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By Email

Dear Sir/ Madam

SMITHFIELD MARKET, MANCHESTER SUPPLEMENTARY SITE INVESTIGATION

1. BACKGROUND

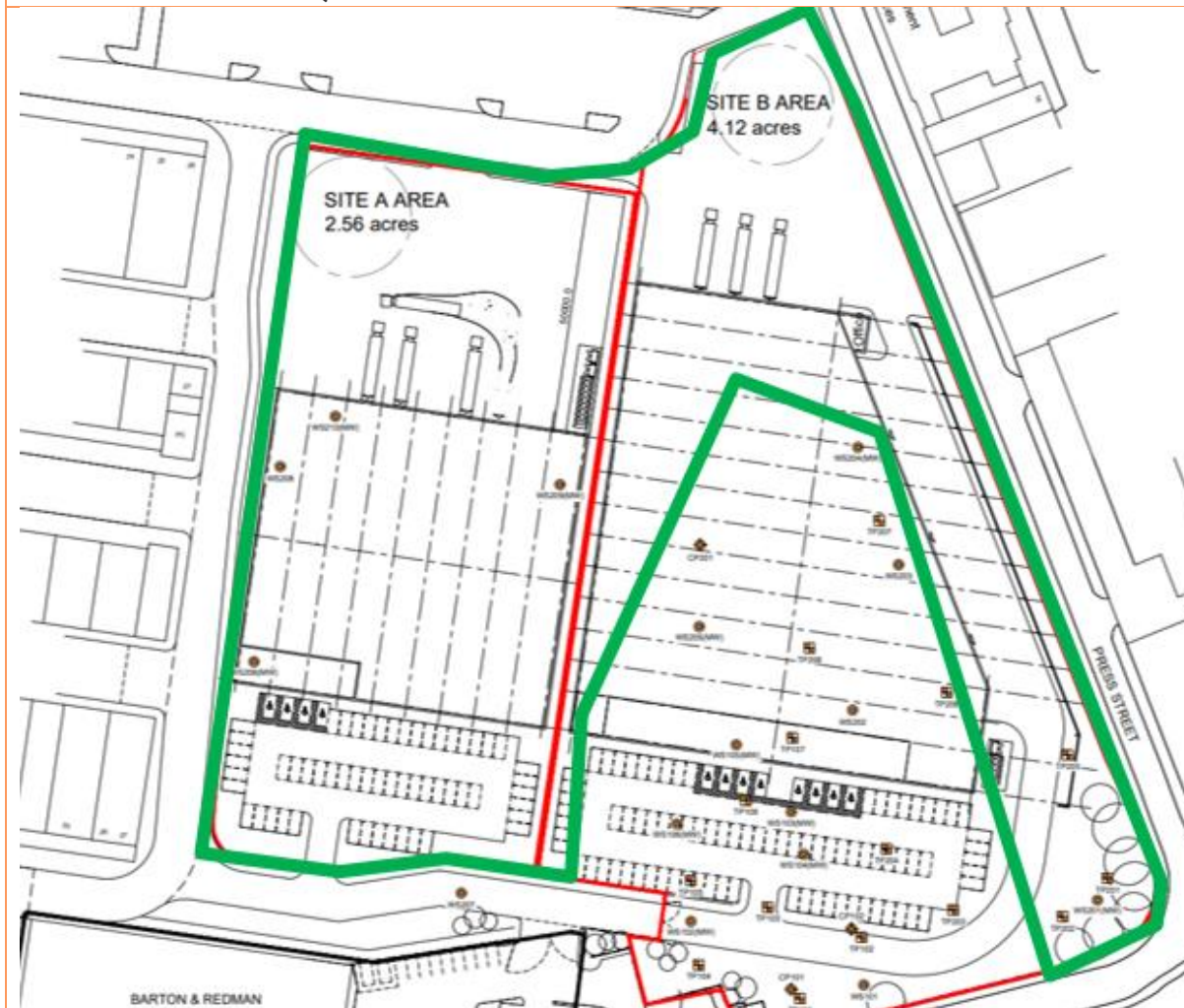
E3P carried out two previous Phase II Geoenvironmental Site Assessment at Smithfield Market, Manchester, in November 2018 (Report Ref: 12-757-R2) and June 2020 (Report Ref: 12-757-R2-1), which noted limited investigation within localised areas of the site due to restricted access.

Smithfield Market buildings were present and active with frequent vehicle movements preventing trial pitting in target areas. The site boundary had also been extended.

A supplementary intrusive investigation was therefore advised to further characterise the underlying ground conditions within these areas. Figure 1.1 shows the areas requiring further investigation due to the extension of the site boundary.



FIGURE 1.1 AREA REQUIRING FURTHER INVESTIGATION IN GREEN



1.1. CURRENT AND HISTORIC LAND USE

The site is currently occupied by vehicle parking, industrial storage units, and access associated with New Smithfield Market. Storage of commercial material, including waste skips, are present on site.

Hardstanding is present across the whole site with some peripheral landscaping on the southern boundary with small trees and bushes.

A review of historic Ordnance Survey mapping shows the site was occupied by a locomotive and carriage works up to the mid-1990s, including railway tracks, cranes, and tanks. Since circa 1970s, the new Smithfield Market comprising a series of buildings for storage has occupied the site and surrounding area; the subject site is located within the vehicle access and parking area of the market. An electricity substation is shown on plans from pre-1978 until the present.



2. SUPPLEMENTARY GROUND INVESTIGATION

2.1. GENERAL OVERVIEW

A ground investigation has been designed based on the previous investigative works with exploratory hole locations advanced in the extended site boundary and locations previously inaccessible.

Eleven mechanically excavated trial pits, five window sample probeholes and two cable percussion boreholes were undertaken within these areas, with exploratory holes advanced to investigate ground conditions and to retrieve environmental samples, spatially distributed to attain suitable coverage.

2.2. LIMITATIONS

The presence of several sensitive underground services were recorded across the site including a combined public sewer, surface water sewer, water distribution main, and BT cables across the site.

GPR borehole clearance was carried out during the supplementary site investigation to clear the locations of the proposed exploratory trial holes, window sample probeholes and cable percussion probeholes from the live underground services identified across the site. Unexploded Ordnance (UXO) supervision was also required due to the site being located within a moderate risk area for unexploded bombs.

The site was active during the time of supplementary site investigations; therefore, exploratory holes were positioned in areas that would not limit access for the occupants.

2.3. SUMMARY OF SUPPLEMENTARY INVESTIGATION

Exploratory fieldwork was completed from 25th to 26th January 2022 for trial pit and window sample locations and from the 31st of January to 2nd February for cable percussive boreholes. The works are summarised in Table 2.1.

TABLE 2.1 SUMMARY OF FIELDWORK

POTENTIAL SOURCE/RATIONALE	LOCATION HOLE	TYPE	MAXIMUM DEPTH (m bgl)
General Ground Conditions Including the Presence/Nature of Obstructions	TP301	Mechanically Excavated Trial Pit	2.50
	TP302		2.70
	TP303		2.20
	TP304		2.20
	TP305		2.50
	TP306		3.10
	TP307		2.20
	TP308		1.10
	TP309		2.20
	TP310		2.50
	TP311		2.20



POTENTIAL SOURCE/RATIONALE	LOCATION HOLE	TYPE	MAXIMUM DEPTH (m bgl)
General Ground Conditions Including the Presence/Nature of Obstructions	WS301	Window Sample Probehole	5.45
	WS302		5.45
	WS303		5.45
	WS304		5.45
	WS305		5.45
Investigation of Deeper Soil Horizons	CP301	Cable Percussion Probehole	20.37
	CP302		20.39

The sampling locations are illustrated in Drawing 12-757-005. The ground conditions encountered are indicated on the logs, which are included with this letter.

2.4. LABORATORY ANALYSIS

Selected soil samples were submitted for a range of chemical analysis comprising:

- ☛ Metals;
- ☛ pH, total sulphate, water-soluble sulphate (2:1 extract);
- ☛ Sulphide;
- ☛ Cyanide;
- ☛ Phenols;
- ☛ Total and speciated polycyclic aromatic hydrocarbons (PAHs);
- ☛ Asbestos identification; and,
- ☛ Banded total petroleum hydrocarbon (TPH).
- ☛ Semi-volatile organic compounds
- ☛ Volatile organic compounds

I2 Analytical undertook the analytical work and the testing results are included with this letter and discussed in Section 3.

2.5. SUMMARY OF GROUND CONDITIONS

The ground investigation generally confirms the published geology and identifies the strata set out in Table 2.2.



TABLE 2.2 SUMMARY OF STRATA

HOLE	DEPTH TO STRATUM (M BGL)			
	MADE GROUND	STIFF SLIGHTLY GRAVELLY CLAY	STIFF GRAVELLY CLAY	STIFF SANDY CLAY
TP301	0.00 – 1.00	1.00 – 2.50	-	-
TP302	0.00 – 1.40	-	1.40 – 2.70	-
TP303	0.00 – 0.70	-	0.70 – 1.70	1.70 – 2.20
TP304	0.00 – 0.80	0.80 – 2.20	-	-
TP305	0.00 - 1.40	-	1.40 – 2.50	-
TP306	0.00 – 2.70	2.70 – 3.10	-	-
TP307	0.00 – 0.70	0.70 – 2.20	-	-
TP308	0.00 – 1.10	-	-	-
TP309	0.00 – 0.70	0.70 – 2.20	-	-
TP310	0.00 – 0.90	1.80 – 2.50	0.90 – 1.80	-
TP311	0.00 – 0.70	-	0.70 – 2.20	-
WS301	0.00 – 1.00	-	1.00 – 5.45	-
WS302	0.00 – 0.80	0.80 – 5.45	-	-
WS303	0.00 – 0.50	0.50 – 5.45	-	-
WS304	0.00 – 1.80	1.80 – 5.45	-	-
WS305	0.00 – 0.60	0.60 – 5.45	-	-
CP301	0.00 - 2.00	2.00 – 15.00	-	15.00 – 20.37
CP302	0.00 – 1.00	1.00 – 20.39	-	-

2.6. MADE GROUND

Made Ground was encountered within all exploratory hole locations at depths between ground level to 2.70 m bgl. The full depth could not be proven in TP308 due to a concrete obstruction at 1.10 m bgl. All exploratory holes were covered by either concrete or asphalt hardstand underlain by brown gravel.

Made Ground composition was relatively consistent across the site. Asphalt and concrete were found to be at depths between 0.30 m to 0.60 m bgl. Underneath, brown or dark brown slightly sand gravel, with the gravel being fine to coarse, subangular to subrounded of brick, concrete, sandstone, and coal. Fragments of glass (WS301), timber (WS304), and metal (WS304) were also found within Made Ground deposits.

WS305 was the only exploratory hole where natural CLAY was directly beneath the concrete.

In the previous 2018 investigation Made Ground was encountered within all exploratory locations up to a maximum proven depth of 5.00 m bgl (WS105). It typically comprises a layer of either asphalt or concrete overlying interbedded sand and gravel. This is in turn underlain by either a soft to firm dark coloured clay or firm to stiff purple brown mottled grey gravelly clay.

In the 2020 investigation Made Ground was also encountered within all exploratory holes to depths up to 2.55 m bgl (WS203 where full depth could not be proven). The majority of exploratory holes were covered by concrete or asphalt hardstand which was in turn generally underlain by a thin band of grey or black sandy gravel.



Made Ground encountered in previous reports is generally consistent with the Made Ground identified within the most recent supplementary investigations; however, depths vary considerably showing that the depth of Made Ground across the site is not consistent.

2.7. DRIFT DEPOSITS

Drift deposits were encountered within all exploratory holes apart from TP308 where the full extent of Made Ground could not be proven. Depths ranged from 0.50 m to a proven depth of 20.39 m bgl (CP302).

Drift deposits identified were generally consistent across the site and comprised very stiff very high strength dark brown slightly sandy gravelly CLAY. With the gravel being fine to coarse subangular to subrounded of sandstone.

This was consistent with previous investigations where 2018 investigation, drift deposits were encountered to a maximum proven depth of depth of 13.00 m bgl (CP101). Drift deposits generally comprise very stiff high strength gravelly sandy CLAY.

In 2020 the investigation found that drift deposits were generally consistent across the site predominantly comprising stiff high strength brown slightly gravelly CLAY with mudstone identified between 0.50 and 14.95 m bgl.

2.8. SOLID GEOLOGY

Solid geology was not encountered during this or the previous phases of investigation. BGS records in the vicinity infer bedrock at 76.20 m bgl (SJ89NE42).

2.9. GROUNDWATER

A slow water ingress was encountered at depths of 0.80 m bgl and 1.10 m bgl within Made Ground recorded as perched water.

2.10. SOIL CONSISTENCY

Undrained shear strength values were measured where natural cohesive materials were encountered using field hand shear vane tests.

Results of the tests are presented in Table 2.3, which indicate the underlying natural CLAY to be stiff to very stiff.

TABLE 2.3 SUMMARY OF UNDRAINED SHEAR STRENGTH TEST RESULTS

LOCATION	DEPTH	SHEAR STRENGTH (kPa)	CALCULATED ALLOWABLE BEARING PRESSURE (kN/m ²)
TP301	1.8	97	223.10
TP301	2.2	141	324.30
TP302	2.5	184	423.20
TP303	1.8	173	397.90
TP303	2.0	178	409.40
TP303	2.1	167	384.10
TP304	1.0	167	384.10
TP304	2.0	191	439.30



LOCATION	DEPTH	SHEAR STRENGTH (kPA)	CALCULATED ALLOWABLE BEARING PRESSURE (kN/m ²)
TP305	1.0	121	278.30
TP305	1.6	124	285.20
TP305	2.0	130	299.00
TP306	3.0	183	420.90
TP307	1.2	129	296.70
TP307	2.0	181	416.30
TP309	1.4	173	397.90
TP309	2.0	183	420.90
TP310	0.8	160	368.00
TP310	2.2	184	423.20
TP310	2.3	171	393.30
TP311	1.8	171	393.30

Notes - ABP Calculated using Stroud and Butler et al 1974.

Results of the standard penetration tests, including undrained shear strengths derived from SPTs are included in Table 2.4.



