Groundwater Monitoring Record

Site Name: Kiln Place | Job No.: 18084

Client: Ramboll

Weather (include Temperature & Pressure): 8 degrees celcius, mild and sunny 1015mb

State of Ground: Dry

Location ID	Date	Time	Surface Elevation (mAOD)	LNAPL Depth[1] (mbgl)	LNAPL Depth (mAOD)	Water Level[1] (mbgl)	Water Level (mAOD)	DNAPL Depth[1] (mbgl)	DNAPL Depth (mAOD)	Depth to base[1] (mbgl)	Depth to base (mAOD)	Stabilized Readings					Sample Method[2] (I, S, B, P)	Purged Volume[3] (L)	Comments: (e.g. problems encountered, standpipe conditions, unusual odours, colour, tubidity, sheens)
												Temp (°C)	pH	Electrical Conductivity (µS/cm)	DO (%)	Redox Potential (mV)			
WS2	01/04/2014	1.10pm	41.36	N/A	-	5.37	35.99	N/A	-	5.90	35.46	-	-	-	-	-	-	-	
WS5	01/04/2014	1.25pm	42.01	N/A	-	3.51	38.50	N/A	-	3.60	38.41	-	-	-	-	-	-	-	
WS7	01/04/2014	1.50pm	41.52	N/A	-	2.22	39.30	N/A	-	4.81	36.71	-	-	-	-	-	-	-	
BH2	01/04/2014	2.10pm	44.48	N/A	-	1.54	42.94	N/A	-	7.83	36.65	-	-	-	-	-	-	-	
BH1	01/04/2014	2.20pm	44.28	N/A	-	3.03	41.25	N/A	-	4.80	39.48	-	-	-	-	-	-	-	

Field Engineer: Helen Jones

1 - All (mbgl) depth measurements are recorded as meters from the top of installation cover.

BH2

Gas Monitoring Field Record

Site Name: Kiln Place

Job No: GL18084

Client:	Ramboll

Equipment	**Model**	**Serial Number**	**Manufacturer's Calibration Date**
Land Gas Analyser	GA5000	G500883	20.03.2014 (Calibrated last)
PID	MiniRAE 3000	SN592-903976	14/05/2014 (due for calibration)

Weather Conditions 24hrs Prior to Monitoring	12 degrees celsius, rainy and cloudy
Weather Conditions During Monitoring	10 degrees, mild and sunny

Location I.D	Date	Time (hhmmss)	Atmospheric Pressure 72hrs Prior to Sampling (hPa)	Atmospheric Pressure 48hrs Prior to Sampling (hPa)	Atmospheric Pressure 24hrs Prior to Sampling (hPa)	Atmospheric Pressure When Sampled (hPa)	Relative Pressure (hPa)	PID -Peak (ppm)	PID - Stabilised (ppm)	CH4 (%)	Peak CH4 (%)	Balance (%)	CO2 (%)	O2 (%)	H2S (ppm)	CO (ppm)	Flow Pod (l/Hr)
WS2	08/04/2014	12.02pm	1014	1013	1009	1013	0.19	0.0	0.0	0.0	0.0	78.9	Steady 2.5 Peak 3.3	Steady 18.7 Minimum 18.2	0	0	0.0
WS5	08/04/2014	12.14pm	1013	1013	1009	1014	0.02	0.0	0.0	0.0	0.0	80.0	Steady 0.3 Peak 0.4	Steady 19.7 Minimum 19.6	1	0	-0.1
BH1	08/04/2014	12.31pm	1013	1013	1009	1014	-0.14	0.0	0.0	0.0	0.0	79.8	Steady 0.2 Peak 0.2	Steady 20.0 Minimum 20.0	1	0	0.0
WS7	08/04/2014	12.41pm	1014	1013	1009	1015	-0.05	0.0	0.0	0.0	0.0	81.0	Steady 3.4 Peak 3.4	Steady 15.7 Minimum 15.7	1	0	-0.1
BH2	08/04/2014	12.51pm	1014	1013	1009	1015	-0.02	0.0	0.0	0.0	0.0	82.0	Steady 0.9 Peak 0.9	Steady 17.1 Minimum 17.1	1	0	0.0

Field Engineer: Helen Jones

Pump Running Time (sampling): (Standard 120 sec)

Pump Running Time (purge): (Standard 30 sec)

Flow Details (e.g. 5 sec average for 1 min.):

Other Remarks:

PID : Photo-Ionisation Detector

"<" indicates that reading is **under** the limit range,

">" indicates that reading is **over** the limit range,

"*" Level to be determined

Harrison Group Environmental Ltd.
Poplar Business Park, Unit A11, 10 Prestons Road, E14 9RL.

Groundwater Monitoring Record

Site Name: Kiln Place | Job No.: 18084

Client: Ramboll

Weather (include Temperature & Pressure): 8 degrees celcius, mild and sunny 1015mb

State of Ground: Dry

Location ID	Date	Time	Surface Elevation (mAOD)	LNAPL Depth[1] (mbgl)	LNAPL Depth (mAOD)	Water Level[1] (mbgl)	Water Level (mAOD)	DNAPL Depth[1] (mbgl)	DNAPL Depth (mAOD)	Depth to base[1] (mbgl)	Depth to base (mAOD)	Stabilized Readings					Sample Method[2] (I, S, B, P)	Purged Volume[3] (L)	Comments: (e.g. problems encountered, standpipe conditions, unusual odours, colour, tubidity, sheens)
												Temp (°C)	pH	Electrical Conductivity (µS/cm)	DO (%)	Redox Potential (mV)			
WS2	08/04/2014	12.05pm	41.36	N/A	-	5.08	36.28	N/A	-	5.90	35.46	-	-	-	-	-	-	-	
WS5	08/04/2014	12.21pm	42.01	N/A	-	3.51	38.50	N/A	-	3.61	38.40	-	-	-	-	-	-	-	
BH1	08/04/2014	12.31pm	41.52	N/A	-	3.02	38.50	N/A	-	4.81	36.71	-	-	-	-	-	-	-	
WS7	08/04/2014	12.44pm	44.48	N/A	-	2.24	42.24	N/A	-	7.83	36.65	-	-	-	-	-	-	-	
BH2	08/04/2014	12.55pm	44.28	N/A	-	1.59	42.69	N/A	-	4.80	39.48	-	-	-	-	-	-	-	

Field Engineer: Helen Jones

1 - All (mbgl) depth measurements are recorded as meters from the top of installation cover.

BH2

Gas Monitoring Field Record

Site Name: Kiln Place

Job No: GL18084

Client:	Ramboll

Equipment	**Model**	**Serial Number**	**Manufacturer's Calibration Date**
Land Gas Analyser	GA5000	G500883	20.03.2014 (Calibrated last)
PID	MiniRAE 3000	SN592-903976	14/05/2014 (due for calibration)

Weather Conditions 24hrs Prior to Monitoring	15 degrees celsius, mild and sunny
Weather Conditions During Monitoring	13 degrees delsius, mild and sunny

Location I.D	Date	Time (hhmmss)	Atmospheric Pressure 72hrs Prior to Sampling (hPa)	Atmospheric Pressure 48hrs Prior to Sampling (hPa)	Atmospheric Pressure 24hrs Prior to Sampling (hPa)	Atmospheric Pressure When Sampled (hPa)	Relative Pressure (hPa)	PID -Peak (ppm)	PID - Stabilised (ppm)	CH4 (%)	Peak CH4 (%)	Balance (%)	CO2 (%)	O2 (%)	H2S (ppm)	CO (ppm)	Flow Pod (l/Hr)
WS2	15/04/2014	15:50:00	1016	1021	1024	1025	-0.03	0.0	0.0	0.0	0.0	78.4	Steady 2.0 Peak 2.5	Steady 19.1 Minimum 19.1	1	0	0.0
WS5	15/04/2014	15:35:00	1016	1021	1024	1025	0.03	0.0	0.0	0.0	0.0	79.7	Steady 0.3 Peak 0.3	Steady 20.1 Minimum 20.1	1	0	0.0
BH1	15/04/2014	14:20:00	1016	1021	1024	1025	0.03	0.0	0.0	10.0	10.0	80.1	Steady 1.0 Peak 1.0	Steady 18.9 Minimum 18.9	2	0	0.0
WS7	15/04/2014	15:04:00	1016	1021	1024	1025	-0.02	0.0	0.0	0.0	0.0	81.0	Steady 6.5 Peak 6.5	Steady 12.5 Minimum 12.5	1	0	0.0
BH2	15/04/2014	16:05:00	1016	1021	1024	1025	0.10	0.0	0.0	0.0	0.0	83.5	Steady 0.5 Peak 0.7	Steady 15.9 Minimum 14.6	1	0	-0.3

Field Engineer: Martin Cooper

Pump Running Time (sampling): (Standard 120 sec)

Pump Running Time (purge): (Standard 30 sec)

Flow Details (e.g. 5 sec average for 1 min.):

Other Remarks:

PID : Photo-Ionisation Detector

"<" indicates that reading is **under** the limit range,

">" indicates that reading is **over** the limit range,

"*" Level to be determined

Groundwater Monitoring Record

Site Name: Kiln Place | Job No.: 18084

Client: Ramboll

Weather (include Temperature & Pressure): 8 degrees celcius, mild and sunny 1015mb

State of Ground: Dry

Location ID	Date	Time	Surface Elevation (mAOD)	LNAPL Depth[1] (mbgl)	LNAPL Depth (mAOD)	Water Level[1] (mbgl)	Water Level (mAOD)	DNAPL Depth[1] (mbgl)	DNAPL Depth (mAOD)	Depth to base[1] (mbgl)	Depth to base (mAOD)	Stabilized Readings					Sample Method[2] (I, S, B, P)	Purged Volume[3] (L)	Comments: (e.g. problems encountered, standpipe conditions, unusual odours, colour, tubidity, sheens)
												Temp (°C)	pH	Electrical Conductivity (µS/cm)	DO (%)	Redox Potential (mV)			
WS2	15/04/2014	15:50:00	41.36	N/A	-	5.08	36.28	N/A	-	5.94	35.42	-	-	-	-	-	-	-	
WS5	15/04/2014	15:35:00	42.02	N/A	-	3.51	38.51	N/A	-	3.62	38.40	-	-	-	-	-	-	-	
BH1	15/04/2014	14:20:00	41.52	N/A	-	3.02	38.50	N/A	-	4.83	36.69	-	-	-	-	-	-	-	
WS7	15/04/2014	15:04:00	44.48	N/A	-	2.24	42.24	N/A	-	4.79	39.69	-	-	-	-	-	-	-	
BH2	15/04/2014	16:05:00	44.28	N/A	-	1.59	42.69	N/A	-	7.82	36.46	-	-	-	-	-	-	-	

Field Engineer: Helen Jones

1 - All (mbgl) depth measurements are recorded as meters from the top of installation cover.

BH2

Gas Monitoring Field Record

Site Name: Kiln Place

Job No: GL18084

Client:	Ramboll

Equipment	**Model**	**Serial Number**	**Manufacturer's Calibration Date**
Land Gas Analyser	GA5000	G500883	20.03.2014 (Calibrated last)
PID	MiniRAE 3000	SN592-903976	14/05/2014 (due for calibration)

Weather Conditions 24hrs Prior to Monitoring	12 degrees celsius, mild and sunny
Weather Conditions During Monitoring	13 degrees delsius, mild and overcast

Location I.D	Date	Time (hhmmss)	Atmospheric Pressure 72hrs Prior to Sampling (hPa)	Atmospheric Pressure 48hrs Prior to Sampling (hPa)	Atmospheric Pressure 24hrs Prior to Sampling (hPa)	Atmospheric Pressure When Sampled (hPa)	Relative Pressure (hPa)	PID -Peak (ppm)	PID - Stabilised (ppm)	CH4 (%)	Peak CH4 (%)	Balance (%)	CO2 (%)	O2 (%)	H2S (ppm)	CO (ppm)	Flow Pod (l/Hr)
WS2	09/05/2014	11:05:00	1006	1009	1007	1006	0.57	0.8	0.1	0.0	0.0	78.0	Steady 2.3 Peak 2.5	Steady 19.7 Minimum 19.5	0	1	0.0
WS5	09/05/2014	10:15:00	1006	1009	1007	1005	-0.02	0.8	0.2	0.0	0.0	78.1	Steady 0.5 Peak 0.5	Steady 21.3 Minimum 21.3	0	0	0.1
BH1	09/05/2014	10:45:00	1006	1009	1007	1006	-4.89	0.5	0.5	0.0	0.0	78.7	Steady 1.0 Peak 1.0	Steady 20.3 Minimum 20.3	0	1	0.0
WS7	09/05/2014	11:30:00	1006	1009	1007	1006	0.01	0.5	0.2	0.0	0.0	78.6	Steady 3.9 Peak 3.9	Steady 17.5 Minimum 17.5	0	1	0.0
BH2	09/05/2014	12:00:00	1006	1009	1007	1006	-0.34	0.6	0.2	0.0	0.0	85.3	Steady 0.6 Peak 3.7	Steady 14.2 Minimum 10.5	0	1	1.2

Field Engineer: Jaime Brown

Pump Running Time (sampling): (Standard 120 sec)

Pump Running Time (purge): (Standard 30 sec)

Flow Details (e.g. 5 sec average for 1 min.):

Other Remarks:

PID : Photo-Ionisation Detector

"<" indicates that reading is **under** the limit range,

">" indicates that reading is **over** the limit range,

"*" Level to be determined

Groundwater Monitoring Record

Site Name: Kiln Place | Job No.: 18084

Client: Ramboll

Weather (include Temperature & Pressure): 8 degrees celcius, mild and sunny 1015mb

State of Ground: Dry

Location ID	Date	Time	Surface Elevation (mAOD)	LNAPL Depth[1] (mbgl)	LNAPL Depth (mAOD)	Water Level[1] (mbgl)	Water Level (mAOD)	DNAPL Depth[1] (mbgl)	DNAPL Depth (mAOD)	Depth to base[1] (mbgl)	Depth to base (mAOD)	Stabilized Readings					Sample Method[2] (I, S, B, P)	Purged Volume[3] (L)	Comments: (e.g. problems encountered, standpipe conditions, unusual odours, colour, tubidity, sheens)
												Temp (°C)	pH	Electrical Conductivity (µS/cm)	DO (%)	Redox Potential (mV)			
WS2	09/05/2014	11:05:00	41.36	N/A	-	4.15	37.21	N/A	-	5.89	35.47	-	-	-	-	-	-	-	
WS5	09/05/2014	10:15:00	42.01	N/A	-	3.47	38.54	N/A	-	3.60	38.41	-	-	-	-	-	-	-	
BH1	09/05/2014	10:45:00	41.52	N/A	-	3.81	37.71	N/A	-	4.76	36.76	-	-	-	-	-	-	-	Bung and tap submerged under water. Bailed water out to expose tap.
WS7	09/05/2014	11:30:00	44.48	N/A	-	2.27	42.21	N/A	-	4.74	39.74	-	-	-	-	-	-	-	
BH2	09/05/2014	12:00:00	44.28	N/A	-	1.52	42.76	N/A	-	7.80	36.48	-	-	-	-	-	-	-	

Field Engineer: Helen Jones

1 - All (mbgl) depth measurements are recorded as meters from the top of installation cover.

BH2

APPENDIX D

LABORATORY TESTING

4041 mCERTS

Environmental Science

Helen Jones
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Analytical Report Number : 14-52583

Replaces Analytical Report Number : 14-52583, issue no. 1

Project / Site name:	Kiln Place	**Samples received on:**	27/ 03/ 2014
Your job number:	GL18084	**Samples instructed on:**	27/ 03/ 2014
Your order number:		**Analysis completed by:**	12/ 05/ 2014
Report Issue Number:	2	**Report issued on:**	14/ 05/ 2014
Samples Analysed:	19 soil samples		

Signed:

Neil Donovan
Environmental Forensics Manager
For & on behalfof i2 Analytical Ltd.

Signed:

Rexona Rahman
Customer Services Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pio nie r6w 39, 41 -711 Ruda Sl ska, Pohmd

Standard sample disposaltimes, unlessotherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeksfrom reporting
waters - 2 weeksfrom reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Analytical Report Number: 14-52583

Project / Site name: Kiln Place

Lab Sample Number				326860	326861	326862	326863	326864
Sample Reference				BH1 ES1	BH1 ES4	BH2 ES1	BH2 ES2	BH2 ES4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.00-2.00	0.50	1.00	6.00
Date Sampled				03/03/2014	03/03/2014	03/03/2014	03/03/2014	03/03/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	18	5.3	13	21	27
Total mass of sample received	kg	0.001	NONE	0.46	0.40	0.47	2.0	0.48
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH	pH Units	N/A	MCERTS	7.5	7.8	8.1	8.0	7.8
Total Cyanide	mg/kg	1	MCERTS	3	< 1	< 1	< 1	< 1
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	3.1	0.065	2.9	3.2	4.7
Water Soluble Sulphate as SO_4 (2:1)	mg/kg	2.5	MCERTS	3100	65	2900	3200	4700
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.6	0.033	1.5	1.6	2.4
Fraction Organic Carbon (FOC)	N/A	0.00001	NONE	0.018	0.0031	0.0005	0.0082	0.027
Total Phenols								
Total Phenols (monohydric)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	1.3	< 0.05	< 0.05	< 0.05	-
Acenaphthylene	mg/kg	0.2	MCERTS	0.98	< 0.20	< 0.20	< 0.20	-
Acenaphthene	mg/kg	0.1	MCERTS	2.5	< 0.10	< 0.10	< 0.10	-
Fluorene	mg/kg	0.2	MCERTS	2.3	< 0.20	< 0.20	< 0.20	-
Phenanthrene	mg/kg	0.2	MCERTS	31	1.6	0.43	0.52	-
Anthracene	mg/kg	0.1	MCERTS	7.3	0.35	0.13	0.10	-
Fluoranthene	mg/kg	0.2	MCERTS	50	2.7	0.66	0.82	-
Pyrene	mg/kg	0.2	MCERTS	39	2.0	0.56	0.72	-
Benzo(a)anthracene	mg/kg	0.2	MCERTS	27	1.4	0.41	0.51	-
Chrysene	mg/kg	0.05	MCERTS	26	1.1	0.35	0.45	-
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	35	1.4	0.44	0.43	-
Benzo(k)fluoranthene	mg/kg	0.2	MCERTS	16	0.60	< 0.20	0.26	-
Benzo(a)pyrene	mg/kg	0.1	MCERTS	29	1.1	0.33	0.38	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.2	MCERTS	15	0.62	< 0.20	< 0.20	-
Dibenz(a,h)anthracene	mg/kg	0.2	MCERTS	2.2	< 0.20	< 0.20	< 0.20	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	15	0.66	< 0.05	< 0.05	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	300	14	3.4	4.2	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	29	14	7.9	17	11
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	-	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	-	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.8	0.3	0.3	0.4	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	-	< 4.0	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	35	26	12	48	41
Copper (aqua regia extractable)	mg/kg	1	MCERTS	250	58	26	63	45
Lead (aqua regia extractable)	mg/kg	2	MCERTS	8000	840	590	420	110
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	1.6	1.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	2	MCERTS	25	21	14	41	32
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	38	47	26	80	74
Zinc (aqua regia extractable)	mg/kg	2	MCERTS	2200	310	150	130	86

Analytical Report Number: 14-52583

Project / Site name: Kiln Place

Lab Sample Number				326860	326861	326862	326863	326864
Sample Reference				BH1 ES1	BH1 ES4	BH2 ES1	BH2 ES2	BH2 ES4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.00-2.00	0.50	1.00	6.00
Date Sampled				03/03/2014	03/03/2014	03/03/2014	03/03/2014	03/03/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	1.1	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	20	< 2.0	< 2.0	4.5	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	74	< 8.0	< 8.0	14	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	330	< 8.0	< 8.0	31	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	430	< 10	< 10	49	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	2.3	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	44	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	420	14	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	1100	33	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	1500	47	< 10	< 10	< 10

Analytical Report Number: 14-52583

Project / Site name: Kiln Place

Lab Sample Number				326860	326861	326862	326863	326864
Sample Reference				BH1 ES1	BH1 ES4	BH2 ES1	BH2 ES2	BH2 ES4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.00-2.00	0.50	1.00	6.00
Date Sampled				03/03/2014	03/03/2014	03/03/2014	03/03/2014	03/03/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
VOCs								
Chloromethane	µg/kg	4	ISO 17025	-	-	-	-	< 4.0
Chloroethane	µg/kg	2	ISO 17025	-	-	-	-	< 2.0
Bromomethane	µg/kg	6	ISO 17025	-	-	-	-	< 6.0
Vinyl Chloride	µg/kg	24	ISO 17025	-	-	-	-	< 24
Trichlorofluoromethane	µg/kg	5	ISO 17025	-	-	-	-	< 5.0
1,1-dichloroethene	µg/kg	7	MCERTS	-	-	-	-	< 7.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	7	ISO 17025	-	-	-	-	< 7.0
Cis-1,2-dichloroethene	µg/kg	7	MCERTS	-	-	-	-	< 7.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	< 1.0
1,1-dichloroethane	µg/kg	6	MCERTS	-	-	-	-	< 6.0
2,2-Dichloropropane	µg/kg	6	NONE	-	-	-	-	< 6.0
Trichloromethane	µg/kg	7	MCERTS	-	-	-	-	< 7.0
1,1,1-Trichloroethane	µg/kg	7	MCERTS	-	-	-	-	< 7.0
1,2-dichloroethane	µg/kg	4	MCERTS	-	-	-	-	< 4.0
1,1-Dichloropropene	µg/kg	7	NONE	-	-	-	-	< 7.0
Trans-1,2-dichloroethene	µg/kg	7	NONE	-	-	-	-	< 7.0
Benzene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Tetrachloromethane	µg/kg	7	MCERTS	-	-	-	-	< 7.0
1,2-dichloropropane	µg/kg	6	MCERTS	-	-	-	-	< 6.0
Trichloroethene	µg/kg	6	MCERTS	-	-	-	-	< 6.0
Dibromomethane	µg/kg	7	MCERTS	-	-	-	-	< 7.0
Bromodichloromethane	µg/kg	7	NONE	-	-	-	-	< 7.0
Cis-1,3-dichloropropene	µg/kg	7	ISO 17025	-	-	-	-	< 7.0
Trans-1,3-dichloropropene	µg/kg	8	ISO 17025	-	-	-	-	< 8.0
Toluene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
1,1,2-Trichloroethane	µg/kg	5	MCERTS	-	-	-	-	< 5.0
1,3-Dichloropropane	µg/kg	8	ISO 17025	-	-	-	-	< 8.0
Dibromochloromethane	µg/kg	2	ISO 17025	-	-	-	-	< 2.0
Tetrachloroethene	µg/kg	8	MCERTS	-	-	-	-	< 8.0
1,2-Dibromoethane	µg/kg	3	ISO 17025	-	-	-	-	< 3.0
Chlorobenzene	µg/kg	7	MCERTS	-	-	-	-	< 7.0
1,1,1,2-Tetrachloroethane	µg/kg	4	MCERTS	-	-	-	-	< 4.0
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
Styrene	µg/kg	5	MCERTS	-	-	-	-	< 5.0
Tribromomethane	µg/kg	7	MCERTS	-	-	-	-	< 7.0
o-xylene	µg/kg	1	MCERTS	-	-	-	-	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg	5	MCERTS	-	-	-	-	< 5.0
Isopropylbenzene	µg/kg	7	NONE	-	-	-	-	< 7.0
Bromobenzene	µg/kg	11	MCERTS	-	-	-	-	< 11
N-Propylbenzene	µg/kg	5	ISO 17025	-	-	-	-	< 5.0
2-Chlorotoluene	µg/kg	11	NONE	-	-	-	-	< 11
4-Chlorotoluene	µg/kg	11	NONE	-	-	-	-	< 11
1,3,5-Trimethylbenzene	µg/kg	4	ISO 17025	-	-	-	-	< 4.0
Tert-Butylbenzene	µg/kg	4	NONE	-	-	-	-	< 4.0
1,2,4-Trimethylbenzene	µg/kg	5	ISO 17025	-	-	-	-	< 5.0
Sec-Butylbenzene	µg/kg	5	NONE	-	-	-	-	< 5.0
1,3-dichlorobenzene	µg/kg	7	ISO 17025	-	-	-	-	< 7.0
P-Isopropyltoluene	µg/kg	16	ISO 17025	-	-	-	-	< 16
1,2-dichlorobenzene	µg/kg	5	MCERTS	-	-	-	-	< 5.0
1,4-dichlorobenzene	µg/kg	8	MCERTS	-	-	-	-	< 8.0
Butylbenzene	µg/kg	4	NONE	-	-	-	-	< 4.0
1,2-Dibromo-3-chloropropane	µg/kg	7	ISO 17025	-	-	-	-	< 7.0
1,2,4-Trichlorobenzene	µg/kg	9	MCERTS	-	-	-	-	< 9.0
Hexachlorobutadiene	µg/kg	7	NONE	-	-	-	-	< 7.0
1,2,3-Trichlorobenzene	µg/kg	10	NONE	-	-	-	-	< 10

