

NS/M4246/9858

20 January 2021

Seddon Construction Ltd
Plodder Lane,
Bolton,
BL4 0NN

For the attention of Mr P Bannister

Dear Paul

Re: Dean Trust Academy, Ardwick, Manchester – Clean Cover System Validation

We write to report on the validation testing of the clean cover system at the above site.

Background / Remedial Requirements

The remediation requirements in accordance with the Geo-Environmental Assessment Report (ref: NS/M4246/8662 Rev B) issued in October 2019 and the Remediation Strategy report by Brownfield Solutions Ltd (Ref: NS/M4246/8855 Rev A) issued in 13th November 2020 were for a warning membrane and at least 200mm clean validated topsoil and 100mm of clean subsoil (or topsoil) to total 300mm. Sufficient topsoil to act as a growing medium should be placed in soft landscaping areas.

Further correspondence was made with the Local Authority when during construction it was found that some areas, although the membrane was in place and intact they had less than 300mm cover of imported soil. It was considered at the time that additional deepening or relandscaping to accommodate 300mm specified in the remedial strategy would put the construction workers unduly at risk working with the exposed materials.

We consider that the risk being largely due to the presence of asbestos, which is effectively buried beneath a geomembrane, is halting any intermixing of soils and that the risk of exposure is diminished. Additionally, as these areas of soft landscaping are managed and any changes are subject to consultation that there will not be any ad hoc or impromptu decisions that could create an exposure pathway.

It was recommended that the Remedial Strategy was updated to caveat that the cover layer should comprise the geomembrane, and the cover of thickness should be at least equivalent to what was in place prior to the construction works. This was agreed with the Local Authority by email on 1st December 2020.

Once installed, there is a requirement to provide evidence of the chemical suitability and depths of the clean cover system, to be carried out by a suitably qualified Geo-environmental Engineer.

Chemical Suitability

The requirements for testing based on the approved Remedial Strategy are detailed below:

Material	Source	Testing Suite	Sampling Frequency
Topsoil	Greenfield	BSL Default Suite Asbestos Screen	1 sample* per 250m ³ (minimum of 3 samples per source)

*Suite of analysis dependent on source of soil

BSL visited site on 30th October 2020 to obtain samples to determine the chemical suitability of the topsoil that was used in the areas of soft landscaping. It is understood that <250m³ in volume was imported to site from a greenfield source and supplied by Drapers Ltd. The topsoil was dark brown slightly gravelly slightly sandy clayey topsoil.

Four samples (Sample HP01 to HP03, i2 analytical testing report reference 20-39023) were tested for a suite of heavy metals, pH, water soluble sulphate, speciated PAH, phenol, total and free cyanide and soil organic matter as part of BSL's default suite, in addition to an asbestos screen. One sample from a subsoil within HP02 was taken and analysed for the above suites and banded petroleum hydrocarbons (TPH CWG), BTEX and MTBE as this was at the time believed to have been a separate source. Seddon Construction Ltd confirmed that only topsoil had been imported to site and no subsoil was used at the site. The testing results were compared to the Generic Risk Assessment Criteria Values for Residential without Plant Uptake as set out in Appendix A of BSL's Remedial Strategy Report. The results of which are attached.

The results show the soils to be below the relevant screening criteria and are therefore considered acceptable for use in soft landscaping areas.

Depth Validation

On 30th October 2020, BSL visited site to validate the depth of soil in the recently installed soft landscaping areas, as shown in green on the attached plan (ref. M4246/06 Rev B). A trial pit was excavated in the centre of each of the three areas in a location selected at random by a suitably qualified Geo-Environmental engineer, the locations of which are also shown on the previously mentioned drawing (HP01 to HP03). On 4th January 2021, hand pits were also dug within the pre-existing soft landscaping to determine whether the new areas were comparable to that which already existed in those locations. Topsoil was encountered underlain by a geotextile membrane, as shown in the table below:

Location within new soft landscaping	Depth/ Stratum	Location within existing soft landscaping	Depth/ Stratum
HP01 (embankment slope)	0 – 0.12 Topsoil within geogrid	HP101 (soft land scaping close by in carpark)	0 - 0.11 Topsoil
	0.12 – 0.18 Topsoil above	HP102 (top of embankment)	0.11 - 0.34 Subsoil
HP02	0 – 0.46 Topsoil		0 - 0.10 Topsoil
			0.10 - 0.24 Subsoil
HP03	0 – 0.20 Topsoil	HP103	0 - 0.25 Topsoil

Closing Remarks

Based on our recent site visit and validation works, we confirm that the cover layer within across the site in soft landscaping areas is comparable to that which is currently in place at the time of carrying out the validation.

This letter report should be provided to the Local Authority and Warranty Provider to satisfy the planning conditions relating to validation attached to the development.

We trust the above and enclosed meets with your current requirements, however if you have any queries then please do not hesitate to contact us.

