level (m)	Sample / Test Type	Sample / Test Depth (m)	Test Results	Casing (Water) Depth (m)	Installations
Firm to stiff dark grey slightly sandy CLAY. Sand is light grey fine and medium. (London Clay)				ES U	21.00 21.00-21.45			
				D	21.50			
...from 21.5mbgl, no sand. Occasional light grey silt? filled tubes (1x5mm scale).				SPT(S) D	22.50 22.50-22.95	50/58mm (3,7,50)	4.50	
				U	24.00-24.45			
				D	24.50			
...from 25.5mbgl, becoming sandy. Sand is light grey and white fine and medium.				SPT(S) D	25.50 25.50-25.95	N=38 (4,6,8,8,11,11)	4.50	
				U	27.00-27.45			
				D	27.50			
				SPT(S) D	28.50 28.50-28.95	N=43 (3,8,11,10,12,10)	4.50	

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client: Carillion plc
Consultant: Ramboll UK Ltd
Dates Drilled: 15/05/2012-22/05/2012
Plant: Dando 2000
SPT Hammer: 004
Date Printed: 10/08/2012
Drilled By: GT/PM
Logged By: DL
Checked By: JE

Remarks:

bam ritchies

Borehole Log

Status: Final

BH3

Sheet 4 of 5

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 25.984mOD
Coordinates: 529945.44E
183708.02N

Description	Legend	Depth (m)	O.D. Level (m)	Sample / Test Type	Sample / Test Depth (m)	Test Results	Casing (Water) Depth (m)	Installations
Firm to stiff dark grey slightly sandy CLAY. Sand is light grey fine and medium. (London Clay)				U	30.00-30.45			
				D	30.45-30.50			
				SPT(S)	31.50	N=44 (2,6,9,11,12,12)	33.00	
				D	31.50-31.95			
				U	33.00-33.45			
				D	33.45-33.50			
				SPT(S)	34.50	N=48 (6,7,10,12,12,14)	33.00	
				D	34.50-34.95			
				U	36.00-36.45			
				D	36.45-36.50			
				SPT(S)	37.50	N=52 (6,8,10,12,14,16)	33.00	
				D	37.50-37.95			
Stiff greyish brown and grey CLAY.		38.10	-12.12	D	38.10			
				U	39.00-39.45			
...from 39.45mbgl, becoming reddish brown and				ES	39.45			
				D	39.45-39.50			

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client:	Carillion plc
Consultant:	Ramboll UK Ltd
Dates Drilled:	15/05/2012-22/05/2012
Plant:	Dando 2000
SPT Hammer:	004
Date Printed:	10/08/2012
Drilled By:	GT/PM
Logged By:	DL
Checked By:	JE

Remarks:

bam ritchies

Borehole Log

Status: Final

BH3

Sheet 5 of 5

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 25.984mOD

Coordinates: 529945.44E
183708.02N

Description	Legend	Depth (m)	O.D. Level (m)	Sample / Test			Casing (Water) Depth (m)	Installations
				Type	Depth (m)	Test Results		
Remaining Detail : 39.45m - 40.00m : grey.		40.00	-14.02					
Borehole Complete at 40.00 m								

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client: Carillion plc
Consultant: Ramboll UK Ltd
Dates Drilled: 15/05/2012-22/05/2012
Plant: Dando 2000
SPT Hammer: 004
Date Printed: 10/08/2012
Drilled By: GT/PM
Logged By: DL
Checked By: JE

Remarks:

bam ritchies

Borehole Log

Status: Final

BH4

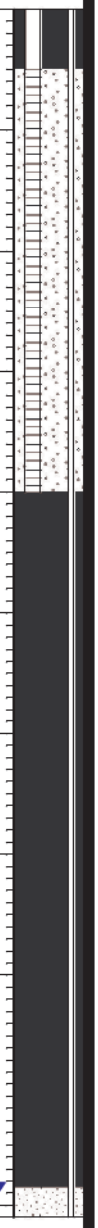
Sheet 1 of 5

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 25.724mOD
Coordinates: 529994.29E
183686.20N