Analytical Report Number: 14-52583

Project / Site name: Kiln Place

Lab Sample Number				326860	326861	326862	326863	326864
Sample Reference				BH1 ES1	BH1 ES4	BH2 ES1	BH2 ES2	BH2 ES4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.00-2.00	0.50	1.00	6.00
Date Sampled				03/03/2014	03/03/2014	03/03/2014	03/03/2014	03/03/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
SVOCs								
Aniline	mg/kg	0.1	NONE	-	-	-	-	< 0.1
Phenol	mg/kg	0.2	ISO 17025	-	-	-	-	< 0.2
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	< 0.1
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-	-	-	< 0.2
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	-	< 0.2
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-	-	-	< 0.1
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	-	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	-	-	< 0.1
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	-	-	< 0.3
Hexachloroethane	mg/kg	0.05	MCERTS	-	-	-	-	< 0.05
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	-	-	< 0.3
4-Methylphenol	mg/kg	0.2	NONE	-	-	-	-	< 0.2
Isophorone	mg/kg	0.2	MCERTS	-	-	-	-	< 0.2
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-	-	-	< 0.3
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	-	-	< 0.3
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	-	-	< 0.3
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	< 0.3
Naphthalene	mg/kg	0.1	ISO 17025	-	-	-	-	< 0.1
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	-	-	< 0.3
4-Chloroaniline	mg/kg	0.1	NONE	-	-	-	-	< 0.1
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	-	-	< 0.1
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	-	-	< 0.1
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	< 0.1
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-	-	-	< 0.2
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	-	-	< 0.1
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	-	-	< 0.1
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	-	-	< 0.1
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-	-	-	< 0.1
Acenaphthylene	mg/kg	0.2	ISO 17025	-	-	-	-	< 0.2
Acenaphthene	mg/kg	0.1	MCERTS	-	-	-	-	< 0.1
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-	-	-	< 0.2
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	-	-	< 0.2
4-Chlorophenyl phenyl ether	mg/kg	0.3	MCERTS	-	-	-	-	< 0.3
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	< 0.2
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-	-	-	< 0.2
Fluorene	mg/kg	0.2	ISO 17025	-	-	-	-	< 0.2
Azobenzene	mg/kg	0.3	MCERTS	-	-	-	-	< 0.3
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	-	-	< 0.2
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	< 0.3
Phenanthrene	mg/kg	0.2	ISO 17025	-	-	-	-	< 0.2
Anthracene	mg/kg	0.1	MCERTS	-	-	-	-	< 0.1
Carbazole	mg/kg	0.3	MCERTS	-	-	-	-	< 0.3
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	< 0.2
Anthraquinone	mg/kg	0.3	MCERTS	-	-	-	-	< 0.3
Fluoranthene	mg/kg	0.2	MCERTS	-	-	-	-	< 0.2
Pyrene	mg/kg	0.2	ISO 17025	-	-	-	-	< 0.2
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-	-	-	< 0.3
Benzo(a)anthracene	mg/kg	0.2	MCERTS	-	-	-	-	< 0.2
Chrysene	mg/kg	0.05	ISO 17025	-	-	-	-	< 0.1
Benzo(b)fluoranthene	mg/kg	0.1	ISO 17025	-	-	-	-	< 0.1
Benzo(k)fluoranthene	mg/kg	0.2	ISO 17025	-	-	-	-	< 0.2
Benzo(a)pyrene	mg/kg	0.1	MCERTS	-	-	-	-	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.2	ISO 17025	-	-	-	-	< 0.2
Dibenz(a,h)anthracene	mg/kg	0.2	ISO 17025	-	-	-	-	< 0.2
Benzo(ghi)perylene	mg/kg	0.05	ISO 17025	-	-	-	-	< 0.1

Analytical Report Number: 14-52583

Project / Site name: Kiln Place

Lab Sample Number				326865	326866	326867	326868	326869
Sample Reference				WS1 ES1	WS1 ES2	WS2 ES1	WS2 ES3	WS3 ES1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.00	0.50	1.50	0.50
Date Sampled				03/03/2014	03/03/2014	03/03/2014	03/03/2014	03/03/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	7.2	22	6.9	21	16
Total mass of sample received	kg	0.001	NONE	0.98	0.78	0.43	0.43	0.44
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
General Inorganics								
pH	pH Units	N/A	MCERTS	8.4	8.2	8.4	7.7	8.2
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	0.43	0.44	0.15	4.7	0.22
Water Soluble Sulphate as SO_4 (2:1)	mg/kg	2.5	MCERTS	430	440	150	4700	220
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.22	0.22	0.077	2.4	0.11
Fraction Organic Carbon (FOC)	N/A	0.00001	NONE	0.0023	0.010	0.0091	0.0030	0.0081
Total Phenols								
Total Phenols (monohydric)	mg/kg	2	MCERTS	< 2.0	-	-	< 2.0	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	-
Acenaphthylene	mg/kg	0.2	MCERTS	< 0.20	-	-	< 0.20	-
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	-	-	< 0.10	-
Fluorene	mg/kg	0.2	MCERTS	< 0.20	-	-	< 0.20	-
Phenanthrene	mg/kg	0.2	MCERTS	0.60	-	-	< 0.20	-
Anthracene	mg/kg	0.1	MCERTS	0.24	-	-	< 0.10	-
Fluoranthene	mg/kg	0.2	MCERTS	2.0	-	-	< 0.20	-
Pyrene	mg/kg	0.2	MCERTS	2.1	-	-	< 0.20	-
Benzo(a)anthracene	mg/kg	0.2	MCERTS	1.5	-	-	< 0.20	-
Chrysene	mg/kg	0.05	MCERTS	1.1	-	-	< 0.05	-
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	1.0	-	-	< 0.10	-
Benzo(k)fluoranthene	mg/kg	0.2	MCERTS	0.61	-	-	< 0.20	-
Benzo(a)pyrene	mg/kg	0.1	MCERTS	1.1	-	-	< 0.10	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.2	MCERTS	0.50	-	-	< 0.20	-
Dibenz(a,h)anthracene	mg/kg	0.2	MCERTS	< 0.20	-	-	< 0.20	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.53	-	-	< 0.05	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	11	-	-	< 1.6	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	10	17	7.6	9.5	20
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	-	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	-	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	0.6	0.4	< 0.2	1.5
Chromium (hexavalent)	mg/kg	4	MCERTS	-	-	-	-	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	11	50	16	48	34
Copper (aqua regia extractable)	mg/kg	1	MCERTS	30	63	46	31	120
Lead (aqua regia extractable)	mg/kg	2	MCERTS	230	220	130	24	570
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	1.2
Nickel (aqua regia extractable)	mg/kg	2	MCERTS	13	39	16	40	32
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	23	91	28	77	60
Zinc (aqua regia extractable)	mg/kg	2	MCERTS	180	140	110	84	1000

Analytical Report Number: 14-52583

Project / Site name: Kiln Place

Lab Sample Number				326865	326866	326867	326868	326869
Sample Reference				WS1 ES1	WS1 ES2	WS2 ES1	WS2 ES3	WS3 ES1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.00	0.50	1.50	0.50
Date Sampled				03/03/2014	03/03/2014	03/03/2014	03/03/2014	03/03/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	8.9
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	9.6	< 8.0	< 8.0	< 8.0	44
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	53

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	2.1	< 2.0	7.8	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	17	< 10	98	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	25	< 10	67	< 10	13
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	43	< 10	170	< 10	13

Analytical Report Number: 14-52583

Project / Site name: Kiln Place

Lab Sample Number				326865	326866	326867	326868	326869
Sample Reference				WS1 ES1	WS1 ES2	WS2 ES1	WS2 ES3	WS3 ES1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.00	0.50	1.50	0.50
Date Sampled				03/03/2014	03/03/2014	03/03/2014	03/03/2014	03/03/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
VOCs								
Chloromethane	µg/kg	4	ISO 17025	-	< 4.0	-	-	-
Chloroethane	µg/kg	2	ISO 17025	-	< 2.0	-	-	-
Bromomethane	µg/kg	6	ISO 17025	-	< 6.0	-	-	-
Vinyl Chloride	µg/kg	24	ISO 17025	-	< 24	-	-	-
Trichlorofluoromethane	µg/kg	5	ISO 17025	-	< 5.0	-	-	-
1,1-dichloroethene	µg/kg	7	MCERTS	-	< 7.0	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	7	ISO 17025	-	< 7.0	-	-	-
Cis-1,2-dichloroethene	µg/kg	7	MCERTS	-	< 7.0	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,1-dichloroethane	µg/kg	6	MCERTS	-	< 6.0	-	-	-
2,2-Dichloropropane	µg/kg	6	NONE	-	< 6.0	-	-	-
Trichloromethane	µg/kg	7	MCERTS	-	< 7.0	-	-	-
1,1,1-Trichloroethane	µg/kg	7	MCERTS	-	< 7.0	-	-	-
1,2-dichloroethane	µg/kg	4	MCERTS	-	< 4.0	-	-	-
1,1-Dichloropropene	µg/kg	7	NONE	-	< 7.0	-	-	-
Trans-1,2-dichloroethene	µg/kg	7	NONE	-	< 7.0	-	-	-
Benzene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
Tetrachloromethane	µg/kg	7	MCERTS	-	< 7.0	-	-	-
1,2-dichloropropane	µg/kg	6	MCERTS	-	< 6.0	-	-	-
Trichloroethene	µg/kg	6	MCERTS	-	< 6.0	-	-	-
Dibromomethane	µg/kg	7	MCERTS	-	< 7.0	-	-	-
Bromodichloromethane	µg/kg	7	NONE	-	< 7.0	-	-	-
Cis-1,3-dichloropropene	µg/kg	7	ISO 17025	-	< 7.0	-	-	-
Trans-1,3-dichloropropene	µg/kg	8	ISO 17025	-	< 8.0	-	-	-
Toluene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,1,2-Trichloroethane	µg/kg	5	MCERTS	-	< 5.0	-	-	-
1,3-Dichloropropane	µg/kg	8	ISO 17025	-	< 8.0	-	-	-
Dibromochloromethane	µg/kg	2	ISO 17025	-	< 2.0	-	-	-
Tetrachloroethene	µg/kg	8	MCERTS	-	< 8.0	-	-	-
1,2-Dibromoethane	µg/kg	3	ISO 17025	-	< 3.0	-	-	-
Chlorobenzene	µg/kg	7	MCERTS	-	< 7.0	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	4	MCERTS	-	< 4.0	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
Styrene	µg/kg	5	MCERTS	-	< 5.0	-	-	-
Tribromomethane	µg/kg	7	MCERTS	-	< 7.0	-	-	-
o-xylene	µg/kg	1	MCERTS	-	< 1.0	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	5	MCERTS	-	< 5.0	-	-	-
Isopropylbenzene	µg/kg	7	NONE	-	< 7.0	-	-	-
Bromobenzene	µg/kg	11	MCERTS	-	< 11	-	-	-
N-Propylbenzene	µg/kg	5	ISO 17025	-	< 5.0	-	-	-
2-Chlorotoluene	µg/kg	11	NONE	-	< 11	-	-	-
4-Chlorotoluene	µg/kg	11	NONE	-	< 11	-	-	-
1,3,5-Trimethylbenzene	µg/kg	4	ISO 17025	-	< 4.0	-	-	-
Tert-Butylbenzene	µg/kg	4	NONE	-	< 4.0	-	-	-
1,2,4-Trimethylbenzene	µg/kg	5	ISO 17025	-	< 5.0	-	-	-
Sec-Butylbenzene	µg/kg	5	NONE	-	< 5.0	-	-	-
1,3-dichlorobenzene	µg/kg	7	ISO 17025	-	< 7.0	-	-	-
P-Isopropyltoluene	µg/kg	16	ISO 17025	-	< 16	-	-	-
1,2-dichlorobenzene	µg/kg	5	MCERTS	-	< 5.0	-	-	-
1,4-dichlorobenzene	µg/kg	8	MCERTS	-	< 8.0	-	-	-
Butylbenzene	µg/kg	4	NONE	-	< 4.0	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	7	ISO 17025	-	< 7.0	-	-	-
1,2,4-Trichlorobenzene	µg/kg	9	MCERTS	-	< 9.0	-	-	-
Hexachlorobutadiene	µg/kg	7	NONE	-	< 7.0	-	-	-
1,2,3-Trichlorobenzene	µg/kg	10	NONE	-	< 10	-	-	-

Analytical Report Number: 14-52583

Project / Site name: Kiln Place

Lab Sample Number				326865	326866	326867	326868	326869
Sample Reference				WS1 ES1	WS1 ES2	WS2 ES1	WS2 ES3	WS3 ES1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.00	0.50	1.50	0.50
Date Sampled				03/03/2014	03/03/2014	03/03/2014	03/03/2014	03/03/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
SVOCs								
Aniline	mg/kg	0.1	NONE	-	< 0.1	< 0.1	-	< 0.1
Phenol	mg/kg	0.2	ISO 17025	-	< 0.2	< 0.2	-	< 0.2
2-Chlorophenol	mg/kg	0.1	MCERTS	-	< 0.1	< 0.1	-	< 0.1
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	< 0.2	< 0.2	-	< 0.2
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	< 0.2	< 0.2	-	< 0.2
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	< 0.1	< 0.1	-	< 0.1
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	< 0.2	< 0.2	-	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	< 0.1	< 0.1	-	< 0.1
2-Methylphenol	mg/kg	0.3	MCERTS	-	< 0.3	< 0.3	-	< 0.3
Hexachloroethane	mg/kg	0.05	MCERTS	-	< 0.05	< 0.05	-	< 0.05
Nitrobenzene	mg/kg	0.3	MCERTS	-	< 0.3	< 0.3	-	< 0.3
4-Methylphenol	mg/kg	0.2	NONE	-	< 0.2	< 0.2	-	< 0.2
Isophorone	mg/kg	0.2	MCERTS	-	< 0.2	< 0.2	-	< 0.2
2-Nitrophenol	mg/kg	0.3	MCERTS	-	< 0.3	< 0.3	-	< 0.3
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	< 0.3	< 0.3	-	< 0.3
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	< 0.3	< 0.3	-	< 0.3
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	< 0.3	< 0.3	-	< 0.3
Naphthalene	mg/kg	0.1	ISO 17025	-	< 0.1	< 0.1	-	< 0.1
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	< 0.3	< 0.3	-	< 0.3
4-Chloroaniline	mg/kg	0.1	NONE	-	< 0.1	< 0.1	-	< 0.1
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	< 0.1	< 0.1	-	< 0.1
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	< 0.1	< 0.1	-	< 0.1
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	< 0.1	< 0.1	-	< 0.1
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	< 0.2	< 0.2	-	< 0.2
2-Methylnaphthalene	mg/kg	0.1	NONE	-	< 0.1	< 0.1	-	< 0.1
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	< 0.1	< 0.1	-	< 0.1
Dimethylphthalate	mg/kg	0.1	MCERTS	-	< 0.1	< 0.1	-	< 0.1
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	< 0.1	< 0.1	-	< 0.1
Acenaphthylene	mg/kg	0.2	ISO 17025	-	< 0.2	< 0.2	-	< 0.2
Acenaphthene	mg/kg	0.1	MCERTS	-	< 0.1	1.3	-	< 0.1
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	< 0.2	< 0.2	-	< 0.2
Dibenzofuran	mg/kg	0.2	MCERTS	-	< 0.2	0.6	-	< 0.2
4-Chlorophenyl phenyl ether	mg/kg	0.3	MCERTS	-	< 0.3	< 0.3	-	< 0.3
Diethyl phthalate	mg/kg	0.2	MCERTS	-	< 0.2	< 0.2	-	< 0.2
4-Nitroaniline	mg/kg	0.2	MCERTS	-	< 0.2	< 0.2	-	< 0.2
Fluorene	mg/kg	0.2	ISO 17025	-	< 0.2	1.4	-	< 0.2
Azobenzene	mg/kg	0.3	MCERTS	-	< 0.3	< 0.3	-	< 0.3
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	< 0.2	< 0.2	-	< 0.2
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	< 0.3	< 0.3	-	< 0.3
Phenanthrene	mg/kg	0.2	ISO 17025	-	0.6	18	-	1.1
Anthracene	mg/kg	0.1	MCERTS	-	0.1	4.1	-	0.3
Carbazole	mg/kg	0.3	MCERTS	-	< 0.3	2.2	-	< 0.3
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	< 0.2	< 0.2	-	< 0.2
Anthraquinone	mg/kg	0.3	MCERTS	-	< 0.3	1.2	-	< 0.3
Fluoranthene	mg/kg	0.2	MCERTS	-	1.0	24	-	2.4
Pyrene	mg/kg	0.2	ISO 17025	-	0.8	15	-	2.0
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	< 0.3	< 0.3	-	< 0.3
Benzo(a)anthracene	mg/kg	0.2	MCERTS	-	0.5	10	-	1.3
Chrysene	mg/kg	0.05	ISO 17025	-	0.5	9.2	-	1.3
Benzo(b)fluoranthene	mg/kg	0.1	ISO 17025	-	0.5	7.5	-	1.4
Benzo(k)fluoranthene	mg/kg	0.2	ISO 17025	-	< 0.2	5.5	-	0.5
Benzo(a)pyrene	mg/kg	0.1	MCERTS	-	0.4	6.8	-	1.4
Indeno(1,2,3-cd)pyrene	mg/kg	0.2	ISO 17025	-	< 0.2	3.1	-	0.7
Dibenz(a,h)anthracene	mg/kg	0.2	ISO 17025	-	< 0.2	0.4	-	< 0.2
Benzo(ghi)perylene	mg/kg	0.05	ISO 17025	-	< 0.1	3.7	-	0.9

Analytical Report Number: 14-52583

Project / Site name: Kiln Place

Lab Sample Number				326870	326871	326872	326873	326874
Sample Reference				WS4 ES1	WS4 ES3	WS5 ES1	WS5 ES5	WS5 ES6
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.50-2.00	0.50	4.50-5.00	5.00-6.00
Date Sampled				03/03/2014	03/03/2014	03/03/2014	03/03/2014	03/03/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	21	12	16	33	23
Total mass of sample received	kg	0.001	NONE	0.44	0.49	0.42	0.41	0.43
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	-
General Inorganics								
pH	pH Units	N/A	MCERTS	8.3	7.6	8.1	7.6	-
Total Cyanide	mg/kg	1	MCERTS	< 1	2	< 1	< 1	-
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	0.25	3.4	0.41	4.0	-
Water Soluble Sulphate as SO_4 (2:1)	mg/kg	2.5	MCERTS	250	3400	410	4000	-
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.13	1.7	0.20	2.0	-
Fraction Organic Carbon (FOC)	N/A	0.00001	NONE	0.0091	0.0042	0.017	0.047	-
Total Phenols								
Total Phenols (monohydric)	mg/kg	2	MCERTS	-	< 2.0	< 2.0	< 2.0	-
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	2.2	6.0	-
Acenaphthylene	mg/kg	0.2	MCERTS	-	< 0.20	< 0.20	< 0.20	-
Acenaphthene	mg/kg	0.1	MCERTS	-	< 0.10	0.97	5.3	-
Fluorene	mg/kg	0.2	MCERTS	-	< 0.20	0.69	5.5	-
Phenanthrene	mg/kg	0.2	MCERTS	-	0.31	8.9	37	-
Anthracene	mg/kg	0.1	MCERTS	-	< 0.10	1.5	6.2	-
Fluoranthene	mg/kg	0.2	MCERTS	-	0.27	10	35	-
Pyrene	mg/kg	0.2	MCERTS	-	< 0.20	7.8	26	-
Benzo(a)anthracene	mg/kg	0.2	MCERTS	-	< 0.20	4.1	15	-
Chrysene	mg/kg	0.05	MCERTS	-	< 0.05	4.2	14	-
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	-	< 0.10	3.1	11	-
Benzo(k)fluoranthene	mg/kg	0.2	MCERTS	-	< 0.20	2.7	9.7	-
Benzo(a)pyrene	mg/kg	0.1	MCERTS	-	< 0.10	3.6	14	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.2	MCERTS	-	< 0.20	1.4	5.7	-
Dibenz(a,h)anthracene	mg/kg	0.2	MCERTS	-	< 0.20	0.31	0.84	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	< 0.05	1.9	5.8	-
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	-	< 1.6	54	200	-
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	20	14	23	14	19
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	270
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	-	-	< 0.1
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	-	-	4.0
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	26	0.3	1.2	0.6	1.9
Chromium (hexavalent)	mg/kg	4	MCERTS	-	-	-	-	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	49	27	36	17	23
Copper (aqua regia extractable)	mg/kg	1	MCERTS	150	440	280	88	130
Lead (aqua regia extractable)	mg/kg	2	MCERTS	490	300	4000	420	470
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.8	1.8	1.4	3.4	9.1
Nickel (aqua regia extractable)	mg/kg	2	MCERTS	48	24	36	20	31
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	91	52	43	41	44
Zinc (aqua regia extractable)	mg/kg	2	MCERTS	370	350	790	260	610

Analytical Report Number: 14-52583

Project / Site name: Kiln Place

Lab Sample Number				326870	326871	326872	326873	326874
Sample Reference				WS4 ES1	WS4 ES3	WS5 ES1	WS5 ES5	WS5 ES6
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.50-2.00	0.50	4.50-5.00	5.00-6.00
Date Sampled				03/03/2014	03/03/2014	03/03/2014	03/03/2014	03/03/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	5.2	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	12	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	50	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	110	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	180	-

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	2.9	6.9	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	5.6	25	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	45	280	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	62	290	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	120	600	-

Analytical Report Number: 14-52583

Project / Site name: Kiln Place

Lab Sample Number				326870	326871	326872	326873	326874
Sample Reference				WS4 ES1	WS4 ES3	WS5 ES1	WS5 ES5	WS5 ES6
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.50-2.00	0.50	4.50-5.00	5.00-6.00
Date Sampled				03/03/2014	03/03/2014	03/03/2014	03/03/2014	03/03/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
VOCs								
Chloromethane	µg/kg	4	ISO 17025	-	-	-	-	-
Chloroethane	µg/kg	2	ISO 17025	-	-	-	-	-
Bromomethane	µg/kg	6	ISO 17025	-	-	-	-	-
Vinyl Chloride	µg/kg	24	ISO 17025	-	-	-	-	-
Trichlorofluoromethane	µg/kg	5	ISO 17025	-	-	-	-	-
1,1-dichloroethene	µg/kg	7	MCERTS	-	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	7	ISO 17025	-	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	7	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-
1,1-dichloroethane	µg/kg	6	MCERTS	-	-	-	-	-
2,2-Dichloropropane	µg/kg	6	NONE	-	-	-	-	-
Trichloromethane	µg/kg	7	MCERTS	-	-	-	-	-
1,1,1-Trichloroethane	µg/kg	7	MCERTS	-	-	-	-	-
1,2-dichloroethane	µg/kg	4	MCERTS	-	-	-	-	-
1,1-Dichloropropene	µg/kg	7	NONE	-	-	-	-	-
Trans-1,2-dichloroethene	µg/kg	7	NONE	-	-	-	-	-
Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Tetrachloromethane	µg/kg	7	MCERTS	-	-	-	-	-
1,2-dichloropropane	µg/kg	6	MCERTS	-	-	-	-	-
Trichloroethene	µg/kg	6	MCERTS	-	-	-	-	-
Dibromomethane	µg/kg	7	MCERTS	-	-	-	-	-
Bromodichloromethane	µg/kg	7	NONE	-	-	-	-	-
Cis-1,3-dichloropropene	µg/kg	7	ISO 17025	-	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	8	ISO 17025	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2-Trichloroethane	µg/kg	5	MCERTS	-	-	-	-	-
1,3-Dichloropropane	µg/kg	8	ISO 17025	-	-	-	-	-
Dibromochloromethane	µg/kg	2	ISO 17025	-	-	-	-	-
Tetrachloroethene	µg/kg	8	MCERTS	-	-	-	-	-
1,2-Dibromoethane	µg/kg	3	ISO 17025	-	-	-	-	-
Chlorobenzene	µg/kg	7	MCERTS	-	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	4	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
Styrene	µg/kg	5	MCERTS	-	-	-	-	-
Tribromomethane	µg/kg	7	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	5	MCERTS	-	-	-	-	-
Isopropylbenzene	µg/kg	7	NONE	-	-	-	-	-
Bromobenzene	µg/kg	11	MCERTS	-	-	-	-	-
N-Propylbenzene	µg/kg	5	ISO 17025	-	-	-	-	-
2-Chlorotoluene	µg/kg	11	NONE	-	-	-	-	-
4-Chlorotoluene	µg/kg	11	NONE	-	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	4	ISO 17025	-	-	-	-	-
Tert-Butylbenzene	µg/kg	4	NONE	-	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	5	ISO 17025	-	-	-	-	-
Sec-Butylbenzene	µg/kg	5	NONE	-	-	-	-	-
1,3-dichlorobenzene	µg/kg	7	ISO 17025	-	-	-	-	-
P-Isopropyltoluene	µg/kg	16	ISO 17025	-	-	-	-	-
1,2-dichlorobenzene	µg/kg	5	MCERTS	-	-	-	-	-
1,4-dichlorobenzene	µg/kg	8	MCERTS	-	-	-	-	-
Butylbenzene	µg/kg	4	NONE	-	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	7	ISO 17025	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	9	MCERTS	-	-	-	-	-
Hexachlorobutadiene	µg/kg	7	NONE	-	-	-	-	-
1,2,3-Trichlorobenzene	µg/kg	10	NONE	-	-	-	-	-

