

Site Analytical Services Ltd.



Site Investigations, Analytical & Environmental Chemists, Laboratory Testing Services.

Units 14 + 15, River Road Business Park,
33 River Road, Barking, Essex IG11 0EA

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Your Ref:

VERBAL INSTRUCTIONS
DEAN PAYNE

Our Ref:

17/26874
JSW/LB

SAMPLES OF 'SOIL'
RE: CAMPUS PROJECT, MANCHESTER

SUBMITTED BY SQUIBB GROUP LIMITED

RECEIVED ON 2nd JUNE 2017

INTRODUCTION

Two samples of the above material were received into the laboratory for waste acceptance criteria (WAC) analysis in order to determine the classification of the material for landfill purposes.

The samples were referenced 'A' & 'B'.

RESULTS

WASTE CLASSIFICATION

'SAMPLE A'

NON HAZARDOUS WASTE

'SAMPLE B'

NON HAZARDOUS WASTE



Reg. Office: Units 14 +15, River Road Business Park,
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Business Reg. No. 2255616





COMMENTS

The samples were analysed using the 'Catwastesoil' assessment tool, which concluded that both samples were not hazardous in nature. For the purpose of waste disposal it is likely that the soil samples submitted would be classified as:

Sample Ref: 'A' Non Hazardous Waste

The sample exceeded the upper acceptance limits for Inert Waste for Molybdenum and Antimony.

Sample Ref: 'B' Non Hazardous Waste

The sample exceeded the upper acceptance limits for Inert Waste for Total PAH and Antimony.

p.p. SITE ANALYTICAL SERVICES LIMITED

12th June 2017

A Davidson BSc MSc DIC
Environmental Engineer



Site Analytical Services Ltd.

A P P E N D I X

Laboratory Test Data



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QTS Environmental Report No: 17-59746

Site Reference: Campus Project, Manchester

Project / Job Ref: 17/26874

Order No: 1087

Sample Receipt Date: 05/06/2017

Sample Scheduled Date: 05/06/2017

Report Issue Number: 1

Reporting Date: 09/06/2017

Authorised by:

Kevin Old
Associate Director of Laboratory

Authorised by:

Russell Jarvis
Associate Director of Client Services

QTSE is the trading name of DETS Ltd, company registration number 03705645



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Soil Analysis Certificate						
QTS Environmental Report No: 17-59746	Date Sampled	02/06/17	02/06/17			
Site Analytical Services Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Campus Project, Manchester	TP / BH No	A	B			
Project / Job Ref: 17/26874	Additional Refs	None Supplied	None Supplied			
Order No: 1087	Depth (m)	None Supplied	None Supplied			
Reporting Date: 09/06/2017	QTS Sample No	271965	271966			

Determinand	Unit	RL	Accreditation				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected	Not Detected		
pH	pH Units	N/a	MCERTS	8.4	8.4		
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2		
Complex Cyanide	mg/kg	< 2	NONE	< 2	< 2		
Free Cyanide	mg/kg	< 2	NONE	< 2	< 2		
Total Sulphate as SO ₄	mg/kg	< 200	NONE	812	1343		
Total Sulphate as SO ₄	%	< 0.02	NONE	0.08	0.13		
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	44	40		
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.04	0.04		
Sulphide	mg/kg	< 5	NONE	13	7		
Organic Matter	%	< 0.1	MCERTS	1.5	1.8		
Total Organic Carbon (TOC)	%	< 0.1	MCERTS	0.8	1		
Arsenic (As)	mg/kg	< 2	MCERTS	11	39		
W/S Boron	mg/kg	< 1	NONE	1.7	1.4		
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	0.6		
Chromium (Cr)	mg/kg	< 2	MCERTS	19	17		
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2	< 2		
Copper (Cu)	mg/kg	< 4	MCERTS	75	73		
Lead (Pb)	mg/kg	< 3	MCERTS	87	1210		
Mercury (Hg)	mg/kg	< 1	NONE	< 1	25.8		
Nickel (Ni)	mg/kg	< 3	MCERTS	19	20		
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3		
Zinc (Zn)	mg/kg	< 3	MCERTS	95	64		
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C

Analysis carried out on the dried sample is corrected for the stone content

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification)

This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

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

Asbestos Analyst: Javeed Malik

RL: Reporting Limit

Pinch Test: Where pinch test is positive it is reported "Loose Fibres - PT" with type(s).

