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Our Ref 24/12780/A1/GO

16th October 2024

Manorwood

Dear Ben

Grainingfold, Horsham Road, Five Oaks

Further to the comments made by the Local Authority environmental health officer requesting additional testing of the proposed amenity areas, please find enclosed the results of additional contamination testing and an appraisal of the data. This serves as an addendum to the Phase 2 Site Investigation report issued in February 2024.

A return visit to site was made 7th October 2024 to resample borehole 3 and samples obtained from 0.10m and 0.40m depth were submitted to the accredited laboratories operated by i2 Analytical for a broad suite of typical priority urban contaminants, which includes heavy metals, PAH, TPH and asbestos screening.

A generic assessment of the chronic or long-term risk to human health from soil contamination has been made using the available generic screening criteria. The screening values include the Category 4 Screening Levels [C4SLs] (DEFRA, 2014) and Suitable for Use Levels [S4ULs] (LQM/CIEH, 2014) derived using the CLEA software. It should be appreciated that these do not consider the short-term or acute risks, such as to construction workers or SI personnel. The results obtained have been compared against the GAC for the proposed end-use category Residential (with homegrown produce) and 2.5% SOM. A study of the data does not reveal any exceedances of the tested parameters and remedial measures are not necessary at this location. The summary table of exceedances has been revised and updated to include this additional data.

We trust this provides you with the information that you require and our invoice for this work is enclosed.

Yours faithfully

[redacted]

G C D Owens BSc MSc FGS MIEnvSc
Director

[redacted]

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Analytical Report Number : 24-046123

Project / Site name:	Horsham Road, Five Oaks	**Samples received on:**	07/10/2024
Your job number:	24-12780-GO	**Samples instructed on/ Analysis started on:**	07/10/2024
Your order number:	15089	**Analysis completed by:**	15/10/2024
Report Issue Number:	1	**Report issued on:**	15/10/2024
Samples Analysed:	2 soil samples		

Signed: [redacted]

Dominika Liana
Junior Reporting Specialist
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.

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 24-046123
Project / Site name: Horsham Road, Five Oaks
Your Order No: 15089

Lab Sample Number				339761	339762
Sample Reference				3	3
Sample Number				None Supplied	None Supplied
Depth (m)				0.10	0.40
Date Sampled				07/10/2024	07/10/2024
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	23	19
Total mass of sample received	kg	0.1	NONE	0.7	0.8

Asbestos

Asbestos in Soil Detected/Not Detected	Type	N/A	ISO 17025	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	SPU	SPU

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	7.7	8
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0
Thiocyanate as SCN	mg/kg	5	NONE	< 5.0	< 5.0
Total Sulphate as SO_4	mg/kg	50	MCERTS	1000	650
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	88	270
Water Soluble SO_4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	44.2	135
Sulphide	mg/kg	1	MCERTS	< 1.0	< 1.0
Elemental Sulphur	mg/kg	5	MCERTS	9.6	5.1
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	4.4	1.1

Total Phenols

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

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.39	0.06
Acenaphthylene	mg/kg	0.05	MCERTS	0.09	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.06	< 0.05
Fluorene	mg/kg	0.05	MCERTS	0.09	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	1.2	0.11
Anthracene	mg/kg	0.05	MCERTS	0.06	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	1.8	0.17
Pyrene	mg/kg	0.05	MCERTS	1.5	0.14
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.49	< 0.05
Chrysene	mg/kg	0.05	MCERTS	0.94	0.07
Benzo(b)fluoranthene	mg/kg	0.05	ISO 17025	0.91	0.09
Benzo(k)fluoranthene	mg/kg	0.05	ISO 17025	0.43	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.64	0.07
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.25	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.26	0.07

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	ISO 17025	9.09	< 0.80

Analytical Report Number: 24-046123
Project / Site name: Horsham Road, Five Oaks
Your Order No: 15089