Analytical Report Number: 14-52583

Project / Site name: Kiln Place

Lab Sample Number				326870	326871	326872	326873	326874
Sample Reference				WS4 ES1	WS4 ES3	WS5 ES1	WS5 ES5	WS5 ES6
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.50-2.00	0.50	4.50-5.00	5.00-6.00
Date Sampled				03/03/2014	03/03/2014	03/03/2014	03/03/2014	03/03/2014
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
SVOCs								
Aniline	mg/kg	0.1	NONE	< 0.1	-	-	-	-
Phenol	mg/kg	0.2	ISO 17025	< 0.2	-	-	-	-
2-Chlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Hexachloroethane	mg/kg	0.05	MCERTS	< 0.05	-	-	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
4-Methylphenol	mg/kg	0.2	NONE	< 0.2	-	-	-	-
Isophorone	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
2-Nitrophenol	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Naphthalene	mg/kg	0.1	ISO 17025	< 0.1	-	-	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	< 0.1	-	-	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
Acenaphthylene	mg/kg	0.2	ISO 17025	< 0.2	-	-	-	-
Acenaphthene	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
4-Nitroaniline	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
Fluorene	mg/kg	0.2	ISO 17025	< 0.2	-	-	-	-
Azobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Phenanthrene	mg/kg	0.2	ISO 17025	0.8	-	-	-	-
Anthracene	mg/kg	0.1	MCERTS	0.2	-	-	-	-
Carbazole	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
Anthraquinone	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Fluoranthene	mg/kg	0.2	MCERTS	1.5	-	-	-	-
Pyrene	mg/kg	0.2	ISO 17025	1.2	-	-	-	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	< 0.3	-	-	-	-
Benzo(a)anthracene	mg/kg	0.2	MCERTS	0.7	-	-	-	-
Chrysene	mg/kg	0.05	ISO 17025	0.7	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.1	ISO 17025	0.7	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.2	ISO 17025	< 0.2	-	-	-	-
Benzo(a)pyrene	mg/kg	0.1	MCERTS	0.6	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.2	ISO 17025	< 0.2	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.2	ISO 17025	< 0.2	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	ISO 17025	< 0.1	-	-	-	-

Analytical Report Number: 14-52583

Project / Site name: Kiln Place

Lab Sample Number				326875	326876	326877	326878	
Sample Reference				WS7 ES1	WS7 ES2	WS7 ES4	WS7 ES6	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.50	1.00	2.50	4.50	
Date Sampled				03/03/2014	03/03/2014	03/03/2014	03/03/2014	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	
Moisture Content	%	N/A	NONE	18	19	25	25	
Total mass of sample received	kg	0.001	NONE	0.42	0.40	0.48	0.44	
Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	Chrysotile - Loose fibres	-	-	
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Detected	-	-	
General Inorganics								
pH	pH Units	N/A	MCERTS	8.2	7.9	-	-	
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	-	-	
Water Soluble Sulphate (Soil Equivalent)	g/l	0.0025	MCERTS	0.35	0.31	-	-	
Water Soluble Sulphate as SO_4 (2:1)	mg/kg	2.5	MCERTS	350	310	-	-	
Water Soluble Sulphate (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.17	0.16	-	-	
Fraction Organic Carbon (FOC)	N/A	0.00001	NONE	0.016	0.011	-	-	
Total Phenols								
Total Phenols (monohydric)	mg/kg	2	MCERTS	< 2.0	< 2.0	-	-	
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	
Acenaphthylene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	-	-	
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	-	-	
Fluorene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	-	-	
Phenanthrene	mg/kg	0.2	MCERTS	1.1	1.0	-	-	
Anthracene	mg/kg	0.1	MCERTS	0.19	0.20	-	-	
Fluoranthene	mg/kg	0.2	MCERTS	2.4	2.2	-	-	
Pyrene	mg/kg	0.2	MCERTS	2.0	1.8	-	-	
Benzo(a)anthracene	mg/kg	0.2	MCERTS	1.3	1.1	-	-	
Chrysene	mg/kg	0.05	MCERTS	1.0	1.0	-	-	
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	1.2	1.3	-	-	
Benzo(k)fluoranthene	mg/kg	0.2	MCERTS	0.70	0.35	-	-	
Benzo(a)pyrene	mg/kg	0.1	MCERTS	1.3	1.0	-	-	
Indeno(1,2,3-cd)pyrene	mg/kg	0.2	MCERTS	0.58	0.51	-	-	
Dibenz(a,h)anthracene	mg/kg	0.2	MCERTS	< 0.20	< 0.20	-	-	
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.76	0.60	-	-	
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	13	11	-	-	
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	23	20	-	13	
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	96	
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	-	1.2	
Boron (water soluble)	mg/kg	0.2	MCERTS	-	-	-	4.3	
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	2.4	16	-	< 0.2	
Chromium (hexavalent)	mg/kg	4	MCERTS	-	-	-	< 4.0	
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	36	37	-	43	
Copper (aqua regia extractable)	mg/kg	1	MCERTS	160	190	-	62	
Lead (aqua regia extractable)	mg/kg	2	MCERTS	590	950	-	400	
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.7	-	< 0.3	
Nickel (aqua regia extractable)	mg/kg	2	MCERTS	38	33	-	38	
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	61	60	-	77	
Zinc (aqua regia extractable)	mg/kg	2	MCERTS	350	320	-	100	

Analytical Report Number: 14-52583

Project / Site name: Kiln Place

Lab Sample Number				326875	326876	326877	326878	
Sample Reference				WS7 ES1	WS7 ES2	WS7 ES4	WS7 ES6	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.50	1.00	2.50	4.50	
Date Sampled				03/03/2014	03/03/2014	03/03/2014	03/03/2014	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	-	-	
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	-	-	
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	-	-	
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	-	-	
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	-	-	
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	-	-	

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	-	-	
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	-	-	
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	-	-	
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	-	-	
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	-	-	
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	-	-	
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	-	-	

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	-	-	
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	-	-	
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	-	-	
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	-	-	
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	-	-	
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	-	-	
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	-	-	

Analytical Report Number: 14-52583

Project / Site name: Kiln Place

Lab Sample Number				326875	326876	326877	326878	
Sample Reference				WS7 ES1	WS7 ES2	WS7 ES4	WS7 ES6	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.50	1.00	2.50	4.50	
Date Sampled				03/03/2014	03/03/2014	03/03/2014	03/03/2014	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
VOCs								
Chloromethane	µg/kg	4	ISO 17025	-	-	-	-	
Chloroethane	µg/kg	2	ISO 17025	-	-	-	-	
Bromomethane	µg/kg	6	ISO 17025	-	-	-	-	
Vinyl Chloride	µg/kg	24	ISO 17025	-	-	-	-	
Trichlorofluoromethane	µg/kg	5	ISO 17025	-	-	-	-	
1,1-dichloroethene	µg/kg	7	MCERTS	-	-	-	-	
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	7	ISO 17025	-	-	-	-	
Cis-1,2-dichloroethene	µg/kg	7	MCERTS	-	-	-	-	
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	
1,1-dichloroethane	µg/kg	6	MCERTS	-	-	-	-	
2,2-Dichloropropane	µg/kg	6	NONE	-	-	-	-	
Trichloromethane	µg/kg	7	MCERTS	-	-	-	-	
1,1,1-Trichloroethane	µg/kg	7	MCERTS	-	-	-	-	
1,2-dichloroethane	µg/kg	4	MCERTS	-	-	-	-	
1,1-Dichloropropene	µg/kg	7	NONE	-	-	-	-	
Trans-1,2-dichloroethene	µg/kg	7	NONE	-	-	-	-	
Benzene	µg/kg	1	MCERTS	-	-	-	-	
Tetrachloromethane	µg/kg	7	MCERTS	-	-	-	-	
1,2-dichloropropane	µg/kg	6	MCERTS	-	-	-	-	
Trichloroethene	µg/kg	6	MCERTS	-	-	-	-	
Dibromomethane	µg/kg	7	MCERTS	-	-	-	-	
Bromodichloromethane	µg/kg	7	NONE	-	-	-	-	
Cis-1,3-dichloropropene	µg/kg	7	ISO 17025	-	-	-	-	
Trans-1,3-dichloropropene	µg/kg	8	ISO 17025	-	-	-	-	
Toluene	µg/kg	1	MCERTS	-	-	-	-	
1,1,2-Trichloroethane	µg/kg	5	MCERTS	-	-	-	-	
1,3-Dichloropropane	µg/kg	8	ISO 17025	-	-	-	-	
Dibromochloromethane	µg/kg	2	ISO 17025	-	-	-	-	
Tetrachloroethene	µg/kg	8	MCERTS	-	-	-	-	
1,2-Dibromoethane	µg/kg	3	ISO 17025	-	-	-	-	
Chlorobenzene	µg/kg	7	MCERTS	-	-	-	-	
1,1,1,2-Tetrachloroethane	µg/kg	4	MCERTS	-	-	-	-	
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	
Styrene	µg/kg	5	MCERTS	-	-	-	-	
Tribromomethane	µg/kg	7	MCERTS	-	-	-	-	
o-xylene	µg/kg	1	MCERTS	-	-	-	-	
1,1,2,2-Tetrachloroethane	µg/kg	5	MCERTS	-	-	-	-	
Isopropylbenzene	µg/kg	7	NONE	-	-	-	-	
Bromobenzene	µg/kg	11	MCERTS	-	-	-	-	
N-Propylbenzene	µg/kg	5	ISO 17025	-	-	-	-	
2-Chlorotoluene	µg/kg	11	NONE	-	-	-	-	
4-Chlorotoluene	µg/kg	11	NONE	-	-	-	-	
1,3,5-Trimethylbenzene	µg/kg	4	ISO 17025	-	-	-	-	
Tert-Butylbenzene	µg/kg	4	NONE	-	-	-	-	
1,2,4-Trimethylbenzene	µg/kg	5	ISO 17025	-	-	-	-	
Sec-Butylbenzene	µg/kg	5	NONE	-	-	-	-	
1,3-dichlorobenzene	µg/kg	7	ISO 17025	-	-	-	-	
P-Isopropyltoluene	µg/kg	16	ISO 17025	-	-	-	-	
1,2-dichlorobenzene	µg/kg	5	MCERTS	-	-	-	-	
1,4-dichlorobenzene	µg/kg	8	MCERTS	-	-	-	-	
Butylbenzene	µg/kg	4	NONE	-	-	-	-	
1,2-Dibromo-3-chloropropane	µg/kg	7	ISO 17025	-	-	-	-	
1,2,4-Trichlorobenzene	µg/kg	9	MCERTS	-	-	-	-	
Hexachlorobutadiene	µg/kg	7	NONE	-	-	-	-	
1,2,3-Trichlorobenzene	µg/kg	10	NONE	-	-	-	-	

Analytical Report Number: 14-52583

Project / Site name: Kiln Place

Lab Sample Number				326875	326876	326877	326878	
Sample Reference				WS7 ES1	WS7 ES2	WS7 ES4	WS7 ES6	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.50	1.00	2.50	4.50	
Date Sampled				03/03/2014	03/03/2014	03/03/2014	03/03/2014	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
SVOCs								
Aniline	mg/kg	0.1	NONE	-	-	< 0.1	-	
Phenol	mg/kg	0.2	ISO 17025	-	-	< 0.2	-	
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-	< 0.1	-	
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-	< 0.2	-	
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	< 0.2	-	
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-	< 0.1	-	
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	< 0.2	-	
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	< 0.1	-	
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	< 0.3	-	
Hexachloroethane	mg/kg	0.05	MCERTS	-	-	< 0.05	-	
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	< 0.3	-	
4-Methylphenol	mg/kg	0.2	NONE	-	-	< 0.2	-	
Isophorone	mg/kg	0.2	MCERTS	-	-	< 0.2	-	
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-	< 0.3	-	
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	< 0.3	-	
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	< 0.3	-	
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	< 0.3	-	
Naphthalene	mg/kg	0.1	ISO 17025	-	-	0.5	-	
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	< 0.3	-	
4-Chloroaniline	mg/kg	0.1	NONE	-	-	< 0.1	-	
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	< 0.1	-	
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	< 0.1	-	
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-	< 0.1	-	
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-	< 0.2	-	
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	< 0.1	-	
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	< 0.1	-	
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	< 0.1	-	
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-	< 0.1	-	
Acenaphthylene	mg/kg	0.2	ISO 17025	-	-	< 0.2	-	
Acenaphthene	mg/kg	0.1	MCERTS	-	-	0.6	-	
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-	< 0.2	-	
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	0.3	-	
4-Chlorophenyl phenyl ether	mg/kg	0.3	MCERTS	-	-	< 0.3	-	
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	< 0.2	-	
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-	< 0.2	-	
Fluorene	mg/kg	0.2	ISO 17025	-	-	0.5	-	
Azobenzene	mg/kg	0.3	MCERTS	-	-	< 0.3	-	
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	< 0.2	-	
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	< 0.3	-	
Phenanthrene	mg/kg	0.2	ISO 17025	-	-	7.3	-	
Anthracene	mg/kg	0.1	MCERTS	-	-	1.0	-	
Carbazole	mg/kg	0.3	MCERTS	-	-	0.4	-	
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-	< 0.2	-	
Anthraquinone	mg/kg	0.3	MCERTS	-	-	0.8	-	
Fluoranthene	mg/kg	0.2	MCERTS	-	-	12	-	
Pyrene	mg/kg	0.2	ISO 17025	-	-	10	-	
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-	< 0.3	-	
Benzo(a)anthracene	mg/kg	0.2	MCERTS	-	-	5.9	-	
Chrysene	mg/kg	0.05	ISO 17025	-	-	5.7	-	
Benzo(b)fluoranthene	mg/kg	0.1	ISO 17025	-	-	8.1	-	
Benzo(k)fluoranthene	mg/kg	0.2	ISO 17025	-	-	2.7	-	
Benzo(a)pyrene	mg/kg	0.1	MCERTS	-	-	6.6	-	
Indeno(1,2,3-cd)pyrene	mg/kg	0.2	ISO 17025	-	-	3.0	-	
Dibenz(a,h)anthracene	mg/kg	0.2	ISO 17025	-	-	0.4	-	
Benzo(ghi)perylene	mg/kg	0.05	ISO 17025	-	-	3.6	-	

Analytical Report Number : 14-52583

Project / Site name: Kiln Place

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and topsoil/loam soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 2 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
326860	BH1 ES1	None Supplied	0.50	Brown topsoil and clay with gravel and brick.
326861	BH1 ES4	None Supplied	1.00-2.00	Light brown sandy clay with rubble.
326862	BH2 ES1	None Supplied	0.50	Light brown gravelly sand with rubble.
326863	BH2 ES2	None Supplied	1.00	Brown clay with gravel.
326864	BH2 ES4	None Supplied	6.00	Brown clay and topsoil.
326865	WS1 ES1	None Supplied	0.50	Light brown gravelly sand with rubble.
326866	WS1 ES2	None Supplied	1.00	Brown clay and sand with gravel.
326867	WS2 ES1	None Supplied	0.50	Brown topsoil and clay with gravel.
326868	WS2 ES3	None Supplied	1.50	Light brown clay.
326869	WS3 ES1	None Supplied	0.50	Brown clay and sand with rubble and brick.
326870	WS4 ES1	None Supplied	0.50	Brown clay and topsoil.
326871	WS4 ES3	None Supplied	1.50-2.00	Brown sandy topsoil with gravel and chalk.
326872	WS5 ES1	None Supplied	0.50	Brown sandy topsoil with gravel and brick.
326873	WS5 ES5	None Supplied	4.50-5.00	Grey clay and topsoil with gravel and vegetation.
326874	WS5 ES6	None Supplied	5.00-6.00	Grey clay and topsoil with gravel and vegetation.
326875	WS7 ES1	None Supplied	0.50	Brown topsoil and clay with gravel.
326876	WS7 ES2	None Supplied	1.00	Brown topsoil and clay with gravel and brick.
326877	WS7 ES4	None Supplied	2.50	Grey clay and topsoil with gravel and vegetation.
326878	WS7 ES6	None Supplied	4.50	Brown clay and sand.

Analytical Report Number : 14-52583

Project / Site name: Kiln Place

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS
Fraction of Organic Carbon in soil	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L023-PL	D	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	MCERTS
Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds in soil by extraction in dichloromethane and hexane followed by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Stones not passing through a 10 mm sieve is determined gravimetrically and reported as a percentage of the dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil	Determination of water soluble sulphate by extraction with water followed by ICP-OES. Results reported corrected for extraction ratio (soil equivalent) as g/l and mg/kg; and upon the 2:1	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
TPHCWG (Soil)	Determination of pentane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	MCERTS
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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Analytical Report Number : 14-53035

Project / Site name:	Kiln Place	Samples received on:	02/04/2014
Your job number:	18084	Samples instructed on:	02/04/2014
Your order number:		Analysis completed by:	10/04/2014
Report Issue Number:	1	Report issued on:	10/04/2014
Samples Analysed:	3 water samples		

Signed:

Thurstan Plummer
Organics Technical Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Rexona Rahman
Customer Services Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Analytical Report Number: 14-53035
Project / Site name: Kiln Place

Lab Sample Number				329679	329680	329681		
Sample Reference				WS7	BH1	BH2		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				Deviating	Deviating	Deviating		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					
General Inorganics								
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10		
Sulphate as SO_4	ug/l	45	ISO 17025	912000	1550000	3260000		
Total Organic Carbon (TOC)	mg/l	0.1	ISO 17025	19	11	26		
Hardness - Total	mgCaCO3/l	1	ISO 17025	1930	1700	3340		
Total Phenols								
Total Phenols (monohydric)	µg/l	10	ISO 17025	-	< 10	-		
Speciated PAHs								
Naphthalene	µg/l	0.01	ISO 17025	-	< 0.01	-		
Acenaphthylene	µg/l	0.01	ISO 17025	-	< 0.01	-		
Acenaphthene	µg/l	0.01	ISO 17025	-	0.25	-		
Fluorene	µg/l	0.01	ISO 17025	-	0.07	-		
Phenanthrene	µg/l	0.01	ISO 17025	-	< 0.01	-		
Anthracene	µg/l	0.01	ISO 17025	-	< 0.01	-		
Fluoranthene	µg/l	0.01	ISO 17025	-	0.18	-		
Pyrene	µg/l	0.01	ISO 17025	-	0.11	-		
Benzo(a)anthracene	µg/l	0.01	ISO 17025	-	< 0.01	-		
Chrysene	µg/l	0.01	ISO 17025	-	< 0.01	-		
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	-	< 0.01	-		
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	-	< 0.01	-		
Benzo(a)pyrene	µg/l	0.01	ISO 17025	-	< 0.01	-		
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	-	< 0.01	-		
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	-	< 0.01	-		
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	-	< 0.01	-		
Total PAH								
Total EPA-16 PAHs	µg/l	0.2	ISO 17025	-	0.62	-		
Heavy Metals / Metalloids								
Arsenic (dissolved)	µg/l	1	ISO 17025	23	12	18		
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08		
Chromium (dissolved)	µg/l	0.4	ISO 17025	< 0.4	1.2	2.6		
Copper (dissolved)	µg/l	0.7	ISO 17025	1.6	5.1	2.8		
Lead (dissolved)	µg/l	1	ISO 17025	18	30	15		
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5		
Nickel (dissolved)	µg/l	0.3	ISO 17025	2.7	6.6	11		
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0		
Zinc (dissolved)	µg/l	0.4	ISO 17025	12	52	12		
Calcium (dissolved)	mg/l	0.012	ISO 17025	600	550	520		
Magnesium (dissolved)	mg/l	0.005	ISO 17025	110	79	490		
Petroleum Hydrocarbons								
TPH1 (C10 - C40)	µg/l	10	NONE	< 10	< 10	< 10		
TPH2 (C6 - C10)	µg/l	10	NONE	< 10	< 10	< 10		

Analytical Report Number: 14-53035
Project / Site name: Kiln Place

Lab Sample Number				329679	329680	329681		
Sample Reference				WS7	BH1	BH2		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				Deviating	Deviating	Deviating		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					
VOCs								
Chloromethane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Chloroethane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Bromomethane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Vinyl Chloride	µg/l	10	NONE	< 10.0	-	< 10.0		
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	-	< 1.0		
1,1-dichloroethene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,1-dichloroethane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Trichloromethane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,2-dichloroethane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Benzene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,2-dichloropropane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Trichloroethene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Dibromomethane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Toluene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
p & m-xylene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Styrene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Tribromomethane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
o-xylene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Bromobenzene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
N-Propylbenzene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,3-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
P-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,2-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,4-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Butylbenzene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	-	< 1.0		

Analytical Report Number: 14-53035
Project / Site name: Kiln Place

Lab Sample Number				329679	329680	329681		
Sample Reference				WS7	BH1	BH2		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				Deviating	Deviating	Deviating		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Phenol	µg/l	0.05	NONE	< 0.05	-	< 0.05		
2-Chlorophenol	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Bis(2-chloroethyl)ether	µg/l	0.05	NONE	< 0.05	-	< 0.05		
1,3-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	-	< 0.05		
1,2-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	-	< 0.05		
1,4-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Bis(2-chloroisopropyl)ether	µg/l	0.05	NONE	< 0.05	-	< 0.05		
2-Methylphenol	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Hexachloroethane	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Nitrobenzene	µg/l	0.05	NONE	< 0.05	-	< 0.05		
4-Methylphenol	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Isophorone	µg/l	0.05	NONE	< 0.05	-	< 0.05		
2-Nitrophenol	µg/l	0.05	NONE	< 0.05	-	< 0.05		
2,4-Dimethylphenol	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Bis(2-chloroethoxy)methane	µg/l	0.05	NONE	< 0.05	-	< 0.05		
1,2,4-Trichlorobenzene	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01		
2,4-Dichlorophenol	µg/l	0.05	NONE	< 0.05	-	< 0.05		
4-Chloroaniline	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Hexachlorobutadiene	µg/l	0.05	NONE	< 0.05	-	< 0.05		
4-Chloro-3-methylphenol	µg/l	0.05	NONE	< 0.05	-	< 0.05		
2,4,6-Trichlorophenol	µg/l	0.05	NONE	< 0.05	-	< 0.05		
2,4,5-Trichlorophenol	µg/l	0.05	NONE	< 0.05	-	< 0.05		
2-Methylnaphthalene	µg/l	0.05	NONE	< 0.05	-	< 0.05		
2-Chloronaphthalene	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Dimethylphthalate	µg/l	0.05	NONE	< 0.05	-	< 0.05		
2,6-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01		
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01		
2,4-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Dibenzofuran	µg/l	0.05	NONE	< 0.05	-	< 0.05		
4-Chlorophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Diethyl phthalate	µg/l	0.05	NONE	< 0.05	-	< 0.05		
4-Nitroaniline	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Fluorene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01		
Azobenzene	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Bromophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Hexachlorobenzene	µg/l	0.02	NONE	< 0.02	-	< 0.02		
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01		
Anthracene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01		
Carbazole	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Dibutyl phthalate	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Anthraquinone	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Fluoranthene	µg/l	0.01	ISO 17025	0.07	-	0.06		
Pyrene	µg/l	0.01	ISO 17025	0.07	-	0.05		
Butyl benzyl phthalate	µg/l	0.05	NONE	< 0.05	-	< 0.05		
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01		
Chrysene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01		
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01		
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01		
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01		
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01		
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01		
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	-	< 0.01		

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 14-53035

Project / Site name: Kiln Place

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds in leachate by extraction in dichloromethane followed by GC-MS.	In-house method based on USEPA 8270	L070-UK	W	NONE
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L070-UK	W	ISO 17025
Sulphate in water	Determination of sulphate in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total Hardness of water	Determination of hardness in waters by calculation from calcium and magnesium. Accredited Matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045-PL	W	ISO 17025
Total organic carbon in water	Determination of total organic carbon in water by the measurement on a non-dispersive infrared analyser of carbon dioxide released by acidification. Determination of nitrite in water by addition of	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
TPH C6 - C40 (water)		In-house method	L070-PL		NONE
TPH1 (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS.	In-house method	L070-UK	W	NONE
TPH2 (Waters)	Determination of hydrocarbons C6-C10 by headspace GC-MS.	In-house method based on USEPA8260	L073W-PL	W	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073W-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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PROJECT NAME: **Kiln Place**
PROJECT NUMBER: **GL18084**
CLIENT: **E C Harris**
DATE OF ISSUE: **17/04/2014**

SUMMARY OF RESTRICTED TESTS

BH No.:	Sample Depth (m)	Sample No.	Test Scheduled	Reason why sample could not be tested
WS6	4.00	D5	Atterberg Limit	Sample not received

REMARKS (Including any abnormalities or departures from procedure)

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Client: Harrison Group Environmental
Poplar Business Park
10 Preston Road
London
E14 9RL

For the attention of: Glenn Pursey

Date of Issue: 17/04/2014

TEST REPORT TRANSMITTAL

Report Form FMR3000 Rev.C Revision Date 26/11/08

Project	**Kiln Place**	**Samples Received**	**12/03/2014**
Report No	**GL18084**	**Instruction received**	**12/03/2014**
Your Ref	**GL18084**	**Testing commenced**	**21/03/2014**

SUMMARY OF RESULTS ATTACHED

Test Method and Description	Quantity	UKAS Accredited
BS1377: Part 2: 1990:3.2 Moisture Content	29	Yes
BS1377: Part 2: 1990:4.4/5.0 Liquid & Plastic Limits - Single Point Method	29	Yes
BS1377: Part 2: 1990:9.3 Particle Size Distribution - Wet Sieve Method	3	Yes
BS1377: Part 5: 1990:3.0 One Dimensional Consolidation	3	Yes
BS1377: Part 7: 1990:8.0 Unconsolidated Undrained Shear Strength - Single Stage	6	Yes