TABLE 2.4 STANDARD/CONE PENETRATION TEST RESULTS

BOREHOLES	DEPTH (m bgl)	MATERIAL FIELD DESCRIPTION	CPT/SPT "N" VALUE	CORRECTED "N" VALUE (N ₁) ₆₀	TERZAGHI & PECK RELATIVE DENSITY (SANDS)	EUROCODE SOIL STRENGTH	CONSISTENCY (BS 5930)	TERZAGHI & PECK APPROXIMATE UNDRAINED SHEAR STRENGTH (kN/m ²)	ALLOWABLE BEARING PRESSURE (kN/m ²)
CP301	1.0	MADE GROUND gravelly clay	4	4.03	N/A	Low strength	Firm	20.16	41.46
CP301	2.0	gravelly CLAY	15	13.70	N/A	Medium strength	Stiff	68.52	140.87
CP301	4.0	gravelly CLAY	20	16.90	N/A	High strength	Very Stiff	84.49	173.70
CP301	6.5	gravelly CLAY	50	40.82	N/A	Very high strength	Very Stiff	204.10	419.62
CP301	8.0	gravelly CLAY	50	40.47	N/A	Very high strength	Very Stiff	202.37	416.07
CP301	9.5	gravelly CLAY	50	40.30	N/A	Very high strength	Very Stiff	201.48	414.25
CP301	11.0	gravelly CLAY	46	35.57	N/A	Very high strength	Very Stiff	177.87	365.71
CP301	12.5	gravelly CLAY	50	36.53	N/A	Very high strength	Very Stiff	182.65	375.53
CP301	14.0	gravelly CLAY	49	33.94	N/A	Very high strength	Very Stiff	169.72	348.93
CP301	15.5	gravelly CLAY	50	32.93	N/A	Very high strength	Very Stiff	164.67	338.56
CP301	17.0	gravelly CLAY	50	31.39	N/A	Very high strength	Very Stiff	156.95	322.68
CP301	18.5	gravelly CLAY	50	29.98	N/A	High strength	Very Stiff	149.88	308.15



BOREHOLES	DEPTH (m bgl)	MATERIAL FIELD DESCRIPTION	CPT/SPT "N" VALUE	CORRECTED "N" VALUE (N ₁) ₆₀	TERZAGHI & PECK RELATIVE DENSITY (SANDS)	EUROCODE SOIL STRENGTH	CONSISTENCY (BS 5930)	TERZAGHI & PECK APPROXIMATE UNDRAINED SHEAR STRENGTH (kN/m ²)	ALLOWABLE BEARING PRESSURE (kN/m ²)
CP301	20.0	gravelly CLAY	50	28.67	N/A	High strength	Very Stiff	143.36	294.75
CP302	3.0	gravelly CLAY	15	13.04	N/A	Medium strength	Stiff	65.22	134.10
CP302	5.0	gravelly CLAY	20	16.59	N/A	High strength	Very Stiff	82.96	170.57
CP302	8.0	gravelly CLAY	40	32.38	N/A	Very high strength	Very Stiff	161.89	332.85
CP302	9.5	gravelly CLAY	50	40.30	N/A	Very high strength	Very Stiff	201.48	414.25
CP302	11.0	gravelly CLAY	50	38.67	N/A	Very high strength	Very Stiff	193.34	397.51
CP302	12.5	gravelly CLAY	50	36.53	N/A	Very high strength	Very Stiff	182.65	375.53
CP302	14.0	gravelly CLAY	50	34.64	N/A	Very high strength	Very Stiff	173.18	356.06
CP302	15.5	gravelly CLAY	50	32.93	N/A	Very high strength	Very Stiff	164.67	338.56
CP302	17.0	gravelly CLAY	50	31.39	N/A	Very high strength	Very Stiff	156.95	322.68
CP302	18.5	gravelly CLAY	50	29.98	N/A	High strength	Very Stiff	149.88	308.15
WS301	2.0	gravelly CLAY	17	15.53	N/A	High strength	Very Stiff	77.65	159.65
WS301	3.0	gravelly CLAY	14	12.18	N/A	Medium strength	Stiff	60.88	125.16
WS301	4.0	gravelly CLAY	19	16.05	N/A	High strength	Very Stiff	80.26	165.02
WS301	5.0	gravelly CLAY	22	18.25	N/A	High strength	Very Stiff	91.26	187.63



BOREHOLES	DEPTH (m bgl)	MATERIAL FIELD DESCRIPTION	CPT/SPT "N" VALUE	CORRECTED "N" VALUE (N ₁) ₆₀	TERZAGHI & PECK RELATIVE DENSITY (SANDS)	EUROCODE SOIL STRENGTH	CONSISTENCY (BS 5930)	TERZAGHI & PECK APPROXIMATE UNDRAINED SHEAR STRENGTH (kN/m ²)	ALLOWABLE BEARING PRESSURE (kN/m ²)
WS301	1.0	gravelly CLAY	10	10.08	N/A	Medium strength	Stiff	50.41	103.64
WS302	1.0	slightly gravelly CLAY	17	17.14	N/A	High strength	Very Stiff	85.69	176.18
WS302	2.0	slightly gravelly CLAY	19	17.36	N/A	High strength	Very Stiff	86.79	178.43
WS302	3.0	slightly gravelly CLAY	19	16.52	N/A	High strength	Very Stiff	82.62	169.86
WS303	4.0	slightly gravelly CLAY	18	15.21	N/A	High strength	Very Stiff	76.04	156.33
WS303	5.0	slightly sandy slightly gravelly CLAY	23	19.08	N/A	High strength	Very Stiff	95.41	196.16
WS304	2.0	slightly gravelly CLAY	20	18.27	N/A	High strength	Very Stiff	91.35	187.82
WS304	3.0	slightly gravelly CLAY	19	16.52	N/A	High strength	Very Stiff	82.62	169.86
WS304	4.0	slightly gravelly CLAY	19	16.05	N/A	High strength	Very Stiff	80.26	165.02
WS304	5.0	slightly gravelly CLAY	31	25.72	N/A	High strength	Very Stiff	128.59	264.38
WS304	1.0	MADE GROUND: gravel	11	11.09	Medium Dense	N/A	N/A	N/A	110.90



BOREHOLES	DEPTH (m bgl)	MATERIAL FIELD DESCRIPTION	CPT/SPT "N" VALUE	CORRECTED "N" VALUE (N ₁) ₆₀	TERZAGHI & PECK RELATIVE DENSITY (SANDS)	EUROCODE SOIL STRENGTH	CONSISTENCY (BS 5930)	TERZAGHI & PECK APPROXIMATE UNDRAINED SHEAR STRENGTH (kN/m ²)	ALLOWABLE BEARING PRESSURE (kN/m ²)
WS305	1.0	slightly gravelly CLAY	11	11.09	N/A	Medium strength	Stiff	55.45	114.00
WS305	2.0	slightly gravelly CLAY	14	12.79	N/A	Medium strength	Stiff	63.95	131.48
WS305	3.0	slightly gravelly CLAY	18	15.65	N/A	High strength	Very Stiff	78.27	160.92
WS305	4.0	slightly gravelly CLAY	21	17.74	N/A	High strength	Very Stiff	88.71	182.39
WS305	5.0	slightly gravelly CLAY	36	29.87	N/A	High strength	Very Stiff	149.33	307.03



2.11. SIDE STABILITY AND EASE OF EXCAVATION

The sides of the exploratory trial pit excavations appeared to be generally stable during excavation with some slight instability within granular Made Ground.

The presence of asphalt and concrete at all locations meant that breaking out was slow through Made Ground.

A concrete obstruction was encountered within Made Ground in TP308 likely to be former foundations.

2.12. PH AND SULPHATE

Chemical analyses for pH and soluble sulphate content summarised in Table 2.5, shows that the soils at the site generally meet Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with BRE *Special Digest 1* (2005).

Elevated sulphate concentrations meeting Class DS-2, AC-2 were noted within the Made Ground deposits in WS206 (0.40 m) and WS210 (0.50 m) within previous investigations (June 2020).

TABLE 2.5 SUMMARY OF pH AND SULPHATE DATA

LOCATION	DEPTH (m)	SO ₄ IN 2:1 WATER/SOIL (g/l)	pH VALUE	CLASSIFICATION
WS103 (Natural)	0.80	0.028	8.0	DS-1/AC-1s
TP101 (Made Ground)	0.50	0.044	8.4	DS-1/AC-1s
TP102 (Made Ground)	0.60	0.160	8.1	DS-1/AC-1s
TP103 (Made Ground)	0.60	0.029	8.7	DS-1/AC-1s
TP107 (Natural)	0.80	0.490	7.5	DS-1/AC-1s

2.13. VISUAL AND OLFACTORY EVIDENCE OF CONTAMINATION

Visual and olfactory evidence of potential contamination has been identified during the site investigation and these are summarised in Table 2.6.

TABLE 2.6 SUMMARY VISUAL AND OLFACTORY EVIDENCE OF CONTAMINATION

LOCATION	DEPTH (m)	STRATUM	NOTES
TP301	0.40 – 1.00	Made Ground	Slight hydrocarbon odour
TP302	0.40 – 1.40	Made Ground	Strong hydrocarbon odour
TP306	0.40 – 2.70	Made Ground	Strong hydrocarbon odour



3. TIER I QUALITATIVE CONTAMINATED LAND RISK ASSESSMENT

E3P has undertaken a Tier 1 qualitative risk assessment to determine if any potential contaminants within the underlying soils pose an unacceptable level of risk to the identified receptors.

3.1. HUMAN HEALTH RISK ASSESSMENT

At Tier 1 stage, the long term (chronic) human health toxicity of the soil has been assessed by comparing the on-site concentrations of organic and inorganic compounds with reference values published in LQM/CIEH S4UL (S4UL3267).

The results of this comparison have been summarised within Table 3.1.

TABLE 3.1 SUMMARY OF INORGANIC AND HYDROCARBON TOXICITY ASSESSMENT FOR A RESIDENTIAL END USE

DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PATH-WAY	ASSESSMENT
Arsenic	mg/kg	640	12	28	–	1	No Further Action
Cadmium	mg/kg	190	12	1.3	–	1	No Further Action
Chromium (VI)	mg/kg	33	12	<4.0	–	1	No Further Action
Lead	mg/kg	1100	12	1000	–	1	No Further Action
Mercury	mg/kg	58	12	0.8	–	3	No Further Action
Nickel	mg/kg	980	12	34	–	1	No Further Action
Selenium	mg/kg	12000	12	<1.0	–	1	No Further Action
Copper	mg/kg	68000	12	940	–	1	No Further Action
Zinc	mg/kg	730000	12	320	–	1	No Further Action
Cyanide – Total	mg/kg	791	12	6.7	–	1	No Further Action
Phenols – Total	mg/kg	210	5	<1.0	–	1	No Further Action
Asbestos	Fibres	NFD	12	0.006	TP308 0.70	4	Further Action
Naphthalene	mg/kg	190	12	34	–	3	No Further Action
Acenaphthylene	mg/kg	83000	12	15	–	2	No Further Action
Acenaphthene	mg/kg	84000	12	49	–	1	No Further Action
Fluorene	mg/kg	63000	12	58	–	1	No Further Action
Phenanthrene	mg/kg	22000	12	130	–	2	No Further Action
Anthracene	mg/kg	520000	12	48	–	2	No Further Action
Fluoranthene	mg/kg	23000	12	56	–	2	No Further Action
Pyrene	mg/kg	54000	12	67	–	2	No Further Action
Benzo(a)Anthracene	mg/kg	170	12	44	–	2	No Further Action
Chrysene	mg/kg	350	12	35	–	2	No Further Action
Benzo(b)Fluoranthene	mg/kg	44	12	20	–	2	No Further Action
Benzo(k)Fluoranthene	mg/kg	1200	12	12	–	2	No Further Action
Benzo(a)Pyrene**	mg/kg	35	12	22	–	2	No Further Action



DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PATH-WAY	ASSESSMENT
Indeno(123-cd)Pyrene	mg/kg	500	12	7.3	–	2	No Further Action
Dibenzo(a,h)Anthracene	mg/kg	3.5	12	3.3	–	2	No Further Action
Benzo(ghi)Perylene	mg/kg	3900	12	8.0	–	2	No Further Action
TPH C5-C6 (aliphatic)*	mg/kg	3200	12	<1.0	–	4	No Further Action
TPH C6-C8 (aliphatic)*	mg/kg	7800	12	<0.1	–	4	No Further Action
TPH C8-C10 (aliphatic)*	mg/kg	2000	12	2.2	–	4	No Further Action
TPH C10-C12 (aromatic)*	mg/kg	16000	12	38	–	4	No Further Action
TPH C12-C16 (aromatic)*	mg/kg	36000	12	470	–	4	No Further Action
TPH C16-C21 (aromatic)*	mg/kg	28000	12	780	–	1	No Further Action
TPH C21-C35 (aromatic)*	mg/kg	28000	12	570	–	1	No Further Action
Benzene	mg/kg	12.5*	3	49	TP306 1.20	3	Further Action
Toluene	mg/kg	27900*	3	25	TP306 1.20	3	No Further Action
Ethylbenzene	mg/kg	7660*	3	230	TP306 1.20	3	No Further Action
p & m-Xylene	mg/kg	5550*	3	740	TP306 1.20	3	No Further Action
o-Xylene	mg/kg	3030*	3	400	TP306 1.20	3	No Further Action
Isopropylbenzene	mg/kg	1400*	3	52	TP306 1.20	3	No Further Action
1,3,5-Trimethylbenzene	mg/kg	-	3	220	TP306 1.20	3	Further Action
1,2,4-Trimethylbenzene	mg/kg	165*	3	600	TP306 1.20	3	Further Action
p-Isopropyltoluene	mg/kg	-	3	28	TP306 1.20	3	Further Action
2-Methylnaphthalene	mg/kg	-	3	36	TP306 1.20	3	Further Action

Notes

Main pathways: PL1 = soil ingestion, PL2 = dermal contact and ingestion, PL3 = vapour inhalation (indoor), PL4 = dust inhalation; PL5 = vertical/lateral migration; PL6 = corrosion of concrete; PL7=tainting of water supply; PL8 = uptake by plants

Abbreviations: GAC = general assessment criteria, n = number of samples, MC = maximum concentration; Loc of Ex = location of exceedance; NFD = no fibres detected.

* Atkins ATRISK

Referring to Table 3.1, the results of this direct comparison indicates that the data exceeds the screening criteria for a residential end-use for the following contaminants:

- ☛ Chrysotile & Amosite
- ☛ Benzene
- ☛ 1,3,5-Trimethylbenzene
- ☛ 1,2,4-Trimethylbenzene
- ☛ p-Isopropyltoluene
- ☛ 2-Methylnaphthalene

Asbestos in the form of loose chrysotile and amosite fibres has been identified in the granular Made Ground in TP308 at 0.70 m bgl and has been quantified as 0.006%



SVOCs and VOCs have been identified within TP306 at 1.20 m bgl within granular Made Ground.

The previous investigation in June 2020 identified elevated lead (WS203 at 0.4 m bgl), amosite (WS206 at 0.4 m bgl) and SVOCs (4-Chloroaniline, 2-Methylnaphthalene, Dibenzofuran, 4-Nitroaniline, Carbazole and Anthraquinone) within WS201 at 0.6 m bgl.

No exceedances were identified in the November 2018 investigation.

In relation to these exceedances, the following can be determined:

 The main exposure pathways based on the Tier I exceedances are:

- Soil ingestion;
- Dust inhalation
- Vapour inhalation

HUMAN HEALTH RISK ASSESSMENT AND MITIGATION

Due to the site currently being active, areas of the site could not be fully accessed. Therefore, it is recommended that when the site is vacant a series of trial pits and further chemical analysis is undertaken in order to fully appraise the site. One of the areas requiring further investigation is below the electricity substation where PCB analysis is recommended.

A Tier I Human Health Risk Assessment has been undertaken using the chemical analysis results of the soils and comparing them to the relevant Tier I criteria. This assessment has identified the presence of elevated amosite and chrysotile (TP308 at 0.7 m bgl) and semi-volatile organic compounds (SVOC) (TP306 at 1.20 m bgl).

With regards to the elevated SVOCs (benzene, toluene, ethylbenzene, p & m-xylene, o-xylene, isopropylbenzene, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, p-isopropyltoluene, 2-methylnaphthalene) these present a potential volatilisation to indoor air risk. These elevated concentrations have only been identified within one area (west of site) and are therefore potentially a hotspot and are likely sourced from a hydrocarbon/ coal tar source related to the former industry on the site. Therefore, during a process of cut/fill enabling works, further delineation, assessment and potential hotspot removal should be undertaken where these soils may be chemically validated to assess chemical suitability for retention on-site in an area of no future sensitivity. However, when considering the proposed development layout, the area identified is due to be car parking and covered in hardstanding, not beneath the building footprint. As such, there is a low/moderate risk to the end-user but controlled waters risk needs to be considered.

Previous investigations noted elevated SVOCs to the southeast of the site within WS201 and these are also considered to be a localised hotspot as TP301 and TP302 located to the north and west of WS201 have not identified VOC or SVOC within the Made Ground.