Subcontracted analysis ^(S)



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Soil Analysis Certificate - Speciated PAHs						
QTS Environmental Report No: 17-59746	Date Sampled	02/06/17	02/06/17			
Site Analytical Services Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Campus Project, Manchester	TP / BH No	A	B			
Project / Job Ref: 17/26874	Additional Refs	None Supplied	None Supplied			
Order No: 1087	Depth (m)	None Supplied	None Supplied			
Reporting Date: 09/06/2017	QTS Sample No	271965	271966			

Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	0.71	6.22		
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	0.28		
Acenaphthene	mg/kg	< 0.1	MCERTS	6.14	36.30		
Fluorene	mg/kg	< 0.1	MCERTS	1.82	29		
Phenanthrene	mg/kg	< 0.1	MCERTS	1.70	90.40		
Anthracene	mg/kg	< 0.1	MCERTS	1.19	6.56		
Fluoranthene	mg/kg	< 0.1	MCERTS	6.28	37.90		
Pyrene	mg/kg	< 0.1	MCERTS	3.90	22.70		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.54	3.38		
Chrysene	mg/kg	< 0.1	MCERTS	0.47	2.92		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.21	1.14		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.47		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.69		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.16		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	0.14		
Coronene	mg/kg	< 0.1	NONE	< 0.1	< 0.1		
Total Oily Waste PAHs	mg/kg	< 1	MCERTS	1.2	8.7		
Total Dutch 10 PAHs	mg/kg	< 1	MCERTS	10.9	149		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	23	238		
Total WAC-17 PAHs	mg/kg	< 1.7	NONE	23	238		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - TPH CWG Banded

QTS Environmental Report No: 17-59746	Date Sampled	02/06/17	02/06/17			
Site Analytical Services Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Campus Project, Manchester	TP / BH No	A	B			
Project / Job Ref: 17/26874	Additional Refs	None Supplied	None Supplied			
Order No: 1087	Depth (m)	None Supplied	None Supplied			
Reporting Date: 09/06/2017	QTS Sample No	271965	271966			

Determinand	Unit	RL	Accreditation			
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01	< 0.01	
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	< 2	
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21	< 21	
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2	23	
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	27	233	
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	52	409	
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	13	102	
Aromatic (C5 - C35)	mg/kg	< 21	NONE	91	766	
Total >C5 - C35	mg/kg	< 42	NONE	91	766	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - BTEX / MTBE						
QTS Environmental Report No: 17-59746	Date Sampled	02/06/17	02/06/17			
Site Analytical Services Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Campus Project, Manchester	TP / BH No	A	B			
Project / Job Ref: 17/26874	Additional Refs	None Supplied	None Supplied			
Order No: 1087	Depth (m)	None Supplied	None Supplied			
Reporting Date: 09/06/2017	QTS Sample No	271965	271966			

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2			
Toluene	ug/kg	< 5	MCERTS	< 5	< 5			
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	58			
p & m-xylene	ug/kg	< 2	MCERTS	< 2	21			
o-xylene	ug/kg	< 2	MCERTS	< 2	14			
MTBE	ug/kg	< 5	MCERTS	< 5	< 5			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3