Description	Depth (m)	O.D. Level (m)	Type	Depth (m)	Test Results
MADE GROUND: Soft greyish brown light brown and grey slightly sandy gravelly CLAY. Gravel is angular to rounded fine and medium flint, brick and ash.			B	0.00-1.20	
			D	1.00	
			ES	1.20	
...from 1.0mbgl, becoming predominantly dark grey in colour with brown and yellowish brown.			U	1.20-1.65	
			D	1.65-1.70	
			SPT(S)	2.00	N=6 (1,0,1,2,1,2)
			D	2.00	
MADE GROUND: Probably medium dense black slightly clayey sandy GRAVEL. Gravel is angular to rounded fine and medium ash with some flint and brick. Occasional soft light brown pockets of clay.	2.30	23.42	D	2.00-2.45	
			D	2.80	
			D	3.00	
			U	3.00-3.45	
MADE GROUND: Soft yellowish brown and greyish brown sandy gravelly CLAY. Gravel is angular to rounded fine and medium flint ash with occasional brick.	3.45	22.27	ES	3.45	
			D	3.45-3.50	
	4.00	21.72	SPT(S)	4.00	N=9 (1,1,1,2,3,3)
			B	4.00	
Soft to firm yellowish brown mottled reddish brownish slightly gravelly CLAY. Occasional rootlets and rare subangular fine flint			D	4.00	
			D	4.00-4.45	
...from 5.0mbgl, becoming yellowish brown with frequent grey veining.			D	5.00	
			U	5.00-5.45	
			D	5.45-5.50	
			SPT(S)	6.00	N=15 (1,2,3,3,4,5)
			D	6.00	
			D	6.00-6.45	
			B	6.80	
			U	7.50-7.95	
			D	7.95-8.00	
...from 9.0mbgl, becoming dark yellowish brown.			SPT(S)	9.00	N=19 (2,3,4,4,5,6)
			D	9.00-9.45	

Casing (Water) Depth (m)	Installations
	

Borehole continued on next sheet

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client: Carillion plc
Consultant: Ramboll UK Ltd
Dates Drilled: 23/05/2012-30/05/2012
Plant: Dando 3000
SPT Hammer: 004
Date Printed: 10/08/2012
Drilled By: PM
Logged By: DL
Checked By: JE

Remarks: Poor reception on GPS when taking coordinates due to close proimity to building, coordinates and level presented are an average of several readings taken. 1no. 19mm standpipe piezometer installed: tip depth 10m. 1no. 50mm standpipe with gas tap installed: slotted from 0.5m - 4m. Backfill as follows: GL - 0.5m bentonite, 0.5m - 4m filter gravel, 4m - 9.75m bentonite, 9.75m - 10.25m filter sand, 10.25m - 40m bentonite.

Borehole Log

Status: Final

BH4

Sheet 2 of 5

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 25.724mOD
Coordinates: 529994.29E
183686.20N

Description	Depth (m)	O.D. Level (m)	Type	Depth (m)	Test Results	Casing (Water) Depth (m)
Soft to firm yellowish brown mottled reddish brownish slightly gravelly CLAY. Occasional rootlets and rare subangular fine flint			B	10.30		
			U	10.50		
...from 10.95mbgl, becoming dark brownish grey, randomly fissured with light brown partings.			EW	10.95-11.00		
			SPT(S)	12.00	N=23 (3,4,5,5,6,7)	10.50
			D	12.00-12.45		
Stiff dark grey CLAY. (London Clay)	12.70	13.02	B	12.70		
			U	13.50-13.95		
			D	13.95-14.00		
			SPT(S)	15.00	N=32 (5,6,8,8,8,8)	10.50
			D	15.00-15.45		
...from 15.6 to 16.3mbgl, layer of weak, light grey claystone.			D	15.60-16.30		
			ES	16.50		
			U	16.50-16.95		
...from 16.9mbgl, becoming dark grey, randomly fissured with rare light grey fine sandy partings.			D	16.95-17.00		
			SPT(S)	18.00	N=31 (4,5,7,7,8,9)	10.50
			D	18.00-18.45		
			U	19.50-19.95		
			D	19.95-20.00		

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)
24/05/12	10.40	20	9.90	-	10.70

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client:	Carillion plc
Consultant:	Ramboll UK Ltd
Dates Drilled:	23/05/2012-30/05/2012
Plant:	Dando 3000
SPT Hammer:	004
Date Printed:	10/08/2012
Drilled By:	PM
Logged By:	DL
Checked By:	JE