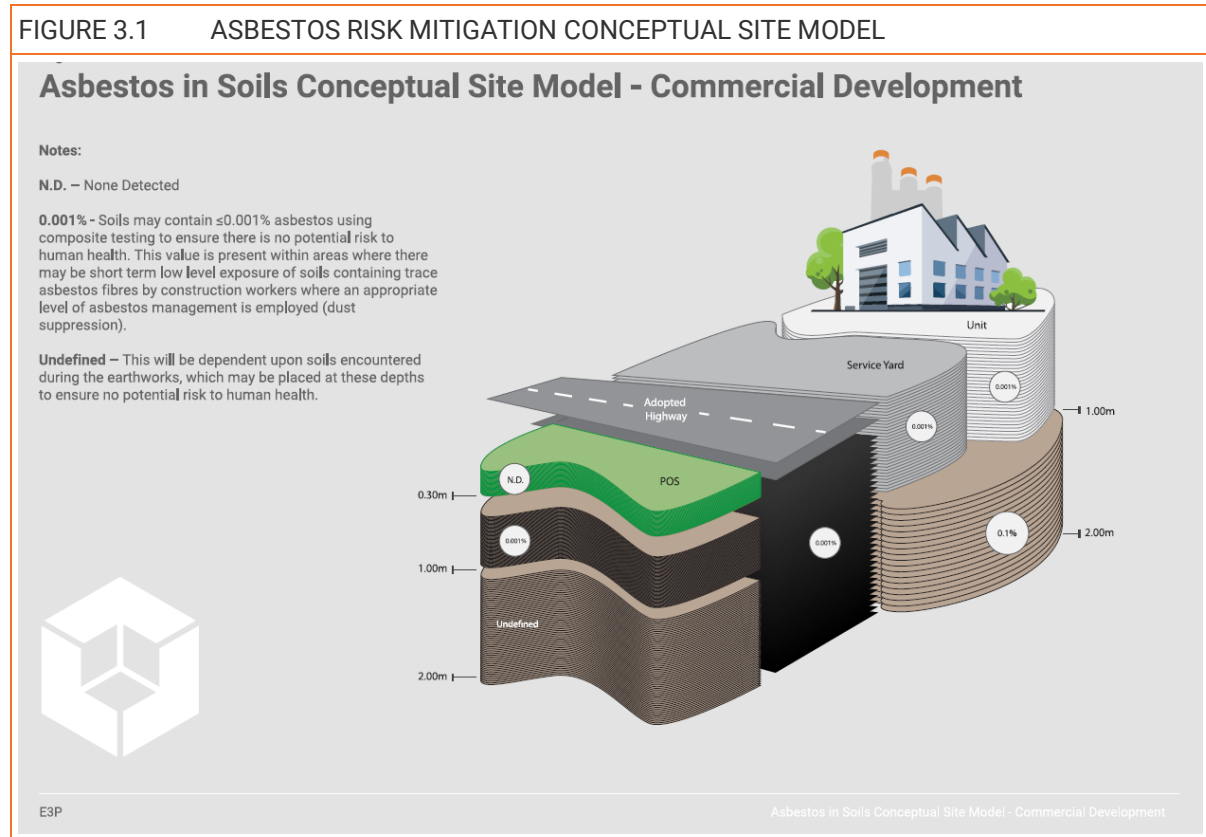
Asbestos in the form of amosite and chrysotile has also been identified within localised areas in shallow Made Ground deposits (TP308, 0.7 m bgl). Asbestos quantification records a concentration of 0.006%. No visual signs of ACM were encountered during the ground investigation; it is, therefore, likely that only trace fibres are present. In previous site investigations, amosite fibres were detected at <0.001% within WS206 at 0.4 m bgl. Impacted soils should be managed according to the asbestos risk mitigation conceptual site model shown in Figure 3.1.



Lead in previous investigations (June 2020) has been identified within one location on the site (WS203 0.40m). The chronic risk to human health associated with the elevated concentrations of inorganic heavy metals can be mitigated through the construction of the proposed building and associated hard standing which will remove direct exposure between the contaminant source and site end user.

The specific design and installation process for the appropriate cover systems and growing mediums will be clearly defined within the site remediation and enabling works strategy.

FIGURE 3.1 ASBESTOS RISK MITIGATION CONCEPTUAL SITE MODEL



4. CONTROLLED WATERS RISK ASSESSMENT

E3P has undertaken a controlled waters risk assessment for the site based on the consideration of the conceptual site model within and the sensitive receptor (underlying principal aquifer).

The Tier I assessment has included a comparison of leachate analysis from samples of the Made Ground to drinking water standards (DWS) due to the underlying principal aquifer. The table below includes site investigation data from E3P from January 2022.

It should also be noted that the one sample selected for leachate analysis targeted to TP306 which is also where elevated VOCs and SVOCs was identified within the soil samples will undergo further investigation and delineation as part of the remediation works. WS201 within previous investigations also elevated in VOC and SVOC will undergo hotspot removal.

TABLE 4.1 COMPARISON OF GROUNDWATER ANALYSIS WITH TIER 1 SCREENING LEVELS

DETERMINAND	UNIT	DWS 3,4,5	NO. OF LEACHATE SAMPLES	MAX CONC. IN LEACHATE	LOCATION OF EXCEEDANCE	ASSESSMENT
Arsenic	µg/l	10	2	6.2	N/A	No Further Action
Cadmium	µg/l	5	2	<0.08	N/A	No Further Action
Chromium (VI)	µg/l	–	2	<5.0	N/A	No Further Action
Chromium (III)	µg/l	50	2	0.5	N/A	No Further Action
Copper	µg/l	2000	2	14	N/A	No Further Action
Total Cyanide	µg/l	50	2	2.9	N/A	No Further Action
Lead	µg/l	10	2	3.2	N/A	No Further Action
Mercury	µg/l	1.0	2	<0.5	N/A	No Further Action
Nickel	µg/l	20	2	7.3	N/A	No Further Action
Selenium	µg/l	10	2	7.5	N/A	No Further Action
Zinc	µg/l	–	2	7.4	N/A	No Further Action
pH	6–9		2	8.0	N/A	No Further Action
Naphthalene	µg/l	10*	2	260	TP306 1.2m	Further Action
Anthracene	µg/l	10*	2	1.6	N/A	No Further Action
Benzo[b]fluoranthene	µg/l	10*	2	<0.01	N/A	No Further Action
Benzo[k]fluoranthene	µg/l	10*	2	<0.01	N/A	No Further Action
Benzo(a)pyrene	µg/l	10*	2	<0.01	N/A	No Further Action
Indeno(123-cd)pyrene	µg/l	10*	2	<0.01	N/A	No Further Action
Fluoranthene	µg/l	10*	2	<0.01	N/A	No Further Action
Benzo(ghi)perylene	µg/l	10*	2	<0.01	N/A	No Further Action
TPH C5-C6 (benzene)	µg/l	1	2	<1.0	N/A	No Further Action
TPH C6-C8 (toluene)	µg/l	700	2	<1.0	N/A	No Further Action
TPH C8-C10 (ethyl benzene)	µg/l	300	2	<1.0	N/A	No Further Action



DETERMINAND	UNIT	DWS 3,4,5	NO. OF LEACHATE SAMPLES	MAX CONC. IN LEACHATE	LOCATION OF EXCEEDANCE	ASSESSMENT
TPH C10-C12 (xylene)	µg/l	500	2	<10	N/A	No Further Action
TPH C10-C12 (xylene)	µg/l	500	2	<10	N/A	No Further Action
TPH C12-C16	µg/l	90 ⁵	2	<10	N/A	No Further Action
TPH C16-C35	µg/l	90 ⁵	2	<10	N/A	No Further Action
TPH C5-C7	µg/l	15000	2	<1.0	N/A	No Further Action
TPH C7-C8	µg/l	15000	2	<1.0	N/A	No Further Action
TPH C8-C10	µg/l	300	2	33	N/A	No Further Action
TPH C10-C12	µg/l	300	2	330	TP306 1.2m	Further Action
TPH C12-C16	µg/l	300	2	1300	TP306 1.2m	Further Action
TPH C16-C21	µg/l	300 ^{**}	2	6000	TP306 1.2m	Further Action
TPH C21-C35	µg/l	300 ^{**}	2	<10	N/A	No Further Action

Notes

Solubility <0.01µg/l

AA – Annual Average

MAC- Maximum Admissible Concentration

* Polyaromatic hydrocarbons (PAH) - Benzo(a)pyrene (BaP), Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)-perylene and Indeno(1,2,3-cd)-pyrene. Benzo(a)pyrene can be considered as a marker for the other PAHs, hence only benzo(a)pyrene needs to be monitored for comparison with the biota EQS or the corresponding AA-EQS in water

** There are no WHO Guideline Values for aliphatic fractions C16-C21 and C21-C35, therefore the guideline value for aliphatic fractions inclusive of C8-C16 (300µg/l) has been applied.

1. The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations (2015)
2. Directive establishing a framework for Community action in the field of water policy (Water Framework Directive)
3. Council Directive on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community (Dangerous Substances Directive) - List II substances
4. Council Directive on the quality of water intended for human consumption (Drinking Water Directive)
5. WHO Guidelines for Drinking Water Quality. Third edition (2004)

CONTROLLED WATER RISK ASSESSMENT AND MITIGATION

No water samples were gathered as part of this assessment as only minimal amounts of water were present within the monitoring well positions when water sampling was attempted.

This comparison indicates that the data exceeds the DWS values for the following inorganic compounds:

- ☞ Naphthalene
- ☞ TPH Aromatic C10-C12
- ☞ TPH Aromatic C12-C16
- ☞ TPH Aromatic C16-C12

Previous site investigations (Report Ref 12-757-R2, dated June 2020) also identified elevated TPH Aromatic C12-C16 and TPH Aromatic C16-C35 with WS201 which is within the same area (southeast of site) as TP306.

It should be noted that leachate analysis is an aggressive test which may overstates the risk.



The TPH carbon bands C16 to C35 identified within the leachate samples from both June 2020 and January 2022 are of a general low solubility, and therefore mobility, suggesting that these will not migrate to controlled water receptors. However, TPH C10-C12 have higher solubility and may pose a risk to the controlled water receptor.

Given the site is underlain by low-permeability, predominantly cohesive, glacial till deposits, which will afford protection to the underlying principal aquifer, there is considered to be a low risk to controlled waters and the wider environment as no complete pollutant linkage can be determined.

It should also be noted that the identified exceedances were found in WS201 and TP306 which is also where elevated VOCs and SVOCs were identified within the soil samples and will undergo further investigation and delineation as part of the remediation works.



5. GROUND GAS

Hazardous ground gas qualitative risk assessment is based on a conceptual site model (CSM) similar to that used for soil and groundwater contamination sources (i.e., source pathway receptor pollutant linkages).

The risk can be assessed based on knowledge of the ground conditions and CSM and a measure of hazardous gas concentrations and gas flow at the site within monitoring standpipes.

5.1. SOURCES AND PATHWAYS OF GROUND GAS (CSM)

The Phase I report and subsequent ground investigation has identified the following potential sources of ground gas:

- ✚ Made Ground deposits;
- ✚ Landfill 141 m east of the site.

Within the initial site investigation. (Report Ref 12-757-R1) undertaken by E3P, gas monitoring wells within window sample probeholes to 5 m bgl. Four ground gas monitoring visits were undertaken over a 1 month period. The monitoring identifying elevated readings of carbon dioxide and thus the site within the original redline boundary (within the south eastern sector of the current subject site) was classified as Characteristic Situation 2. The full details of the assessment are outlined within the Ground Gas Addendum Report (Report ref: 12-757-L1 March 2019).

Within the second site investigation, ground gas monitoring suggests that the site can be predominantly classified as CS1, however, WS201 which is away from the proposed on-site structure has been assessed as being CS2 due to the elevated CO₂ concentrations identified. Further assessment is required and will be provided on completion of the most recent gas monitoring.

5.2. GROUND GAS RISK ASSESSMENT METHODOLOGY

The potential impact on the development from ground gases has been assessed with reference to standards and guidelines published in:

- ✚ CIRIA Report 665 – Assessing risks posed by hazardous ground gases to buildings (2007)
- ✚ BS8485:2015+A1:2019 – Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings

BS8485:2015+A1:2019 provides guidance on the level of gas protection requirements based upon the characteristic situation (CS) and the proposed development based on building type.

Therefore, in accordance with BS8485:2015+A1:2019, based on the measured flow rates and hazardous gas concentrations, individual hazardous gas flow rates (Q_{hg}) shall be derived for each monitoring point, from which the site characteristic hazardous gas flow rate (Q_{hgs}), and then the Characteristic Situation (CS) can be determined.

The following equation should be utilised:

$$Q_{hg} = q \left(\frac{C_{hg}}{100} \right)$$



Where:

q is the measured flow rate (in litres per hour) of combined gases from the monitoring standpipe
 C_{hg} is the measured hazardous gas concentration (in percentage volume/volume).

The subsequent derived gas screening value (GSV) should be the maximum Q_{hg} (flow rate x concentration as a percentage volume) for all the monitoring events.

A 'worst case check' may be carried out using the maximum recorded flow in any hole with the maximum concentration in any hole to present the plausible worst case conditions. Adoption of the worst case Q_{hg} requires thorough justification and reference to the CSM.

The final derived GSV can then be used to characterise the site as summarised in Table 5.1.

TABLE 5.1 SITE CHARACTERISATION BY GSV (BS8485:2015+A1:2019)

CS	HAZARD POTENTIAL	GSV (l/hr) FOR METHANE AND CARBON DIOXIDE	ADDITIONAL FACTORS
CS1	Very Low	< 0.07	Typically <1% methane concentration and <5% carbon dioxide concentration (otherwise consider an increase to CS2)
CS2	Low	< 0.70	Typical measured flow rate <70 l/h (otherwise consider an increase to CS3)
CS3	Moderate	< 3.5	N/A
CS4	Moderate to High	< 15	N/A
CS5	High	< 70	N/A
CS6	Very High	> 70	N/A

Notes

1. The CS is equivalent to the characteristic GSV in CIRIA C665.
2. The worst-case ground gas regime identified on the site, either methane or carbon dioxide, at the worst-case temporal conditions that the site may be expected to encounter should be considered.
3. Gas Screening Value is the Borehole Gas Volume Flow Rate, in litres per hour, multiplied by the concentration in the air stream of the particular gas being considered.
4. The Gas Screening Value thresholds should not generally be exceeded without the completion of a detailed ground gas risk assessment taking into account site-specific conditions.

5.3. MONITORING METHODOLOGY

Concentrations of methane (CH_4), carbon dioxide (CO_2) and oxygen (O_2) (hydrogen sulphide) were measured using a calibrated infrared gas analyser (GFM435) with gas flow rates measured using an integrated flow meter.

Gas measurements were recorded for a minimum of 500 seconds at each location, at which point the maximum concentration of CH_4 and CO_2 , together with the lowest concentration of O_2 were recorded.

The results of the ground gas monitoring are presented in Table 5.2.

In addition to the raw data, the results for each individual standpipe have been assessed with reference to guidance provided in BS8485:2015+A1:2019. Based on the initial peak measured flow rates and hazardous gas concentrations, individual hazardous gas flow rates (Q_{hg}) have been derived for each monitoring point, from which an individual Characteristic Situation (CS) can ultimately be determined.



TABLE 5.2 SUMMARY OF GROUND GAS MONITORING RESULTS

WELL	STRATA	DATE	CH ₄ PEAK (%V/V)	CH ₄ STEADY (%V/V)	CH ₄ Q _{hg} (l/hr)	CO ₂ PEAK (%V/V)	CO ₂ STEADY (%V/V)	CO ₂ Q _{hg} (l/hr)	O ₂ (%V/V)	ATMOS (mb)	ATMOS. DYNAMIC	PEAK FLOW (l/hr)	STEADY FLOW (l/hr)	RESPONSE ZONE (m bgl)	DEPTH TO BASE (m bgl)	DEPTH TO WATER (m bgl)
WS102	Natural CLAY Drift	03/02/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	16.8	1001	Falling	0.1	0.1	1.00-5.00	4.95	3.80
		22/02/2022	Could not access. Blocked by van													
WS103	Natural CLAY Drift	03/02/2022														
		22/02/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	1007	Falling	0.1	0.1	0.50-5.00	4.00	0.60
WS104	Made Ground	03/02/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.3	1000	Falling	0.1	0.1	0.50-1.50	1.30	Dry
		22/02/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.9	1007	Falling	0.1	0.1		1.31	Dry
WS105	Natural CLAY Drift	03/02/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	14.6	1000	Falling	0.1	0.1	1.00-5.00	4.00	2.60
		22/02/2022	0.1	0.1	0.0001	0.1	0.1	0.0001	19.8	1008	Falling	0.1	0.1		3.95	1.30

Notes

CIRIA Characteristic Situation

Q_{hg}

CS1

<0.07

Typical Max CO₂ <5 % Typical Max CH₄ <1 %

Values in **BOLD** exceed CS1 Thresholds

CS2

<0.7

Flow rate not to exceed 70 l/hr otherwise consider increase to CS3 Values in **BLUE** denote water above level of response zone (flooded)

CS3

<3.5

CS4

<15

Quantitative Risk Assessment required to evaluate scope of protective measures



5.4. SUMMARY OF MONITORING RESULTS

5.4.1. GROUNDWATER

Water levels within Made Ground of WS104 were observed to be dry. All other wells were observed to have water within on all monitoring visits with WS105 water levels rising between the first two monitoring visits; however, due to the predominantly low permeability cohesive drift stratum, it is likely that water levels are representative of surface water collecting within the standpipes and not a true representation of groundwater.

5.4.2. BAROMETRIC PRESSURE

During both visits monitoring was undertaken during a period of relatively high, with pressure recorded to be 1000 and 1007 mbar.

5.4.3. GAS FLOW

Throughout the monitoring period, flow rates were recorded to be 0.1 l/hr (limit of detection of the analyser).

5.4.4. GAS CONCENTRATIONS

The maximum methane and carbon dioxide values recorded within the monitoring wells was 0.1% v/v (limit of detection of the analyser).

