

Alan ShawVia email only: alans280760@me.com3rd August 2021

Our Ref.: 18189/Add

Dear Alan

Re: Willowdene Close, Havant, Hampshire PO9 3QP– Additional analysis

Soils Limited have been provided with 5no. samples from the above site by the Client in order to assess the potential for contamination in the upper layers of the Made Ground as identified in previous investigations and site models in line with the recommendations and requirements of the regulator and also in light of the recommendations following previous investigations at this site as modified by the subsequent decision to retain hard cover across the site as part of the development.

Site Data

5 No. Samples were provided from the site by the Client on 14th July 2021 and presented to DETS, a suitably UKAS accredited laboratory, for a range of screening analysis as previously indicated by the conceptual site model (industrial metals, organics, inorganics and asbestos). Details of the suite are included in the results in Appendix A attached to this report. Samples were taken from an excavation to the east of the site adjacent to the Sparshots Garage (the closest noted potential contamination source) at variable depths (0.30-0.60m) to reflect the potential for deleterious materials to be present in the Made Ground that could present a risk to site development and/or future users were gardens to be emplaced in the future.

Methodology

The results have been tabulated and compared with appropriate conservative soil guideline values (Residential with plant uptake exposure model C4SL or S4UL as available and appropriate at 6% organic matter) to reflect the potential for harm should the underlying material be exposed to vulnerable human receptors in the future.

Chemical Results

Results for this report are enclosed as Appendix A and a summary of the combined results (for reference only) are included in Appendix B. The results of the Made Ground analysis for this report (Samples 1-5) indicate no exceedances of any guideline values for any of the analytes and exposure risk is therefore low to negligible by default. In addition, PAH ratio analysis and the hydrocarbon banding results confirm once more that the slightly elevated hydrocarbons noted in all Made Ground samples are from coal-based rather than oil-based sources. This strongly indicates the adjacent garage is unlikely to be the source for these or the previously recorded slightly elevated levels in the previous investigation.



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Registered Office: Newton House, Cross Road, Tadworth, Surrey KT20 5SR

Asbestos

This is a non-threshold physical substance and therefore has no associated or accepted guideline for low to negligible risk determination for long term human receptors. However, bundle as a matrix type description (as noted in Sample 1 0.60m: Chrysotile Bundle) usually indicates between <0.001 and 0.003% in soils, significantly below the current waste threshold of 0.1% and unlikely to exceed the UK occupational exposure limit of 40,000 fibers per cubic meter over a 6-8 hour time weighted average even if not an isolated occurrence (now removed by default in the sample) and fully vaporized.

To facilitate assessment of potential risks to the current development, quantification analysis has been scheduled to allow the Clients Asbestos advisor to determine the potential short term acute risks to workers and local receptors during the works, in line with their obligations under H&S at Work Act and CAR2012. A copy for reference is included in Appendix A and was less than the detection limit of the method (0.001%).

One sample in nine (total) or one in six (Made Ground) for trace Asbestos is not unusual given the age of the emplacement of the Made Ground material as post WWII, the type of material emplaced and the former presence and development of Asbestos containing structures on site. This was anticipated in previous risk assessments and site models and was a reason why precautionary analysis was initially recommended for any excavations on site that would enter, expose or manipulate the underlying Made Ground. Long-term human health risk is negligible by default by removal of the inhalation exposure pathway through installation of complete hard standing across the site.

Conclusions

In light of the results obtained, Soils Limited consider that the risk of exposure of these materials at surface is low to negligible from chemical contaminants and whilst it may not be suitable for purpose as a growing medium (and would probably fail if compared with British Standard for Topsoil BS3882 for example) it is in compliance with the appropriate fitness for purpose criteria in a residential with plant uptake land use exposure scenario and would therefore present no significant long term risk to human receptors if exposed or used as such.

The single positive Asbestos result is only of concern to acute risks during development, which are to be assessed separately by the Clients competent Asbestos advisor. This finding is of no long-term contaminated land concern as there is no evidence in the results to date of any systematic Asbestos contamination across the site, which will in any case be hard covered (removing the inhalation pathway) on completion.

However, potential risks and possible unknowns will always remain with any investigation and it is not possible to determine if further unidentified outliers may (or may not be) present and hence the Discovery Strategy should continue to be applied to any and all site activities and formally reported on completion to the regulator as part of the validation process. Otherwise The results appear to confirm, vindicate and validate the conceptual site model as currently understood and no changes are therefore proposed, and no significant additional unknowns have been identified requiring or indicating further investigation or analysis.