Yours sincerely

For Brownfield Solutions Ltd

Written by:



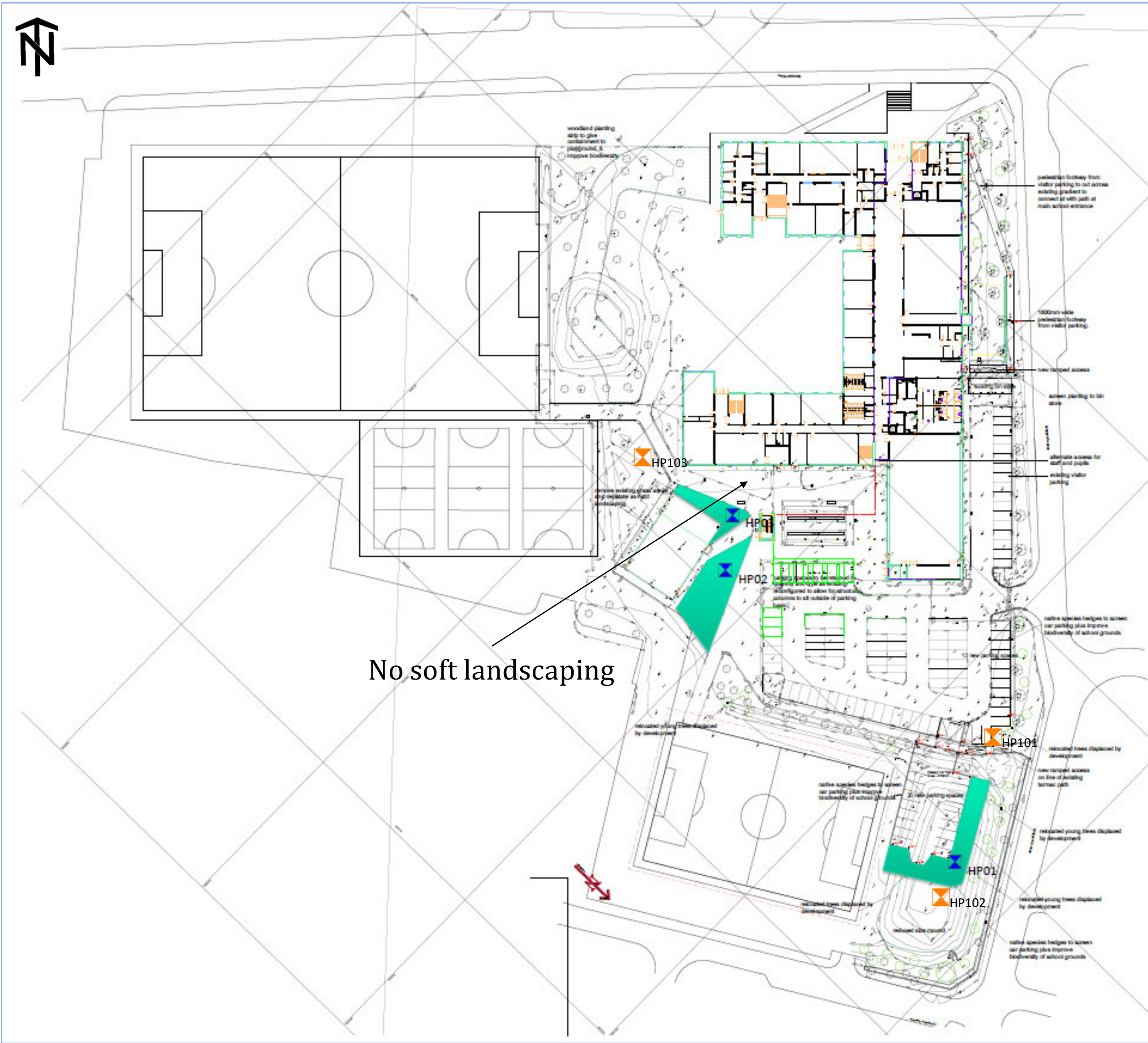
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Enc. Validation Location Plan (M4246/06 Rev B)
Validation Photographs
Laboratory Test Results (20-39023)



No soft landscaping



DRAWN BY PG	CHECKED BY DMG
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PHOTO 1



PHOTO 2



PHOTO 3



PHOTO 4

Photo Descriptions

PHOTO NO.	LOCATION	COVER SYSTEM DEPTH (mm)
1	HP01	120mm (~180mm)
2	HP01	120mm (~180mm)
3	HP02	460mm
4	HP02	460mm

REV	DATE	DESCRIPTION	BY	CKD



CLIENT
SEDDON CONSTRUCTION LTD

PROJECT TITLE
DEAN TRUST ACADEMY, ARDWICK

TITLE
COVER SYSTEM VALIDATION PHOTOGRAPHS

Associated Document Ref No. M4642/07	PAGE 1 of 3
COMPLIED BY NS	CHECKED BY DMG



PHOTO 1



PHOTO 2



PHOTO 3



PHOTO 4

Photo Descriptions

PHOTO NO.	LOCATION	COVER SYSTEM DEPTH (mm)
1	HP03	200mm
2	HP03	200mm
3	HP101	340mm
4	HP101	340mm