5.5. CONCLUSION

The determined Characteristic Situation for each standpipe for each visit is presented in Table 5.3. This indicates that based on the peak flow rates the majority of the monitoring visits classify as Characteristic Situation (CS)1 – Very Low Gas Risk.

TABLE 5.3 GAS RISK PROFILE AND LOCATION

WELL	DATE	DEPTH TO WATER (m bgl)	MAX FLOW (l/hr)	MAX CH ₄ (%V/V)	MAX CH ₄ Q _{hg} (l/hr)	MAX CO ₂ (%V/V)	MAX CO ₂ Q _{hg} (l/hr)	CHARACTERISTIC SITUATION	NHBC TRAFFIC LIGHT
WS102	03/02/2022	3.80	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
WS103	22/02/2022	0.60	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
WS104	03/02/2022	Dry	0.1	0.1	0.0000	0.1	0.0001	CS1	Green
	22/02/2022	Dry	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
WS105	03/02/2022	2.60	0.1	0.1	0.0001	0.1	0.0001	CS1	Green
	22/02/2022	1.30	0.1	0.1	0.0001	0.1	0.0001	CS1	Green

E3P has assessed the previous variables and come to the following conclusions:

Ground gas monitoring suggests that the site can be classified as CS1, and that gas protection measures will not be required.



Previous ground gas monitoring outlined within Ground Gas Addendum Report (Report Ref 12-757-L1, dated April 2019) noted the majority of the site has been classified as being CS1; however, elevated carbon dioxide readings were recorded within WS103 and WS104. The second round of gas monitoring carried out in 2020 noted no elevated reading of carbon dioxide or methane across the site except for WS201.

WS103, WS104 and WS201 are located outside of the building footprint; therefore, gas mitigations are not considered to be required. Precautionary CS2 measures should be adopted until the full gas regime is completed. A full assessment will be detailed upon completion of the gas monitoring schedule.



6. GEOTECHNICAL ASSESSMENT

6.1. FOUNDATION CONDITIONS

It is understood that Russels WBHO is considering the proposed future redevelopment of land at Smithfield Market for a commercial unit with associated hardstanding.

Based on the findings from the initial site investigation, including the assessment of the relative undrained shear strength, relative in-situ densities and corresponding safe net allowable bearing pressure, the following foundation options are considered theoretically viable:

A summary of anticipated foundations based on the findings of the supplementary site investigation is presented in Table 6.1.

TABLE 6.1 ANTICIPATED FOUNDATIONS

LOCATION	ANTICIPATED FOUNDING STRATA DEPTH (m bgl)	GROUND WATER (m bgl)	Target Stratum	Trees	FOUNDATION TYPE
TP301	1.45	1.10	gravelly CLAY	No	Pad
TP302	1.85	N/A	gravelly CLAY	No	Pad
TP303	1.15	N/A	gravelly CLAY	No	Pad
TP304	1.25	N/A	gravelly CLAY	No	Pad
TP305	1.85	0.80	gravelly CLAY	No	Pad
TP306	3.15	N/A	gravelly CLAY	No	VSC
TP307	1.15	N/A	gravelly CLAY	No	Pad
TP309	1.25	N/A	gravelly CLAY	No	Pad
TP310	1.35	N/A	gravelly CLAY	No	Pad
TP311	1.15	N/A	gravelly CLAY	No	Pad
WS301	1.45	N/A	gravelly CLAY	No	Pad
WS302	1.25	N/A	gravelly CLAY	No	Pad
WS303	0.95	N/A	gravelly CLAY	No	Pad
WS304	2.25	N/A	gravelly CLAY	No	Pad
WS305	1.05	N/A	gravelly CLAY	No	Pad
CP301	2.45	9.50	gravelly CLAY	No	Pad
CP302	1.45	N/A	gravelly CLAY	No	Pad

Based on the assessment of the relative undrained shear strength, relative in-situ densities and corresponding safe net allowable bearing pressure, the suitable target founding stratum has been identified as the underlying very stiff CLAY in excess of 1.00 m bgl, where an ABP in excess of 160 kN/m² can be achieved.

However, prior to the detailed design of suitable foundations solutions, a programme of remediation and enabling works will be required to remove any buried obstructions and cut/fill the site to provide suitable development platform levels.



Upon completion of these enabling works, it is likely that the most cost effective option for the majority of the site would be to utilise shallow pad foundations to support the portal frame of the proposed commercial/industrial building bearing at least 500 mm below the stiff to very stiff medium to high strength cohesive soils. Vibro stone columns may need to be utilised in areas of deep Made Ground.

The previous report for the south eastern sector made recommendations for vibro stone columns but the location for the proposed structure has now been relocated to an area of more favourable ground conditions.

It must be noted that if the foundations for the current buildings and infrastructure on-site are significant and during removal cause site-wide disturbance to the underlying strata, it may be more cost-effective to use vibro stone columns to support the pad foundations. However, disturbance of cohesive materials should be minimal and where clay soils are removed they must be re-engineered in accordance with an appropriate geotechnical specification.

Trees are present on the site periphery. Foundations that are within influencing distance of these trees will require deepening to mitigate against the chance of heave.



7. CONCLUSIONS

7.1. HUMAN HEALTH

The Tier 1 human health risk assessment has identified the presence of elevated Lead Chrysotile & Amosite (TP308 0.70 m bgl) and SVOCs (benzene, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, p-isopropyltoluene, 2-methylnaphthalene) within TP306 at 1.20 m bgl.

Asbestos in the form of Chrysotile and Amosite have been identified within localised areas in Made Ground deposits (TP108 0.70). Asbestos quantification records a concentration of 0.006%. No visual signs of ACM were encountered during the ground investigation. It is therefore likely that only trace fibres are present. Impacted soils should be managed according to the asbestos risk mitigation conceptual site model.

Elevated SVOCs within TP306 at 1.2 m bgl present a potential volatilisation to indoor air risk. These elevated concentrations have only been identified within one area (west of site). Therefore, during a process of cut/fill enabling works, further delineation, assessment and potential hotspot removal should be undertaken where these soils may be chemically validated to assess chemical suitability for retention on site in an area of no future sensitivity. However, when considering the proposed development layout, the area identified is due to be car parking and covered in hardstanding, not beneath the building footprint. As such, there is a low/moderate risk to the end-user but controlled waters risk needs to be considered.

Previous investigations noted elevated SVOCs to the southeast of site within WS201 and is also thought to be a localised hotspot as TP301 and TP302 located to the north and west of WS201 have not identified VOC or SVOC contaminants within the made ground.

In the 2020 investigation elevated Lead (WS203 0.40 m), amosite (WS206 0.40 m) and semi-volatile organic compounds (SVOC) (WS201 0.60 m) were identified.

In the 2018 investigation, no chemical exceedances were identified within the Made Ground from 14 samples in the very south east of the site.

Further post-demolition investigations are required to confirm the findings of this initial and supplementary assessments as and when full and unrestricted access is available and underground services have been disconnected.

7.2. CONTROLLED WATERS

Elevated Naphthalene, TPH Aromatic C10-C12, TPH Aromatic C12-C16, TPH Aromatic C16-C12 have been identified within a leachate sample obtained from TP306 at 1.2 m bgl.

Previous site investigations (Report Ref 12-757-R2, dated June 2020) also identified elevated TPH Aromatic C12-C16 and TPH Aromatic C16-C35 with WS201 which is within the same area (southeast of site) as TP306.

It should be noted that leachate analysis is an aggressive test which overstates the risk.

The TPH carbon bands C16 to C35 identified within the leachate samples from both June 2020 and January 2022 are of a general low solubility, and therefore mobility, suggesting that these will not migrate to controlled water receptors. However, TPH C10-C12 have higher solubility and may pose a risk to controlled water receptor.



Given the site is underlain by low-permeability, predominantly cohesive, glacial till deposits, which will afford protection to the underlying principal aquifer, there is considered to be a low risk to controlled waters and the wider environment as no complete pollutant linkage can be determined.

It should also be noted that these were found in WS201 and TP306 which is also where elevated VOCs and SVOCs were identified within the soil samples and will undergo further investigation and delineation as part of the remediation works.

7.3. GROUND GAS

Ground gas monitoring suggests that the site can be classified as CS1, and that gas protection measures will not be required.

Previous ground gas monitoring outlined within Ground Gas Addendum Report (Report Ref 12-757-L1, dated April 2019) noted the majority of the site has been classified as being CS1; however, elevated carbon dioxide readings were recorded within WS103 and WS104. The second round of gas monitoring carried out in 2020 noted no elevated reading of carbon dioxide or methane across the site.

WS103 and WS104 are located outside of the building footprint; therefore, gas mitigations are not considered to be required. Precautionary CS2 measures should be adopted until the full gas regime is completed. A full assessment will be detailed upon completion of the gas monitoring schedule.

7.4. FOUNDATION ASSESSMENT

Upon completion of these enabling works, the most cost-effective option for the majority of the site would likely be to utilise shallow pad foundations to support the portal frame of the proposed commercial/industrial building bearing at least 500 mm below the stiff to very stiff medium to high strength cohesive soils. Driven piles may need to be utilised in areas of deep made ground.



8. RECOMMENDATIONS

Post-demolition site investigation to confirm ground conditions beneath present buildings.

Foundation schedule (upon receipt of the final development layout and levels).

I trust that the above information is sufficient at this time and if you require anything further, please do not hesitate to contact me

Yours sincerely,
For and on behalf of E3P Ltd

Veronique Wilkinson
Geo-Environmental Consultant

Approved by.
Stuart Ellis
Principal Geo-Environmental Consultant

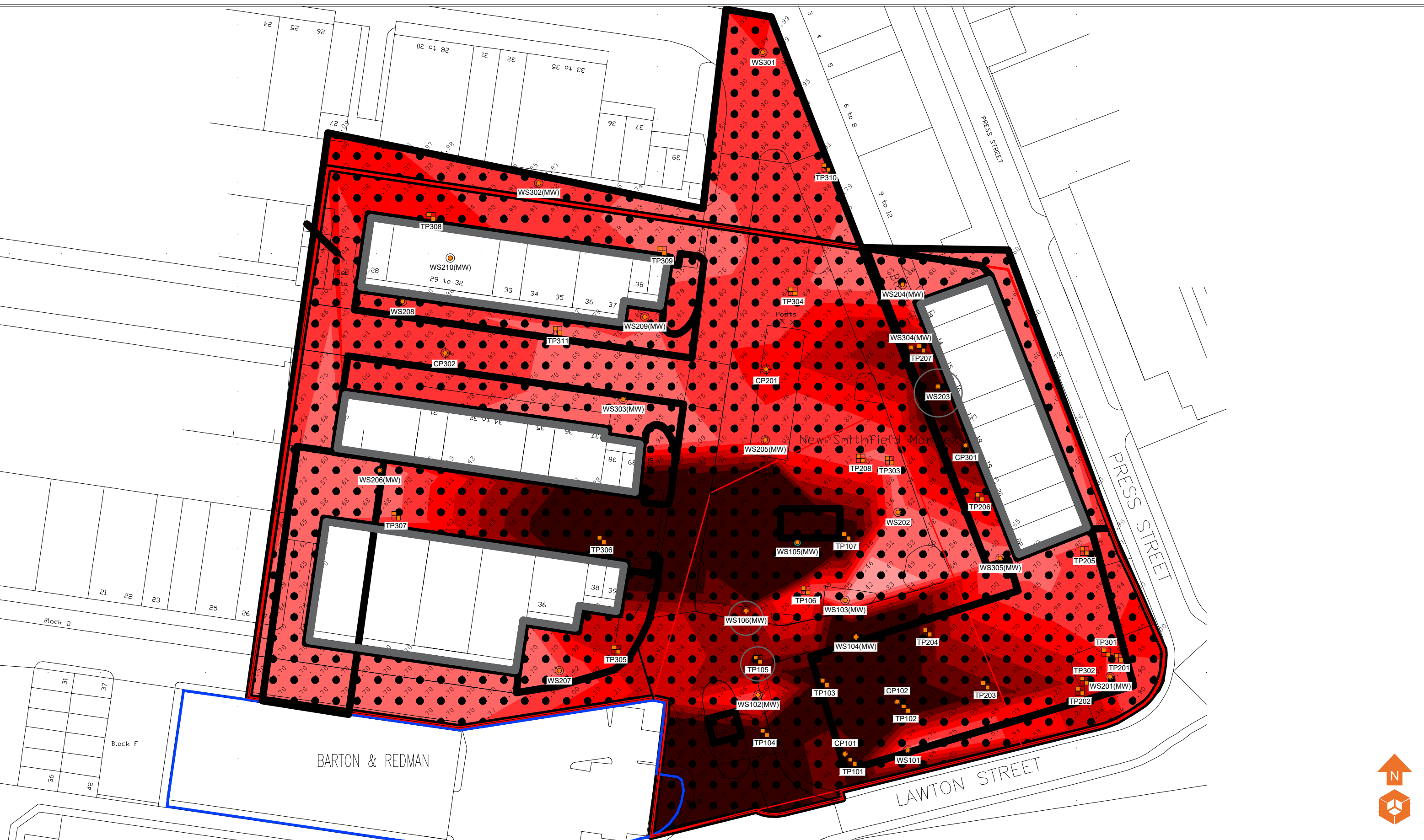
Enclosed:

Exploratory Borehole Logs
i2 Chemical Analysis Reports

Drawings:

- 12-757-005 – Exploratory Location Plan
- 12-757-006 – Depth of Made Ground Plan
- 12-757-007 – Depth of Founding Strata Plan
- 12-757-008 – Development Constraints Plan
- 14-464-018 – Contamination Issues Plan





Location Symbols

Approximate Window Sample Probehole Location

Approximate Window Sample Probehole Location with Install

Approximate Trial Pit Location

Approximate Cable Percussive Borehole Location

Made Ground Depth (m)

Depth of Made Ground 0.25 - 0.49m

Depth of Made Ground 0.50 - 0.74m

Depth of Made Ground 0.75 - 0.99m

Depth of Made Ground 1.00 - 1.24m

Depth of Made Ground 1.25 - 1.49m

Depth of Made Ground 1.50 - 1.74m

Depth of Made Ground 1.75 - 1.99m

Depth of Made Ground >2.00m

Hole Refused on Obstruction

Notes:

P1	REVF	08.03.2022	EB	VW
P1	REVE	02.12.2020	CB	SE
P1	REVD	23.07.2020	LM	SE
P1	REVC	16.07.2020	CB	SE
P1	REVB	26.06.2020	LM	SE
P1	REVA	18.06.2020	LM	SE
Phase	Issue	Date	Drawn	Checked

Client:

Russells Construction

Job Title:

Barton & Redman,
Manchester

Job No:

12-757

Drawing No:

006

Job Title:

Depth of Made Ground
Plan

Date:

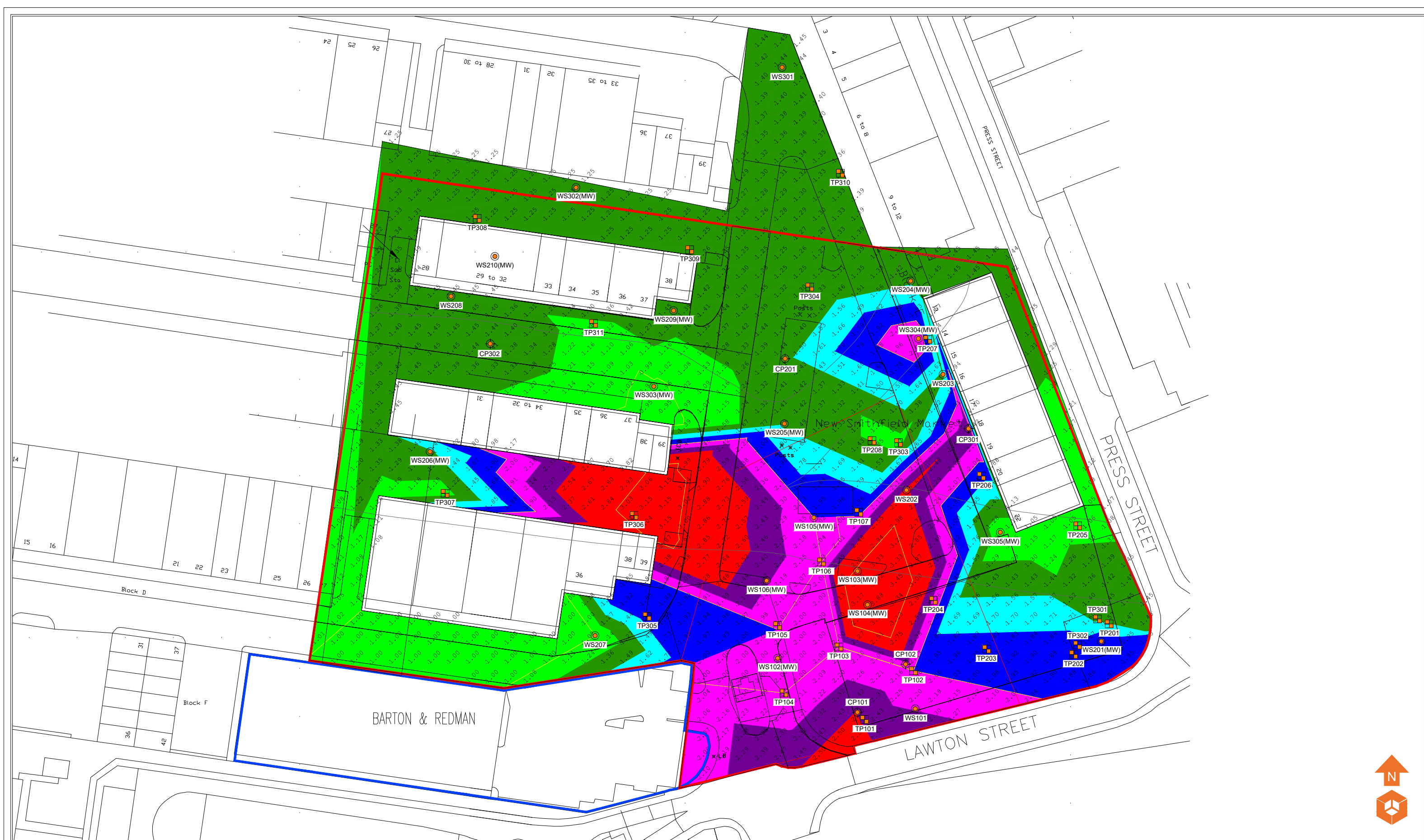
08.03.2022

Scale:

NTS @ A3

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Location Symbols

- Approximate Window Sample Probehole Location
- Approximate Window Sample Probehole Location with Install
- Approximate Trial Pit Location
- Approximate Cable Percussive Borehole Location

Shallow Spread Footings

- Depth to Founding Strata 0.00 - 1.24m
- Depth to Founding Strata 1.25 - 1.49m

Mass Trench Fill Footings

- Depth to Founding Strata 1.50 - 1.74m
- Depth to Founding Strata 1.75 - 1.99m
- Depth to Founding Strata 2.00 - 2.24m

Engineered Footings

- Depth to Founding Strata 2.25 - 2.49m
- Depth to Founding Strata >2.50m

Notes:				
P1	REVF	07.03.2022	EB	VW
P1	REVE	02.12.2020	CB	SE
P1	REVD	23.07.2020	LM	SE
P1	REVC	16.07.2020	CB	SE
P1	REVB	26.06.2020	LM	SE
P1	REVA	18.06.2020	LM	SE
Phase	Issue	Date	Drawn	Checked

Client:

Russells Construction

Job Title:

Barton & Redman,
Manchester

Job No:

12-757

Drawing No:

007

Date:

07.03.2022

Scale:

NTS @ A3

Drawing Title:

Depth to Founding Strata
Plan

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TP308		
Contaminant	Depth	Concentration
Chrysotile Amosite	0.70m	0.006%
Asbestos	0.70m	

WS203		
Contaminant	Depth	Concentration
Lead	0.60m	1700mg/kg

WS206		
Contaminant	Depth	Concentration
Asbestos (Amosite)	0.40m	<0.001%

TP201		
Contaminant	Depth	Concentration
Dibenzofuran	1.50m	73mg/kg
Carbazole	1.50m	12mg/kg
Anthraquinone	1.50m	4.4mg/kg

WS201		
Contaminant	Depth	Concentration
4-Chloroaniline	0.60m	2.3mg/kg
2-Methylnaphthalene	0.60m	2.9mg/kg
Dibenzofuran	0.60m	11mg/kg
4-Nitroaniline	0.60m	0.90mg/kg
Carbazole	0.60m	1.7mg/kg
Anthraquinone	0.60m	3.5mg/kg

TP202		
Contaminant	Depth	Concentration
2-Methylnaphthalene	1.00m	170mg/kg
Dibenzofuran	1.00m	160mg/kg
Carbazole	1.00m	21mg/kg
Anthraquinone	1.00m	9.1mg/kg

TP306		
Contaminant	Depth	Concentration
Benzene	1.20m	49mg/kg
Toluene	1.20m	25mg/kg
Ethylbenzene	1.20m	230mg/kg
P&M - Xylene	1.20m	740mg/kg
O - Xylene	1.20m	400mg/kg
Isopropylbenzene	1.20m	52mg/kg
1, 3, 5 - Trimethylbenzene	1.20m	220mg/kg
1, 2, 4 - Trimethylbenzene	1.20m	600mg/kg
P - Isopropyltoluene	1.20m	28mg/kg
2 - Methylnaphthalene	1.20m	36mg/kg

Location Symbols

- Approximate Window Sample Probehole Location
- Approximate Window Sample Probehole Location with Install
- Approximate Trial Pit Location
- Approximate Cable Percussive Borehole Location

Contamination Exceedances

- Asbestos
- SVOC
- Lead

Notes:

P1	REVC	07.03.2022	EB	VW
P1	REVB	02.12.2020	CB	SE
P1	REVA	09.07.2020	LM	SE
Phase	Issue	Date	Drawn	Checked

Client:

Russells Construction

Job Title:

Barton & Redman,
Manchester

Job No:

12-757

Drawing No:

018

Date:

07.03.2022

Scale:

NTS @ A3

Drawing Title:

Contamination Exceedances
Plan



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Location Symbols

- Approximate Window Sample Probehole Location
- Approximate Window Sample Probehole Location with Install
- Approximate Trial Pit Location
- Approximate Cable Percussive Borehole Location

Notes:

P1	REVF	15.02.2022	HM	VW
P1	REVE	28.01.2022	EB	VW
P1	REVD	11.10.2021	HM	SE
P1	REVC	17.11.2020	CB	SE
P1	REVB	18.05.2020	LM	SE
P1	REVA	29.05.2020	CB	SE
Phase	Issue	Date	Drawn	Checked

Client:

Russells Construction

Job Title:

Barton & Redman,
Manchester

Job No:

12-757

Drawing No:

005

Date:

15.02.2022

Scale:

NTS @ A3

Drawing Title:

Exploratory Hole Location
Plan



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Borehole Log

Borehole No.

CP301

Sheet 1 of 2

Project Name: Barton & Redman

Project No.
12757

Co-ords: 388573.00 - 397159.00

Hole Type
CP

Location: Manchester

Level:

Scale
1:100

Client: Russells Construction

Dates: 31/01/2022 -

Logged By
DP Drilling

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	D		0.30			MADE GROUND: Concrete.	
		1.00		N=4 (1,0/1,1,1,1)				MADE GROUND: Brown gravelly clay. Gravel is fine to coarse subangular to subrounded of concrete, brick and sandstone.	1
		2.00		N=15 (2,2/2,4,4,5)	2.00				2
		3.50	D					Stiff medium strength brown slightly gravelly CLAY. Gravel is fine to coarse, subangular to subrounded of sandstone and mudstone. Becoming very stiff high strength at 4.00m bgl. Becoming very stiff very high strength at 6.50m bgl.	3
		4.00		N=20 (2,3/4,5,5,6)					4
		5.00	U	Ublow=67					5
		5.50	D						6
		6.50		50 (4,7/50 for 265mm)	6.90				7
		8.00		50 (4,9/50 for 180mm)				Very stiff very high strength brown slightly gravelly CLAY with sand bands. Gravel is fine to coarse, subangular to subrounded of sandstone and mudstone.	8
		9.50		50 (25 for 145mm/50 for 220mm)					9
		11.00		N=46 (4,6/9,11,12,14)					10
		12.50		50 (5,8/50 for 295mm)					11
		14.00		49 (4,9/49 for 290mm)					12
		15.50		N=50 (5,9/10,12,13,15)	15.00			Very stiff very high strength brown sandy CLAY.	13
		17.00		50 (6,10/50 for 230mm)					14
		18.50		50 (7,11/50 for 230mm)	18.20			Very stiff high strength brown slightly gravelly CLAY. Gravel is fine to coarse, subangular to subrounded of sandstone and mudstone.	15
									16
									17
									18
									19
									20

Continued on next sheet

Remarks

1. Complete. 2. Water strike encountered at 9.70 m bgl, rising to 2.80m bgl after 20 minutes. 2. Chiselling from 9.60 m to 9.90 m bgl.



Borehole Log

Borehole No.

CP301

Sheet 2 of 2

Project Name: Barton & Redman

Project No.
12757

Co-ords: 388573.00 - 397159.00

Hole Type
CP

Location: Manchester

Level:

Scale
1:100

Client: Russells Construction

Dates: 31/01/2022 -

Logged By
DP Drilling

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		20.00		50 (8,12/50 for 215mm)	20.37			End of borehole at 20.37 m	21
									22
									23
									24
									25
									26
									27
									28
									29
									30
									31
									32
									33
									34
									35
									36
									37
									38
									39
									40

Remarks

1. Complete. 2. Water strike encountered at 9.70 m bgl, rising to 2.80m bgl after 20 minutes. 2. Chiselling from 9.60 m to 9.90 m bgl.



Borehole Log

Borehole No.

CP302

Sheet 1 of 2

Project Name: Barton & Redman

Project No.
12757

Co-ords: 388440.00 - 397175.00

Hole Type
CP

Location: Manchester

Level:

Scale
1:100

Client: Russells Construction

Dates: 01/02/2022 -

Logged By
DP Drilling+DP Drilling

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30	D		0.10 0.30 1.00			MADE GROUND: Asphalt. MADE GROUND: Concrete. MADE GROUND: Brown gravel. Gravel is fine to coarse subangular to subrounded of asphalt and concrete, Very stiff high strength brown slightly gravelly CLAY. Gravel is fine to coarse, subangular to subrounded of sandstone.	1
		2.00	U	Ublow=63					2
		2.50	D						3
		3.00		N=15 (2,3/3,3,4,5)					4
		4.00	U	Ublow=71					5
		4.50	D						6
		5.00		N=20 (2,3/4,5,5,6)					7
		6.50	U	Ublow=74					8
		7.00	D		7.00			Very stiff very high strength brown slightly gravelly CLAY. Gravel is fine to coarse, subangular to subrounded of sandstone and mudstone. Becoming very stiff high strength at 20.00m bgl.	9
		8.00		50 (4,8/50 for 295mm)					10
		9.50		50 (6,10/50 for 205mm)					11
		11.00		50 (4,8/50 for 255mm)					12
		12.50		50 (5,8/50 for 275mm)					13
		14.00		50 (6,9/50 for 285mm)					14
		15.50		50 (6,10/50 for 275mm)					15
		17.00		50 (7,10/50 for 275mm)					16
		18.50		50 (25 for 95mm/50 for 125mm)					17
									18
									19
									20

Continued on next sheet

Remarks

1. Complete 2. Chiselling between 18.40m and 18.80m bgl.



Borehole Log

Borehole No.

CP302

Sheet 2 of 2

Project Name: Barton & Redman

Project No.
12757

Co-ords: 388440.00 - 397175.00

Hole Type
CP

Location: Manchester

Level:

Scale
1:100

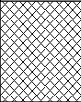
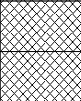
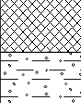
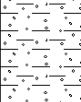
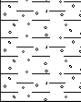
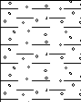
Client: Russells Construction

Dates: 01/02/2022 -

Logged By
DP Drilling+DP Drilling

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		20.00		50 (8,12/50 for 235mm)	20.39			End of borehole at 20.39 m	21
								22	
								23	
								24	
								25	
								26	
								27	
								28	
								29	
								30	
								31	
								32	
								33	
								34	
								35	
								36	
								37	
								38	
								39	
								40	

				Trial Pit Log			TrialPit No TP301 Sheet 1 of 1	
Project Name: Barton & Redman				Project No. 12757		Co-ords: 388606.00 - 397105.00 Level:		Date 26/01/2022
Location: Manchester						Dimensions (m): 2.00 0.60		Scale 1:30
Client: Russells Construction						Depth 2.50		Logged H.Mason

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 1.10				0.40			MADE GROUND: Asphalt.	
	0.50	ES		0.60			MADE GROUND: Brown clayey sandy gravel. Gravel is fine to coarse subangular to subrounded of sandstone and brick. (Hydrocarbon odour).	
	0.80	ES					MADE GROUND: Brown slightly clayey sandy gravel. Gravel is fine to coarse subangular to subrounded of sandstone and brick. (Hydrocarbon odour).	
				1.00			Stiff high strength brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded of coal and sandstone.	1
	1.60	ES						
	1.80	HVP	97					
				2.00			Stiff high strength brown slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded of coal and sandstone.	2
	2.20	HVP	141					
				2.50			End of Pit at 2.50m	
								3
								4

Trial Pit Photographs



Trial Pit 101



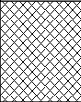
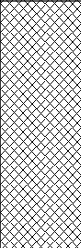
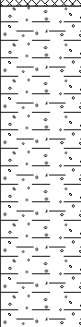
Trial Pit 101

Remarks: 1. Complete. 2. Water strike encountered at 1.10 m bgl, slow seepage. 3. Hydrocarbon odour at 0.40 m to 1.00 m bgl. 4. Breaking out concrete for 30 minutes.

Stability: **Stable**



Project Name: Barton & Redman	Project No. 12757	Co-ords: 388588.00 - 397096.00 Level:	Date 26/01/2022
Location: Manchester	Dimensions (m): 2.00 Depth 2.70		Scale 1:30
Client: Russells Construction			Logged H.Mason

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.60 0.60	D ES		0.40			MADE GROUND: Asphalt.	
							MADE GROUND: Dark brown slightly clayey sandy gravel. Gravel is fine to coarse subangular to subrounded of asphalt, coal and sandstone. (Strong hydrocarbon odour).	1
	1.60	ES		1.40			Very stiff very high strength dark brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of sandstone.	2
	2.50	HVP	184	2.70			End of Pit at 2.70m	3
								4

Trial Pit Photographs



Trial Pit 302

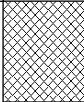
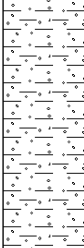


Trial Pit 302 Spoil

Remarks: 1. Complete. 2. Strong hydrocarbon odour between 0.40 m and 1.40 m bgl. 3. Breaking out concrete for 30 minutes

Stability: Stable

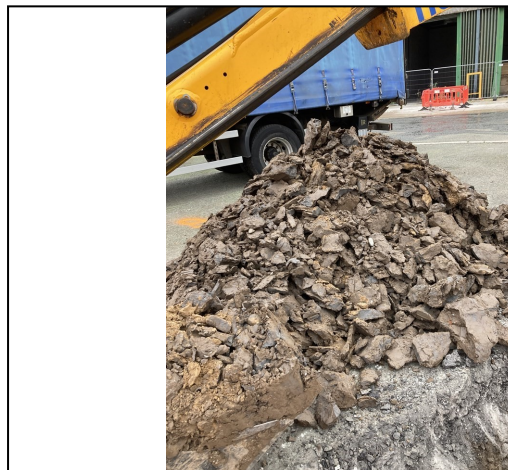
Project Name: Barton & Redman	Project No. 12757	Co-ords: 388552.00 - 397150.00 Level:	Date 26/01/2022
Location: Manchester		Dimensions (m): 2.00 Depth 2.20	Scale 1:30
Client: Russells Construction			Logged H.Mason

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.40			MADE GROUND: Asphalt.	
	0.60	ES		0.70			MADE GROUND: Dark brown slightly sandy gravel. Gravel is fine to coarse subangular to subrounded of asphalt, concrete, brick and sandstone.	
	1.00	ES					Stiff dark brown gravelly CLAY. Gravel is fine to coarse subangular to subrounded of sandstone.	1
	1.80	HVP	173	1.70			Very stiff very high strength brown slightly gravelly sandy CLAY. Gravel is fine to coarse subangular to subrounded of sandstone and mudstone.	2
	2.00 2.00 2.10	B HVP HVP	178 167	2.20			End of Pit at 2.20m	3
								4

Trial Pit Photographs



Trial Pit 303



Trial Pit 303 Spoil

Remarks: 1. Complete. 2. Breaking out concrete for 30 minutes.