Yours sincerely



C Swainston BSc, PGCE, CGeol, FGS, CLAire QP

Principal Environmental Engineer

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For and on behalf of Soils Limited

Appendix A: Analytical Results

Appendix B: Combined Results Summary



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t: 01622 850410

DETS Report No: 21-08986

Site Reference: Willowdene Close

Project / Job Ref: 18189

Order No: 18189

Sample Receipt Date: 16/07/2021

Sample Scheduled Date: 16/07/2021

Report Issue Number: 1

Reporting Date: 23/07/2021

Authorised by:



Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Soil Analysis Certificate						
DETS Report No: 21-08986	Date Sampled	14/07/21	14/07/21	14/07/21	14/07/21	14/07/21
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Willowdene Close	TP / BH No	1	2	3	4	5
Project / Job Ref: 18189	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 18189	Depth (m)	0.60	0.30	0.30	0.60	0.60
Reporting Date: 23/07/2021	DETS Sample No	555169	555170	555171	555172	555173

Determinand	Unit	RL	Accreditation					
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix ^(S)	Material Type	N/a	NONE	Small bundle of Chrysotile				
Asbestos Type ^(S)	PLM Result	N/a	ISO17025	Chrysotile				
pH	pH Units	N/a	MCERTS	7.6	7.6	7.6	7.2	8.5
Organic Matter (SOM)	%	< 0.1	MCERTS	6.3	3.5	3.2	7.4	1.6
Arsenic (As)	mg/kg	< 2	MCERTS	9	8	9	9	10
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	NONE	0.4	0.3	0.3	0.4	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	18	18	16	20	19
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2
Copper (Cu)	mg/kg	< 4	MCERTS	54	34	31	43	19
Lead (Pb)	mg/kg	< 3	MCERTS	127	96	108	188	52
Mercury (Hg)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	10	9	9	11	12
Selenium (Se)	mg/kg	< 2	MCERTS	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 1	MCERTS	31	30	26	33	30
Zinc (Zn)	mg/kg	< 3	MCERTS	221	114	160	177	64
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2	< 2	< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion.
 Subcontracted analysis (S)



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Soil Analysis Certificate - Speciated PAHs						
DETS Report No: 21-08986	Date Sampled	14/07/21	14/07/21	14/07/21	14/07/21	14/07/21
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Willowdene Close	TP / BH No	1	2	3	4	5
Project / Job Ref: 18189	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 18189	Depth (m)	0.60	0.30	0.30	0.60	0.60
Reporting Date: 23/07/2021	DETS Sample No	555169	555170	555171	555172	555173

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	0.26	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	mg/kg	< 0.1	MCERTS	0.27	< 0.1	< 0.1	0.15	< 0.1
Phenanthrene	mg/kg	< 0.1	MCERTS	3.79	0.25	1.82	2.12	< 0.1
Anthracene	mg/kg	< 0.1	MCERTS	0.93	< 0.1	< 0.1	0.58	< 0.1
Fluoranthene	mg/kg	< 0.1	MCERTS	5.84	1.21	2.88	4.65	0.28
Pyrene	mg/kg	< 0.1	MCERTS	4.78	0.99	2.25	3.87	0.23
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	2.65	0.76	1.06	2.37	0.36
Chrysene	mg/kg	< 0.1	MCERTS	2.70	0.56	1.30	2.14	< 0.1
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	3.34	1.09	1.87	2.88	0.41
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	1.30	0.37	0.59	0.96	< 0.1
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	2.61	0.77	1.17	2.16	0.32
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	1.91	0.72	1.12	1.67	0.37
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	0.27	< 0.1	0.13	0.25	< 0.1
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	1.30	0.43	0.72	1.14	< 0.1
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	31.9	7.2	14.9	25	2



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Soil Analysis Certificate - EPH Texas Banded						
DETS Report No: 21-08986	Date Sampled	14/07/21	14/07/21	14/07/21	14/07/21	14/07/21
Soils Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Willowdene Close	TP / BH No	1	2	3	4	5
Project / Job Ref: 18189	Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Order No: 18189	Depth (m)	0.60	0.30	0.30	0.60	0.60
Reporting Date: 23/07/2021	DETS Sample No	555169	555170	555171	555172	555173