Remarks:

Issued by: M Willson

Approved Signatories:

M Willson (Laboratory Manager), G Bream (Senior Laboratory Technician)

Unless we are notified to the contrary, samples will be disposed after a period of one month from this date

Only those results indicated in this report are UKAS accredited and any opinion or interpretations expressed are outside the scope of UKAS accreditation

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PROJECT NAME: Kiln Place
PROJECT NUMBER: GL18084
CLIENT: E C Harris
DATE OF ISSUE: 17/04/2014

SUMMARY OF MOISTURE CONTENT, LIQUID LIMIT (ONE POINT CONE PENETROMETER METHOD), PLASTIC LIMIT AND PLASTICITY INDEX TO BS1377 : PART 2 : 1990

BH/TP No	Depth (m)	Sample No.	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	NHBC Modified Plasticity Index	Passing 0.425mm (%)	Soil Class	Sample Description
BH1	2.00	D2	16	40	30	11	4	40	MI	MADE GROUND (Dark grey clayey sandy GRAVEL. Gravel is of flint, brick, ceramic, concrete, slag and clinker)
BH1	5.00	D5	31	49	24	25	9	37	CI	MADE GROUND (Orange brown mottled dark grey clayey GRAVEL. Gravel is of flint, brick, clinker, concrete, slate and slag fragments)
BH1	6.00	D6	44	68	26	42	29	70	CH	Grey and orange brown slightly gravelly CLAY. Gravel is of flint
BH1	8.50	D9	36	77	28	50	50	100	CV	Brown CLAY
BH1	11.50	D13	30	72	26	46	46	100	CV	Brown CLAY
BH1	15.00	D19	29	38	26	12	12	100	MI	Brown CLAY
BH2	1.00	D1	36	60	23	36	22	62	CH	MADE GROUND (Dark brown gravelly CLAY. Gravel is of flint, brick, concrete and clinker)
BH2	2.50	D3	44	70	26	43	43	99	CH	Brown slightly gravelly CLAY. Gravel is of flint
BH2	6.00	D7	40	64	33	31	27	87	MH	Dark brown and dark grey slightly gravelly peaty CLAY. Gravel is of flint
BH2	7.00	D8	31	74	27	48	48	100	CV	Orange brown and brown CLAY

BS1377 : Part 2 : Clause 3.2 : 1990 Determination of Moisture Content
BS1377 : Part 2 : Clause 4.4 : 1990 Determination of Liquid Limit (Single Point Cone Penetrometer Method)
BS1377 : Part 2 : Clause 5 : 1990 Determination of Plastic Limit and Plasticity Index
NHBC Standards Chapter 4.2 : Determination of the modified plasticity index

REMARKS (Including any abnormalities or departures from procedure)
Determination of modified plasticity index is not covered by UKAS accreditation

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PROJECT NAME: Kiln Place
PROJECT NUMBER: GL18084
CLIENT: E C Harris
DATE OF ISSUE: 17/04/2014

SUMMARY OF MOISTURE CONTENT, LIQUID LIMIT (ONE POINT CONE PENETROMETER METHOD), PLASTIC LIMIT AND PLASTICITY INDEX TO BS1377 : PART 2 : 1990

BH/TP No	Depth (m)	Sample No.	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	NHBC Modified Plasticity Index	Passing 0.425mm (%)	Soil Class	Sample Description
BH2	10.00	D13	32	79	28	51	51	100	CV	Brown CLAY
WS2	1.50	D3	30	71	26	45	45	100	CV	Orange brown and brown CLAY
WS2	2.80	D4	15	47	21	26	6	22	CI	Greenish grey and grey brown clayey GRAVEL. Gravel is of flint
WS2	3.00	D5	10	49	24	25	7	26	CI	Dark reddish brown clayey GRAVEL. Gravel is of flint
WS2	4.00	D7	30	79	26	53	53	100	CV	Brown mottled grey CLAY
WS2	6.00	D9	32	79	27	52	52	100	CV	Brown mottled grey CLAY
WS4	0.50	D1	38	74	27	47	31	66	CV	MADE GROUND (Grey brown gravelly CLAY. Gravel is of flint, brick, clinker and slag fragments)
WS4	3.00	D4	21	56	25	30	20	65	CH	MADE GROUND (Dark grey brown gravelly slightly sandy CLAY. Gravel is of flint, brick, clinker, bone and shell fragments)
WS4	6.00	D7	25	79	28	51	51	100	CV	Brown mottled orange brown CLAY
WS5	4.50	D5	66	77	42	34	11	33	MV	Dark grey slightly gravelly very silty organic CLAY with wood fragments. Gravel is of flint

BS1377 : Part 2 : Clause 3.2 : 1990 Determination of Moisture Content
BS1377 : Part 2 : Clause 4.4 : 1990 Determination of Liquid Limit (Single Point Cone Penetrometer Method)
BS1377 : Part 2 : Clause 5 : 1990 Determination of Plastic Limit and Plasticity Index
NHBC Standards Chapter 4.2 : Determination of the modified plasticity index

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PROJECT NAME: Kiln Place
PROJECT NUMBER: GL18084
CLIENT: E C Harris
DATE OF ISSUE: 17/04/2014

SUMMARY OF MOISTURE CONTENT, LIQUID LIMIT (ONE POINT CONE PENETROMETER METHOD), PLASTIC LIMIT AND PLASTICITY INDEX TO BS1377 : PART 2 : 1990

BH/TP No	Depth (m)	Sample No.	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	NHBC Modified Plasticity Index	Passing 0.425mm (%)	Soil Class	Sample Description
WS5	6.50	D6	38	78	27	52	51	98	CV	Dark grey mottled grey brown slightly gravelly CLAY. Gravel is of flint
WS6	0.50	D1	20	47	31	16	7	46	MI	MADE GROUND (Dark grey clayey very sandy GRAVEL. Gravel is of flint, brick, concrete, metal, glass and clinker fragments)
WS6	2.00	D3	19	44	31	13	7	56	MI	MADE GROUND (Dark grey clayey very sandy GRAVEL. Gravel is of flint, brick, concrete, metal, glass and clinker fragments)
WS6	2.50	D4	29	43	35	9	5	59	MI	MADE GROUND (Reddish brown clayey very gravelly SAND. Gravel is of flint, brick, concrete, metal, glass and clinker fragments)
WS6	5.00	D6	28	73	26	47	47	100	CV	Brown mottled blue grey CLAY
WS6	8.00	D9	31	77	27	50	50	100	CV	Brown mottled blue grey CLAY
WS7	1.00	D2	26	50	28	22	10	46	CH	MADE GROUND (Dark grey and reddish brown gravelly slightly sandy silty CLAY. Gravel is of flint, brick, ceramic, slate, slag and clinker fragments)
WS7	3.00	D4	40	64	31	33	33	100	CH	MADE GROUND (Dark grey gravelly CLAY. Gravel is of flint, brick, glass and clinker fragments)
WS7	5.00	D6	30	50	22	28	12	43	CH	Brown mottled blue grey CLAY

BS1377 : Part 2 : Clause 3.2 : 1990 Determination of Moisture Content
BS1377 : Part 2 : Clause 4.4 : 1990 Determination of Liquid Limit (Single Point Cone Penetrometer Method)
BS1377 : Part 2 : Clause 5 : 1990 Determination of Plastic Limit and Plasticity Index
NHBC Standards Chapter 4.2 : Determination of the modified plasticity index

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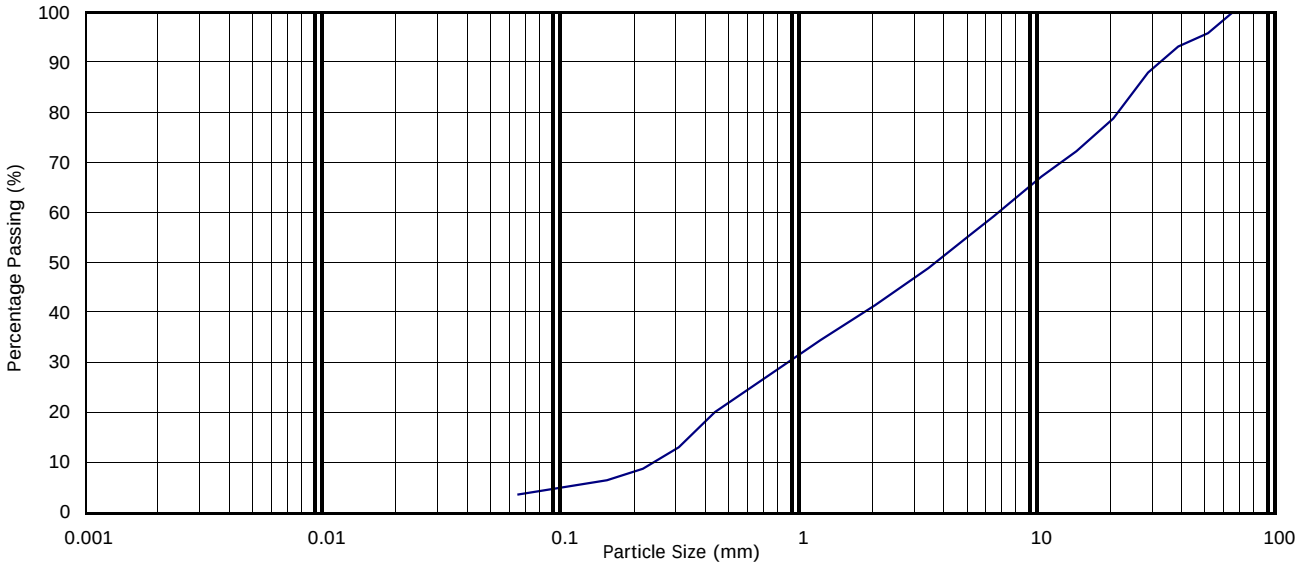
PROJECT NAME:	**Kiln Place**	**BH/TP No.:**	**BH1**
PROJECT NUMBER:	**GL18084**	**Depth (m):**	**0.50**
CLIENT:	**E C Harris**	**Sample No.:**	**B1**
DATE OF ISSUE:	**17/04/2014**		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Particle Size (mm)	Percentage Passing
75.0	100
63.0	100
50.0	96
37.5	93
28.0	88
20.0	79
14.0	72
10.0	67
6.30	59
5.00	56
3.35	49
2.00	42
1.18	35
0.600	25
0.425	20
0.300	13
0.212	9
0.150	7
0.063	4

Sample Description

MADE GROUND (Dark grey brown slightly silty very sandy GRAVEL. Gravel is of brick and concrete fragments)

Sample Proportions %

Cobbles	0.0
Gravel	58.4
Sand	37.8
Silt / Clay	3.8

Remarks

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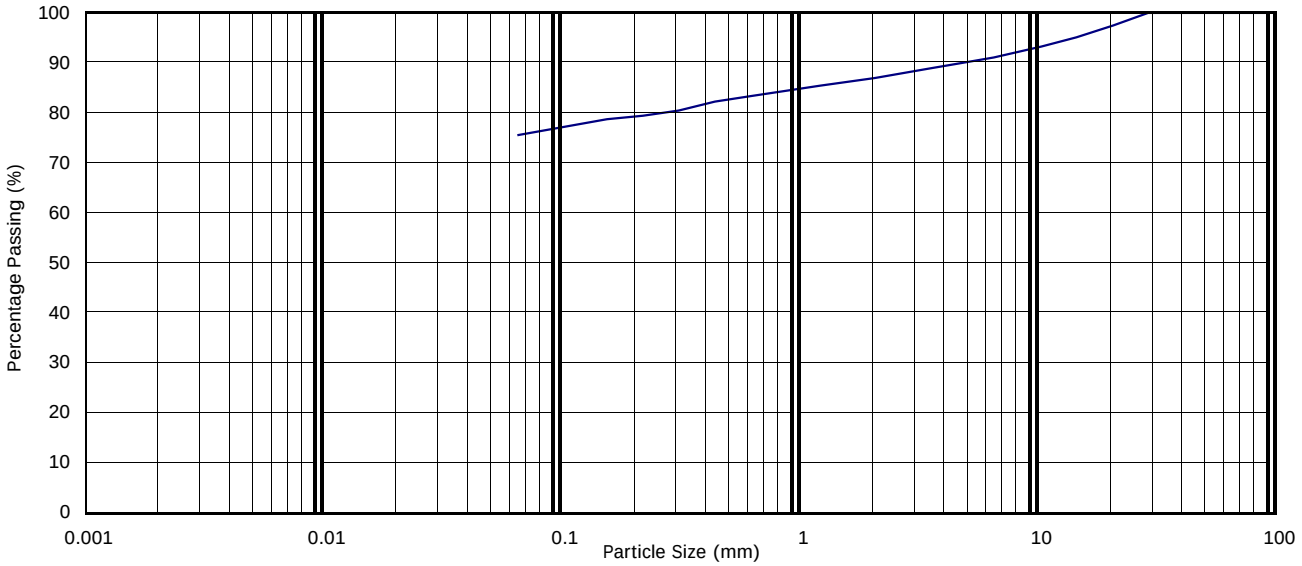
PROJECT NAME:	**Kiln Place**	**BH/TP No.:**	**BH2**
PROJECT NUMBER:	**GL18084**	**Depth (m):**	**0.60**
CLIENT:	**E C Harris**	**Sample No.:**	**B1**
DATE OF ISSUE:	**17/04/2014**		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Particle Size (mm)	Percentage Passing
75.0	100
63.0	100
50.0	100
37.5	100
28.0	100
20.0	98
14.0	95
10.0	93
6.30	91
5.00	90
3.35	89
2.00	87
1.18	85
0.600	83
0.425	82
0.300	80
0.212	79
0.150	79
0.063	76

Sample Description

MADE GROUND (Brown slightly gravelly slightly sandy silty CLAY. Gravel is of brick fragments)

Sample Proportions %

Cobbles	0.0
Gravel	13.0
Sand	11.4
Silt / Clay	75.6

Remarks

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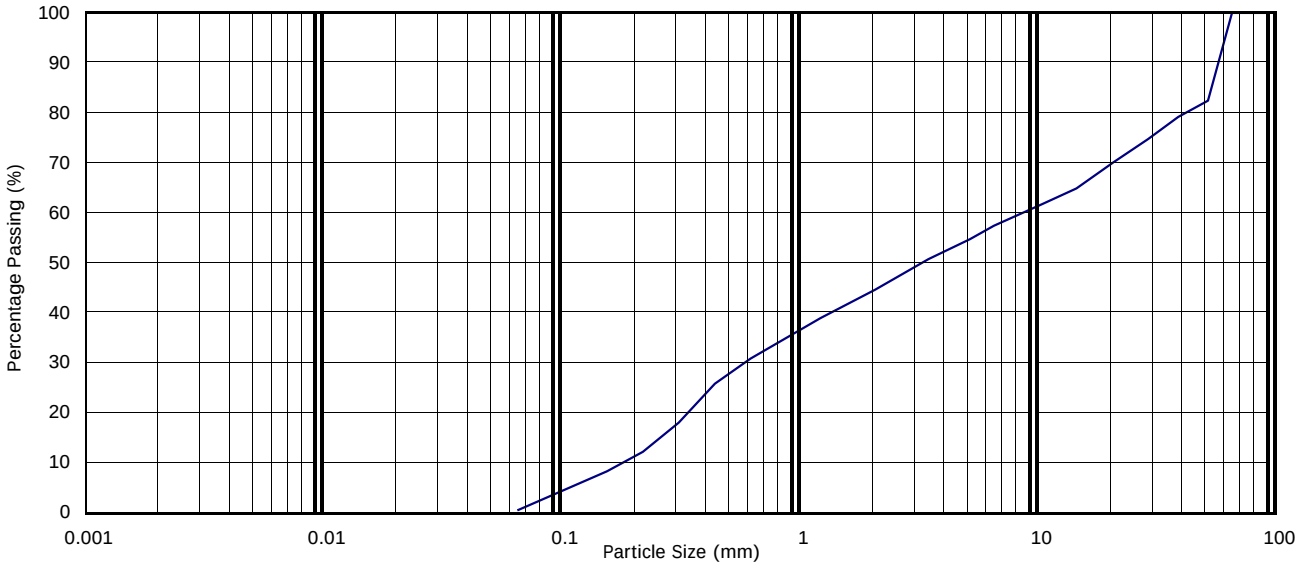
PROJECT NAME:	**Kiln Place**	**BH/TP No.:**	**WS5**
PROJECT NUMBER:	**GL18084**	**Depth (m):**	**0.50**
CLIENT:	**E C Harris**	**Sample No.:**	**B1**
DATE OF ISSUE:	**17/04/2014**		

DETERMINATION OF PARTICLE SIZE DISTRIBUTION TO BS1377 : PART 2 : 1990 : CLAUSE 9.2 - WET SIEVING



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	COBBLES
	SILT			SAND			GRAVEL			

Particle Size (mm)	Percentage Passing
75.0	100
63.0	100
50.0	82
37.5	79
28.0	75
20.0	70
14.0	65
10.0	62
6.30	57
5.00	55
3.35	51
2.00	45
1.18	39
0.600	31
0.425	26
0.300	18
0.212	12
0.150	8
0.063	1

Sample Description

MADE GROUND (Dark grey brown slightly silty very sandy GRAVEL. Gravel is of flint, brick, concrete, ceramic and glass fragments)

Sample Proportions %

Cobbles	0.0
Gravel	55.3
Sand	44.1
Silt / Clay	0.6

Remarks

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PROJECT NAME:	**Kiln Place**	**BH/TP No.:**	**BH1**
PROJECT NUMBER:	**GL18084**	**Depth (m):**	**10.00**
CLIENT:	**E C Harris**	**Sample No.:**	**UT2**
DATE OF ISSUE:	**17/04/2014**		

DETERMINATION OF ONE DIMENSIONAL CONSOLIDATION PROPERTIES TO BS1377 : PART 5 : 1990 : CLAUSE 3

Description: Brown mottled blue grey CLAY

Preparation: Undisturbed
Orientation: Vertical
Depth of sample within original sample (m): 10.10

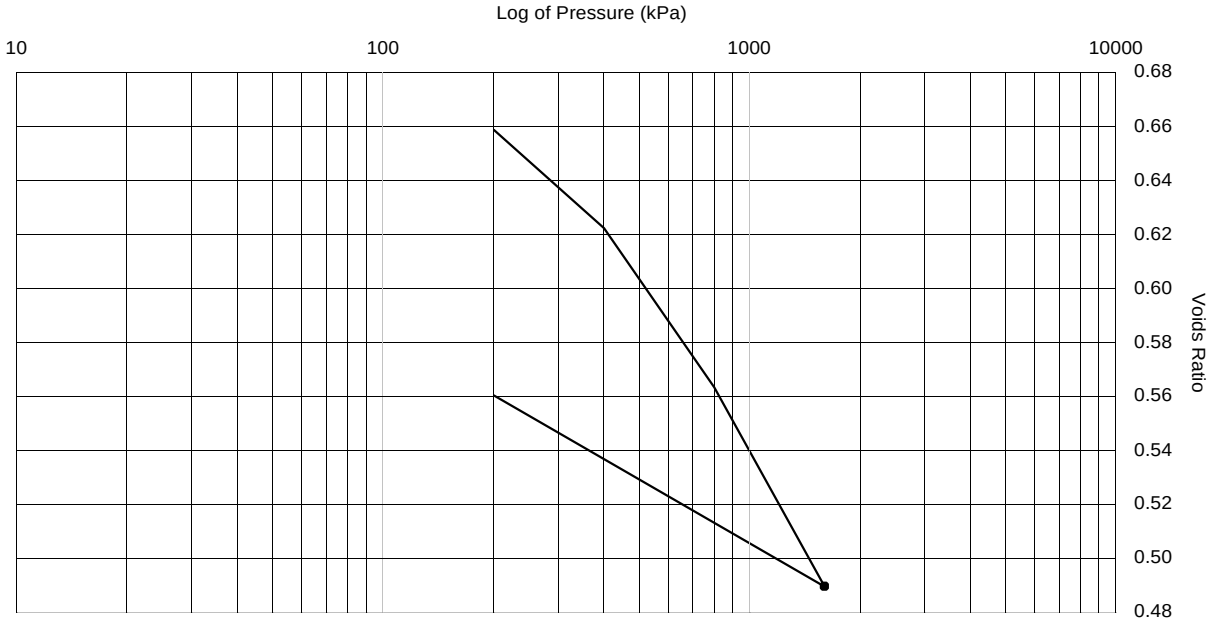
Initial Conditions:

Moisture Content	27 %
Voids Ratio	0.715
Diameter	74.95 mm
Height	20.02 mm
Bulk Density	1.96 Mg/m^3
Dry Density	1.54 Mg/m^3

Final Conditions

Moisture Content	26 %	
Voids Ratio	0.5604	
Degree of Saturation	100 %	
Particle Density	2.64 Mg/m^3	(Assumed)
Laboratory Temperature	18.1 ^{o}C	

Pressure Range kPa	Time Fitting Method	Mv (m^2/MN)	Voids Ratio	Cv M^2/year
200	t90	0.163	0.6587	14.895
400	t90	0.110	0.6222	5.386
800	t90	0.091	0.5633	3.133
1600	t90	0.059	0.4895	3.917
200	t90	0.034	0.5604	~



REMARKS:

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PROJECT NAME:	**Kiln Place**	**BH/TP No.:**	**BH2**
PROJECT NUMBER:	**GL18084**	**Depth (m):**	**1.50**
CLIENT:	**E C Harris**	**Sample No.:**	**UT1**
DATE OF ISSUE:	**17/04/2014**		

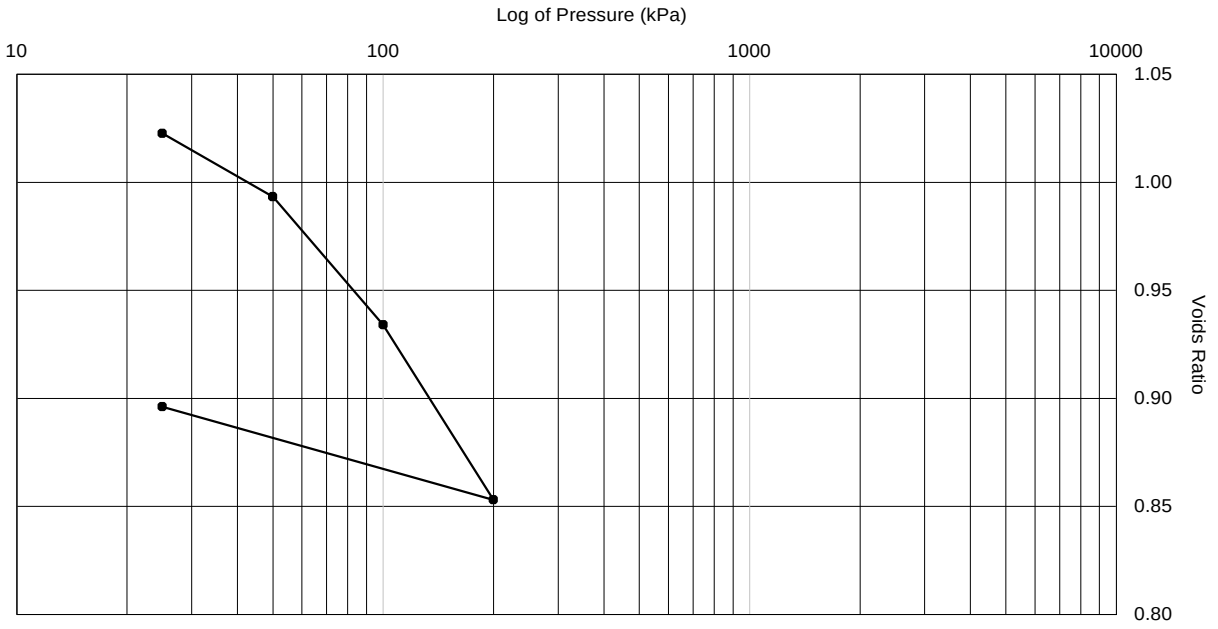
DETERMINATION OF ONE DIMENSIONAL CONSOLIDATION PROPERTIES TO BS1377 : PART 5 : 1990 : CLAUSE 3

Description: Grey brown mottled occasional orange brown CLAY

Preparation: Undisturbed
Orientation: Vertical
Depth of sample within original sample (m): 1.70

Initial Conditions:		**Final Conditions**		
Moisture Content	39 %	Moisture Content	34 %	
Voids Ratio	1.074	Voids Ratio	0.8961	
Diameter	74.72 mm			
Height	20.05 mm	Degree of Saturation	100 %	
Bulk Density	1.84 Mg/m^3	Particle Density	2.75 Mg/m^3	(Assumed)
Dry Density	1.33 Mg/m^3	Laboratory Temperature	18.1 ^oC	

Pressure Range kPa	Time Fitting Method	Mv (m^2/MN)	Voids Ratio	Cv M^2/year
25	t90	0.998	1.0225	8.226
50	t90	0.579	0.9933	0.540
100	t90	0.595	0.9340	0.453
200	t90	0.418	0.8531	0.421
25	t90	0.133	0.8961	~



REMARKS:

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PROJECT NAME:	**Kiln Place**	**BH/TP No.:**	**BH2**
PROJECT NUMBER:	**GL18084**	**Depth (m):**	**5.50**
CLIENT:	**E C Harris**	**Sample No.:**	**UT3**
DATE OF ISSUE:	**17/04/2014**		