Stability: Stable

Project Name: Barton & Redman	Project No. 12757	Co-ords: 388531.00 - 397195.00 Level:	Date 26/01/2022
Location: Manchester		Dimensions (m): 2.00 Depth 2.20	Scale 1:30
Client: Russells Construction			Logged H.Mason

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.50	D		0.40			MADE GROUND: Asphalt.	
	0.50	ES					MADE GROUND: Brown slightly sandy gravel. Gravel is fine to coarse subangular to subrounded of asphalt, concrete, brick and sandstone.	
	1.00	HVP	167	0.80			Very stiff very high strength brown grey mottled slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded of coal and sandstone.	1
	1.80	ES						
	2.00	HVP	191	2.20			End of Pit at 2.20m	2
								3
								4

Trial Pit Photographs



Trial Pit 304

Trial Pit 304 Spoil

Remarks: 1. Complete. 2. Breaking out concrete for 30 minutes

Stability: Stable

Project Name: Barton & Redman	Project No. 12757	Co-ords: 388473.00 - 397105.00 Level:	Date 26/01/2022
Location: Manchester		Dimensions (m): 2.00 Depth 2.50	Scale 1:30
Client: Russells Construction			Logged H.Mason

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 0.80	0.60	ES		0.50			MADE GROUND: Asphalt.	
				0.80			MADE GROUND: Dark brown slightly sandy gravel. Gravel is fine to coarse subangular to subrounded of brick, concrete and asphalt.	
	1.00	HVP	121				MADE GROUND: Brown gravelly clay. Gravel is fine to coarse subangular to subrounded of brick.	1
	1.20 1.20	D ES		1.40			Stiff high strength dark brown sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of sandstone.	
	1.60	HVP	124					2
	2.00	HVP	130	2.50			End of Pit at 2.50m	3
								4

Trial Pit Photographs



Trial Pit 305



Trial Pit 305 Spoil

Remarks: 1. Complete. 2. Water strike encountered at 0.80 m bgl, slow seepage. 3. Breaking out concrete for 35 minutes.

Stability: Stable

Project Name: Barton & Redman	Project No. 12757	Co-ords: 388479.00 - 397135.00 Level:	Date 26/01/2022
Location: Manchester		Dimensions (m): 2.00 Depth 3.10	Scale 1:30
Client: Russells Construction			Logged H.Mason

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.50 0.50	B ES		0.40			MADE GROUND: Concrete with reinforced metal bar.	
							MADE GROUND: Brown sandy gravel. Gravel is fine to coarse subangular to subrounded of brick, asphalt and concrete.	
	1.20 1.20 1.20	B D ES		1.00			MADE GROUND: Dark brown slightly sandy gravel. Gravel is fine to coarse subangular to subrounded of brick, asphalt and concrete with fragments of timber. (Strong hydrocarbon odour).	1
								2
				2.70			Very stiff very high strength brown slightly sandy CLAY.	
	3.00 3.00	ES HVP	183	3.10			End of Pit at 3.10m	3
								4

Trial Pit Photographs



Trial Pit 306

Trial Pit 306 Spoil

Remarks: 1. Complete. 2. Strong hydrocarbon odour between 0.40 m and 2.70 m bgl. 3. Breaking out concrete for 30 minutes.

Stability: Stable

Project Name: Barton & Redman	Project No. 12757	Co-ords: 388425.00 - 397151.00 Level:	Date 26/01/2022
Location: Manchester	Dimensions (m): 1.00 Depth 2.20 0.60		Scale 1:30
Client: Russells Construction			Logged H.Mason

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.40	ES		0.30			MADE GROUND: Concrete.	
	0.80	ES		0.70			MADE GROUND: Brown slightly sandy gravel. Gravel is fine to coarse subangular to subrounded of brick and concrete.	
	1.20	HVP	129	1.00			Stiff light brown slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded of sandstone and mudstone.	1
	1.40	B					Stiff high strength brown grey mottled slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded of sandstone. Becoming very stiff very high strength at 2.00 m bgl.	
	2.00	HVP	181	2.20			End of Pit at 2.20m	2
								3
								4

Trial Pit Photographs



Trial Pit 307

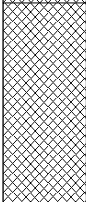


Trial Pit 307 Spoil

Remarks: 1. Complete. 2. Breaking out concrete for 30 minutes.

Stability: Stable

Project Name: Barton & Redman	Project No. 12757	Co-ords: 388444.00 - 397225.00 Level:	Date 26/01/2022
Location: Manchester		Dimensions (m): 2.00 Depth 1.10	Scale 1:30 Logged H.Mason
Client: Russells Construction			

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.70	ES		0.30			MADE GROUND: Concrete.	
				1.10			MADE GROUND: Brown sandy gravel. Gravel is fine to coarse subangular to subrounded of brick and concrete with fragments of ceramic.	1
							End of Pit at 1.10m	2
								3
								4

Trial Pit Photographs



Remarks: 1. Terminated due to concrete obstruction at base of excavation. Breaking out concrete for 30 minutes.

Stability: Stable

Project Name: Barton & Redman	Project No. 12757	Co-ords: 388492.00 - 397213.00 Level:	Date 26/01/2022
Location: Manchester	Dimensions (m): 2.00 Depth 2.20		Scale 1:30
Client: Russells Construction			Logged H.Mason

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.40	ES		0.30			MADE GROUND: Concrete.	
				0.70			MADE GROUND: Brown sandy gravel. Gravel is fine to coarse subangular to subrounded of brick, concrete and sandstone with fragments of timber.	
	0.90	ES					Very stiff very high strength dark brown slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded of sandstone.	1
	1.40	HVP	173					
	2.00	HVP	183	2.20			End of Pit at 2.20m	2
								3
								4

Trial Pit Photographs



Trial Pit 309



Trial Pit 309 Spoil

Remarks: 1. Complete. 2. Breaking out concrete for 30 minutes.

Stability: Stable

Project Name: Barton & Redman	Project No. 12757	Co-ords: 388537.00 - 397231.00 Level:	Date 26/01/2022
Location: Manchester		Dimensions (m): 2.00 Depth 2.50	Scale 1:30
Client: Russells Construction			Logged H.Mason

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.40			MADE GROUND: Asphalt	
	0.50	ES					MADE GROUND: Dark brown slightly sandy gravel. Gravel is fine to coarse subangular to subrounded of tarmac, concrete, brick and sandstone.	
	0.80	HVP	160	0.90			Dark brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of sandstone.	1
	1.10	ES						
				1.80			Very stiff very high strength greyish brown slightly gravelly CLAY. Gravel is fine to medium subangular to subrounded of sandstone.	2
	2.20	HVP	184					
	2.30	HVP	171					
				2.50			End of Pit at 2.50m	3
								4

Trial Pit Photographs



Trial Pit 310



Trial Pit 310 Spoil

Remarks: 1. Complete. 2. Breaking out concrete for 30 minutes.

Stability: Stable

Project Name: Barton & Redman	Project No. 12757	Co-ords: 388462.00 - 397178.00 Level:	Date 26/01/2022
Location: Manchester	Client: Russells Construction	Dimensions (m): 2.00 Depth 2.20	Scale 1:30 Logged H.Mason

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.60	ES		0.40			MADE GROUND: Concrete.	
				0.70			MADE GROUND: Dark brown slightly sandy gravel. Gravel is fine to coarse subangular to subrounded of concrete and brick.	
	1.20	ES					Very stiff very high strength greyish brown mottled slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of sandstone	1
	1.80	HVP	171					2
				2.20			End of Pit at 2.20m	3
								4

Trial Pit Photographs



Trial Pit 311



Trial Pit 311 Spoil

Remarks: 1. Complete. 2. Breaking out concrete for 20 minutes.

Stability: Stable

Borehole Log

Borehole No.

WS301

Sheet 1 of 1

Project Name: Barton & Redman

Project No.
12757

Co-ords: 388525E - 397246N

Hole Type
WS

Location: Manchester

Level:

Scale
1:50

Client: Russells Construction

Dates: 25/01/2022

Logged By
H.Mason

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.50			MADE GROUND: Asphalt and concrete.	
		0.70	ES					MADE GROUND: Greyish brown slightly clayey gravel. Gravel is fine to coarse subangular to subrounded of concrete, coal and brick with fragments of glass.	1
		1.00	SPT	N=10 (2,2/1,3,2,4)	1.00				
		1.60	ES					Stiff medium strength brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded of coal and sandstone.	2
		2.00	SPT	N=17 (2,3/3,4,4,6)	2.00				
		2.50	U					Very stiff high strength brown gravelly CLAY. Gravel is fine to coarse subangular to subrounded of coal and sandstone. Becoming stiff medium strength at 3.00 m bgl. Becoming very stiff high strength at 4.00m bgl.	3
		3.00	SPT	N=14 (2,2/3,3,3,5)					
		4.00	SPT	N=19 (2,2/4,4,5,6)					
		5.00	SPT	N=22 (6,5/5,5,5,7)				End of Borehole at 5.45m	5
					5.45				
									6
									7
									8
									9
									10

Remarks

1. Complete. 2. Breaking out concrete for 20 minutes.

Borehole Log

Borehole No.

WS302

Sheet 1 of 1

Project Name: Barton & Redman

Project No.
12757

Co-ords: 388453E - 397222N

Hole Type
WS

Location: Manchester

Level:

Scale
1:50

Client: Russells Construction

Dates: 25/01/2022

Logged By
H.Mason

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.40 0.50 0.80			MADE GROUND: Concrete.	
		0.60	ES					MADE GROUND: Brown gravel. Gravel is fine to coarse subangular to subrounded of concrete, brick and sandstone.	
		0.90	ES					MADE GROUND: Brown gravelly clay. Gravel is fine to coarse subangular to subrounded of coal and sandstone.	
		1.00	SPT	N=17 (3,3/4,4,4,5)				Very stiff high strength brown mottled grey slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded of coal and sandstone.	1
		1.50	U						
		2.00	SPT	N=19 (2,3/4,4,4,7)					2
		2.50	U						
		3.00	SPT	N=19 (3,3/3,5,5,6)					3
		4.00	SPT	N=18 (2,2/3,4,4,7)					4
		5.00	SPT	N=19 (3,3/4,4,5,6)					5
					5.45			End of Borehole at 5.45m	6
									7
									8
									9
									10

Remarks

1. Complete. 2. Monitoring well installed. 3. Response zone 1.00 m to 5.00 m bgl. 4. Breaking out concrete for 15 minutes.

Borehole Log

Borehole No.

WS303

Sheet 1 of 1

Project Name: Barton & Redman

Project No.
12757

Co-ords: 388492E - 397168N

Hole Type
WS

Location: Manchester

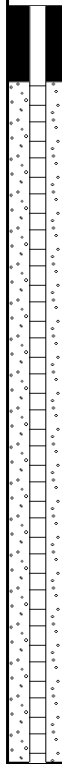
Level:

Scale
1:50

Client: Russells Construction

Dates: 25/01/2022

Logged By
H.Mason

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.40	ES		0.40			MADE GROUND: Asphalt and concrete.	
		0.80	ES		0.50			MADE GROUND: Light brown slightly sandy gravel. Gravel is fine to coarse angular to subangular of concrete and sandstone.	
		1.00	SPT	N=19 (4,3/4,4,5,6)				Very stiff high strength brown mottled grey slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded of sandstone.	1
		1.50	U						
		2.00	SPT	N=22 (2,3/4,5,5,8)					2
		2.50	U						
		3.00	SPT	N=21 (3,4/4,5,5,7)					3
					3.50				
		4.00	SPT	N=18 (2,3/3,4,5,6)	4.00			Very stiff high strength brown mottled grey slightly gravelly CLAY with pockets of light brown sand. Gravel is fine to coarse subangular to subrounded of sandstone.	4
								Very stiff high strength brown mottled grey slightly sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded of coal and sandstone.	
		5.00	SPT	N=23 (3,4/5,5,5,8)					5
					5.45			End of Borehole at 5.45m	
									6
									7
									8
									9
									10

Remarks

1. Complete. 2. Monitoring well installed. 3. Response zone 0.50 m to 5.00 m bgl. 4. Breaking out concrete for 10 minutes.

Borehole Log

Borehole No.

WS304

Sheet 1 of 1

Project Name: Barton & Redman

Project No.
12757

Co-ords: 388558E - 397183N

Hole Type
WS

Location: Manchester

Level:

Scale
1:50

Client: Russells Construction

Dates: 25/01/2022

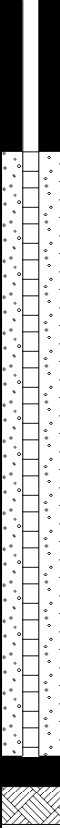
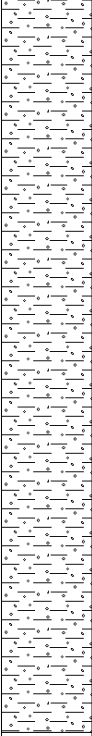
Logged By
H.Mason

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.50			MADE GROUND: Concrete.	
		0.60	ES		0.80			MADE GROUND: Dark brown gravel. Gravel is fine to coarse subangular to subrounded of asphalt and concrete.	
		1.00	SPT	N=11 (1,0/1,2,4,4)	1.00			MADE GROUND: Brown gravel. Gravel is fine to coarse subangular to subrounded of asphalt and coal with fragments of timber and metal.	1
					1.50			MADE GROUND: Dark brown Gravel. Gravel is fine to coarse subangular to subrounded of asphalt coal and sandstone with fragments of timber and metal.	
		2.00	SPT	N=20 (3,3/4,5,5,6)	2.00			MADE GROUND: Dark brown gravel. Gravel is fine to coarse subangular to subrounded of asphalt, coal and sandstone with fragments of metal and timber.	2
		2.20	ES					Very stiff high strength brown slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded of coal and sandstone.	
								Very stiff high strength brown slightly gravelly CLAY. Gravel is fine to coarse subrounded to rounded of sandstone.	3
		3.00	SPT	N=19 (3,2/4,4,5,6)					
		3.80	B						
		4.00	SPT	N=19 (3,3/4,4,5,6)					4
		5.00	SPT	N=31 (4,4/6,6,7,12)					5
					5.45			End of Borehole at 5.45m	6
									7
									8
									9
									10

Remarks

1. Complete. 2. Monitoring well installed. 3. Response zone 0.50 m to 1.50 m bgl. 4. Breaking out concrete for 15 minutes.

				Borehole Log				Borehole No. WS305 Sheet 1 of 1	
Project Name: Barton & Redman				Project No. 12757		Co-ords: 388576E - 397132N		Hole Type WS	
Location: Manchester				Level:				Scale 1:50	
Client: Russells Construction				Dates: 25/01/2022				Logged By H.Mason	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.60		MADE GROUND: Concrete.		
	0.70	ES						1	
	1.00	SPT	N=11 (2,2/2,3,3,3)			2			
	1.50	U							
	2.00	SPT	N=14 (3,3/3,4,3,4)			3			
	2.50	U							
	3.00	SPT	N=18 (2,3/3,5,5,5)			4			
4.00	SPT	N=21 (3,4/4,5,6,6)				5			
5.00	SPT	N=36 (4,4/8,8,10,10)			5.45		End of Borehole at 5.45m	6	
								7	
								8	
								9	
								10	

Remarks
 1. Complete. 2. Monitoring well installed. 3. Response zone 1.00 m to 5.00 m bgl. 4. Breaking out concrete 15 minutes



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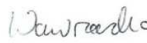
i2 Analytical Ltd.
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e: reception@i2analytical.com

Analytical Report Number : 22-36009

Replaces Analytical Report Number: 22-36009, issue no. 1
Client references/information amended.