Determinand	Unit	RL	Accreditation					
EPH Texas (C6 - C8)	mg/kg	< 0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
EPH Texas (>C8 - C10)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH Texas (>C10 - C12)	mg/kg	< 1	MCERTS	< 1	< 1	2	< 1	< 1
EPH Texas (>C12 - C16)	mg/kg	< 1	MCERTS	10	53	38	129	3
EPH Texas (>C16 - C21)	mg/kg	< 1	MCERTS	46	61	57	145	8
EPH Texas (>C21 - C40)	mg/kg	< 6	MCERTS	111	150	178	329	15
EPH Texas (C6 - C40)	mg/kg	< 6	NONE	167	265	275	602	26



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Soil Analysis Certificate - Sample Descriptions

DETS Report No: 21-08986

Soils Ltd

Site Reference: Willowdene Close

Project / Job Ref: 18189

Order No: 18189

Reporting Date: 23/07/2021

DETS Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
555169	1	None Supplied	0.60	25.7	Brown loamy sand with stones
555170	2	None Supplied	0.30	18.5	Brown sandy clay with stones
555171	3	None Supplied	0.30	14.8	Brown sandy clay with stones
555172	4	None Supplied	0.60	27.5	Brown loamy sand with vegetation
555173	5	None Supplied	0.60	25	Brown sandy clay with stones

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{1/4}

Unsuitable Sample ^{1/5}



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 21-08986

Soils Ltd

Site Reference: Willowdene Close

Project / Job Ref: 18189

Order No: 18189

Reporting Date: 23/07/2021

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenvicarbazine followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received



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DETS Report No: 21-09415

Site Reference: Willowdene Close
Project / Job Ref: 18189
Order No: 18189
Sample Receipt Date: 28/07/2021
Sample Scheduled Date: 28/07/2021
Report Issue Number: 1
Reporting Date: 03/08/2021

Authorised by:



Dave Ashworth
Technical Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Soil Analysis Certificate						
DETS Report No: 21-09415	Date Sampled	14/07/21				
Soils Ltd	Time Sampled	None Supplied				
Site Reference: Willowdene Close	TP / BH No	1				
Project / Job Ref: 18189	Additional Refs	None Supplied				
Order No: 18189	Depth (m)	0.60				
Reporting Date: 03/08/2021	DETS Sample No	556925				

Determinand	Unit	RL	Accreditation				
Asbestos Quantification ^(S)	%	< 0.001	ISO17025	< 0.001			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion
Subcontracted analysis (S)



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Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 21-09415

Soils Ltd

Site Reference: Willowdene Close

Project / Job Ref: 18189

Order No: 18189

Reporting Date: 03/08/2021

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenvicarbazine followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
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Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
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Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
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Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