DETERMINATION OF ONE DIMENSIONAL CONSOLIDATION PROPERTIES TO BS1377 : PART 5 : 1990 : CLAUSE 3

Description: Black and dark grey peaty CLAY

Preparation: Undisturbed
Orientation: Vertical
Depth of sample within original sample (m): 5.58

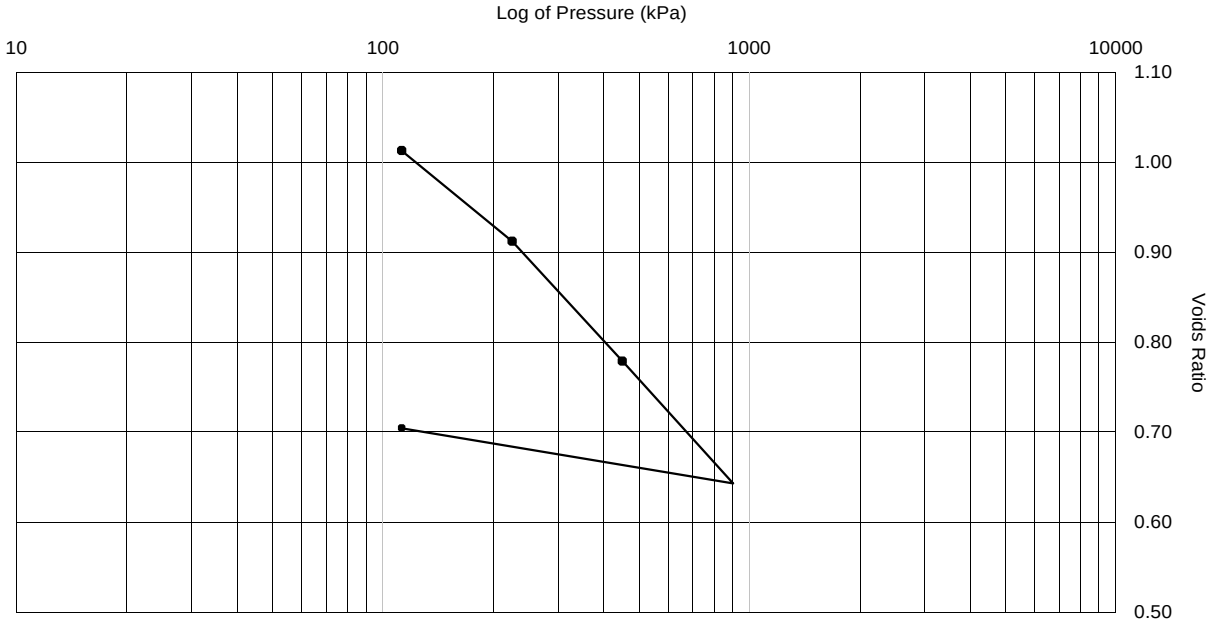
Initial Conditions:

Moisture Content	51 %
Voids Ratio	1.184
Diameter	74.63 mm
Height	20.12 mm
Bulk Density	1.61 Mg/m^3
Dry Density	1.06 Mg/m^3

Final Conditions

Moisture Content	36 %	
Voids Ratio	0.7045	
Degree of Saturation	100 %	
Particle Density	2.32 Mg/m^3	(Assumed)
Laboratory Temperature	18.1 ^{o}C	

Pressure Range kPa	Time Fitting Method	Mv (m^2/MN)	Voids Ratio	Cv M^2/year
112.5	t90	0.698	1.0123	10.369
225	t90	0.444	0.9118	4.627
450	t90	0.310	0.7785	3.564
900	t90	0.169	0.6433	0.741
112.5	t90	0.047	0.7045	~



REMARKS:

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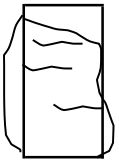
PROJECT NAME:	**Kiln Place**	**BH/TP No.:**	**BH1**
PROJECT NUMBER:	**GL18084**	**Depth (m):**	**7.00**
CLIENT:	**E C Harris**	**Sample No.:**	**UT1**
DATE OF ISSUE:	**17/04/2014**		

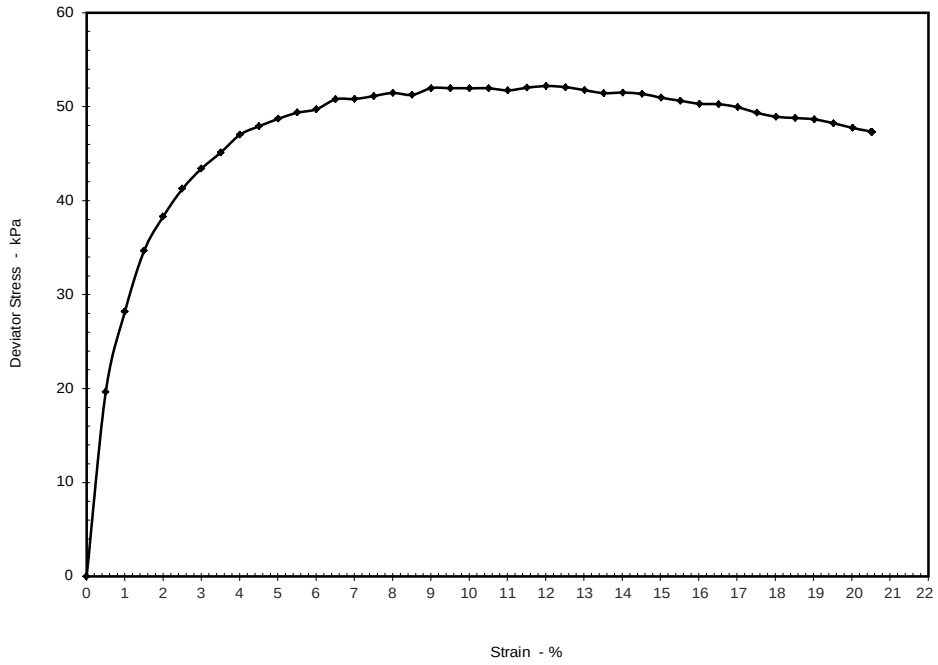
DETERMINATION OF UNCONSOLIDATED UNDRAINED SINGLE STAGE SHEAR STRENGTH TO BS1377 : PART 7 : 1990 : CLAUSE 8

Sample Details		
Sample Condition		Undisturbed
Height	mm	199.7
Diameter	mm	106.4
Moisture Content	%	36
Bulk Density	Mg/m³	1.74
Dry Density	Mg/m³	1.28
Test Details		
Membrane Thickness	mm	0.25
Membrane Correction	kPa	0.61
Rate of Axial Displacement	%/min	1.50
Cell Pressure	kPa	140
Strain at Failure	%	12.0
Maximum Deviator Stress	kPa	52
Shear Strength	kPa	26
Mode of Failure		Plastic
Sample Description		Low strength grey brown CLAY

Mode of failure



Shear Strength Parameters	
Cu	26 kPa
Phi	N/A °



REMARKS (Including any abnormalities or departures from procedure)

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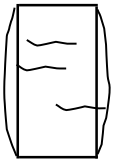
SERVICES

PROJECT NAME:	**Kiln Place**	**BH/TP No.:**	**BH1**
PROJECT NUMBER:	**GL18084**	**Depth (m):**	**13.00**
CLIENT:	**E C Harris**	**Sample No.:**	**UT3**
DATE OF ISSUE:	**17/04/2014**		

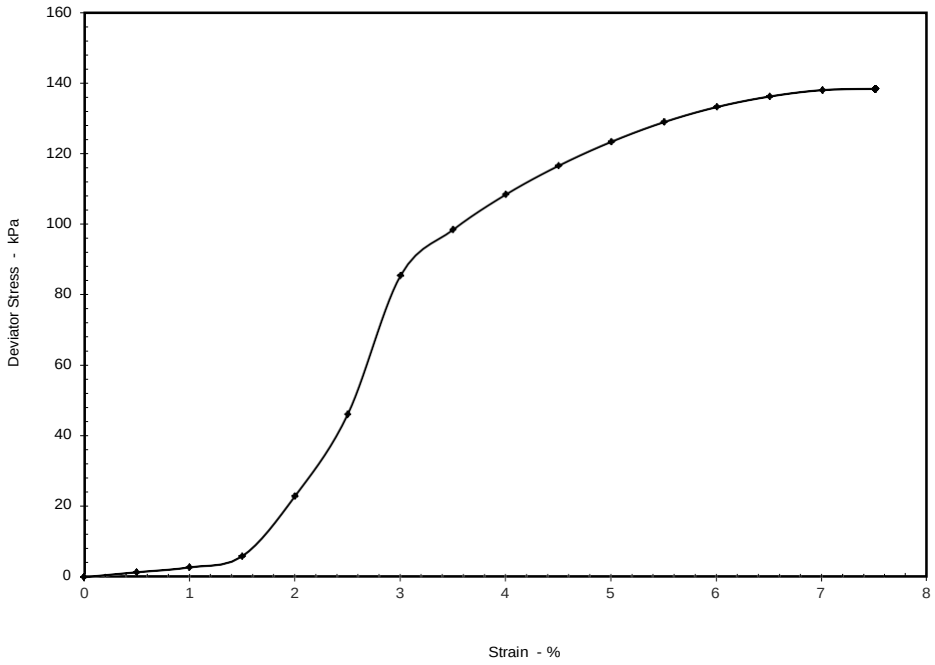
DETERMINATION OF UNCONSOLIDATED UNDRAINED SINGLE STAGE SHEAR STRENGTH TO BS1377 : PART 7 : 1990 : CLAUSE 8

Sample Details		
Sample Condition		Undisturbed
Height	mm	199.7
Diameter	mm	102.9
Moisture Content	%	29
Bulk Density	Mg/m^3	1.87
Dry Density	Mg/m^3	1.44
Test Details		
Membrane Thickness	mm	0.25
Membrane Correction	kPa	0.44
Rate of Axial Displacement	%/min	1.50
Cell Pressure	kPa	260
Strain at Failure	%	7.5
Maximum Deviator Stress	kPa	138
Shear Strength	kPa	69
Mode of Failure		Plastic
Sample Description		Medium strength grey brown CLAY

Mode of failure



Shear Strength Parameters	
Cu	69 kPa
Phi	N/A °



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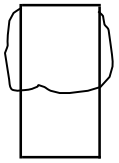
PROJECT NAME:	**Kiln Place**	**BH/TP No.:**	**BH2**
PROJECT NUMBER:	**GL18084**	**Depth (m):**	**3.50**
CLIENT:	**E C Harris**	**Sample No.:**	**UT2**
DATE OF ISSUE:	**17/04/2014**		

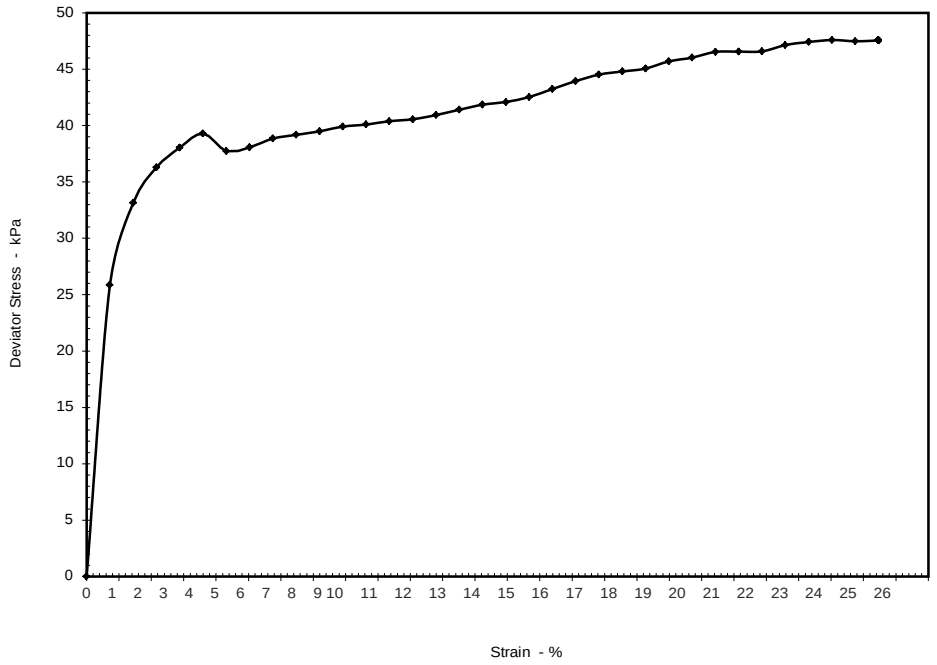
DETERMINATION OF UNCONSOLIDATED UNDRAINED SINGLE STAGE SHEAR STRENGTH TO BS1377 : PART 7 : 1990 : CLAUSE 8

Sample Details		
Sample Condition		Undisturbed
Height	mm	139.0
Diameter	mm	104.1
Moisture Content	%	43
Bulk Density	Mg/m³	1.81
Dry Density	Mg/m³	1.26
Test Details		
Membrane Thickness	mm	0.25
Membrane Correction	kPa	0.98
Rate of Axial Displacement	%/min	2.16
Cell Pressure	kPa	75
Strain at Failure	%	23.0
Maximum Deviator Stress	kPa	48
Shear Strength	kPa	24
Mode of Failure		Plastic
Sample Description		Low strength brown mottled occasional grey CLAY

Mode of failure



Shear Strength Parameters	
Cu	24 kPa
Phi	N/A °



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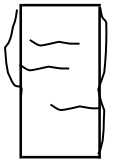
SERVICES

PROJECT NAME:	**Kiln Place**	**BH/TP No.:**	**BH2**
PROJECT NUMBER:	**GL18084**	**Depth (m):**	**8.50**
CLIENT:	**E C Harris**	**Sample No.:**	**UT4**
DATE OF ISSUE:	**17/04/2014**		

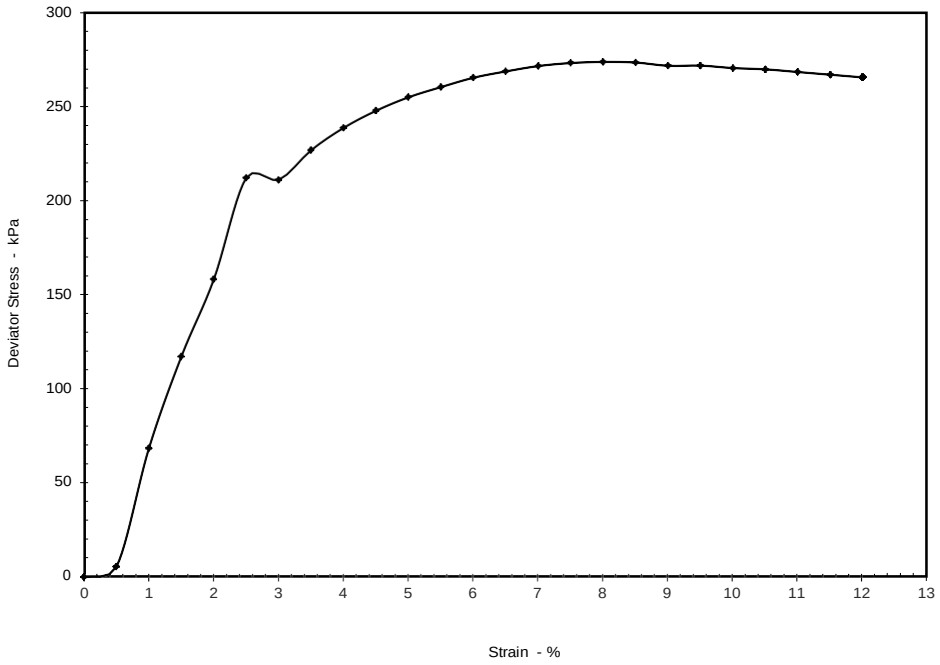
DETERMINATION OF UNCONSOLIDATED UNDRAINED SINGLE STAGE SHEAR STRENGTH TO BS1377 : PART 7 : 1990 : CLAUSE 8

Sample Details		
Sample Condition		Undisturbed
Height	mm	199.7
Diameter	mm	103.3
Moisture Content	%	29
Bulk Density	Mg/m^3	1.89
Dry Density	Mg/m^3	1.46
Test Details		
Membrane Thickness	mm	0.25
Membrane Correction	kPa	0.46
Rate of Axial Displacement	%/min	1.50
Cell Pressure	kPa	175
Strain at Failure	%	8.0
Maximum Deviator Stress	kPa	274
Shear Strength	kPa	137
Mode of Failure		Plastic
Sample Description		High strength brown CLAY

Mode of failure



Shear Strength Parameters	
Cu	137 kPa
Phi	N/A °



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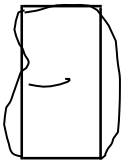
SERVICES

PROJECT NAME:	**Kiln Place**	**BH/TP No.:**	**BH2**
PROJECT NUMBER:	**GL18084**	**Depth (m):**	**11.50**
CLIENT:	**E C Harris**	**Sample No.:**	**UT5**
DATE OF ISSUE:	**17/04/2014**		

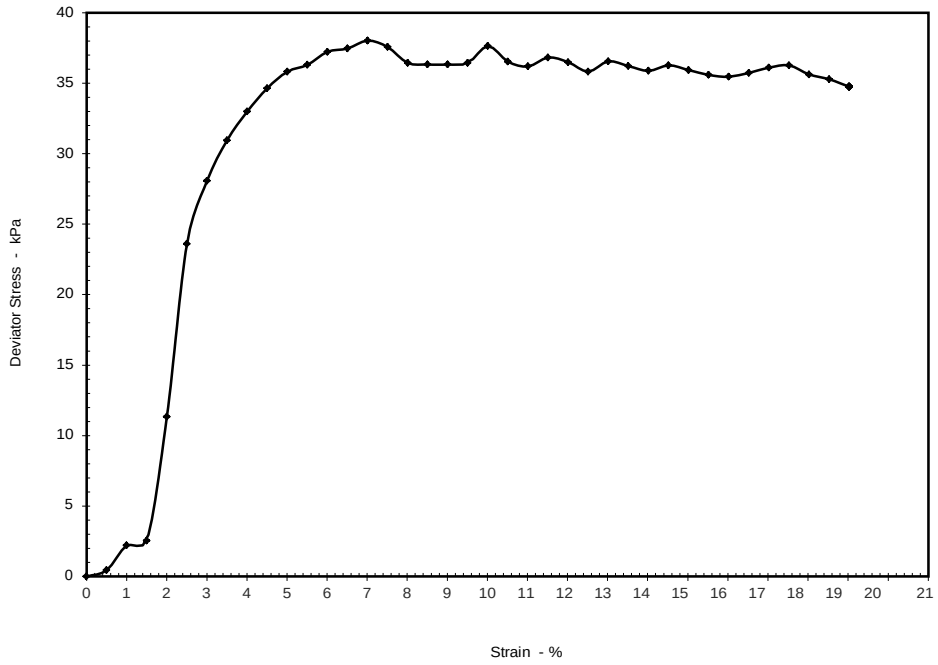
DETERMINATION OF UNCONSOLIDATED UNDRAINED SINGLE STAGE SHEAR STRENGTH TO BS1377 : PART 7 : 1990 : CLAUSE 8

Sample Details		
Sample Condition		Undisturbed
Height	mm	199.7
Diameter	mm	102.2
Moisture Content	%	40
Bulk Density	Mg/m^3	1.58
Dry Density	Mg/m^3	1.13
Test Details		
Membrane Thickness	mm	0.25
Membrane Correction	kPa	0.42
Rate of Axial Displacement	%/min	1.50
Cell Pressure	kPa	225
Strain at Failure	%	7.0
Maximum Deviator Stress	kPa	38
Shear Strength	kPa	19
Mode of Failure		Plastic
Sample Description		Very low strength brown mottled occasional grey CLAY

Mode of failure



Shear Strength Parameters	
Cu	19 kPa
Phi	N/A °



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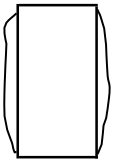
SERVICES

PROJECT NAME:	**Kiln Place**	**BH/TP No.:**	**BH2**
PROJECT NUMBER:	**GL18084**	**Depth (m):**	**14.50**
CLIENT:	**E C Harris**	**Sample No.:**	**UT6**
DATE OF ISSUE:	**17/04/2014**		

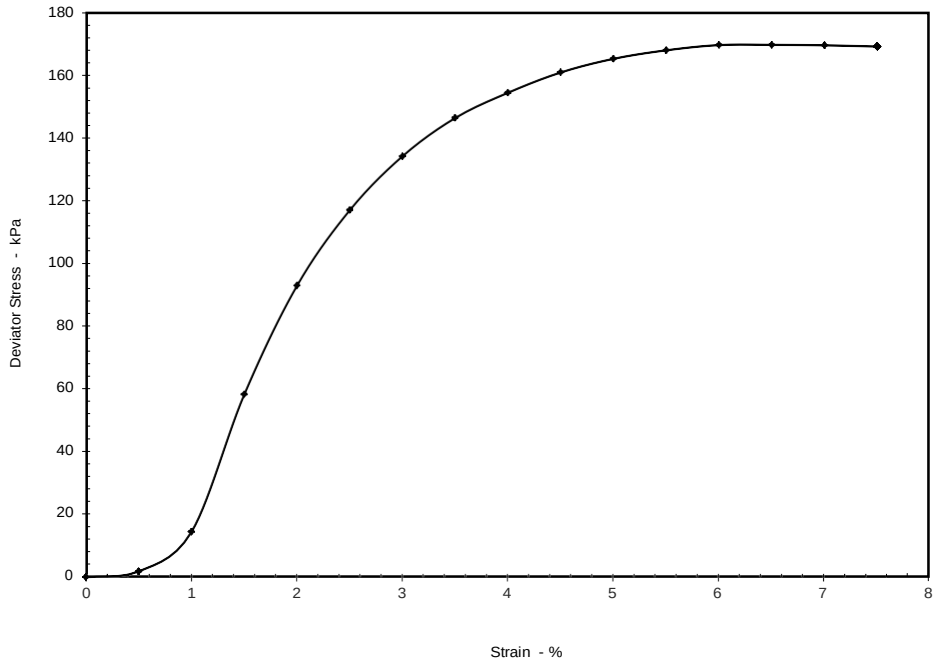
DETERMINATION OF UNCONSOLIDATED UNDRAINED SINGLE STAGE SHEAR STRENGTH TO BS1377 : PART 7 : 1990 : CLAUSE 8

Sample Details		
Sample Condition		Undisturbed
Height	mm	199.7
Diameter	mm	103.3
Moisture Content	%	34
Bulk Density	Mg/m³	1.82
Dry Density	Mg/m³	1.36
Test Details		
Membrane Thickness	mm	0.25
Membrane Correction	kPa	0.39
Rate of Axial Displacement	%/min	1.50
Cell Pressure	kPa	290
Strain at Failure	%	6.5
Maximum Deviator Stress	kPa	170
Shear Strength	kPa	85
Mode of Failure		Plastic
Sample Description		High strength brown CLAY

Mode of failure



Shear Strength Parameters	
Cu	85 kPa
Phi	N/A °



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FAO Matthew Willson

LABORATORY TEST REPORT

Results of analysis of 16 samples
received 21 March 2014

GL18084 - Kiln Place

Report Date
31 March 2014

Login Batch No					**254060**						
Chemtest LIMS ID					AJ98611	AJ98612	AJ98613	AJ98614	AJ98615	AJ98616
Sample ID					BH1	BH1	BH1	BH1	BH2	BH2
Sample No					1	4	10	16	4	10
Sampling Date					17/3/2014	17/3/2014	17/3/2014	17/3/2014	17/3/2014	17/3/2014
Depth					1.00m	4.00m	9.00m	13.50m	3.00m	8.00m
Matrix					*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*
SOP↓	Determinand↓	CAS No↓	Units↓	*						
2010	pH			M	8.0	10.5	8.1	8.1	7.7	7.6
2175	Sulfur (total TRL report 447)		%	M	0.42	0.29	0.33	0.56	0.20	2.3
2120	Sulfate (2:1 water soluble) as SO4	14808798	g l^{-1}	M	1.1	1.2	0.58	0.66	0.69	1.7
2420	Magnesium (soluble)	7439954	g l^{-1}	N	<0.01	<0.01	0.07	0.06	0.08	0.15
2430	Sulfate (total BS1377 HCl extract)	14808798	%	M	0.66	0.78	0.27	0.28	0.83	7.38

All tests undertaken between 21/03/2014 and 26/03/2014

* Accreditation status

This report should be interpreted in conjunction with the notes on the accompanying cover page.