QTS Environmental Report No: 17-59746			Date Sampled	02/06/17		Landfill Waste Acceptance Criteria Limits			
Site Analytical Services Ltd			Time Sampled	None Supplied					
Site Reference: Campus Project, Manchester			TP / BH No	A					
Project / Job Ref: 17/26874			Additional Refs	None Supplied					
Order No: 1087			Depth (m)	None Supplied					
Reporting Date: 09/06/2017			QTSE Sample No	271965					
Determinand			Unit	MDL					Inert Waste Landfill
TOC ^{MU}			%	< 0.1	0.8				
Loss on Ignition			%	< 0.01	4.60				
BTEX ^{MU}			mg/kg	< 0.05	< 0.05				
Sum of PCBs			mg/kg	< 0.1	< 0.1				
Mineral Oil ^{MU}			mg/kg	< 10	< 10				
Total PAH ^{MU}			mg/kg	< 1.7	23				
pH ^{MU}			pH Units	N/a	8.4				
Acid Neutralisation Capacity			mol/kg (+/-)	< 1	1	--	To be evaluated	To be evaluated	
Eluate Analysis				2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)	
				mg/l	mg/l		mg/kg		
Arsenic ^U			< 0.01	< 0.01		< 0.2	0.5	2	25
Barium ^U			0.04	0.04		0.4	20	100	300
Cadmium ^U			< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium ^U			< 0.005	< 0.005		< 0.20	0.5	10	70
Copper ^U			< 0.01	< 0.01		< 0.5	2	50	100
Mercury ^U			< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum ^U			0.403	0.110		1.4	0.5	10	30
Nickel ^U			< 0.007	< 0.007		< 0.2	0.4	10	40
Lead ^U			0.005	< 0.005		< 0.2	0.5	10	50
Antimony ^U			0.011	0.009		0.10	0.06	0.7	5
Selenium ^U			< 0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc ^U			0.009	< 0.005		< 0.2	4	50	200
Chloride ^U			7	1		19	800	15000	25000
Fluoride ^U			0.5	< 0.5		< 1	10	150	500
Sulphate ^U			28	22		229	1000	20000	50000
TDS			218	117		1266	4000	60000	100000
Phenol Index		< 0.01	< 0.01		< 0.5	1	-	-	
DOC		33	12.5		144	500	800	1000	
Leach Test Information									
Sample Mass (kg)				0.22					
Dry Matter (%)				79.3					
Moisture (%)				26.2					
Stage 1									
Volume Eluate L2 (litres)				0.30					
Filtered Eluate VE1 (litres)				0.17					

Results are expressed on a dry weight basis, after correction for moisture content where applicable

Stated limits are for guidance only and QTS Environmental cannot be held responsible for any discrepancies with current legislation

M Denotes MCERTS accredited test

U Denotes ISO17025 accredited test



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Waste Acceptance Criteria Analytical Certificate - BS EN 12457 / 3

QTS Environmental Report No: 17-59746		Date Sampled	02/06/17		Landfill Waste Acceptance Criteria Limits			
Site Analytical Services Ltd		Time Sampled	None Supplied					
Site Reference: Campus Project, Manchester		TP / BH No	B					
Project / Job Ref: 17/26874		Additional Refs	None Supplied					
Order No: 1087		Depth (m)	None Supplied					
Reporting Date: 09/06/2017		QTSE Sample No	271966					
Determinand	Unit	MDL				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
TOC ^{MU}	%	< 0.1	1			3%	5%	6%
Loss on Ignition	%	< 0.01	4.90			--	--	10%
BTEX ^{MU}	mg/kg	< 0.05	0.09			6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1			1	--	--
Mineral Oil ^{MU}	mg/kg	< 10	< 10			500	--	--
Total PAH ^{MU}	mg/kg	< 1.7	238			100	--	--
pH ^{MU}	pH Units	N/a	8.4			--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.8			--	To be evaluated	To be evaluated
Eluate Analysis			2:1 mg/l	8:1 mg/l		Cumulative 10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)	
Arsenic ^U		< 0.01	< 0.01		< 0.2	0.5	2	25
Barium ^U		0.08	0.11		1	20	100	300
Cadmium ^U		< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium ^U		< 0.005	< 0.005		< 0.20	0.5	10	70
Copper ^U		< 0.01	< 0.01		< 0.5	2	50	100
Mercury ^U		< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum ^U		0.149	0.032		0.4	0.5	10	30
Nickel ^U		< 0.007	< 0.007		< 0.2	0.4	10	40
Lead ^U		< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony ^U		0.022	0.015		0.15	0.06	0.7	5
Selenium ^U		< 0.005	< 0.005		< 0.1	0.1	0.5	7
Zinc ^U		< 0.005	< 0.005		< 0.2	4	50	200
Chloride ^U		14	2		30	800	15000	25000
Fluoride ^U		0.6	< 0.5		< 1	10	150	500
Sulphate ^U		36	11		127	1000	20000	50000
TDS		182	124		1277	4000	60000	100000
Phenol Index		0.03	0.01		< 0.5	1	-	-
DOC		21.2	9.7		104	500	800	1000
Leach Test Information								
Sample Mass (kg)		0.23						
Dry Matter (%)		77.2						
Moisture (%)		29.6						
Stage 1								
Volume Eluate L2 (litres)		0.30						
Filtered Eluate VE1 (litres)		0.11						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
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Soil Analysis Certificate - Sample Descriptions