Lab Sample Number				339761	339762
Sample Reference				3	3
Sample Number				None Supplied	None Supplied
Depth (m)				0.10	0.40
Date Sampled				07/10/2024	07/10/2024
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	13
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.76	0.92
Boron (water soluble)	mg/kg	0.2	MCERTS	2.3	1.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.6	< 0.2
Chromium (hexavalent) Low Level	mg/kg	1.2	NONE	< 1.2	< 1.2
Chromium (III)	mg/kg	1	NONE	23	32
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	32
Copper (aqua regia extractable)	mg/kg	1	MCERTS	20	15
Lead (aqua regia extractable)	mg/kg	1	MCERTS	36	25
Manganese (aqua regia extractable)	mg/kg	1	MCERTS	590	1100
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	15	15
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	36	43
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	190	65
Petroleum Hydrocarbons					
TPHCWG - Aliphatic >EC5 - EC6 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	< 0.010
TPHCWG - Aliphatic >EC6 - EC8 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	< 0.010
TPHCWG - Aliphatic >EC8 - EC10 HS_1D_AL	mg/kg	0.01	MCERTS	< 0.010	< 0.010
TPHCWG - Aliphatic >EC10 - EC12 EH_CU_1D_AL	mg/kg	1	MCERTS	< 1.0	< 1.0
TPHCWG - Aliphatic >EC12 - EC16 EH_CU_1D_AL	mg/kg	2	MCERTS	< 2.0	< 2.0
TPHCWG - Aliphatic >EC16 - EC21 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0
TPHCWG - Aliphatic >EC21 - EC35 EH_CU_1D_AL	mg/kg	8	MCERTS	< 8.0	< 8.0
TPHCWG - Aliphatic >EC21 - EC40 EH_CU_1D_AL	mg/kg	10	NONE	< 10	< 10
TPHCWG - Aliphatic >EC35 - EC44 EH_CU_1D_AL	mg/kg	8.4	NONE	< 8.4	< 8.4
TPHCWG - Aliphatic >EC5 - EC35 EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	< 10
TPHCWG - Aliphatic >EC5 - EC44 EH_CU+HS_1D_AL	mg/kg	10	NONE	< 10	< 10
TPHCWG - Aromatic >EC5 - EC7 HS_1D_AR	mg/kg	0.01	MCERTS	< 0.010	< 0.010
TPHCWG - Aromatic >EC7 - EC8 HS_1D_AR	mg/kg	0.01	MCERTS	< 0.010	< 0.010
TPHCWG - Aromatic >EC8 - EC10 HS_1D_AR	mg/kg	0.02	MCERTS	< 0.020	< 0.020
TPHCWG - Aromatic >EC10 - EC12 EH_CU_1D_AR	mg/kg	1	MCERTS	1.1	< 1.0
TPHCWG - Aromatic >EC12 - EC16 EH_CU_1D_AR	mg/kg	2	MCERTS	< 2.0	< 2.0
TPHCWG - Aromatic >EC16 - EC21 EH_CU_1D_AR	mg/kg	10	MCERTS	< 10	< 10
TPHCWG - Aromatic >EC21 - EC35 EH_CU_1D_AR	mg/kg	10	MCERTS	17	< 10
TPHCWG - Aromatic >EC21 - EC40 EH_CU_1D_AR	mg/kg	10	NONE	18	< 10
TPHCWG - Aromatic >EC35 - EC44 EH_CU_1D_AR	mg/kg	8.4	NONE	< 8.4	< 8.4
TPHCWG - Aromatic >EC5 - EC35 EH_CU+HS_1D_AR	mg/kg	10	NONE	18	< 10
TPHCWG - Aromatic >EC5 - EC44 EH_CU+HS_1D_AR	mg/kg	10	NONE	18	< 10
TPH Total >EC6 - EC40 EH_CU+HS_1D_TOTAL	mg/kg	10	NONE	35	< 10
Petroleum Range Organics (EC6 - EC10) HS_1D_TOTAL	mg/kg	1	ISO 17025	< 1.0	< 1.0
TPH (EC10 - EC40) EH_CU_1D_TOTAL	mg/kg	10	MCERTS	35	< 10

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Analytical Report Number: 24-046123
Project / Site name: Horsham Road, Five Oaks
Your Order No: 15089

Lab Sample Number				339761	339762
Sample Reference				3	3
Sample Number				None Supplied	None Supplied
Depth (m)				0.10	0.40
Date Sampled				07/10/2024	07/10/2024
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Test Limit of detection**	**Test Accreditation Status**		
VOCs					
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	MCERTS	< 5.0	< 5.0
Benzene	µg/kg	5	MCERTS	< 5.0	< 5.0
Toluene	µg/kg	5	MCERTS	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	MCERTS	< 5.0	< 5.0
p & m-Xylene	µg/kg	8	MCERTS	< 8.0	< 8.0
o-Xylene	µg/kg	5	MCERTS	< 5.0	< 5.0

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

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Analytical Report Number : 24-046123
Project / Site name: Horsham Road, Five Oaks

* 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 *
339761	3	None Supplied	0.1	Brown loam and clay with gravel and vegetation
339762	3	None Supplied	0.4	Brown clay and loam with gravel and vegetation