Harrison Testing Services
Units 1 & 2 Alston Road
Hellesdon Park Industrial Estate
Norwich
NR6 5DS

FAO Matthew Willson

LABORATORY TEST REPORT

Results of analysis of 16 samples
received 21 March 2014

GL18084 - Kiln Place

Report Date
31 March 2014

Login Batch No					**254060**						
Chemtest LIMS ID					AJ98617	AJ98618	AJ98619	AJ98620	AJ98621	AJ98622
Sample ID					BH2	WS2	WS2	WS2	WS4	WS4
Sample No					18	2	6	8	3	6
Sampling Date					17/3/2014	17/3/2014	17/3/2014	17/3/2014	17/3/2014	17/3/2014
Depth					14.00m	1.00m	3.50m	5.00m	2.00m	4.50m
Matrix					*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*	*SOIL*
SOP↓	Determinand↓	CAS No↓	Units↓	*						
2010	pH			M	7.9	7.8	7.8	7.9	7.6	7.6
2175	Sulfur (total TRL report 447)		%	M	0.50	0.11	0.096	0.075	0.51	0.12
2120	Sulfate (2:1 water soluble) as SO4	14808798	g l^{-1}	M	0.72	0.19	0.35	0.40	1.3	0.54
2420	Magnesium (soluble)	7439954	g l^{-1}	N	0.07	0.01	0.03	0.05	0.04	0.05
2430	Sulfate (total BS1377 HCl extract)	14808798	%	M	0.41	0.17	0.25	0.13	1.44	0.35

* Accreditation status

This report should be interpreted in conjunction with the notes on the accompanying cover page.

Harrison Testing Services
Units 1 & 2 Alston Road
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Norwich
NR6 5DS

FAO Matthew Willson

LABORATORY TEST REPORT

Results of analysis of 16 samples
received 21 March 2014

GL18084 - Kiln Place

Report Date
31 March 2014

Login Batch No					**254060**			
	Chemtest LIMS ID				AJ98623	AJ98624	AJ98625	AJ98626
	Sample ID				WS5	WS5	WS7	WS7
	Sample No				1	3	1	5
	Sampling Date				17/3/2014	17/3/2014	17/3/2014	17/3/2014
	Depth				0.25m	2.30m	0.50m	4.00m
	Matrix				*SOIL*	*SOIL*	*SOIL*	*SOIL*
SOP↓	Determinand↓	CAS No↓	Units↓	*				
2010	pH			M	8.0	8.3	8.0	7.7
2175	Sulfur (total TRL report 447)		%	M	0.15	0.71	0.11	0.25
2120	Sulfate (2:1 water soluble) as SO4	14808798	g l^{-1}	M	0.15	1.3	0.16	0.47
2420	Magnesium (soluble)	7439954	g l^{-1}	N	<0.01	<0.01	<0.01	0.03
2430	Sulfate (total BS1377 HCl extract)	14808798	%	M	0.21	1.29	0.17	0.18

* Accreditation status

This report should be interpreted in conjunction with the notes on the accompanying cover page.

Harrison Testing Services
Units 1 & 2 Alston Road
Hellesdon Park Industrial Estate
Norwich
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FAO Matthew Willson

AMENDED LABORATORY TEST REPORT

Results of analysis of 2 samples
received 26 March 2014

GL18084 - Kiln Place

Report Date
19 May 2014

Login Batch No					**254359**	
Chemtest LIMS ID					AK00181	AK00182
Sample ID					WS6	WS6
Sample No					2	7
Sampling Date					17/3/2014	17/3/2014
Depth					1.00m	6.00m
Matrix					*SOIL*	*SOIL*
SOP↓	Determinand↓	CAS No↓	Units↓	*		
2010	pH			M	7.5	8.2
2175	Sulfur (total TRL report 447)		%	M	0.68	2.8
2120	Sulfate (2:1 water soluble) as SO4	14808798	g l^{-1}	M	1.2	1.3
2420	Magnesium (soluble)	7439954	g l^{-1}	N	<0.01	0.13
2430	Sulfate (total BS1377 HCl extract)	14808798	%	M	1.08	4.72

All tests undertaken between 26/03/2014 and 31/03/2014

* Accreditation status

This report should be interpreted in conjunction with the notes on the accompanying cover page.

APPENDIX E

CALIBRATION CERTIFICATES

SPT Calibration Report

www .equipe group.c om

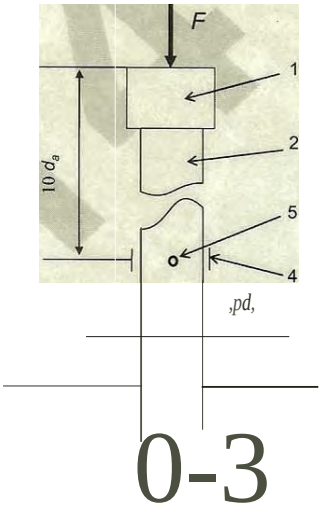
Hammer Energy Measurement Report

Type of Hammer	SPTHAMMER
Client	SI DRILLING
Test No	EQU936_1
Test Depth (m)	6.80
Date of Test	23 December 2014
Valid until	23 December 2014
Hammer ID	EQU756

Mass of the hammer	m=	63.5kg
Fallin J height	h=	0.76m
E theor =	$mxgxh$ =	473J

Chara1cte rist ic s of the instrumented rod

Diametier	d, =	0.052 m
Length of the instrumented rod		0.558 m
Area	A=	11.61 cm^2
Modulus	Ea =	206843 MPa



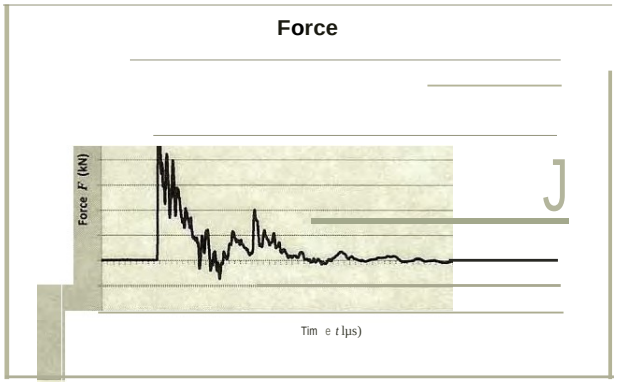
Key

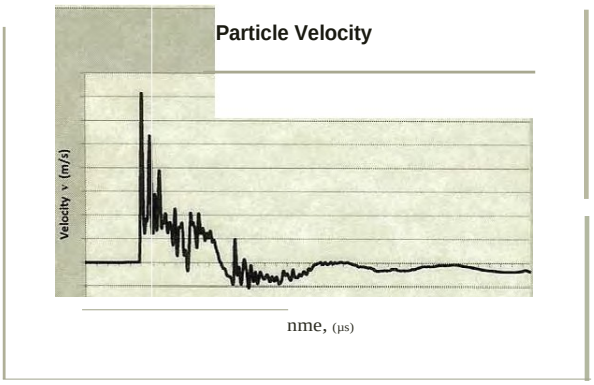
1 Anvil
2 Part of instrumen ted rod
3 Dr i ve Rod
Stra in Gauge
Accelerometer
6 Ground

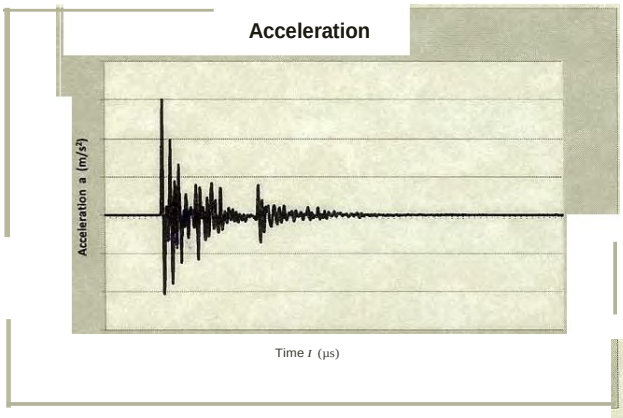
F Force
d, Diameter of rod

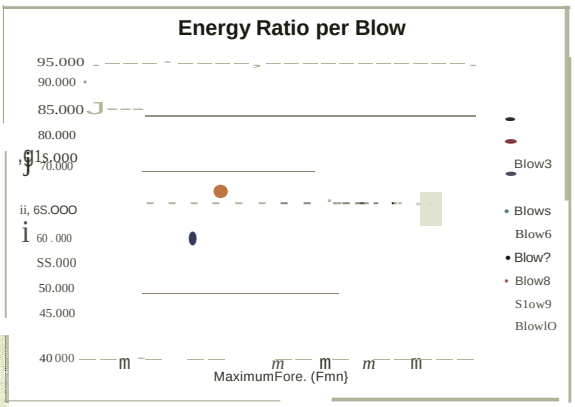
0-3

Fi g. B.1 and B.2 BS EN ISO 22476-3 : 2005 + A1 : 2011









L_ rvations:

E meas =	0.281 kN-m
E the,or =	0.473 kN-m

Ei]btio• $\frac{E_{meas}}{E_{theor}}$ = **59.45%**

Equipe SPT Analyzer Operators: KS

epared by: **Checked by:** Date 09/01/2014

APPENDIX C

1st LINE DEFENCE DETAILED UXO THREAT ASSESSMENT

1ST LINE DEFENCE

UXO SOLUTIONS

Detailed Unexploded Ordnance (UXO) Threat Assessment

Project Name	Kiln Place, Camden, London		
Client	Ramboll UK Limited		
Site Address	Kiln Place, Camden, London, NW5		
Report Reference	1594RV00	Revision	00
Date	6th February 2014		
Originator	RV		

1ST LINE DEFENCE

Executive Summary

Site Location

The Kiln Place site is situated in the north-west London Borough of Camden in the area of Gospel Oak. Kentish Town is located to the south-east with the Parliament Hill section of Hampstead Heath located to the north. The site lies approximately 6km north-west of The City of London.

To the immediate north of the site is Lamble Street and adjoining residential property. To the east of the site are Meru Close and an associated housing estate with a main car parking location. To the immediate south is rail infrastructure from the Carlton Road Junction railway line. Grafton Road is located to the immediate west with a neighbouring housing estate located a short distance beyond this location.

The site is centred on the approximate OS grid reference: **TQ 2831885464**

Proposed Works

The exact proposals are not currently finalised at the time of this reports production however it is planned to include a tenure mix of 50% social rented, 40% private, and 10% intermediate residential property.

The residential property proposals have been separated into five separate sections with exact plans detailed below (as provided by Ramboll UK Limited):

- Site 1: A row of seven three-bed houses with courtyards and lawned areas, following the curve of the street. Building heights alternate between one- and three-storeys high.
- Site 2: A row of two three-bed and one one-bed cottages with courtyards, following the curve of the street. Building heights alternate between one-, two- and three-storeys high.
- Site 3: A three-bed house with a courtyard proposed to complete the corner of existing buildings 65-80 and 81-96 Kiln Place. The house is one-, two- and three-storeys high, completing the new terrace elevation formed by the cottages of Site 2.
- Site 4: A three-bed house with a courtyard proposed to complete the corner of existing buildings 1-64 Kiln Place. The house is one-, two- and three-storeys high.
- Site 5: A two-bed upper maisonette and one-bed ground-floor flat with a courtyard proposed to complete the corner of existing buildings 97-104 and 105-116 Kiln Place. The building is one-, two and three-storeys high.

Geology and Bomb Penetration Depth

Site specific geological data has not been provided at this time. Once relevant information has been made available, 1st Line Defence can provide site specific bomb penetration considerations. Generic geological information indicates that the site lies within London Clay formation.

UXO Risk Assessment

1st Line Defence believes that there is a risk from UXO at the site of the proposed development. However, this risk is not considered to be homogenous across the entire site area but has been zoned into areas of **Medium** and **Low** risk. A risk map has been prepared and is presented in **Annex P**. This assessment is based on the following factors:

- During WWII the Metropolitan Borough of St. Pancras was subjected to a **Moderate / Medium Density** bombing campaign, with 258 items falling per 1,000 acres. A total of 641 High Explosive bombs fell on the borough. St. Pancras and neighbouring areas contained some Luftwaffe targets which included rail infrastructure and a small number of industry sites.
- The London Bomb Census maps shown in **Annexes G & H**, show a significant quantity of bomb strikes in the immediate area of the site, particularly to the east and west. There is no indication of recorded bomb

UXO Risk Assessment

incidents within the proposed site boundary from the information available. It is possible that records of land such as this would not have been kept as it was of low importance/priority.

- The proposed site contains areas of open ground which previously housed a disused brick kiln works during WWII. It appears to contain a mix of dense vegetation, soft open ground (including the access route) and areas of debris and rubble, mounds of spoil, open excavations and material associated with the sites former usage. The brick kiln structure appears to remain in place during the WWII era as evidenced by the presence of the chimney. An electrical sub-station occupies a small space of land in the north-west corner of the proposed site.
- Where the ground cover is not occupied by occupied facilities or structures, the risk of UXO going unnoticed can be significantly increased, especially if the ground conditions are poor and the frequency of access / post raid checks for evidence of UXO is limited. Rubble, debris and dense vegetation often had the direct consequence of hiding / obscuring the presence of UXO. This puts large areas of the site at concern as given the nature of the groundcover and limited access, it is considered highly unlikely that evidence of UXO would have been noted and dealt with.
- There is no evidence that the site formerly had any military occupation or usage that could have led to contamination with other items of ordnance.
- Some post-war redevelopment has occurred on the site although the exact nature of the groundwork is unknown. Where this development has taken place, the risk of encountering shallow buried UXO (especially 1kg incendiaries or anti-personnel bombs) and anti-aircraft projectiles will have been partly mitigated since any such items may have been discovered during excavations. The risk from deeper buried UXO may be mitigated at the locations of existing foundations for the Kiln Place estate. If the planned works (piling or excavations) are planned to exceed pre-existing levels it may be necessary to further mitigate the risk from UXO down to planned works levels. This would be particularly necessary if the assessed level of bomb penetration for this site exceeds pre-existing foundation level and any depths for piling / percussive drilling etc.

Recommended Risk Mitigation Measures

The following risk mitigation measures are recommended depending on the type of works implemented for the Kiln Place, Camden site:

All works in Low and Medium Risk Areas:

- Site Specific Unexploded Ordnance Awareness Briefings to all personnel conducting intrusive works

Medium Risk Area only:

Shallow intrusive works (trial pits, open excavations, shallow foundations etc.)

- Unexploded Ordnance (UXO) Specialist Presence on Site to support shallow intrusive works

Deep intrusive works (boreholes and piles)

- Intrusive Magnetometer Survey of all Borehole and pile locations down to a maximum bomb penetration depth

In making this assessment and recommending the above risk mitigation measures, the proposed works outlined in the 'Scope of the Proposed Works' section were considered. Should the planned works be modified or additional intrusive engineering works be considered, 1st Line Defence should be consulted to see if a re-assessment of the risk or mitigation recommendations is necessary.

Contents

Executive Summary ..... **II**

Contents ..... **IV**

Annexes ..... **VI**

1. Introduction **1**

1.1. Background *1*

2. UK Regulatory Environment **2**

2.1. General *2*

2.2. CDM Regulations 2007 ..... *2*

2.3. The 1974 Health and Safety at Work Act *2*

2.4. Additional Legislation *2*

3. Role of Commercial UXO Contractors and The Authorities **3**

3.1. Commercial UXO Contractors *3*

3.2. The Authorities *3*

4. The Report **4**

4.1. Report Objectives *4*

4.2. Risk Assessment Process *4*

4.3. Sources of Information *4*

5. Reporting Conditions **5**

5.1. General Considerations *5*

5.2. Background to Bombing Records *5*

6. The Site **6**

6.1. Site Location *6*

6.2. Site Description *6*

7. Scope of the Proposed Works **6**

7.1. General *6*

8. Ground Conditions **7**

8.1. General Geology *7*

9. Site History **7**

9.1. Ordnance Survey Historical Maps *7*

10. Aerial Bombing Introduction **8**

10.1. General *8*

10.2. Generic Types of WWII German Air-delivered Ordnance *8*

10.2.1. High Explosives *8*

10.2.2. Parachute Mines *9*

10.2.3. 1kg Incendiary Bombs *9*

10.2.4. Large Incendiary Bombs *9*

10.2.5. Anti-personnel (AP) Bomblet's *9*

10.2.6. Failure Rate of German Air-Delivered Ordnance *10*

10.2.7. V-Weapons *10*

11. UXB Ground Penetration **11**

11.1. General *11*

11.2. The J Curve Effect *11*

11.3. WWII UXB Penetration Studies *11*

11.4. Site Specific Bomb Penetration Considerations 11
12. Initiation of Unexploded Ordnance 12
12.1. General 12
12.2. UXB Initiation Mechanisms 12
12.3. Effects of Detonation 12
13. Threat from German UXBs 13
13.1. World War I 13
13.2. World War II Bombing of St. Pancras / Camden 13
13.3. Second World War Bombing Statistics 14
13.4. London Air Raid Precautions Bomb Census Maps 14
13.5. London V-Weapon Maps 15
13.8. WWII-Era Aerial Photographs 16
13.9. Bombing Decoy Sites 17
13.10. Abandoned Bombs 17
13.11. Bomb Disposal Tasks 18
13.12. Evaluation of Bombing Records 18
14. The Threat from Allied Military Ordnance 20
14.1. General 20
14.2. Land Service Ammunition 20
14.3. Defending London from Aerial Attack 20
14.4. Anti-Aircraft Artillery (AAA) and Projectiles 21
14.5. Evaluation of Allied Military Ordnance Risk 22
15. Ordnance Clearance and Post-WWII Ground Works 23
15.1. General 23
15.2. UXO Clearance 23
15.3. Post war Redevelopment 23
16. 1st Line Defence Risk Assessment 24
16.1. Risk Assessment Stages 24
16.2. Assessed Risk Level 26
17. Proposed Risk Mitigation Methodology 27
17.1. General 27
Bibliography 28

Annexes

List of Report Annexes	
Annex A	Site Location Maps
Annex B	Recent Aerial Photography
Annex C	Site Plan
Annex D	Pre and Post-WWII Historical Maps
Annex E	WWI Bomb Plot Map
Annex F	WWII Bomb Density Map
Annex G	Consolidated London ARP Bomb Census Maps
Annex H	Weekly London ARP Bomb Census Maps
Annex I	London V-Weapon Bomb Census Map
Annex J	LCC Bomb Damage Map
Annex K	1947 RAF Aerial Photography of the Site
Annex L	Common Types of German Air-Delivered Ordnance
Annex M	Examples of UXO Incidents
Annex N	Example of 50kg Bomb Entry Hole
Annex O	Examples of Anti-Aircraft Projectiles
Annex P	Risk Map

1st Line Defence Limited
Detailed Unexploded Ordnance (UXO) Threat Assessment

Site: Kiln Place, Camden
Client: Ramboll UK Limited

1. Introduction

1.1. Background

1st Line Defence has been commissioned by Ramboll UK Limited to produce a Detailed Unexploded Ordnance (UXO) Threat Assessment for the proposed works at Kiln Place, Camden.

UXO in the UK can originate from three principal sources:

1. Munitions deposited as a result of military training procedures and exercises.
2. Munitions lost, burnt, buried or otherwise discarded either deliberately, accidentally or ineffectively.
3. Munitions resulting from wartime activities including German bombing in WWI and WWII, long rang shelling, defensive activities or area denial.

In certain parts of the UK, buried UXO can present a significant risk to construction works and development projects. This is not only in terms of safety as even the simple discovery of a suspected device during on-going works can cause considerable disruption to production and cause unwanted delays and expense.

This report will examine in detail all of the factors that could potentially contribute to a threat from UXO at the site in question. For the majority of sites in the UK, the risk of encountering UXO of any sort will be extremely minimal and generally therefore, no further action is recommended beyond an initial desktop assessment of risk. However, if a potential risk is identified, the report will make recommendations for the most appropriate and work-specific measures available in order to reduce this risk to as low as reasonably practicable. Full analysis and evidence will be provided to allow to client to fully understand the basis for the assessed risk level and any recommendations.

The report directly follows the guidelines set out in the document CIRIA C681 'Unexploded Ordnance (UXO) A Guide for the Construction Industry'.

2. UK Regulatory Environment

2.1. General

There is no formal requirement for undertaking an assessment of UXO risk for construction projects in the UK, nor any specific legislation covering the management or mitigation of UXO risk. However, it is implicit in the legislation that is outlined below that those responsible for intrusive works (archaeology, site investigation, drilling, piling, excavation etc.) do undertake a comprehensive and robust assessment or potential risks to employees and that mitigation measures are put in place to address any identified hazards.

2.2. CDM Regulations 2007

This legislation defines the responsibilities of all parties (primarily the Client, the CDM Co-ordinator, the Designer and the Principal Contractor) involved with works. Under CDM2007, the client has the 'legal responsibility for the way that a construction project is managed and run and they are accountable for the health and safety of those working on or affected by the project'.

Although UXO is not specifically addressed, the regulations effectively place obligations on all these parties to:

- Provide an appropriate assessment of potential UXO risks at the site (or ensure such an assessment is completed by others).
- Put in place appropriate risk mitigation measures if necessary.
- Supply all parties with information relevant to the risks presented by the project.
- Ensure the preparation of a suitably robust emergency response plan.

2.3. The 1974 Health and Safety at Work Act

All employers have a responsibility under the Health and Safety at Work Act of 1974 (and the Management of Health and Safety at Work Regulations of 1999) to ensure, so far as is reasonably practicable, the health and safety of their employees and that of other persons who are affected by their work activity (including the general public).

2.4. Additional Legislation

Other relevant legislation includes the Safety at Work Regulations 1999 and The Corporate Manslaughter and Corporate Homicide Act 2007.

3. Role of Commercial UXO Contractors and The Authorities

3.1. Commercial UXO Contractors

The role of an experienced UXO specialist such as 1st Line Defence is to provide expert knowledge and guidance to the client on the most appropriate and cost effective approach to UXO risk management on a site.

The undertaking of Preliminary and Detailed UXO Risk Assessments is the first step in this risk management process. The extensive amount of specialist experience, weapons knowledge, datasets and historical information available to 1st Line Defence in particular, allows a robust, detailed and realistic assessment of the potential risk, and the recommendation of suitable mitigation measures if deemed necessary.

In addition to undertaking specialist Risk Assessments, a commercial UXO contractor will be able to provide pre-construction site survey and clearance/avoidance, as well as a reactive response to any suspect finds. Furthermore, the presence of a qualified UXO Specialist with ordnance recognition skills will avoid unnecessary call-outs to the authorities and allow for arrangement to be made for the removal and disposal of low risk items. If high risk ordnance is discovered, actions will be co-ordinated with the authorities with the objective of causing the minimum possible disruption to site operations whilst putting immediate, safe and appropriate measures in place. For more information on the role of commercial UXO specialists, see CIRIA C681.

3.2. The Authorities

The Police have the responsibility for co-ordinating the emergency services in the case of an ordnance-related incident on a construction site. They will make an initial assessment and if they judge necessary, impose a safety cordon and/or evacuation and call the military authorities Joint Services Explosive Ordnance Disposal (JSEOD) to arrange for investigation and/or disposal. In the absence of an UXO Specialist on site many Police Officers will use the precautionary principle, impose cordon/evacuation and await advice from the JSEOD. The discovery of UXO will invariably cause work to cease on a site and the site and often neighbouring properties evacuated.

The priority given to the request by JSEOD will depend on their judgement of the nature of the threat UXO, location, people and assets at risk and the availability of resources. They may respond immediately or as resources are freed up. It can take 1-2 days and often longer for the authorities to respond and deal with a UXB.

Depending on the on-site risk assessment the item of ordnance may be removed from site or destroyed by controlled explosion. In the latter case additional cordons and/or evacuations may be necessary and the process will take longer.

It should be noted that following the discovery of an item of UXO, the military authorities will only carry out further investigations or clearances in very high profile or high risk situations. If there are regular UXO finds on a site the JSEOD may not treat each occurrence as an emergency and will recommend the construction company puts in place alternative procedures i.e. the appointment of a commercial contractor to manage the situation.

4. The Report

4.1. Report Objectives

The aim of this report is to undertake a fair, proportionate and comprehensive assessment of the potential risk from UXO at the Kiln Place site in Camden – London. Every reasonable effort will be made to ensure that all available and pertinent historical information and records are accessed and checked. Full analysis and evidence will be provided where possible to allow the Client to fully understand the basis for the risk assessment.

Site specific risk mitigation measures will be recommended if deemed necessary, to reduce the threat from explosive ordnance during the envisaged works to as low as reasonably practicable.

4.2. Risk Assessment Process

1st Line Defence undertakes a five-step process for assessing the risk posed by UXO:

1. The risk that the site was contaminated with UXO.
2. The risk UXO remains on the site.
3. The risk that UXO may be encountered during the proposed works.
4. The risk that UXO may be initiated.
5. The consequences of initiating or encountering UXO.

In order to address the above, 1st Line Defence has considered in detail, site specific and non-site specific factors including:

- Evidence of German bombing, delivery of UXBs, records of abandoned bombs and maximum bomb penetration depth assessment.
- Site history, occupancy and conditions during WWII.
- The potential legacy of Allied military activity.
- Details of the specific UXO threat and any known UXO clearance work.
- The extent of any post-war redevelopment.
- The extent and nature of any proposed works.

4.3. Sources of Information

In order to produce a robust and thorough assessment of UXO risk, detailed historical research has been carried out by specialist graduate researchers. Military records and archive material held in the public domain has been accessed. Information from the following sources has been consulted for this report:

- The National Archives, Kew and Camden Local Studies and Archives Centre.
- Landmark Maps.
- English Heritage National Monuments Record.
- Relevant information supplied by Ramboll UK Limited.
- Available material from 33 Engineer Regiment (EOD) Archive.
- 1st Line Defence's extensive historical archives, library and UXO geo-datasets.
- Open sources such as published book and internet resources.

Research involved a visit to the Camden Local Studies and Archives Centre and the National Archives, Kew.