QTS Environmental Report No: 17-59746

Site Analytical Services Ltd

Site Reference: Campus Project, Manchester

Project / Job Ref: 17/26874

Order No: 1087

Reporting Date: 09/06/2017

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
271965	A	None Supplied	None Supplied	20.7	Black clay
271966	B	None Supplied	None Supplied	22.7	Black clay

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

Insufficient Sample ^{I/S}

Unsuitable Sample ^{U/S}



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Soil Analysis Certificate - Methodology & Miscellaneous Information

QTS Environmental Report No: 17-59746

Site Analytical Services Ltd

Site Reference: Campus Project, Manchester

Project / Job Ref: 17/26874

Order No: 1087

Reporting Date: 09/06/2017

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 diphenylcarbazide 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	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

Site Analytical Services Ltd.



Site Investigations, Analytical & Environmental Chemists, Laboratory Testing Services.

Units 14 + 15, River Road Business Park,
33 River Road, Barking, Essex IG11 0EA

Directors: J. S. Warren, M.R.S.C., P. C. Warren, J. I. Pattinson, BSc (Hons), MSc
Consultants: G. Evans, BSc., M.Sc., P.G. Dip., FGS., MEnvSc. A. J. Kingston, BSc C.Eng. MIMM
F. J. Gibbs, F.I.B.M.S. F.I.F.S.T., F.R.S.H. K. J. Blanchette

Tel: 0208 594 8134

Fax: 0208 594 8072

E-Mail: services@siteanalytical.co.uk

Your Ref:

VERBAL INSTRUCTIONS
DEAN PAYNE

Our Ref:

17/27010
JSW/LB

SAMPLE OF 'SOIL'
RE: CAMPUS PROJECT, MANCHESTER

SUBMITTED BY SQUIBB GROUP LIMITED

RECEIVED ON 30th JUNE 2017

INTRODUCTION

A sample of the above material was received into the laboratory for Waste Acceptance Criteria (WAC) analysis in order to determine the classification of the material for landfill purposes.

The sample was referenced 'A'.

RESULTS

WASTE CLASSIFICATION

'SAMPLE A'

NON HAZARDOUS WASTE



Reg. Office: Units 14 +15, River Road Business Park,
33 River Road, Barking, Essex IG11 0EA
Business Reg. No. 2255616





Ref: 17/27010

COMMENTS

The sample was analysed using the 'Catwastesoil' assessment tool, which concluded that the sample was not hazardous in nature. For the purpose of waste disposal it is likely that the soil samples submitted would be classified as:

Sample Ref: 'A' Non Hazardous Waste

The sample exceeded the upper acceptance limit for Inert Waste for Arsenic, Antimony and Selenium.

p.p. SITE ANALYTICAL SERVICES LIMITED

10th July 2017

A Davidson BSc MSc DIC
Environmental Engineer



Site Analytical Services Ltd.

APPENDIX

Laboratory Test Data



Aubrey Davidson
Site Analytical Services Ltd
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River Road Business Park
33 River Road
Barking
Essex
IG11 0EA

QTS Environmental Ltd
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Kent
ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 17-60958

Site Reference: Manchester Campus

Project / Job Ref: 17/27010

Order No: 1177

Sample Receipt Date: 03/07/2017

Sample Scheduled Date: 03/07/2017

Report Issue Number: 1

Reporting Date: 07/07/2017

Authorised by:

A handwritten signature in black ink, appearing to read 'K Old'.

Kevin Old
Associate Director of Laboratory

Authorised by:

A handwritten signature in black ink, appearing to read 'R Jarvis'.