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Analytical Report Number : 24-046123
Project / Site name: Horsham Road, Five Oaks

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
Asbestos identification in Soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques	In-house method based on HSG 248, 2021	A001B	D	ISO 17025
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
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
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
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.	L019B	D	NONE
Elemental sulphur in soil	Determination of elemental sulphur in soil by extraction in acetonitrile followed by HPLC	In-house method based on Secondsite Property Holdings Guidance for Assessing and Managing Potential	L021B	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	L038B	D	MCERTS
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	L038B	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	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	MCERTS
TPH Chromatogram in soil	TPH Chromatogram in soil	In-house method	L064B	D	NONE
BTEX and/or Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS	In-house method based on USEPA 8260	L073B	W	MCERTS
Total petroleum hydrocarbons with carbon banding by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS with carbon banding aliphatic and aromatic	In-house method	L076B/L088-PL	D/W	MCERTS
Total petroleum hydrocarbons by GC-FID/GC-MS HS in soil	Determination of total petroleum hydrocarbons in soil by GC-FID/GC-MS HS	In-house method	L076B/L088-PL	D/W	MCERTS
Chromium III in soil	In-house method by calculation from total Cr and Cr VI	In-house method by calculation	L080-PL/L130B	W	NONE
Hexavalent chromium in soil (low level)	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

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Analytical Report Number : 24-046123
Project / Site name: Horsham Road, Five Oaks

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
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	L080-PL	W	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	MCERTS
Thiocyanate in soil	Determination of thiocyanate in soil by extraction in water followed by acidification followed by addition of ferric nitrate followed by discrete analyser (spectrophotometer)	In-house method	L082B	D	NONE
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

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' 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
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 - underscore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

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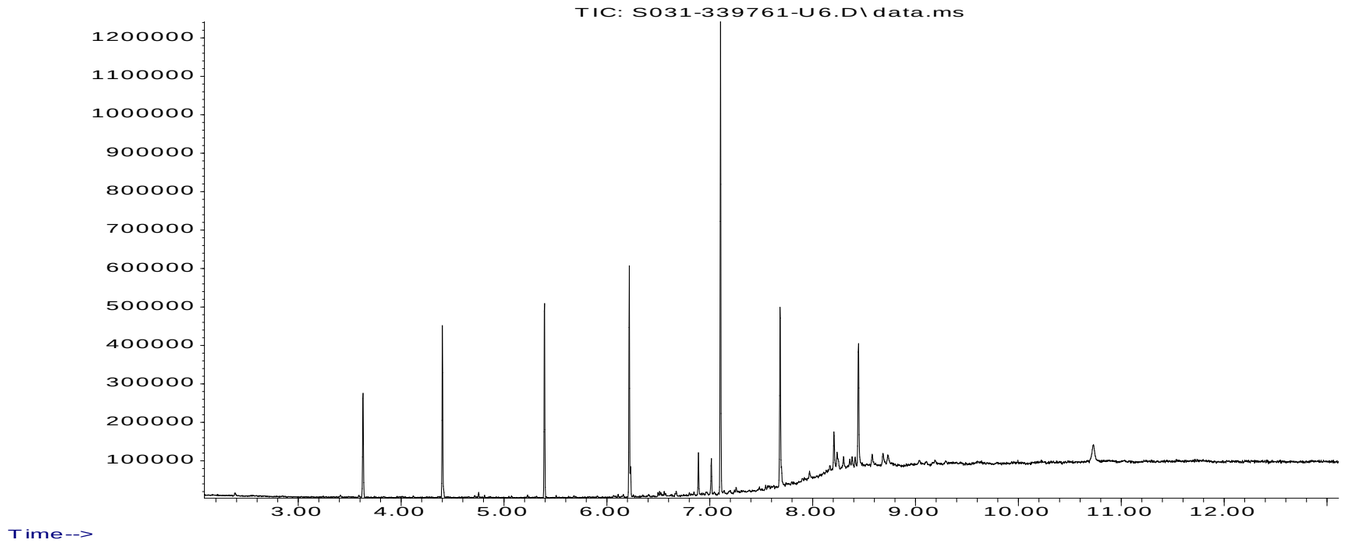