REV	DATE	DESCRIPTION	BY	CKD



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SEDDON CONSTRUCTION LTD

PROJECT TITLE
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Associated Document Ref No. M4642/07	PAGE 2 of 3
COMPLIED BY NS	CHECKED BY DMG



PHOTO 1



PHOTO 2



PHOTO 3



PHOTO 4

Photo Descriptions

PHOTO NO.	LOCATION	COVER SYSTEM DEPTH (mm)
1	HP102	240mm
2	HP102	240mm
3	HP103	250mm
4	HP103	340mm

REV	DATE	DESCRIPTION	BY	CKD



CLIENT SEDDON CONSTRUCTION LTD	
PROJECT TITLE DEAN TRUST ACADEMY, ARDWICK	
TITLE COVER SYSTEM VALIDATION PHOTOGRAPHS	
Associated Document Ref No. M4642/07	PAGE 3 of 3
COMPLIED BY NS	CHECKED BY DMG

**Nicola Swallow**

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Analytical Report Number : 20-39023

Project / Site name:	Ardwick	Samples received on:	02/11/2020
Your job number:	M4246	Samples instructed on/ Analysis started on:	02/11/2020
Your order number:	1393	Analysis completed by:	09/11/2020
Report Issue Number:	1	Report issued on:	09/11/2020
Samples Analysed:	4 soil samples		

Signed: *A. Czerwińska*

Agnieszka Czerwińska
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: 20-39023

Project / Site name: Ardwick

Your Order No: 1393

Lab Sample Number				1670669	1670670	1670671	1670672
Sample Reference				HP01	HP02	HP02	HP03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.12	0.00-0.20	0.20-0.46	0.00-0.20
Date Sampled				30/10/2020	30/10/2020	30/10/2020	30/10/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	13	13	16	16
Total mass of sample received	kg	0.001	NONE	1.2	1.2	1	1.2

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.2	8.1	8.4	7.9
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	49	53	100	35
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.025	0.027	0.05	0.017
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	24.5	26.6	49.8	17.3
Organic Matter	%	0.1	MCERTS	2.2	2.8	3.5	1.8

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	0.45	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.16	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.28	1.3	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	0.21	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.34	1.2	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	0.39	1.2	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.33	0.95	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.15	0.48	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.54	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.36	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.54	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05
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	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	1.49	7.31	< 0.80	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7.7	8	4	6.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.2	0.2	0.2
Chromium (hexavalent)	mg/kg	1.2	MCERTS	1.7	1.8	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	10	10	8.6	8.5
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	12	12	9.7	9.7
Copper (aqua regia extractable)	mg/kg	1	MCERTS	26	28	16	19
Lead (aqua regia extractable)	mg/kg	1	MCERTS	50	57	21	38
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.5	< 0.3	0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	12	13	8.6	9.6
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	35	45	42	32

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	-	< 1.0	-
Toluene	µg/kg	1	MCERTS	-	-	< 1.0	-

Analytical Report Number: 20-39023

Project / Site name: Ardwick

Your Order No: 1393

Lab Sample Number				1670669	1670670	1670671	1670672
Sample Reference				HP01	HP02	HP02	HP03
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.00-0.12	0.00-0.20	0.20-0.46	0.00-0.20
Date Sampled				30/10/2020	30/10/2020	30/10/2020	30/10/2020
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Ethylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	-
p & m-xylene	µg/kg	1	MCERTS	-	-	< 1.0	-
o-xylene	µg/kg	1	MCERTS	-	-	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	< 1.0	-

Monoaromatics & Oxygenates

Benzene	mg/kg	0.001	MCERTS	-	-	< 0.001	-
Toluene	mg/kg	0.001	MCERTS	-	-	< 0.001	-
Ethylbenzene	mg/kg	0.001	MCERTS	-	-	< 0.001	-
p & m-xylene	mg/kg	0.001	MCERTS	-	-	< 0.001	-
o-xylene	mg/kg	0.001	MCERTS	-	-	< 0.001	-
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	0.001	MCERTS	-	-	< 0.001	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	< 0.001	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	< 0.001	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	< 0.001	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	< 1.0	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	< 2.0	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	< 8.0	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	< 8.0	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	< 10	-

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	< 0.001	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	< 0.001	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	< 0.001	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	< 1.0	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	< 2.0	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	< 10	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	< 10	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	< 10	-

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

Analytical Report Number : 20-39023

Project / Site name: Ardwick

* 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 *
1670669	HP01	None Supplied	0.00-0.12	Brown loam and clay with gravel and vegetation.
1670670	HP02	None Supplied	0.00-0.20	Brown clay and sand with gravel.
1670671	HP02	None Supplied	0.20-0.46	Brown loam and clay with gravel.
1670672	HP03	None Supplied	0.00-0.20	Brown sand.

Analytical Report Number : 20-39023

Project / Site name: Ardwick

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in 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
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
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
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Organic matter (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
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
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
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Sulphate, water soluble, in soil	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

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.