Project / Site name:	Smithfield Market	Samples received on:	27/01/2022
Your job number:	12 757	Samples instructed on/ Analysis started on:	27/01/2022
Your order number:	000443	Analysis completed by:	03/02/2022
Report Issue Number:	2	Report issued on:	11/03/2022
Samples Analysed:	2 leachate samples - 12 soil samples		


Signed:

Joanna Wawrzeczko
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

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

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

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 22-36009
Project / Site name: Smithfield Market
Your Order No: 000443

Lab Sample Number				2152909	2152910	2152911	2152912	2152913
Sample Reference				WS301	WS303	WS306	TP301	TP302
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.60	0.80	2.20	0.50	0.60
Date Sampled				25/01/2022	25/01/2022	25/01/2022	26/01/2022	26/01/2022
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	%	0.01	NONE	17	15	10	7.1	4.8
Total mass of sample received	kg	0.001	NONE	0.4	0.4	0.4	0.4	0.4

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
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	KSZ	KSZ	KSZ	KSZ	KSZ

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	8	-	8.4	8.1
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	250	-	330	510
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	-	0.028	-	0.044	0.16
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	-	56	-	88	320
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	-	28.2	-	43.8	160
Sulphide	mg/kg	1	MCERTS	-	< 1.0	-	19	36
Total Sulphur	mg/kg	50	MCERTS	-	120	-	780	950
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	0.7	-	0.7	1

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80	-	-
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Analytical Report Number: 22-36009
Project / Site name: Smithfield Market
Your Order No: 000443

Lab Sample Number				2152909	2152910	2152911	2152912	2152913
Sample Reference				WS301	WS303	WS306	TP301	TP302
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.60	0.80	2.20	0.50	0.60
Date Sampled				25/01/2022	25/01/2022	25/01/2022	26/01/2022	26/01/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7.9	9.3	7.2	6.9	5.3
Barium (aqua regia extractable)	mg/kg	1	MCERTS	140	-	110	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.1	-	0.85	-	-
Boron (water soluble)	mg/kg	0.2	MCERTS	0.3	-	0.4	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	0.5	0.4
Chromium (hexavalent)	mg/kg	4	NONE	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	23	-	11	9.2
Copper (aqua regia extractable)	mg/kg	1	MCERTS	26	24	24	240	17
Lead (aqua regia extractable)	mg/kg	1	MCERTS	12	12	10	39	15
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.5	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	33	31	27	16	11
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	27	-	22	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	58	57	46	76	41

Petroleum Hydrocarbons

TPH (C5 - C6) HS_ID_TOTAL	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C6 - C8) HS_ID_TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C8 - C10) HS_ID_TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12) EH_CU_ID_TOTAL	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH (C12 - C16) EH_CU_ID_TOTAL	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	14
TPH (C16 - C21) EH_CU_ID_TOTAL	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	17	33
TPH (C21 - C35) EH_CU_ID_TOTAL	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	160	400
TPH (C35 - C40) EH_CU_ID_TOTAL	mg/kg	10	MCERTS	< 10	< 10	< 10	35	150
TPH Total C5 - C40 EH_CU+HS_ID_TOTAL	mg/kg	10	MCERTS	< 10	< 10	< 10	210	590

Analytical Report Number: 22-36009
Project / Site name: Smithfield Market
Your Order No: 000443

Lab Sample Number	2152909	2152910	2152911	2152912	2152913
Sample Reference	WS301	WS303	WS306	TP301	TP302
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	1.60	0.80	2.20	0.50	0.60
Date Sampled	25/01/2022	25/01/2022	25/01/2022	26/01/2022	26/01/2022
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	1	ISO 17025	-	-	-	< 1.0	< 1.0
Chloroethane	µg/kg	1	NONE	-	-	-	< 1.0	< 1.0
Bromomethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
Vinyl Chloride	µg/kg	1	NONE	-	-	-	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg	1	NONE	-	-	-	< 1.0	< 1.0
1,1-Dichloroethene	µg/kg	1	NONE	-	-	-	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Trichloromethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	-	< 1.0	< 1.0
Benzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Tetrachloromethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Trichloroethene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Dibromomethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Bromodichloromethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
Tetrachloroethene	µg/kg	1	NONE	-	-	-	< 1.0	< 1.0
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
Chlorobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	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
Styrene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Tribromomethane	µg/kg	1	NONE	-	-	-	< 1.0	< 1.0
o-Xylene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Isopropylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Bromobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Butylbenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-	-	< 1.0	< 1.0

Analytical Report Number: 22-36009
 Project / Site name: Smithfield Market
 Your Order No: 000443

Lab Sample Number				2152909	2152910	2152911	2152912	2152913
Sample Reference				WS301	WS303	WS306	TP301	TP302
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.60	0.80	2.20	0.50	0.60
Date Sampled				25/01/2022	25/01/2022	25/01/2022	26/01/2022	26/01/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-	-	< 1.0	< 1.0

Analytical Report Number: 22-36009
Project / Site name: Smithfield Market
Your Order No: 000443

Lab Sample Number				2152909	2152910	2152911	2152912	2152913
Sample Reference				WS301	WS303	WS306	TP301	TP302
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.60	0.80	2.20	0.50	0.60
Date Sampled				25/01/2022	25/01/2022	25/01/2022	26/01/2022	26/01/2022
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
Phenol	mg/kg	0.2	ISO 17025	-	-	-	< 0.2	< 0.2
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-	-	< 0.1	< 0.1
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-	-	< 0.1	< 0.1
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	-	< 0.1	< 0.1
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
Hexachloroethane	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
4-Methylphenol	mg/kg	0.2	NONE	-	-	-	< 0.2	< 0.2
Isophorone	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
4-Chloroaniline	mg/kg	0.1	NONE	-	-	-	< 0.1	< 0.1
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	-	< 0.1	< 0.1
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	-	< 0.1	< 0.1
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-	-	< 0.1	< 0.1
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	-	< 0.1	< 0.1
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	-	< 0.1	< 0.1
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	-	< 0.1	< 0.1
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-	-	< 0.1	< 0.1
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	0.99
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-	-	< 0.3	< 0.3
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
Fluorene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	1.2
Azobenzene	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	0.86	4.7
Anthracene	mg/kg	0.05	MCERTS	-	-	-	0.23	0.64
Carbazole	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-	-	< 0.2	< 0.2
Anthraquinone	mg/kg	0.3	MCERTS	-	-	-	< 0.3	< 0.3
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	1.3	2.5
Pyrene	mg/kg	0.05	MCERTS	-	-	-	1.3	2
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-	-	< 0.3	< 0.3
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	0.59	0.58
Chrysene	mg/kg	0.05	MCERTS	-	-	-	0.61	0.59
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	0.41	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	0.3	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	0.37	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	0.2	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	0.23	< 0.05

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Lab Sample Number				2152909	2152910	2152911	2152912	2152913
Sample Reference				WS301	WS303	WS306	TP301	TP302
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.60	0.80	2.20	0.50	0.60
Date Sampled				25/01/2022	25/01/2022	25/01/2022	26/01/2022	26/01/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

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

Analytical Report Number: 22-36009
Project / Site name: Smithfield Market
Your Order No: 000443

Lab Sample Number				2152914	2152915	2152916	2152917	2152918
Sample Reference				TP303	TP305	TP306	TP307	TP308
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	1.20	1.20	0.80	0.70
Date Sampled				26/01/2022	26/01/2022	26/01/2022	26/01/2022	26/01/2022
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	%	0.01	NONE	3	15	25	18	12
Total mass of sample received	kg	0.001	NONE	0.4	0.4	0.4	0.4	0.4

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	Chrysotile & Amosite
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	0.006
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	0.006
Asbestos Analyst ID	N/A	N/A	N/A	KSZ	KSZ	KSZ	KSZ	KSZ

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.7	-	-	7.5	-
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	6.7	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	380	-	-	990	-
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	0.029	-	-	0.49	-
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	59	-	-	990	-
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	29.4	-	-	493	-
Sulphide	mg/kg	1	MCERTS	23	-	-	< 1.0	-
Total Sulphur	mg/kg	50	MCERTS	180	-	-	410	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	< 0.1	-	-	0.3	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	1.5
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	0.36
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	2.2
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	2.2
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	1.3
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	1.2
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	1.2
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	0.65
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	1.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	0.72
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	0.84

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	-	< 0.80	13.2
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Analytical Report Number: 22-36009
Project / Site name: Smithfield Market
Your Order No: 000443

Lab Sample Number				2152914	2152915	2152916	2152917	2152918
Sample Reference				TP303	TP305	TP306	TP307	TP308
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	1.20	1.20	0.80	0.70
Date Sampled				26/01/2022	26/01/2022	26/01/2022	26/01/2022	26/01/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	3.5	6.2	28	10	20
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	80	240	-	390
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	0.86	1.2	-	0.94
Boron (water soluble)	mg/kg	0.2	MCERTS	-	< 0.2	0.6	-	1.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.6	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	NONE	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	6	-	-	27	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	5.9	24	940	19	340
Lead (aqua regia extractable)	mg/kg	1	MCERTS	7	13	690	21	1000
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	3.1	27	29	23	34
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	45	-	31
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	19	51	320	38	220

Petroleum Hydrocarbons

TPH (C5 - C6) HS_ID_TOTAL	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C6 - C8) HS_ID_TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C8 - C10) HS_ID_TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1	2.2	< 0.1	< 0.1
TPH (C10 - C12) EH_CU_ID_TOTAL	mg/kg	2	MCERTS	< 2.0	< 2.0	38	< 2.0	< 2.0
TPH (C12 - C16) EH_CU_ID_TOTAL	mg/kg	4	MCERTS	< 4.0	< 4.0	470	< 4.0	< 4.0
TPH (C16 - C21) EH_CU_ID_TOTAL	mg/kg	1	MCERTS	< 1.0	< 1.0	780	< 1.0	11
TPH (C21 - C35) EH_CU_ID_TOTAL	mg/kg	1	MCERTS	< 1.0	< 1.0	570	< 1.0	18
TPH (C35 - C40) EH_CU_ID_TOTAL	mg/kg	10	MCERTS	< 10	< 10	35	< 10	< 10
TPH Total C5 - C40 EH_CU+HS_ID_TOTAL	mg/kg	10	MCERTS	< 10	< 10	1900	< 10	29

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Lab Sample Number				2152914	2152915	2152916	2152917	2152918
Sample Reference				TP303	TP305	TP306	TP307	TP308
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	1.20	1.20	0.80	0.70
Date Sampled				26/01/2022	26/01/2022	26/01/2022	26/01/2022	26/01/2022
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	1	ISO 17025	-	-	< 1.0	-	-
Chloroethane	µg/kg	1	NONE	-	-	< 1.0	-	-
Bromomethane	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
Vinyl Chloride	µg/kg	1	NONE	-	-	< 1.0	-	-
Trichlorofluoromethane	µg/kg	1	NONE	-	-	< 1.0	-	-
1,1-Dichloroethene	µg/kg	1	NONE	-	-	< 1.0	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Trichloromethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	< 1.0	-	-
Benzene	µg/kg	1	MCERTS	-	-	49	-	-
Tetrachloromethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Trichloroethene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Dibromomethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Bromodichloromethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
Toluene	µg/kg	1	MCERTS	-	-	25	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
Tetrachloroethene	µg/kg	1	NONE	-	-	< 1.0	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
Chlorobenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	230	-	-
p & m-Xylene	µg/kg	1	MCERTS	-	-	740	-	-
Styrene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Tribromomethane	µg/kg	1	NONE	-	-	< 1.0	-	-
o-Xylene	µg/kg	1	MCERTS	-	-	400	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Isopropylbenzene	µg/kg	1	MCERTS	-	-	52	-	-
Bromobenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	220	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	600	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	28	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Butylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	< 1.0	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-	< 1.0	-	-

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Lab Sample Number				2152914	2152915	2152916	2152917	2152918
Sample Reference				TP303	TP305	TP306	TP307	TP308
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	1.20	1.20	0.80	0.70
Date Sampled				26/01/2022	26/01/2022	26/01/2022	26/01/2022	26/01/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-	< 1.0	-	-

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Lab Sample Number				2152914	2152915	2152916	2152917	2152918
Sample Reference				TP303	TP305	TP306	TP307	TP308
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	1.20	1.20	0.80	0.70
Date Sampled				26/01/2022	26/01/2022	26/01/2022	26/01/2022	26/01/2022
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	0.05	MCERTS	-	-	34	-	-
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	-	-	36	-	-
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	0.05	MCERTS	-	-	15	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	49	-	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	18	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-	< 0.3	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	58	-	-
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	0.05	MCERTS	-	-	130	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	48	-	-
Carbazole	mg/kg	0.3	MCERTS	-	-	8	-	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-	< 0.2	-	-
Anthraquinone	mg/kg	0.3	MCERTS	-	-	< 0.3	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	56	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-	67	-	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-	< 0.3	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	44	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	35	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	20	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	12	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	22	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	7.3	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	3.3	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	8	-	-

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Lab Sample Number				2152914	2152915	2152916	2152917	2152918
Sample Reference				TP303	TP305	TP306	TP307	TP308
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.60	1.20	1.20	0.80	0.70
Date Sampled				26/01/2022	26/01/2022	26/01/2022	26/01/2022	26/01/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

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

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Project / Site name: Smithfield Market
Your Order No: 000443

Lab Sample Number				2152919	2152920
Sample Reference				TP309	TP310
Sample Number				None Supplied	None Supplied
Depth (m)				0.40	0.50
Date Sampled				26/01/2022	26/01/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)		Units	Limit of detection	Accreditation Status	
	Stone Content	%	0.1	NONE	< 0.1
	Moisture Content	%	0.01	NONE	11
	Total mass of sample received	kg	0.001	NONE	0.4

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	-	-
Asbestos Analyst ID	N/A	N/A	N/A	SSZ	SSZ

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	-
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	-	-
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	-	-
Water Soluble SO ₄ (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	-	-
Sulphide	mg/kg	1	MCERTS	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.38	0.46
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.39	0.74
Pyrene	mg/kg	0.05	MCERTS	0.41	0.7
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.26	0.39
Chrysene	mg/kg	0.05	MCERTS	0.25	0.4
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.33
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.25
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.33
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	1.69	3.6
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Lab Sample Number				2152919	2152920
Sample Reference				TP309	TP310
Sample Number				None Supplied	None Supplied
Depth (m)				0.40	0.50
Date Sampled				26/01/2022	26/01/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	8.4	6.9
Barium (aqua regia extractable)	mg/kg	1	MCERTS	270	130
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.71	0.2
Boron (water soluble)	mg/kg	0.2	MCERTS	0.5	< 0.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	1.3
Chromium (hexavalent)	mg/kg	4	NONE	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	47	27
Lead (aqua regia extractable)	mg/kg	1	MCERTS	280	21
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.8
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	21	8.9
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	24	9.9
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	100	58

Petroleum Hydrocarbons

TPH (C5 - C6) HS_ID_TOTAL	mg/kg	1	NONE	< 1.0	< 1.0
TPH (C6 - C8) HS_ID_TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1
TPH (C8 - C10) HS_ID_TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1
TPH (C10 - C12) EH_CU_ID_TOTAL	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH (C12 - C16) EH_CU_ID_TOTAL	mg/kg	4	MCERTS	< 4.0	< 4.0
TPH (C16 - C21) EH_CU_ID_TOTAL	mg/kg	1	MCERTS	< 1.0	11
TPH (C21 - C35) EH_CU_ID_TOTAL	mg/kg	1	MCERTS	< 1.0	290
TPH (C35 - C40) EH_CU_ID_TOTAL	mg/kg	10	MCERTS	< 10	140
TPH Total C5 - C40 EH_CU+HS_ID_TOTAL	mg/kg	10	MCERTS	< 10	440

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Lab Sample Number				2152919	2152920
Sample Reference				TP309	TP310
Sample Number				None Supplied	None Supplied
Depth (m)				0.40	0.50
Date Sampled				26/01/2022	26/01/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
VOCs					
Chloromethane	µg/kg	1	ISO 17025	-	-
Chloroethane	µg/kg	1	NONE	-	-
Bromomethane	µg/kg	1	ISO 17025	-	-
Vinyl Chloride	µg/kg	1	NONE	-	-
Trichlorofluoromethane	µg/kg	1	NONE	-	-
1,1-Dichloroethene	µg/kg	1	NONE	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-
Trichloromethane	µg/kg	1	MCERTS	-	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-
Benzene	µg/kg	1	MCERTS	-	-
Tetrachloromethane	µg/kg	1	MCERTS	-	-
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-
Trichloroethene	µg/kg	1	MCERTS	-	-
Dibromomethane	µg/kg	1	MCERTS	-	-
Bromodichloromethane	µg/kg	1	MCERTS	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-
Toluene	µg/kg	1	MCERTS	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	-
Tetrachloroethene	µg/kg	1	NONE	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-
Chlorobenzene	µg/kg	1	MCERTS	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-
p & m-Xylene	µg/kg	1	MCERTS	-	-
Styrene	µg/kg	1	MCERTS	-	-
Tribromomethane	µg/kg	1	NONE	-	-
o-Xylene	µg/kg	1	MCERTS	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-
Isopropylbenzene	µg/kg	1	MCERTS	-	-
Bromobenzene	µg/kg	1	MCERTS	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-
Butylbenzene	µg/kg	1	MCERTS	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-

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 Your Order No: 000443

Lab Sample Number				2152919	2152920
Sample Reference				TP309	TP310
Sample Number				None Supplied	None Supplied
Depth (m)				0.40	0.50
Date Sampled				26/01/2022	26/01/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-

Analytical Report Number: 22-36009
Project / Site name: Smithfield Market
Your Order No: 000443

Lab Sample Number				2152919	2152920
Sample Reference				TP309	TP310
Sample Number				None Supplied	None Supplied
Depth (m)				0.40	0.50
Date Sampled				26/01/2022	26/01/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		
SVOCs					
Aniline	mg/kg	0.1	NONE	-	-
Phenol	mg/kg	0.2	ISO 17025	-	-
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	-	-
Hexachloroethane	mg/kg	0.05	MCERTS	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	-	-
4-Methylphenol	mg/kg	0.2	NONE	-	-
Isophorone	mg/kg	0.2	MCERTS	-	-
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-
Naphthalene	mg/kg	0.05	MCERTS	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-
4-Chloroaniline	mg/kg	0.1	NONE	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-
Azobenzene	mg/kg	0.3	MCERTS	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-
Carbazole	mg/kg	0.3	MCERTS	-	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-
Anthraquinone	mg/kg	0.3	MCERTS	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-

Analytical Report Number: 22-36009
 Project / Site name: Smithfield Market
 Your Order No: 000443

Lab Sample Number				2152919	2152920
Sample Reference				TP309	TP310
Sample Number				None Supplied	None Supplied
Depth (m)				0.40	0.50
Date Sampled				26/01/2022	26/01/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

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



Analytical Report Number: 22-36009
Project / Site name: Smithfield Market
Your Order No: 000443

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006-PL based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
2152918	TP308	0.70	160	Loose Fibrous Debris	Chrysotile & Amosite	0.006	0.006

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.