5. Reporting Conditions

5.1. General Considerations

It is important to note that this desktop assessment is based largely upon research of historical evidence. Although every effort has been made to locate all significant and pertinent information, 1st Line Defence cannot be held accountable for any changes to the assessed level of risk or risk mitigation measures based on documentation or other data that may come to light at a later date, or which was not available to 1st Line Defence at the time of the reports production.

It is often problematic and sometimes impossible to verify the completeness and accuracy of WWII-era records – see 'Background to Bombing Records'. As a consequence, conclusions as to the exact location, quantity and nature a UXO threat can rarely be definitive. To counter this, it is essential that as many different sources and types of information as possible are consulted and analysed before a conclusion is reached. 1st Line Defence cannot be held responsible for inaccuracies or gaps in the available historical information.

5.2. Background to Bombing Records

In September 1940, the Government started to collect and collate information relating to damage sustained during bomb raids. This was known as the 'Bomb Census'. Initially, only information relating to London, Birmingham and Liverpool was collated, but by September 1940, the bomb census had been extended to cover the rest of the UK.

Its purpose was to provide the Government with a complete picture of raid patterns, types of weapon used and damage caused – in particular to strategic services and installations such as railways, factories and public utilities.

Information was gathered locally by police, Air Raid Wardens and military personnel. They noted when, where and what types of bombs had fallen during an air raid, and passed this on to the Ministry of Home Security. Records of strikes were made either through direct observation or by post-raid surveys. However, the immediate priority was to deal with casualties and minimise damage. As a result, it is only to be expected that the records kept were often incomplete and contradictory.

Prior to the official 'Bomb Census', record keeping in the early months of the war was not comprehensive. The quality, detail and nature of record keeping could vary considerably from borough to borough and town to town. Many records were even damaged destroyed in subsequent attacks. Records of raids that took place on sparsely or uninhabited areas were often based upon third party or hearsay information and are not always reliable. Furthermore, records of attacks on military or strategic targets were often maintained separately from the general records and have not always survived.

6. The Site

6.1. Site Location

The Kiln Place site is situated in the north-west London Borough of Camden in the area of Gospel Oak. Kentish Town is located to the south-east with the Parliament Hill section of Hampstead Heath located to the north. The site lies approximately 6km north-west of The City of London.

To the immediate north of the site is Lamble Street and adjoining residential property. To the east of the site are Meru Close and an associated housing estate with a main car parking location. To the immediate south is rail infrastructure from the Carlton Road Junction railway line. Grafton Road is located to the immediate west with a neighbouring housing estate located a short distance beyond this location.

The site is centred on the approximate OS grid reference: **TQ 2831885464**

Site location maps are presented in **Annex A**.

6.2. Site Description

The proposed site is an irregular shaped parcel of land which contains the Kiln Place Housing Estate. The housing estate is comprised of four separate multi-storey buildings and associated areas of open ground / grass landscaping and a roadway leading from Lamble Street and Oak Village.

A recent aerial photograph, site boundary and plan drawing of the site area are presented in **Annex B** and **Annex C** respectively.

7. Scope of the Proposed Works

7.1. General

The exact proposals are not currently finalised at the time of this reports production however it is planned to include a tenure mix of 50% social rented, 40% private, and 10% intermediate residential property.

The residential property proposals have been separated into five separate sections with exact plans detailed below (as provided by Ramboll UK Limited):

- Site 1: A row of seven three-bed houses with courtyards and lawned areas, following the curve of the street. Building heights alternate between one- and three-storeys high.
- Site 2: A row of two three-bed and one one-bed cottages with courtyards, following the curve of the street. Building heights alternate between one-, two- and three-storeys high.
- Site 3: A three-bed house with a courtyard proposed to complete the corner of existing buildings 65-80 and 81-96 Kiln Place. The house is one-, two- and three-storeys high, completing the new terrace elevation formed by the cottages of Site 2.
- Site 4: A three-bed house with a courtyard proposed to complete the corner of existing buildings 1-64 Kiln Place. The house is one-, two- and three-storeys high.
- Site 5: A two-bed upper maisonette and one-bed ground-floor flat with a courtyard proposed to complete the corner of existing buildings 97-104 and 105-116 Kiln Place. The building is one-, two and three-storeys high.

8. Ground Conditions

8.1. General Geology

Site specific geological data has not been provided at this time. Once relevant information has been made available, 1st Line Defence can provide site specific bomb penetration considerations. Generic geological information indicates that the site is underlain by London Clay Formation – Clay, Silt and Sand of the Palaeogene Period.

9. Site History

9.1. Ordnance Survey Historical Maps

Pre and post-WWII historical maps for the site were obtained by 1st Line Defence from Landmark Maps. These are presented in **Annex D**.

WWI era		
Date	**Scale**	**Description**
1915 – 1916	1:2,500	This map indicates the presence of a 'works' facility (later referred to as Gospel Oak Brick Works) during this period. A formation of buildings appears to occupy the proposed site in the eastern section of the boundary. Later map editions refer to the ellipse shaped structure as a kiln used for the manufacture of bricks. Much of the remainder of the site is occupied by largely indeterminate ground cover, however it appears to be excavated land associated with the Gospel Oak Brick Works. Grafton Road is not in existence during this period with the western section of the site boundary running through open ground. Lamble Street is located to the north of the proposed site with the Carlton Road Junction railway line to the south. The Hampstead Junction and neighbouring buildings are located to the east of the site boundary.

Pre-WWII		
Date	**Scale**	**Description**
1936	1:2,500	A number of small structures within the site boundary have been removed / cleared since the previous map edition. A timber yard has been constructed in the south-west section of the proposed site boundary which also extends to the west of the site boundary. This map edition refers to the Gospel Oak Brick Works as 'Disused'. It is not currently known if the proposed site area was utilised for any other purpose at this time in the absence of the Brick Works. Structures to the east of the proposed site appear to have been redeveloped with three separate structures in existence when compared to the two buildings previous.

Post-WWII		
Date	**Scale**	**Description**
1953 – 1954	1:1,250	As this map is a number of years after WWII it may not provide the best account of post-war damage to the area. It is likely that areas of heavy damage may have been redeveloped by this time. Three structures to the north of the proposed site on Mansfield Road show signs of being 'cleared'. Bombing is known to have occurred at this location. There are no further signs of obvious bomb damage presence in the immediate

		area from this date range. Gospel Oak Timber Yard occupies land in the south-west of the proposed site. It is not clear from this record if the timber yard utilises the former Brick Works area. The Brick Works kiln is referred to as 'Disused'. A structure in the north-west corner of the proposed site appears to be an electrical sub-station.
1963 – 1974	1:1,250	This map shows the presence of the Kiln Place development on the proposed site of works. Grafton Road has been constructed to the west of the proposed site with the four main residential sections of the Kiln Place Estate in existence during this period. Much of the neighbouring areas adhere to contemporary designs apart from the section of land to the immediate east which remained a 'works' during the 1960s and 1970s.

10. Aerial Bombing Introduction

10.1. General

During WWI and WWII, many towns and cities throughout the UK were subject to bombing which often resulted in extensive damage to city centres, docks, rail infrastructure and industrial areas. The poor accuracy of WWII targeting technology and techniques often resulted in all areas around a specific target being bombed.

In addition to raids which concentrated on specific targets, indiscriminate bombing of large areas also took place – notably the London 'Blitz', but also affecting many other towns and cities. As discussed in the following sections, a proportion of the bombs dropped on the UK did not detonate as designed and while extensive efforts were made to locate and deal with these UXBs at the time, many still remain buried and can present a potential risk to construction projects.

The main focus of this report with regards to bombing will be weapons dropped during WWII, although WWI bombing will also be considered.

10.2. Generic Types of WWII German Air-delivered Ordnance

The type and characteristics of the ordnance used by the Luftwaffe during WWII allows an informed assessment of the hazards posed by any unexploded items that may remain in situ on a site. A brief summary of these characteristics is given below. Examples of German air delivered ordnance are presented at **Annex L**.

10.2.1. High Explosives

High explosive bombs are thick-skinned and typically have sufficient mass and velocity and a suitably streamlined shape to enable them to penetrate the ground if they failed to explode on the surface. Most bombs were 50kg, 250kg or 500kg (overall weight, about half of which was high explosive) though larger bombs of up to 2000kg were also used. In terms of weight of ordnance dropped, H.E. Bombs were the most frequent weapon deployed by the Luftwaffe during WWII.

Although efforts were made to identify the presence of unexploded ordnance following an air raid, often the damage and destruction caused made observation of UXB entry holes impossible. The entry hole of an unexploded bomb can be as little as 20cm in diameter and easily overlooked in certain ground conditions. Furthermore, ARP documents describe the danger of assuming that damage, actually caused by a large UXB, was due to an exploded 50kg bomb. UXB's therefore present the greatest risk to present–day intrusive works.

10.2.2. Parachute Mines

The Luftmines (LMA-500kg and LMB-1000kg) were magnetic sea mines which were thin walled, cylindrical in shape with a hemispherical nose and were deployed under a green artificial silk parachute about 27 feet in diameter. They were fitted with magnetic and later with acoustic or magnetic/acoustic firing. When the mine hit the water and sank to more that 8ft, hydrostatic pressure and the dissolution of a soluble plug actuated the magnetic device and the mine became operational against shipping. The mine was also armed with a clockwork bomb fuze which caused the bomb to explode when used against land targets, and this was started by the impact of hitting the ground. The Bombenmine (BM 1000, Monika, or G Mine) was also used. This was fitted with a tail made from Bakelite which broke up on impact. It had a photoelectric cell beneath a cover which detonated the bomb if exposed to light to counteract the work of bomb disposal units.

Their weight was either 500kg or 1000kg (overall weight, of which about 2/3 was explosive) depending on the type of mine. Their length ranged from 1.73-2.64m. These were much less frequently deployed than H.E. and Incendiary bombs due to their size, cost and their difficulty technically to deploy. If functioning correctly, parachute mines would generally have had a slow rate of descent (falling at about 40 mph) and were very unlikely to have penetrated the ground. Where the parachute failed, mines would have simply shattered on impact if the main charge failed to explode. There have been extreme cases when these items have been found unexploded. However, in these scenarios, the ground was either extremely soft or the munition fell into water. 1st Line Defence does not consider there to be a significant threat from this type of munition on land, although their presence can account for significant damage to sites.

10.2.3. 1kg Incendiary Bombs

These thermite filled devices were jettisoned from air-dropped containers. Some variants had explosive heads and these present a risk of detonation during intrusive works. In terms of number of weapons dropped these small Incendiaries were the most numerous. Millions of these weapons were dropped throughout WWII. These weapons had very limited penetration capability and in urban areas especially they would usually have been located in post-raid surveys. If they failed to initiate and fell in water, on soft vegetated ground, or bomb rubble, they could easily have gone unnoticed.

10.2.4. Large Incendiary Bombs

They had various flammable fill materials (including oil and white phosphorus), and a small explosive charge. They were designed to explode and burn close to the surface. Although they were often the same shape as HE bombs, they were thin-skinned and generally did not penetrate the surface. These types of bombs could effectively weight up to 350kg. These items of ordnance were not as common as the 1kg Incendiaries however they were still more frequently deployed than the Parachute Mines and Anti-Personnel Bomblets. If they did penetrate the ground, complete combustion did not always occur and in such cases they would remain a risk to intrusive works.

10.2.5. Anti-personnel (AP) Bomblet's

The 'Butterfly Bomb' had an 8cm long, thin, cylindrical, cast iron outer shell which hinged open when the bomblet deployed gave it the superficial appearance of a large butterfly. A steel cable 15 cm long was attached via a spindle to an aluminium fuze. The wings at the end were canted at an angle to the airflow, which turned the spindle anti-clockwise as the bomblet fell. After the spindle had revolved approximately 10 times (partially unscrewing itself from the bomb) it released a spring-loaded pin inside the fuze, which fully armed the SD2 bomb. They were generally lethal to anyone within a radius of 10 metres (33 ft) and could inflict serious shrapnel injuries. The size and weight ranged depending on the type used. The most common was the "Butterfly Bomb" (SD2) which weighed 2kg and contained 225 grams of TNT. They were not commonly used and generally considered to pose a low risk to most works in the UK.

SD2 bomblets were not dropped individually, but were packed into containers holding between 6 and 108 submunitions however, AP bombs had little ground penetration ability and should have been located by the post-raid survey unless they fell into water, dense vegetation or bomb rubble.

10.2.6. Failure Rate of German Air-Delivered Ordnance

It has been estimated that 10% of the German HE bombs dropped during WWII failed to explode as designed. This estimate is based on the statistics of wartime recovered UXBs and therefore will not have taken account of the unknown numbers of UXBs that were not recorded at the time. It is therefore quite likely that the average failure rate would have been higher than this.

There are a number of reasons why an air-delivered weapon might fail to function as designed:

- Many German bombs were fitted with a clockwork mechanism which could jam or malfunction.
- Malfunction of the fuze or gain mechanism (manufacturing fault, sabotage by forced labour or faulty installation)
- Failure of the bomber aircraft to arm the bombs due to human error or equipment defect.
- Jettison of the bomb before it was armed or from a very low altitude. Most likely if the bomber was under attack or crashing.

War Office Statistics document that a daily average of 84 bombs which failed to function were dropped on civilian targets in Great Britain between 21st September 1940 and 5th July 1941. 1 in 12 of these probably mostly fitted with time delay fuzes exploded sometime after they fell, the remainder were unintentional failures.

From 1940 to 1945 bomb disposal teams dealt with a total of 50,000 explosive items of 50 kg and over i.e. German bombs, 7,000 AAA shells and 300,000 beach mines. These operations resulted in the deaths of 394 officers and men. However, unexploded ordnance is still regularly encountered across the UK, especially in London, see press articles in **Annex M**.

10.2.7. V-Weapons

From mid-1944, Hitler's 'V-weapon' campaign began. It used newly developed unmanned cruise missiles and rockets. The V1 known as the *Flying Bomb* or *Doodlebug* and the V2, a Long Range Rocket, were launched from bases in Germany and occupied Europe. A total of 2,419 V1s and 517 V2s were recorded in the London Civil Defence region alone.

Although these weapons caused considerable damage their relatively low numbers allowed accurate records of strikes to be maintained. These records have mostly survived. It should be stressed that there is a negligible risk from unexploded V-weapons on land today since even if the 1000kg warhead failed to explode, the weapons are so large that they would have been observed and the threat dealt with at the time. Therefore V-weapons are referenced in this report not as a viable risk factor, but primarily in order to help account for evidence of damage and clearance reported.

11. UXB Ground Penetration

11.1. General

An important consideration when assessing the risk from a UXB is the likely maximum depth of burial. There are several factors which impact on the depth that an unexploded bomb will penetrate:

- Mass and shape of bomb
- Height of release
- Velocity and angle of bomb
- Nature of the groundcover
- Underlying geology

Geology is perhaps the most important variable. If the ground is soft, there is more potential for deeper penetration – peat and alluvium are easier to penetrate than gravel and sand for example and the bomb is likely to come to rest at deeper depths. Layers of hard strata will significantly retard and may stop the trajectory of a UXB.

11.2. The J Curve Effect

J-curve is the term used to describe the characteristic curve commonly followed by an air-delivered bomb dropped from height after it penetrates the ground. Typically, as the bomb is slowed by its passage through underlying soils, its trajectory curves towards the surface. Many UXBs are found with their nose cone pointing upwards as a result of this effect. More importantly however is the resulting horizontal offset from the point of entry. This is typically a distance of about one third of the bombs penetration depth but can be up to 15m, especially if sub-surface structures or hard layers of subsurface geology are present.

11.3. WWII UXB Penetration Studies

During WWII the Ministry of Home Security undertook a major study on actual bomb penetration depths, carrying out statistical analysis on the measured depths of 1,328 bombs as reported by Bomb Disposal, mostly in the London area. They then came to conclusions as to the likely average and maximum depths of penetration of different sized bombs in different geological strata.

They concluded that the largest common German bomb, 500kg, had a likely penetration depth of 6m in sand or gravel but 11m in clay. The maximum observed depth for a 500kg bomb was 11.4m and for a 1000kg bomb 12.8m. Theoretical calculations suggested that significantly greater penetration depths were probable.

11.4. Site Specific Bomb Penetration Considerations

When considering an assessment of the bomb penetration at the site the following parameters would be used:

- WWII Geology – London Clay formation: Clay, Silt and Sand
- Impact Angle and Velocity – 10-15° from Vertical and 270 metres per second.
- Bomb Mass and Configuration – The 500kg SC (General Purpose) HE bomb, without retarder units or armour piercing nose. This was the largest of the common bombs used against Britain.

Site specific maximum bomb penetration calculations can be made once reference has been made to site specific geological information. An assessment can also be made by a UXO Specialist once survey works are under way. Typically for this area of London, maximum bomb penetration for a 500kg bomb should not exceed 12m bgl.

12. Initiation of Unexploded Ordnance

12.1. General

Unexploded ordnance does not spontaneously explode. All high explosive requires significant energy to create the conditions for detonation to occur. In the case of unexploded German bombs discovered within the construction site environment, there are a number of potential initiation mechanisms.

12.2. UXB Initiation Mechanisms

There are a number of ways in which UXB can be initiated. These are detailed in the table below.

UXB Initiation	
Direct Impact	Unless the fuze or fuze pocket is struck, there needs to be a significant impact e.g. from piling or large and violent mechanical excavation, onto the main body of the weapon to initiate a buried iron bomb. Such violent action can cause the bomb to detonate.
Re- starting the Clock	A small proportion of German WWII bombs employed clockwork fuzes. It is probable that significant corrosion would have taken place within the fuze mechanism over the last 60 years that would prevent clockwork mechanisms from functioning. Nevertheless it was reported that the clockwork fuze in a UXB dealt with by 33 EOD Regiment in Surrey in 2002 did re-start.
Friction Impact	This is the most likely scenario resulting in the weapon detonating; friction impact initiating the shock-sensitive fuze explosive. The combined effects of seasonal changes in temperature and general degradation over time can cause explosive compounds to crystallise and extrude out from the main body of the bomb. It may only require a limited amount of energy to initiate the extruded explosive which could detonate the main charge.

Annex M2 & M3 details UXB incidents where intrusive works have caused UXBs to detonate, resulting in death or injury and damage to plant.

12.3. Effects of Detonation

Then considering the potential consequences of a detonation, it is necessary to identify the significant receptors that may be affected. The receptors that may potentially be at risk from UXO detonating on a construction site will vary depending on the site specific conditions but can be summarised as follows:

- People – site workers, local residents and general public
- Plant and equipment – construction plant on site
- Services – subsurface gas, electricity, telecommunications
- Structures – not only visible damage to above ground buildings, but potentially damage to foundations and weakening of support structures
- Environment – introduction of potentially contaminating materials

13. Threat from German UXBs

13.1. World War I

During WWI London was targeted and bombed by Zeppelin Airships and by Gotha and Giant fixed-wing aircraft. An estimated 250 tons of ordnance (high explosive and incendiary bombs) was dropped on Greater London, more than half of which fell on the City of London. The WWI bomb census map can be seen in **Annex E**. It is believed that WWI bombs fell in the general area however there is no specific evidence that points to bombs landing on the proposed site.

WWI bombs were generally smaller than those used in WWII and were dropped from a lower altitude, resulting in limited UXB penetration depths. Aerial bombing was often such a novelty at the time that it attracted public interest and even spectators to watch the raids in progress. For these reasons there is a limited risk that UXBs passed undiscovered in the urban environment. When combined with the relative infrequency of attacks and an overall low bombing density the threat from WWI UXBs is considered low and will not be further addressed in this report.

13.2. World War II Bombing of St. Pancras / Camden

The Luftwaffe's objective for the attacks on London was to paralyse the commercial life of the capital by bombing the docks, warehouses, wharves, railway lines, factories and power stations. The Metropolitan Borough of St. Pancras (in which the site was located during WWII) was subject to a Moderate / Medium bombing density. The district and neighbouring areas contained some targets of significance for the Luftwaffe which resulted in a relatively heavy bombardment throughout the region.

The main strategic targets in the area include the St. Pancras and King's Cross Stations with an electricity generating station and gas works also located in the area. Luftwaffe reconnaissance flights would take place over London and highlight such buildings / features which would be supplied to military planners and bomber crews.

Much of the area is residential in make-up however this did not mean it escaped the worst of the raids on the city. The neighbouring area of Hampstead experienced a relatively high density of bombing for a location of its nature. Some of this can be attributed to the aforementioned railway presence. The site neighboured railway infrastructure / railway intersections which would have provided incoming Luftwaffe raids with potential targets. Its close proximity to Central London is also a consideration when taking into account the levels of bombing for the area. Certain concepts of 'total war', i.e. less differentiation between combatants and civilians, brought the war to the doorstep of civilian Londoners with the belief that it was possible to break the country's will if the civilian population were directly impacted. Large scale raids were therefore designed to carpet bomb certain areas and not just target individual industry hubs and military establishments.

There were areas of industry in this part of London however they were not comparable to the concentration of industry in the East End of London. In addition there were no objectives of military significance in the area.

Records of bombing incidents in the civilian areas of London were collected by the Air Raid Precautions wardens and collated by the Civil Defence Office. Some other organisations, such as the London Port Authority and railways, maintained separate records.

Records would be in the form of typed or hand written incident notes, maps and statistics. Bombing data was carefully analysed, not only due to the requirement to identify those parts of the capital most needing assistance, but also in an attempt to find patterns in the Germans' bombing strategy in order to predict where future raids might take place.

Records of bombing incidents for the Metropolitan Borough of St. Pancras are presented in the following sections.

13.3. Second World War Bombing Statistics

The following tables summarise the quantity of German bombs (excluding 1kg incendiaries and anti-personnel bombs) falling on the Metropolitan Borough of St. Pancras between 1940 and 1945.

Record of German Ordnance Dropped on the Metropolitan Borough of St. Pancras		
Area Acreage		**2,694**
Weapons	High Explosive Bombs (all types)	641
	Parachute Mines	8
	Oil Bombs	14
	Phosphorus Bombs	11
	Fire Pot	0
	Pilotless Aircraft (V1)	20
	Long Range Rockets (V2)	2
Total		**696**
Number of Items per 1000 acres		**258.4**

Source: Home Office Statistics
This table does not include UXO found during or after WWII.

Detailed records of the quantity and locations of the 1kg incendiary and anti-personnel bombs were not routinely maintained by the authorities as they were frequently too numerous to record. Although the incendiaries are not particularly significant in the threat they pose, they nevertheless are items of ordnance that were designed to cause damage and inflict injury and should not be overlooked in assessing the general risk to personnel and equipment. The anti-personnel bombs were used in much smaller quantities and are rarely found today but are potentially more dangerous.

13.4. London Air Raid Precautions Bomb Census Maps

During WWII, the Ministry of Home Security produced consolidated and weekly bomb census maps for London. The maps covering the area of the site were checked for this report. Those showing bomb strikes on and in the vicinity of the site are presented in **Annex G** and are discussed below:

London Consolidated Bomb Maps – Annex G	
Date Range	**Comments**
Night bombing up to 7th October 1940	There are no bomb incidents directly impacting / affecting the proposed site however there are a relatively high number of incidents in the surrounding area. Much of the bombing is located to the east of the site in the vicinity of the neighbouring rail infrastructure.
Night bombing – 7th October 1940 to 28th July 1941	Numerous bomb incidents occurred throughout the area. The proposed site appears to have escaped bombing during this period of the war. A HE bomb landed on the corner of Lamble Street and Oak Village, a short distance from the site boundary to the north. Much of the surrounding area, particularly to the east and south-west show a particularly high density of localised bombing.
Day bombing – 8th October to 31st December 1940	An incident which has been recorded in the previous consolidated bomb census map is accounted for in this edition. It appears to corroborate the previous map with regards to the location of this incident.

London Weekly Bomb Maps – Annex H	
Date Range	**Comments**
7th to 14th October 1940	There are no bombing incidents in the direct vicinity of the proposed site during this week of the war. Bombs did fall to the north, east and west of the site, particularly around the area of Hampstead. A number of **1kg incendiary shower** incidents can be noted in the area to the west.
21st to 28th October 1940	There are no bombing incidents in the direct vicinity of the proposed site during this week of the war. The surrounding area did receive a number of high explosive and large calibre incendiary bombs.
4th to 11th November 1940	There are no bombing incidents of direct significance to the proposed site however a total of **18 HE bombs** fell in the region to the south, south-west and west of the site location. **1 UXB** can also be noted in this sequence of bomb strikes.
11th to 18th November 1940	Numerous bombing incidents of various types occurred throughout the area during this week of the war. The closest bomb incident to the proposed site area was a **1000kg HE bomb** located along Mansfield Road at an approx. distance of 170m to the north-west. A concentration of incidents is located to the north-west of the site location in the area of Tufnell Park.
6th to 13th January 1941	The proposed site escaped bombing during this week of the war however of a sequence of **10 HE bombs** is located to the south, south-west and west of the site running in an easterly direction.
5th to 12th May 1941	A number of HE bombs fell in the surrounding area with a **1kg incendiary bomb shower** located approx. 80-100m to the south-west. 1kg incendiary bombs do not have the ground penetration capabilities of large calibre HE bombs however they are still occasionally found on construction sites across the UK and can be misidentified in the absence of an Explosive Ordnance Disposal Engineer.
14th to 20th February 1944	A number of unexploded bombs of various types are located to the west of the proposed site. Two incidents are classed as 'unclassified'. At the time of the event the relevant authorities did not have the required information with which to formally classify the incident. **3 unexploded HE 50kg bombs** and **2 unexploded phosphorus incendiary bombs** are located in this sequence.