Russell Jarvis
Associate Director of Client Services

QTSE is the trading name of DETS Ltd, company registration number 03705645



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Maidstone
Kent ME17 2JN
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Soil Analysis Certificate						
QTS Environmental Report No: 17-60958	Date Sampled	30/06/17				
Site Analytical Services Ltd	Time Sampled	None Supplied				
Site Reference: Manchester Campus	TP / BH No	A				
Project / Job Ref: 17/27010	Additional Refs	None Supplied				
Order No: 1177	Depth (m)	None Supplied				
Reporting Date: 07/07/2017	QTSE Sample No	277181				

Determinand	Unit	RL	Accreditation				
Asbestos Screen ^(S)	N/a	N/a	ISO17025	Not Detected			
pH	pH Units	N/a	MCERTS	9.7			
Total Cyanide	mg/kg	< 2	NONE	< 2			
Complex Cyanide	mg/kg	< 2	NONE	< 2			
Free Cyanide	mg/kg	< 2	NONE	< 2			
Total Sulphate as SO ₄	mg/kg	< 200	NONE	3377			
Total Sulphate as SO ₄	%	< 0.02	NONE	0.34			
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	471			
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	0.47			
Sulphide	mg/kg	< 5	NONE	< 5			
Organic Matter	%	< 0.1	MCERTS	1.2			
Total Organic Carbon (TOC)	%	< 0.1	MCERTS	0.7			
Arsenic (As)	mg/kg	< 2	MCERTS	93			
W/S Boron	mg/kg	< 1	NONE	18.9			
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	1.7			
Chromium (Cr)	mg/kg	< 2	MCERTS	30			
Chromium (hexavalent)	mg/kg	< 2	NONE	< 2			
Copper (Cu)	mg/kg	< 4	MCERTS	56			
Lead (Pb)	mg/kg	< 3	MCERTS	37			
Mercury (Hg)	mg/kg	< 1	NONE	< 1			
Nickel (Ni)	mg/kg	< 3	MCERTS	38			
Selenium (Se)	mg/kg	< 3	NONE	< 3			
Zinc (Zn)	mg/kg	< 3	MCERTS	69			
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C

Analysis carried out on the dried sample is corrected for the stone content

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification)

This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

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

Asbestos Analyst: Javeed Malik

RL: Reporting Limit

Pinch Test: Where pinch test is positive it is reported "Loose Fibres - PT" with type(s).

Subcontracted analysis ^(S)



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Soil Analysis Certificate - Speciated PAHs						
QTS Environmental Report No: 17-60958	Date Sampled	30/06/17				
Site Analytical Services Ltd	Time Sampled	None Supplied				
Site Reference: Manchester Campus	TP / BH No	A				
Project / Job Ref: 17/27010	Additional Refs	None Supplied				
Order No: 1177	Depth (m)	None Supplied				
Reporting Date: 07/07/2017	QTSE Sample No	277181				

Determinand	Unit	RL	Accreditation				
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1			
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1			
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1			
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1			
Coronene	mg/kg	< 0.1	NONE	< 0.1			
Total Oily Waste PAHs	mg/kg	< 1	MCERTS	< 1			
Total Dutch 10 PAHs	mg/kg	< 1	MCERTS	< 1			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6			
Total WAC-17 PAHs	mg/kg	< 1.7	NONE	< 1.7			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - TPH CWG Banded						
QTS Environmental Report No: 17-60958	Date Sampled	30/06/17				
Site Analytical Services Ltd	Time Sampled	None Supplied				
Site Reference: Manchester Campus	TP / BH No	A				
Project / Job Ref: 17/27010	Additional Refs	None Supplied				
Order No: 1177	Depth (m)	None Supplied				
Reporting Date: 07/07/2017	QTSE Sample No	277181				

Determinand	Unit	RL	Accreditation				
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	< 0.01			
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	< 0.05			
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	< 2			
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	< 2			
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3			
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3			
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10			
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	< 21			
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01			
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05			
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2			
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	< 2			
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2			
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3			
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10			
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21			
Total >C5 - C35	mg/kg	< 42	NONE	< 42			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Soil Analysis Certificate - BTEX / MTBE						
QTS Environmental Report No: 17-60958	Date Sampled	30/06/17				
Site Analytical Services Ltd	Time Sampled	None Supplied				
Site Reference: Manchester Campus	TP / BH No	A				
Project / Job Ref: 17/27010	Additional Refs	None Supplied				
Order No: 1177	Depth (m)	None Supplied				
Reporting Date: 07/07/2017	QTSE Sample No	277181				