Remarks:

bam ritchies

Borehole Log

Status: Final

BH4

Sheet 3 of 5

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 25.724mOD
Coordinates: 529994.29E
183686.20N

Description	Legend	Depth (m)	O.D. Level (m)	Sample / Test Type	Sample / Test Depth (m)	Test Results	Casing (Water) Depth (m)	Installations
Stiff dark grey CLAY. (London Clay)								
				SPT(S)	21.00	N=33 (5,5,7,7,9,10)	10.50	
				D	21.00-21.45			
				U	22.50-22.95			
...from 22.9mbgl, becoming sandy. Sand is light grey fine and medium. Occasionally fissured.				D	22.95-23.00			
				SPT(S)	24.00	N=49 (6,7,11,12,12,14)	10.50	
				D	24.00-24.45			
				U	25.50-25.95			
...from 25.9mbgl, weak black coal like gravel with pyrite.				ES	25.95			
				D	25.95-26.00			
				SPT(C)	27.00	N=40 (4,8,9,9,10,12)	10.50	
				D	27.00-27.45			
				U	28.50-28.95			
...from 28.9mbgl, frequent off white silt? filled tubes (1x5mm).				D	28.95-29.00			

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client: Carillion plc
Consultant: Ramboll UK Ltd
Dates Drilled: 23/05/2012-30/05/2012
Plant: Dando 3000
SPT Hammer: 004
Date Printed: 10/08/2012
Drilled By: PM
Logged By: DL
Checked By: JE

Remarks:

bam ritchies

Borehole Log

Status: Final

BH4

Sheet 4 of 5

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 25.724mOD
Coordinates: 529994.29E
183686.20N

Description	Legend	Depth (m)	O.D. Level (m)	Sample / Test Type	Sample / Test Depth (m)	Test Results	Casing (Water) Depth (m)	Installations
Stiff dark grey CLAY. (London Clay)				D	30.00-30.45			
				U	31.50-31.95			
				D	31.95-32.00			
				SPT(S)	33.00	N=53 (7,8,11,12,14,16)	10.50	
				D	33.00-33.45			
Stiff mottled reddish brown brownish yellow and light grey CLAY.		34.50	-8.78	B	34.50			
				U	34.50-34.95			
				D	34.95-35.00			
				SPT(S)	36.00	50/225mm (10,12,15,16,19)	10.50	
				D	36.00-36.45			
...from 37.9mbgl, becoming purpleish grey mottled dark yellow.				U	37.50-37.95			
				D	37.95-38.00			
				SPT(S)	39.00	50/220mm (12,13,16,17,17)	10.50	
				D	39.00-39.45			

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client: Carillion plc
Consultant: Ramboll UK Ltd
Dates Drilled: 23/05/2012-30/05/2012
Plant: Dando 3000
SPT Hammer: 004
Date Printed: 10/08/2012
Drilled By: PM
Logged By: DL
Checked By: JE

Remarks:

bam ritchies

Borehole Log

Status: Final

BH4

Sheet 5 of 5

Project: Kings Cross Building P1

Project No: 4805

Ground Level: 25.724mOD

Coordinates: 529994.29E
183686.20N

Description	Legend	Depth (m)	O.D. Level (m)	Sample / Test			Casing (Water) Depth (m)	Installations
				Type	Depth (m)	Test Results		
Stiff mottled reddish brown brownish yellow and light grey CLAY.		40.00	-14.28					
Borehole Complete at 40.00 m								

Hole Diameter Detail

Diameter (mm)	Depth (m)	Casing Depth (m)

Chiselling / Slow Progress

From (m)	To (m)	Time (hours)

Water Level Observations

Date	Water Strike (m)	Standing Time (mins)	Standing Level (m)	Casing Depth (m)	Depth Sealed (m)

Progress

Date	Hole Depth	Casing Depth	Water Depth	Remarks

Client:	Carillion plc
Consultant:	Ramboll UK Ltd
Dates Drilled:	23/05/2012-30/05/2012
Plant:	Dando 3000
SPT Hammer:	004
Date Printed:	10/08/2012
Drilled By:	PM
Logged By:	DL
Checked By:	JE

Remarks:

APPENDIX 2.0 – Observation Trenches Logs, Sketches and Photographs