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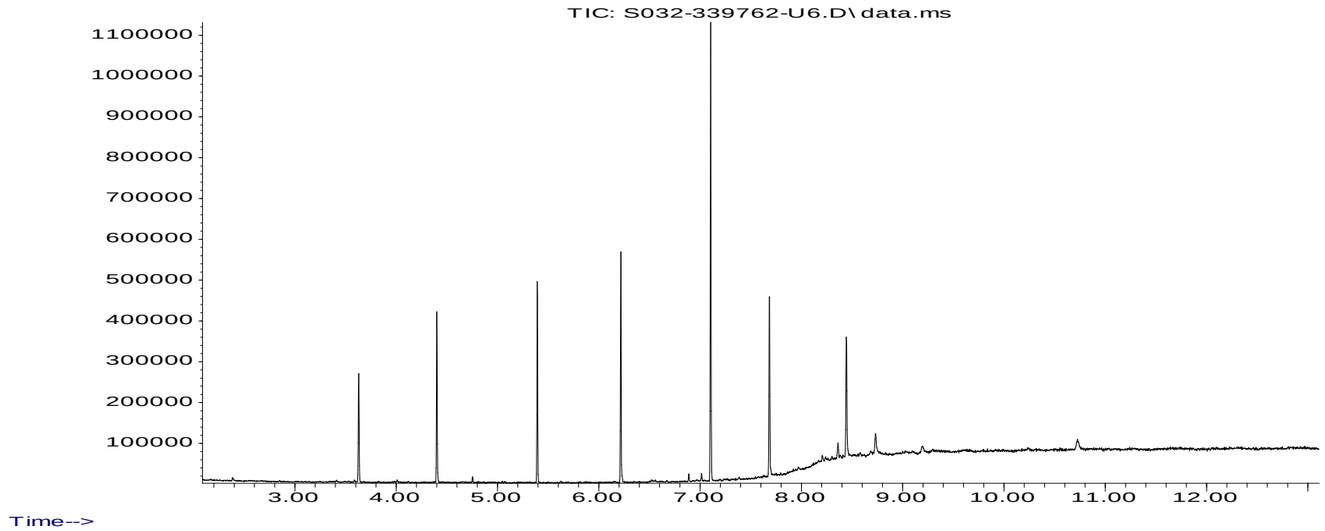

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Job Ref: 23/12780/GO
Contract: Horsham Road, Five Oaks

SUMMARY TABLE OF EXCEEDANCES

Sample Reference			1	2	3	3	4	6	6	GAC
Depth (m)			0.10	0.30	0.10	0.40	0.10	0.10	0.50	
Date Sampled			11/01/2024	11/01/2024	07/10/24	07/10/24	11/01/2024	11/01/2024	11/01/2024	(2.5% SOM)
Asbestos in Soil Detected/Not Detected	Type	N/A	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected	
Total Organic Carbon (TOC) - Automated	%	0.1	3.8	0.9	4.4	1.1	4.2	4.6	0.6	
Naphthalene	mg/kg	0.05	0.21	0.05	0.39	0.06	2	0.64	< 0.05	5.6
Benzo(a)pyrene	mg/kg	0.05	2.4	0.75	0.64	0.07	2.1	94	0.06	2.7
Beryllium	mg/kg	0.06	0.8	1.2	0.76	0.92	0.76	0.65	1.8	1.7
TPHCWG - Aliphatic >C10 - C12	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	118
TPHCWG - Aliphatic >C12 - C16	mg/kg	2	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	13	< 2.0	2400
TPHCWG - Aliphatic >C16 - C21	mg/kg	8	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	25	< 8.0	-
TPHCWG - Aliphatic >C21 - C35	mg/kg	8	< 8.0	< 8.0	< 8.0	< 8.0	36	140	< 8.0	92000
TPHCWG - Aliphatic >C35 - C44	mg/kg	8.4	< 8.4	< 8.4	< 8.4	< 8.4	8.4	160	< 8.4	92000
TPHCWG - Aromatic >EC10 - EC12	mg/kg	1	< 1.0	< 1.0	1.1	< 1.0	< 1.0	< 1.0	< 1.0	180
TPHCWG - Aromatic >EC12 - EC16	mg/kg	2	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	23	< 2.0	330
TPHCWG - Aromatic >EC16 - EC21	mg/kg	10	11	< 10	< 10	< 10	< 10	300	< 10	540
TPHCWG - Aromatic >EC21 - EC35	mg/kg	10	28	< 10	18	< 10	21	820	< 10	1500
TPHCWG - Aromatic >EC35 - EC44	mg/kg	8.4	< 8.4	< 8.4	< 8.4	< 8.4	< 8.4	270	< 8.4	1500
TPH Total >C6 - C40	mg/kg	10	40	< 10	35	<10	74	1600	< 10	-