Willowdene Close		TP / BH No	1	2	3	4	5	WS1	WS2	WS3	WS4	Max	SGV
Project No:18189		Depth (m)	0.6	0.3	0.3	0.6	0.6	0.7	1.9	2.2	1.9		
Determinand	Unit	RL											
Organic Matter	%	< 0.1	6.3	3.5	3.2	7.4	1.6	1.6	3.8	0.8	2.5	7.4	
Asbestos Screen	N/a	N/a	Detected	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D		TRACE
Matrix			Bundle										
Type			Chrysotile										
pH	pH Units	N/a	7.6	7.6	7.6	7.2	8.5	7.8	6.9	7.3	8.3	8.5	
Arsenic	mg/kg	< 2	9	8	9	9	10	9.8	5.1	12	11	12	37
Water Soluble Boron	mg/kg	< 1	< 1	< 1	< 1	< 1	< 1	1.3	1.6	0.6	0.8	1.6	290
Cadmium	mg/kg	< 0.2	0.4	0.3	0.3	0.4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.4	26
Chromium	mg/kg	< 2	18	18	16	20	19	29	22	30	26	30	910
Hexavalent Chromium	mg/kg	< 2	< 2	< 2	< 2	< 2	< 2	< 4.0	< 4.0	< 4.0	< 4.0	0	21
Copper	mg/kg	< 4	54	34	31	43	19	18	4.4	3.4	36	54	2400
Lead	mg/kg	< 3	127	96	108	188	52	52	30	12	130	188	210
Mercury	mg/kg	< 1	< 1	< 1	< 1	< 1	< 1	< 0.3	< 0.3	< 0.3	< 0.3	0	1.2
Nickel	mg/kg	< 3	10	9	9	11	12	20	9.1	32	19	32	130
Selenium	mg/kg	< 2	< 3	< 3	< 3	< 3	< 3	< 1.0	< 1.0	< 1.0	< 1.0	0	250
Vanadium	mg/kg	< 1	31	30	26	33	30	41	30	43	42	43	410
Zinc	mg/kg	< 3	221	114	160	177	64	73	34	58	120	221	3700
Monohydric Phenols	mg/kg	< 2	< 2	< 2	< 2	< 2	< 2	< 1.0	< 1.0	< 1.0	< 1.0	0	1100
Acenaphthene	mg/kg	< 0.1	0.26	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	0.68	0.68	1100
Acenaphthylene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	0.34	0.34	920
Anthracene	mg/kg	< 0.1	0.93	< 0.1	< 0.1	0.58	< 0.1	< 0.05	< 0.05	< 0.05	2.3	2.3	11000
Benzo(a)anthracene	mg/kg	< 0.1	2.65	0.76	1.06	2.37	0.36	0.38	< 0.05	< 0.05	4.7	4.7	13
Benzo(a)pyrene	mg/kg	< 0.1	2.61	0.77	1.17	2.16	0.32	0.41	< 0.05	< 0.05	4	4	5
Benzo(b)fluoranthene	mg/kg	< 0.1	3.34	1.09	1.87	2.88	0.41	0.45	< 0.05	< 0.05	4	4	3.7
Benzo(ghi)perylene	mg/kg	< 0.1	1.3	0.43	0.72	1.14	< 0.1	< 0.05	< 0.05	< 0.05	3.2	3.2	350
Benzo(k)fluoranthene	mg/kg	< 0.1	1.3	0.37	0.59	0.96	< 0.1	0.21	< 0.05	< 0.05	2.4	2.4	100
Chrysene	mg/kg	< 0.1	2.7	0.56	1.3	2.14	< 0.1	0.35	< 0.05	< 0.05	2.8	2.8	27
Di-benzo(a,h)anthracene	mg/kg	< 0.1	0.27	< 0.1	0.13	0.25	< 0.1	< 0.05	< 0.05	< 0.05	0.56	0.56	0.3
Fluoranthene	mg/kg	< 0.1	5.84	1.21	2.88	4.65	0.28	0.66	0.39	< 0.05	8.9	8.9	890
Fluorene	mg/kg	< 0.1	0.27	< 0.1	< 0.1	0.15	< 0.1	< 0.05	< 0.05	< 0.05	0.78	0.78	860
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	1.91	0.72	1.12	1.67	0.37	< 0.05	< 0.05	< 0.05	2.5	2.5	41
Naphthalene	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	0	13
Phenanthrene	mg/kg	< 0.1	3.79	0.25	1.82	2.12	< 0.1	0.28	< 0.05	< 0.05	6.5	6.5	440
Pyrene	mg/kg	< 0.1	4.78	0.99	2.25	3.87	0.23	0.65	0.35	< 0.05	7.5	7.5	2000
Total EPA-16 PAHs	mg/kg	< 1.6	31.9	7.2	14.9	25	2	3.39	< 0.80	< 0.80	51.1	51.1	
			Coal	Coal	Coal	Coal	Coal	Coal			Coal	0	
EPH Texas (C6 - C8)	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	0	300
EPH Texas (C8 - C10)	mg/kg	< 1	< 1	< 1	< 1	< 1	< 1	< 10	< 10	< 10	< 10	0	150
EPH Texas (C10 - C12)	mg/kg	< 1	< 1	< 1	2	< 1	< 1	< 1.0	< 1.0	< 1.0	< 1.0	2	380
EPH Texas (C12 - C16)	mg/kg	< 1	10	53	38	129	3	< 4.0	< 4.0	< 4.0	150	150	660
EPH Texas (C16 - C21)	mg/kg	< 1	46	61	57	145	8	< 10	< 10	< 10	890	890	930
EPH Texas (C21 - C40)	mg/kg	< 6	111	150	178	329	15	< 10	< 10	< 10	490	490	1700
EPH Texas (C6 - C40)	mg/kg	< 6	167	265	275	602	26	< 10	< 10	< 10	1500	1500	