Analytical Report Number: 22-36009
Project / Site name: Smithfield Market

Your Order No: 000443

Lab Sample Number	2152921	2152922
Sample Reference	TP302	TP306
Sample Number	None Supplied	None Supplied
Depth (m)	0.50	1.20
Date Sampled	26/01/2022	26/01/2022
Time Taken	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection Accreditation Status

General Inorganics

pH (automated)	pH Units	N/A	ISO 17025	7.8	8
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1.0	2.9

Total Phenols

Total Phenols (monohydric)	µg/l	1	ISO 17025	11	320
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Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	260
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	4.6
Acenaphthene	µg/l	0.01	ISO 17025	3.6	17
Fluorene	µg/l	0.01	ISO 17025	1.2	12
Phenanthrene	µg/l	0.01	ISO 17025	1.1	4.2
Anthracene	µg/l	0.01	ISO 17025	< 0.01	1.6
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01
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	NONE	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	5.9	300
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1	ISO 17025	< 1.0	6.2
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.4	ISO 17025	0.5	< 0.4
Copper (dissolved)	µg/l	0.7	ISO 17025	11	14
Lead (dissolved)	µg/l	1	ISO 17025	3	3.2
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	4.2	7.3
Selenium (dissolved)	µg/l	4	ISO 17025	6.5	7.5
Zinc (dissolved)	µg/l	0.4	ISO 17025	4.7	7.4

Monoaromatics & Oxygenates

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	4.4
p & m-xylene	µg/l	1	ISO 17025	< 1.0	12
o-xylene	µg/l	1	ISO 17025	< 1.0	9.6
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10	< 10

Petroleum Hydrocarbons

TPH1 (C10 - C40) EH_ID_TOTAL_#1_#2_MS	µg/l	10	NONE	< 10	2200
TPH-CWG - Aliphatic >C5 - C6 HS_ID_AL	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C6 - C8 HS_ID_AL	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aliphatic >C8 - C10 HS_ID_AL	µg/l	1	ISO 17025	< 1.0	< 1.0



Analytical Report Number: 22-36009
Project / Site name: Smithfield Market

Your Order No: 000443

Lab Sample Number				2152921	2152922
Sample Reference				TP302	TP306
Sample Number				None Supplied	None Supplied
Depth (m)				0.50	1.20
Date Sampled				26/01/2022	26/01/2022
Time Taken				None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status		
TPH-CWG - Aliphatic >C10 - C12 _{EH, 1D, AL, #1, #2, MS}	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16 _{EH, 1D, AL, #1, #2, MS}	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21 _{EH, 1D, AL, #1, #2, MS}	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35 _{EH, 1D, AL, #1, #2, MS}	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35) _{HS+EH, 1D, AL, #1, #2, MS}	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic >C5 - C7 _{HS, 1D, AR}	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C7 - C8 _{HS, 1D, AR}	µg/l	1	ISO 17025	< 1.0	< 1.0
TPH-CWG - Aromatic >C8 - C10 _{HS, 1D, AR}	µg/l	1	ISO 17025	< 1.0	33
TPH-CWG - Aromatic >C10 - C12 _{EH, 1D, AR, #1, #2, MS}	µg/l	10	NONE	< 10	330
TPH-CWG - Aromatic >C12 - C16 _{EH, 1D, AR, #1, #2, MS}	µg/l	10	NONE	< 10	1300
TPH-CWG - Aromatic >C16 - C21 _{EH, 1D, AR, #1, #2, MS}	µg/l	10	NONE	< 10	600
TPH-CWG - Aromatic >C21 - C35 _{EH, 1D, AR, #1, #2, MS}	µg/l	10	NONE	< 10	< 10
TPH-CWG - Aromatic (C5 - C35) _{HS+EH, 1D, AR, #1, #2, MS}	µg/l	10	NONE	< 10	2200

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

Analytical Report Number : 22-36009

Project / Site name: Smithfield Market

* 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 loam (MCERTS) 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 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2152909	WS301	None Supplied	1.6	Grey clay.
2152910	WS303	None Supplied	0.8	Grey clay with gravel.
2152911	WS306	None Supplied	2.2	Grey clay with gravel.
2152912	TP301	None Supplied	0.5	Grey clay and sand with gravel.
2152913	TP302	None Supplied	0.6	Brown clay and sand with gravel.
2152914	TP303	None Supplied	0.6	Brown clay and sand with gravel.
2152915	TP305	None Supplied	1.2	Brown clay and sand.
2152916	TP306	None Supplied	1.2	Grey clay and sand with gravel.
2152917	TP307	None Supplied	0.8	Brown clay.
2152918	TP308	None Supplied	0.7	Brown sand with gravel.
2152919	TP309	None Supplied	0.4	Brown clay and sand with gravel.
2152920	TP310	None Supplied	0.5	Brown gravel with stones.

Analytical Report Number : 22-36009

Project / Site name: Smithfield Market

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-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
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
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
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	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
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
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	W	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in leachate - LOW LEVEL 1 ug/l	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
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
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
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
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
pH at 20oC in leachate (automated)	Determination of pH in leachate by electrometric measurement.	In house method.	L099B	W	ISO 17025
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS

Analytical Report Number : 22-36009
Project / Site name: Smithfield Market

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	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
TPH1 (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
TPHCWG (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	ISO 17025
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
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
BTEX and MTBE in leachates (Monoaromatics)	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
Total cyanide in leachate - 1µg/l	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Sulphate, water soluble, in soil (1hr extraction)	Sulphate, water soluble, in soil (1hr extraction)	In-house method	L038-PL	D	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 30°C.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.



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Analytical Report Number : 22-42962

Project / Site name:	Smithfield Market	Samples received on:	01/03/2022
Your job number:	12-757	Samples instructed on/ Analysis started on:	01/03/2022
Your order number:	000531	Analysis completed by:	08/03/2022
Report Issue Number:	1	Report issued on:	08/03/2022
Samples Analysed:	1 water sample		

Izabela Wójcik
Signed:

Izabela Wójcik
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

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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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.



Analytical Report Number: 22-42962
Project / Site name: Smithfield Market

Your Order No: 000531

Lab Sample Number	2191171			
Sample Reference	WS105			
Sample Number	None Supplied			
Depth (m)	None Supplied			
Date Sampled	01/03/2022			
Time Taken	None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status	

General Inorganics

pH	pH Units	N/A	ISO 17025	11.9
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1.0
Dissolved Organic Carbon (DOC)	mg/l	0.1	ISO 17025	8.55

Total Phenols

Total Phenols (monohydric)	µg/l	1	ISO 17025	5.3
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Heavy Metals / Metalloids

Calcium (dissolved)	mg/l	0.012	ISO 17025	32
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0

Arsenic (dissolved)	µg/l	0.15	ISO 17025	2.52
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.08
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.9
Copper (dissolved)	µg/l	0.5	ISO 17025	11
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2
Manganese (dissolved)	µg/l	0.05	ISO 17025	0.24
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	1.6
Selenium (dissolved)	µg/l	0.6	ISO 17025	29
Zinc (dissolved)	µg/l	0.5	ISO 17025	5.2

Monoaromatics & Oxygenates

Benzene	µg/l	1	ISO 17025	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0

Petroleum Hydrocarbons

TPH1 (C10 - C40) EH_2D_TOTAL_#1_#2	µg/l	10	NONE	< 10
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TPH-CWG - Aliphatic >C5 - C6 HS_1D_AL	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C6 - C8 HS_1D_AL	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C8 - C10 HS_1D_AL	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C10 - C12 EH_1D_AL_#1_#2_MS	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C12 - C16 EH_1D_AL_#1_#2_MS	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C16 - C21 EH_1D_AL_#1_#2_MS	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C21 - C35 EH_1D_AL_#1_#2_MS	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic (C5 - C35) HS+EH_1D_AL_#1_#2_MS	µg/l	10	NONE	< 10

TPH-CWG - Aromatic >C5 - C7 HS_1D_AR	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C7 - C8 HS_1D_AR	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C8 - C10 HS_1D_AR	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C10 - C12 EH_1D_AR_#1_#2_MS	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C12 - C16 EH_1D_AR_#1_#2_MS	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C16 - C21 EH_1D_AR_#1_#2_MS	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C21 - C35 EH_1D_AR_#1_#2_MS	µg/l	10	NONE	< 10
TPH-CWG - Aromatic (C5 - C35) HS+EH_1D_AR_#1_#2_MS	µg/l	10	NONE	< 10



Analytical Report Number: 22-42962
Project / Site name: Smithfield Market

Your Order No: 000531

Lab Sample Number				2191171
Sample Reference				WS105
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				01/03/2022
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status	

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0
Chloroethane	µg/l	1	ISO 17025	< 1.0
Bromomethane	µg/l	1	ISO 17025	< 1.0
Vinyl Chloride	µg/l	1	NONE	< 1.0
Trichlorofluoromethane	µg/l	1	NONE	< 1.0
1,1-Dichloroethene	µg/l	1	ISO 17025	< 1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	1	ISO 17025	< 1.0
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0
1,1-Dichloroethane	µg/l	1	ISO 17025	< 1.0
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0
Trichloromethane	µg/l	1	ISO 17025	< 1.0
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0
1,2-Dichloroethane	µg/l	1	ISO 17025	< 1.0
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0
1,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0
Trichloroethene	µg/l	1	ISO 17025	< 1.0
Dibromomethane	µg/l	1	ISO 17025	< 1.0
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0
Chlorobenzene	µg/l	1	ISO 17025	< 1.0
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0
p & m-Xylene	µg/l	1	ISO 17025	< 1.0
Styrene	µg/l	1	ISO 17025	< 1.0
Tribromomethane	µg/l	1	ISO 17025	< 1.0
o-Xylene	µg/l	1	ISO 17025	< 1.0
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0
Bromobenzene	µg/l	1	ISO 17025	< 1.0
n-Propylbenzene	µg/l	1	ISO 17025	< 1.0
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0
tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0
sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0
1,3-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0
p-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0
1,2-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0
1,4-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0



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Project / Site name: Smithfield Market

Your Order No: 000531

Lab Sample Number				2191171
Sample Reference				WS105
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				01/03/2022
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status	
Butylbenzene	µg/l	1	ISO 17025	< 1.0
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0

SVOCs

Aniline	µg/l	0.05	NONE	< 0.05
Phenol	µg/l	0.05	NONE	< 0.05
2-Chlorophenol	µg/l	0.05	NONE	< 0.05
Bis(2-chloroethyl)ether	µg/l	0.05	NONE	< 0.05
1,3-Dichlorobenzene	µg/l	0.05	NONE	< 0.05
1,2-Dichlorobenzene	µg/l	0.05	NONE	< 0.05
1,4-Dichlorobenzene	µg/l	0.05	NONE	< 0.05
Bis(2-chloroisopropyl)ether	µg/l	0.05	NONE	< 0.05
2-Methylphenol	µg/l	0.05	NONE	< 0.05
Hexachloroethane	µg/l	0.05	NONE	< 0.05
Nitrobenzene	µg/l	0.05	NONE	< 0.05
4-Methylphenol	µg/l	0.05	NONE	< 0.05
Isophorone	µg/l	0.05	NONE	< 0.05
2-Nitrophenol	µg/l	0.05	NONE	< 0.05
2,4-Dimethylphenol	µg/l	0.05	NONE	< 0.05
Bis(2-chloroethoxy)methane	µg/l	0.05	NONE	< 0.05
1,2,4-Trichlorobenzene	µg/l	0.05	NONE	< 0.05
Naphthalene	µg/l	0.01	ISO 17025	< 0.01
2,4-Dichlorophenol	µg/l	0.05	NONE	< 0.05
4-Chloroaniline	µg/l	0.05	NONE	< 0.05
Hexachlorobutadiene	µg/l	0.05	NONE	< 0.05
4-Chloro-3-methylphenol	µg/l	0.05	NONE	< 0.05
2,4,6-Trichlorophenol	µg/l	0.05	NONE	< 0.05
2,4,5-Trichlorophenol	µg/l	0.05	NONE	< 0.05
2-Methylnaphthalene	µg/l	0.05	NONE	< 0.05
2-Chloronaphthalene	µg/l	0.05	NONE	< 0.05
Dimethylphthalate	µg/l	0.05	NONE	< 0.05
2,6-Dinitrotoluene	µg/l	0.05	NONE	< 0.05
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01
2,4-Dinitrotoluene	µg/l	0.05	NONE	< 0.05
Dibenzofuran	µg/l	0.05	NONE	< 0.05
4-Chlorophenyl phenyl ether	µg/l	0.05	NONE	< 0.05
Diethyl phthalate	µg/l	0.05	NONE	< 0.05
4-Nitroaniline	µg/l	0.05	NONE	< 0.05
Fluorene	µg/l	0.01	ISO 17025	< 0.01
Azobenzene	µg/l	0.05	NONE	< 0.05
Bromophenyl phenyl ether	µg/l	0.05	NONE	< 0.05
Hexachlorobenzene	µg/l	0.05	NONE	< 0.05
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01
Carbazole	µg/l	0.05	NONE	< 0.05
Dibutyl phthalate	µg/l	0.05	NONE	< 0.05
Anthraquinone	µg/l	0.05	NONE	< 0.05
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01



Analytical Report Number: 22-42962
Project / Site name: Smithfield Market

Your Order No: 000531

Lab Sample Number				2191171
Sample Reference				WS105
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				01/03/2022
Time Taken				None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status	
Butyl benzyl phthalate	µg/l	0.05	NONE	< 0.05
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
3&4-Methylphenol	µg/l	0.1	NONE	< 0.10

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

Analytical Report Number : 22-42962
Project / Site name: Smithfield Market

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

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, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 *for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Monohydric phenols in water - LOW LEVEL 1 ug/l	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	L102B-PL	W	NONE
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-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	L073B-PL	W	ISO 17025
Dissolved Organic Carbon in water	Determination of dissolved inorganic carbon in water by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Low level 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
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
TPH1 (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS.	In-house method	L070-PL	W	NONE

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.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector



Analytical Report Number : 22-42962

Project / Site name: Smithfield Market

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
GC	Gas Chromatography				
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))				
CU	Clean-up - e.g. by Florisil®, silica gel				
1D	GC - Single coil/column gas chromatography				
2D	GC-GC - Double coil/column gas chromatography				
Total	Aliphatics & Aromatics				
AL	Aliphatics				
AR	Aromatics				
#1	EH_2D_Total but with humics mathematically subtracted				
#2	EH_2D_Total but with fatty acids mathematically subtracted				
-	Operator - understore to separate acronyms (exception for +)				
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total				