13.5. London V-Weapon Maps

Plots showing the location of all the V-1 strikes in the London area were compiled by the Ministry of Home Security. The covering the area of the site was checked and a section of it is presented in **Annex I**.

V-Weapon Map – Annex I	
Date Range	**Comments**
Post-war consolidated Bomb Plot Map	This V1 flying bomb census map shows 2 V1 strikes to the south and north-west of the site. There are no V1 strikes in the immediate area of the proposed site.

13.6. LCC Bomb Damage Map

A map compiled by the London County Council Architects department showing the extent of bomb damage on the area is presented in **Annex J**.

LCC Bomb Damage Map – Annex I	
Date Range	**Comments**
Post-War	The residential area to the north of the proposed site experienced bomb damage ranging from 'general blast damage' to 'damage beyond repair / total destruction'. This account of bomb damage to the area appears to be corroborated by post-war aerial imagery. The area to the north of the site, along Mansfield Road, has been cleared of structures as a consequence of this damage. Areas to the north-east, east and south-west also experienced considerable damage. There is no damage recorded to the proposed site, however much of the site area contains ground cover which did not house buildings / structures to which damage can be attributed. The only structures of significance are an electrical sub-station and a disused brick kiln.

13.7. Metropolitan Borough of St. Pancras Bomb Incident Records

A transcript of the associated written records for the bombs which fell in the area is not available for reference. Attempts were made to locate and then access bombing records for this area however it appears that they have either been lost or even destroyed.

13.8. WWII-Era Aerial Photographs

A high resolution scan of WWII-era aerial photography for the site area has been obtained from the National Monuments Record (English Heritage). Imagery dated 17th August 1947 is presented in **Annex K**.

The RAF aerial photograph of the site does not show any obvious signs of bomb damage however the ground cover conditions at the time make it impossible to confirm this fact. Much of the proposed site appears to be an uneven, unkempt environment with individual areas utilised for storage. Open ground such as this containing rubble, spoil, stockpiles of material and areas of dense vegetation, generally provides ground conditions which are not conducive to the observation of a UXB entry hole. Note size of a 50kg HE bomb entry hole in **Annex N**. It would have been very easy to have overlooked evidence of UXO – in some areas across the site, impossible.

Historic maps from this era refer to the Brick Kiln Works as being 'disused' at this time. It is not clear how often the proposed site may have been accessed or regularly used. A small section of the proposed site to the west was occupied by an operational timber yard. The presence of UXO in this particular area is likely to have been observed and dealt with at the time if it occurred. Ground conditions do not contain dense vegetation and may even contain ground cover of a hard standing nature at this location.

A view of the wider area has been included in **Annex K2**. Areas which show the impact of the war are highlighted accordingly. As this image was taken nearly two years after the end of hostilities some of the damage will have been repaired / redeveloped. Any damage which occurred to railway infrastructure was normally repaired in a timely fashion during the war period. As such there are no obvious signs of bomb damage in the vicinity of neighbouring railway lines.

13.9. Bombing Decoy Sites

The decoy principal – drawing German bombers away from their designated targets onto dummy sites five or six miles away – began in WWI to protect RAF stations. In 1939, a new department was set up to investigate and coordinate the concept of defence by deception. A whole range of decoy sites were developed – some of them became very elaborate and covered large areas.

Common WWII Decoy Site Variants	
Decoy Type	**Description**
K-site	Daytime dummy airfield. Dummy aircraft and infrastructure.
Q-site	Night time dummy airfield. Intended to represent the working lights of an airfield after dark.
QL	Night time dummy infrastructure. Replicating the lights and workings of marshalling yards, naval installations, armament factories etc.
QF	Fire based decoy. Initially for aircraft factories, RAF maintenance units and ordnance works to simulate them on fire following bombing.
Oil QF	Simulation of burning oil tanks
Starfish	Replicating a city under incendiary attack

By June 1944, decoy sites had been attacked on 730 occasions. Each of these ranged from a single night-time bomber dropping its load onto a "Q" site, to the mass attacks on Starfish sites. In drawing the high explosives and incendiaries on to themselves, they were undoubtedly responsible for saving the lives of thousands of people.

Works planned in the vicinity of WWII decoy sites can be at an elevated risk from UXBs as the facilities were specifically designed to be bombed. It was not uncommon for evidence of UXBs to be overlooked following a raid. Given that the sites were on open ground, sometimes agricultural fields, UXB entry holes were not always evident.

Records indicate that bombing decoy sites were present for the region of the site during WWII. The nearest decoy was an RAF Decoy for RAF Northolt situated approx. 13.5km north of the site between High Barnet and Borehamwood.

13.10. Abandoned Bombs

A post-air raid survey of buildings, facilities and installations would have included a search for evidence of bomb entry holes. If evidence were encountered, Bomb Disposal Officer Teams would normally have been requested to attempt to locate, render safe and dispose of the bomb. Occasionally evidence of UXBs was discovered but due to a relatively benign position, access problems or a shortage of resources the UXB could not be exposed and rendered safe. Such an incident may have been recorded and noted as an Abandoned Bomb.

Given the inaccuracy of WWII records and the fact that these bombs were ‘abandoned’, their locations cannot be considered definitive or the lists exhaustive. The MoD states that ‘action to make the devices safe would be taken only if it was thought they were unstable’. It should be noted that other than the ‘officially’ abandoned bombs, there will inevitably be UXBs that were never recorded.

1st Line Defence holds no records of officially registered abandoned bombs at or near the site of the proposed works.

13.11. Bomb Disposal Tasks

The information service from the Explosive Ordnance Disposal (EOD) Archive Information Office at 33 Engineer Regiment (EOD) is currently facing considerable delay. It has therefore not been possible to include any official information regarding bomb disposal/clearance tasks on this site. If any relevant information is received at a later date Ramboll UK Limited will be advised.

13.12. Evaluation of Bombing Records

Item	Conclusion
Density of Bombing *It is important to consider the bombing density for assessing the possibility that UXBs remain in an area. High levels of bombing density could allow for error in record keeping due to extreme damage caused to the area.*	The Metropolitan Borough of St. Pancras was subject to a **Moderate / Medium Density** of bombing with 258 bombs recorded per 1000 acres. The former Metropolitan Borough of St. Pancras covered a relatively large area which gives a slightly lower impression of bombing in this area of London when taking into consideration the bombs per 1000 acres figure. Bombing in the localised area is considered to be relatively high. An illustration of the bombing density can be seen in the consolidated bomb census map from the 7th October 1940 to 28th July 1941. The site was situated approximately 6km from the City of London which experienced very high levels of bombing throughout WWII.
Ground Cover *The type & amount of ground cover existing during WWII would have a substantial influence on any visual indication that may indicate UXO being present.*	The proposed site contains areas of open ground which previously housed a brick kiln works. It appears to contain a mix of dense vegetation, soft open ground (including the access route) and areas of debris and rubble, mounds of spoil, open excavations and material associated with the sites former usage. The brick kiln structure appears to remain in place during the WWII era as evidenced by the presence of the chimney. An electrical sub-station occupies a small space of land in the north-west corner of the proposed site. Where the ground cover is not occupied by occupied facilities or structures, the risk of UXO going unnoticed can be significantly increased, especially if the ground conditions are poor and the frequency of access / post raid checks for evidence of UXO is limited. Rubble, debris and dense vegetation often had the direct consequence of hiding / obscuring the presence of UXO.
Access Frequency *UXO in locations where access was irregular would have a greater chance of passing unnoticed than at those that were regularly occupied. The importance of a site to the war effort is also an important consideration as such sites are likely to have been both frequently visited and are also likely to have been subject to post-raid checks for evidence of UXO.*	The frequency of access to this particular site during WWII is difficult to gauge from the information available. Some areas areas would have been accessed and would have more clearly exposed the presence of UXO if such an incident occurred. This would include the sub-station and the area used as a timber yard. While it appears that remainder of the site was accessed to some degree with sections used for storage, widespread access to the most of the site area would have been very limited. Areas of dense vegetation / open uneven ground and debris may not have been accessed with regularity.

Damage *If buildings or structures on a site have received bomb or fire damage, it is probable that rubble and debris to be present. Also a High Explosive bomb strike in an area of open agricultural land is likely to have some soil disturbance. In these cases there is a risk that the bomb entry holes of unexploded bombs dropped during following air raids being covered and being overlooked.*	Available records and post-war reconnaissance imagery appears to indicate a bomb damage free site. However it should be noted that there was not a concentration of buildings within the site boundary to which damage could be attributed. From the information available there are no bomb incidents within the site boundary. The surrounding area experienced considerable damage from Luftwaffe bombing. LCC Bomb Damage maps and aerial imagery give an indication of the effects of the war and can be seen in **Annex J** and **Annex K** respectively.
Bomb Failure Rate	There is no evidence to suggest that the bomb failure rate in the locality of the site would have been dissimilar to the 10% normally used.
Abandoned Bombs	1st Line Defence holds no records of abandoned bombs within the site vicinity.
Bombing Decoy sites	1st Line Defence could find no evidence of bombing decoy sites within the site vicinity.
Bomb Disposal Tasks	1st Line Defence has no evidence of bomb disposal tasks in the vicinity of the proposed site. Note that we are awaiting this confirmation from 33 Engineer Regiment (Explosive Ordnance Disposal).

14. The Threat from Allied Military Ordnance

14.1. General

In addition to the threat from aerial delivered UXO, this report also assesses the potential risk from Allied military ordnance at the site. Even on sites which are not directly occupied by the military, there is still sometimes the potential that historic military presence could have resulted in contamination from items of Land Service (LSA) and Small Arms Ammunition (SAA). Inner city areas for example can still be at risk from buried unexploded Anti-Aircraft projectiles fired during WWII.

14.2. Land Service Ammunition

The term LSA covers all items of ordnance that are propelled, placed or thrown during land warfare. They may be filled or charged with explosives, smoke, incendiary or pyrotechnics. They can be broken into five main groups:

Mortars	A bomb, normally nosed-fused and fitted with its own propelling charge, who's flight is stabilised by the use of a fin. They are tear-dropped shape (older variants however are parallel sided) with a finned 'spigot tube' screwed or welded to the rear end of the body which houses the propellant charge. They are either High Explosive or Carrier.
Grenades	A short range weapon (explosive range 15-20m) which can be thrown by hand or alternatively fired from the end of a rifle or a purposely designed grenade launcher. They can either be High Explosive of Carrier (usually smoke) and common variants have a classic 'pineapple' shape.
Projectiles	A projectile (or shell) is defined as an object which can be propelled by force, normally from a gun, and continues in motion by virtue of its kinetic energy. It contains a fuzing mechanism and a filling. Projectiles can be High Explosive, Carrie (i.e. with smoke) or Shot (a solid projectile).
Rockets	A rocket is defined as a missile that obtains thrust from a rocket engine. Military rockets are used to propel warheads to an intended target. This warhead will contain an explosive charge normally initiated on contact or at a predetermined height / proximity from target.
Landmines	A landmine is a munition designed to be placed under, on, or near the ground or other surface and to be exploded by the presence, proximity or contact of a person or vehicle.

Unexploded or partially unexploded Mortars and Grenades are among the most common items of LSA encountered in the UK as they could be transported and utilised anywhere. They are commonly encountered in areas used by the military for training and are often found discarded on or near historic military bases.

As with UXBs, items of LSA do not become inert or lose their effectiveness with age. Time can cause items to become more sensitive and less stable. This applies equally to items submerged in water or embedded in silts, clays or similar materials. The greatest risk occurs when an item of ordnance is struck or interfered with. This is likely to occur when mechanical equipment is used or when unqualified personnel pick up munitions.

14.3. Defending London from Aerial Attack

Both passive and active defences were deployed against enemy bombers attacking targets in the Greater London region.

Passive Defences	Active Defences
These included defence tactics such as: • To hinder the identification of targets, by using lighting blackouts at night and	These relied on a coordinated combination of a number of installations in order to actively engage and oppose attacking aircraft. Some of these installations were:

camouflaging strategic installations. • To mislead bomber pilots into attacking decoy sites located away from the city with the use of dummy buildings or lighting to replicate that of the city under attack. • To force attacking aircraft to higher altitudes with the use of barrage balloons.	• Fighter aircraft to act as interceptors. • Anti-aircraft gun batteries. • The use of rockets and missiles (later during WWII).

14.4. Anti-Aircraft Artillery (AAA) and Projectiles

At the start of WWII two types of Anti-Aircraft Artillery (AAA) guns were deployed: Heavy Anti-Aircraft Artillery (HAA), using large calibre weapons such as the 3.7" QF (Quick Firing) gun and Light Anti-Aircraft Artillery (LAA) using smaller calibre weapons such as 40mm Bofors gun.

During the early war period there was a severe shortage of AAA available and older WWI 3" and modified naval 4.5" guns were deployed alongside those available 3.7" weapons. The maximum ceiling height of fire at that time was around 11,000m for the 3.7" gun and less for other weapons. As the war progressed improved variants of the 3.7" gun were introduced and, from 1942, large 5.25 inch weapons began to be brought into service. These had significantly improved ceiling heights of fire reaching over 18,000m.

The LAA batteries were intended to engage fast low flying aircraft and were typically deployed around airfields or strategic installations. These batteries were mobile and could be moved to new positions with relative ease when required. The most numerous of these were the 40mm Bofors gun which could fire up to 120 x 40mm HE shells per minute to over 1800m.

The HAA projectiles were high explosive shells, usually fitted with a time delay or barometric pressure fuze to make them explode at a pre-determined height. If they failed to explode or strike an aircraft, they would eventually fall back to earth. Details of the most commonly deployed WWII AAA projectiles are shown below:

Gun type	Calibre	Shell Weight	Shell Dimensions
3.0 Inch	76mm	7.3kg	76mm x 356mm
3.7 Inch	94mm	12.7kg	94mm x 438mm
4.5 Inch	114mm	24.7kg	114mm x 578mm
40mm	40mm	0.9kg	40mm x 311mm

Although the larger unexploded projectiles could enter the ground they did not have great penetration ability and are therefore likely to be found close to WWII ground level. These shells are frequently mistakenly identified as small German air-delivered bombs, but are differentiated by the copper driving band found in front of the base. With a high explosive fill and fragmentation hazard these items of UXO present a significant risk if encountered. The smaller 40mm projectiles are similar in appearance and effect to small arms ammunition and, although still dangerous, present a lower risk.

Numerous unexploded AAA shells were recovered during and following WWII and are still occasionally encountered on sites today.

The closest recorded HAA battery to the site was situated approximately 940m north-west on Parliament Hill (Hampstead Heath).

Illustrations of Anti-Aircraft artillery, projectiles and rockets are presented at **Annex O**.

14.5. Evaluation of Allied Military Ordnance Risk

1st Line Defence has considered the following potential sources of contamination:

Item	Conclusion
Military Camps	1st Line Defence could find no evidence of a Military Camp within the site.
Anti-Aircraft Defences	1st Line Defence could find no evidence of Anti-Aircraft Defences in the site proximity. The closest HAA battery was approx. 940m to the north-west.
Home Guard Activity	Evidence of Home Guard training areas and activities is difficult to obtain. 1st Line Defence has no evidence of any Home Guard activities on the site.
Defensive Positions	There is no evidence of any defensive structures in the vicinity of the site.
Training or firing ranges	No evidence of these could be found.
Defensive Minefields	No evidence of these could be found.
Ordnance Manufacture	No such evidence of this could be found.
Military Related Airfields	There has been no history of military related airfields in the site vicinity or surrounding area.
Explosive Ordnance Clearance Tasks	1st Line Defence holds no records of EOD operations on the site.

15. Ordnance Clearance and Post-WWII Ground Works

15.1. General

The extent to which any ordnance clearance activities have taken place on site or extensive ground works have occurred is relevant since on the one hand they may indicate previous ordnance contamination but also may have reduced the risk that ordnance remains undiscovered.

15.2. UXO Clearance

1st Line Defence has no evidence that any official ordnance clearance operations have taken place on site. Note however that we have not yet received confirmation of this fact from 33 EOD Regiment.

15.3. Post war Redevelopment

There has been some re-development on the site post WWII. The most significant development in the post-war period is the Kiln Place estate which currently occupies the proposed site location. The extent of the developments and depth of foundations can partly mitigate the UXO risk as any present items of UXO may have been uncovered during the works. If the assessed level of bomb penetration is deeper than pre-existing foundations, it may be necessary to mitigate the risk from deep buried UXO if piling or excavations are planned.

Areas of open ground between the four main sections of the residential estate would have contained some degree of shallow excavation for levelling purposes. However these areas do not appear to have been subject to any significant works in the post-war period.

16. 1st Line Defence Risk Assessment

16.1. Risk Assessment Stages

Taking into account the quality of the historical evidence, the assessment of the overall threat to the proposed works from unexploded ordnance is based on the following five considerations:

1. That the site was contaminated with unexploded ordnance.
2. That unexploded ordnance remains on site.
3. That such items will be encountered during the proposed works.
4. That ordnance may be initiated by the works operations.
5. The consequences of encountering or initiating ordnance.

UXO Risk Assessment	
Quality of the Historical Record	The research has located and evaluated pre- and post-WWII Ordnance Survey maps, London WWII ARP bomb plots from 1940 to 1945, available Metropolitan Borough of St. Pancras / Hampstead bomb incident Records, in-house data and post WWII era aerial photographs for the site.
The Risk that the Site was Contaminated with UXO	After considering the following facts, 1st Line Defence believes that there is a risk that the site could have been contaminated with unexploded ordnance. However, this risk is not considered to be homogenous across the entire site area but has been zoned into areas of **Low** and **Medium** risk (see Risk Map, **Annex P**). ☐ During WWII the Metropolitan Borough of St. Pancras was subjected to a **Moderate / Medium Density** bombing campaign, with 258 items falling per 1,000 acres. A total of 641 High Explosive bombs fell on the borough. St. Pancras and neighbouring areas contained some Luftwaffe targets which included rail infrastructure and a small number of industry sites. ☐ The London Bomb Census maps shown in **Annexes G & H**, show a significant quantity of bomb strikes in the immediate area of the site, particularly to the east and west. There is no indication of recorded bomb incidents within the proposed site boundary from the information available. It is possible that records of land such as this would not have been kept as it was of low importance/priority. ☐ The proposed site contains areas of open ground which previously housed a disused brick kiln works during WWII. It appears to contain a mix of dense vegetation, soft open ground (including the access route) and areas of debris and rubble, mounds of spoil, open excavations and material associated with the sites former usage. The brick kiln structure appears to remain in place during the WWII era as evidenced by the presence of the chimney. An electrical sub-station occupies a small space of land in the north-west corner of the proposed site. ☐ Where the ground cover is not occupied by occupied facilities or structures, the risk of UXO going unnoticed can be significantly increased, especially if the ground conditions are poor and the frequency of access / post raid checks for evidence of UXO is limited. Rubble, debris and dense vegetation often had the direct consequence of hiding / obscuring the presence of UXO. This puts large areas of the site at concern as given the nature of the groundcover and limited access, it is considered highly unlikely that evidence of UXO would have been noted and dealt with. ☐ There is no evidence that the site formerly had any military occupation or usage that could have led to contamination with other items of ordnance.
The Risk that	Some post-war redevelopment has occurred on the site although the exact nature of

UXO Remains on Site	the groundwork is unknown. Where this development has taken place, the risk of encountering shallow buried UXO (especially 1kg incendiaries or anti-personnel bombs) and anti-aircraft projectiles will have been partly mitigated since any such items may have been discovered during excavations. The risk from deeper buried UXO may be mitigated at the locations of existing foundations for the Kiln Place estate. If the planned works (piling or excavations) are planned to exceed pre-existing levels it may be necessary to further mitigate the risk from UXO down to planned works levels. This would be particularly necessary if the assessed level of bomb penetration for this site exceeds pre-existing foundation level and any depths for piling / percussive drilling etc.
The Risk that UXO may be Encountered during the Works	The most likely scenarios under which a UXO could be encountered during construction works is during piling, drilling operations or bulk excavations for basement levels. The overall risk will depend on the extent of the works, such as the numbers of boreholes/piles (if required) and the volume of the excavations. Since an air-dropped bomb may come to rest at any depth between just below ground level and its maximum penetration depth there is also a chance that such an item could be encountered during shallow excavations (for services or site investigations) into the original WWII ground level.
The Risk that UXO may be Initiated	The risk that UXO could be initiated if encountered will depend on its condition, how it is found and the energy with which it is struck. Certain construction activities such as piling and percussive drilling pose a greater risk of initiating UXO than, say, machine excavation where the force of impact is generally lower and the item more likely to be observed. If a UXB is struck by pilling or percussive drilling equipment, the force of the impact can be sufficient to detonate the main high explosive charge irrespective of the condition of the fuze or other components. Violent vibration might also impart enough energy to a chemical detonator for it to function, and there is a potential risk that clockwork fuzes could restart. If piling works are planned at the Kiln Place site in Camden – London, there is a potential risk that a UXB, if present, could be initiated. The risk of initiation assessed to be considerably lower for any open shallow excavation works planned.
The Consequences of Encountering or Initiating Ordnance	The repercussions of the inadvertent detonation of UXO during intrusive ground works are potentially profound, both in terms of human and financial cost. A serious risk to life and limb, damage to plant and total site shutdown during follow-up investigations are potential outcomes. If appropriate risk mitigation measures are put in place, the chances of initiating an item of UXO during ground works is comparatively low. The primary consequence of encounter of UXO will therefore be economic. This would be particularly notable in the case of a high-profile site and sites where it is necessary to evacuate the public from the surrounding area. A site may be closed for anything from a few hours to a week with potentially significant cost in lost time. It should be noted that even the discovery of suspected or possible item of UXO during intrusive works (if handled solely through the authorities), may also involve loss of production. Generally, the first action of the police in most cases will be to isolate the locale whilst awaiting military assistance, even if this turns out to have been unnecessary.

16.2. Assessed Risk Level

Taking into consideration the findings of this study, 1st Line Defence considers there to be a risk on site from air-delivered UXBs. However, the risk is not considered to be homogenous across the whole site area, and has been divided into zones – see Risk Map, **Annex P**.

Medium Risk Zone

Within this area, it is considered very unlikely given ground conditions and low frequency of access/checks that evidence of UXBs would have been noted and dealt with. Any items of UXO falling into the spoil heaps, open excavations, vegetation, uneven ground and stockpiles of material are not likely to have been observed. This is of concern given the high localised bombing density.

Ordnance Type	Risk Level			
	Negligible	Low	Medium	High
German UXB's			✓	
Allied AAA		✓		
German Incendiaries and AP bomblet's		✓		
Other Allied Military Ordnance	✓			

Low Risk Zone

These areas of the site were occupied by undamaged structures (i.e. the substation) and areas of homogenous groundcover which appear to be in use (i.e. the timber yard) throughout WWII. It is considered likely that these properties would have been accessed and occupied throughout this period and that checks would therefore have been made for evidence of UXO.

Ordnance Type	Risk Level			
	Negligible	Low	Medium	High
German UXB's		✓		
Allied AAA		✓		
German Incendiaries and AP bomblet's		✓		
Other Allied Military Ordnance	✓			

17. Proposed Risk Mitigation Methodology

17.1. General

The following risk mitigation measures are recommended to support the proposed works at the Kiln Place, Camden site:

Type of Work	Recommended Mitigation Measure
All Works in *Low and Medium Risk Areas*	• **Site Specific Unexploded Ordnance Awareness Briefings to all personnel conducting intrusive works.** A specialised briefing is always advisable when there is a possibility of explosive ordnance contamination. It is an essential component of the Health & Safety Plan for the site and conforms to requirements of CDM Regulations 2007. All personnel working on the site should be instructed on the identification of UXB, actions to be taken to alert site management and to keep people and equipment away from the hazard. Posters and information of a general nature on the UXB threat should be held in the site office for reference and as a reminder.
Shallow Intrusive Works/Open Excavations in Medium Risk Areas	• **Unexploded Ordnance (UXO) Specialist Presence on Site to support shallow intrusive works:** When on site the role of the UXO Specialist would include; monitoring works using visual recognition and instrumentation and immediate response to reports of suspicious objects or suspected items of ordnance that have been recovered by the ground workers on site; providing UXO Awareness briefings to any staff that have not received them earlier and advise staff of the need to modify working practices to take account of the ordnance threat, and finally to aid Incident Management which would involve liaison with the local authorities and Police should ordnance be identified and present an explosive hazard.
Borehole/Piles in *Medium Risk Areas*	• **Intrusive Magnetometer Survey of all Borehole and pile locations down to a maximum bomb penetration depth:** 1st Line Defence can deploy a range of intrusive magnetometer techniques to clear ahead of all the pile locations. The appropriate technique is governed by a number of factors, but most importantly the site's ground conditions. The appropriate survey methodology would be confirmed once the enabling works have been completed.

In making this assessment and recommending these risk mitigation measures, the proposed works outlined in the 'Scope of the Proposed Works' section were considered. Should the planned works be modified or additional intrusive engineering works be considered, 1st Line Defence should be consulted to see if a re-assessment of the risk or mitigation recommendations is necessary.

1st Line Defence Limited **6th February 2014**

This Report has been produced in compliance with the Construction Industry Research and Information Association (CIRIA) C681 guidelines for the writing of Detailed Risk Assessments in regard to the UXO risk.

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