Determinand	Unit	RL	Accreditation				
Benzene	ug/kg	< 2	MCERTS	< 2			
Toluene	ug/kg	< 5	MCERTS	< 5			
Ethylbenzene	ug/kg	< 2	MCERTS	< 2			
p & m-xylene	ug/kg	< 2	MCERTS	< 2			
o-xylene	ug/kg	< 2	MCERTS	< 2			
MTBE	ug/kg	< 5	MCERTS	< 5			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C



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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/3									
QTS Environmental Report No: 17-60958		Date Sampled	30/06/17			Landfill Waste Acceptance Criteria Limits			
Site Analytical Services Ltd		Time Sampled	None Supplied						
Site Reference: Manchester Campus		TP / BH No	A						
Project / Job Ref: 17/27010		Additional Refs	None Supplied						
Order No: 1177		Depth (m)	None Supplied						
Reporting Date: 07/07/2017		QTSE Sample No	277181						
Determinand	Unit	MDL							
TOC ^{MU}	%	< 0.1	0.7						
Loss on Ignition	%	< 0.01	3.80						
BTEX ^{MU}	mg/kg	< 0.05	< 0.05						
Sum of PCBs	mg/kg	< 0.1	< 0.1						
Mineral Oil ^{MU}	mg/kg	< 10	< 10						
Total PAH ^{MU}	mg/kg	< 1.7	< 1.7						
pH ^{MU}	pH Units	N/a	9.7						
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.6						
Eluate Analysis			2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)		
			mg/l	mg/l		mg/kg			
Arsenic ^U			0.06	0.09		0.9	0.5	2	25
Barium ^U			0.21	0.10		1.1	20	100	300
Cadmium ^U			< 0.0005	< 0.0005		< 0.02	0.04	1	5
Chromium ^U			< 0.005	< 0.005		< 0.20	0.5	10	70
Copper ^U			< 0.01	< 0.01		< 0.5	2	50	100
Mercury ^U			< 0.005	< 0.005		< 0.01	0.01	0.2	2
Molybdenum ^U			0.016	0.014		0.1	0.5	10	30
Nickel ^U			< 0.007	< 0.007		< 0.2	0.4	10	40
Lead ^U			< 0.005	< 0.005		< 0.2	0.5	10	50
Antimony ^U			0.031	0.041		0.40	0.06	0.7	5
Selenium ^U			0.011	0.012		0.1	0.1	0.5	7
Zinc ^U			< 0.005	< 0.005		< 0.2	4	50	200
Chloride ^U			16	6		66	800	15000	25000
Fluoride ^U			0.5	< 0.5		< 1	10	150	500
Sulphate ^U			120	78		821	1000	20000	50000
TDS			201	143		1490	4000	60000	100000
Phenol Index			< 0.01	< 0.01		< 0.5	1	-	-
DOC			3.1	2.9		29.3	500	800	1000
Leach Test Information									
Sample Mass (kg)			0.24						
Dry Matter (%)			73.4						
Moisture (%)			36.4						
Stage 1									
Volume Eluate L2 (litres)			0.29						
Filtered Eluate VE1 (litres)			0.18						
Results are expressed on a dry weight basis, after correction for moisture content where applicable Stated limits are for guidance only and QTS Environmental cannot be held responsible for any discrepancies with current legislation M Denotes MCERTS accredited test U Denotes ISO17025 accredited test									



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Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 17-60958	
Site Analytical Services Ltd	
Site Reference: Manchester Campus	
Project / Job Ref: 17/27010	
Order No: 1177	
Reporting Date: 07/07/2017	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
277181	A	None Supplied	None Supplied	26.6	Black sandy clay

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

Insufficient Sample ^{I/S}

Unsuitable Sample ^{U/S}



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Soil Analysis Certificate - Methodology & Miscellaneous Information	
QTS Environmental Report No: 17-60958	
Site Analytical Services Ltd	
Site Reference: Manchester Campus	
Project / Job Ref: 17/27010	
Order No: 1177	
Reporting Date: 07/07/2017	

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 diphenylcarbazide 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	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