Borehole Log

Borehole No. **WS 12**
Sheet 1 of 2

Project Name: Townsend Lane	Project No. 2015/2631	Co-ords: -	Hole Type WLS
Location: Harpenden		Level:	Scale 1:25
Client: Hill Partnerships		Dates: 12/08/2015 -	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.48	ES					TOPSOIL. Weathered dark brown silty sandy CLAY with some angular flint gravel and roots. (Weathered Clay with Flints).
					0.48			Stiff to very stiff orange brown silty sandy CLAY with lenses of orange brown limonite stained sand, lignite and limonite staining and angular flint gravel. (Clay with Flints) Formation).
		1.00		N=20 (3,3/4,4,5,7)				
		1.20 - 3.00	ES		1.20			Dense orange brown clayey SAND with some angular flint gravel, limonite and lignite staining with clay lenses. (Clay with Flints Formation).
		2.00		N=24 (2,4/6,5,5,8)				
		3.00		N=13 (2,2/3,3,3,4)	3.00			Stiff to very stiff orange brown silty sandy CLAY with lenses of limonite stained sand, lignite and limonite staining, angular flint gravel. (Clay with Flints)Formation).
		4.00		N=10 (2,2/2,2,3,3)				
		4.80 - 5.00	ES		4.80			CHALK. White very soft to soft putty CHALK with limonite staining and some small hard nodular
		5.00		N=12 (2,3/4,3,2,3)	5.00			

Continued on next sheet

Remarks
Hole dry.

AGS

Borehole Log

Borehole No. **WS 12** Sheet 2 of 2

Project Name: Townsend Lane	Project No. 2015/2631	Co-ords: -	Hole Type WLS
Location: Harpenden		Level:	Scale 1:25
Client: Hill Partnerships		Dates: 12/08/2015 -	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
								lithorelicts. (Lewes Nodular Chalk & Seaford Chalk Formations- undifferentiated).
								End of borehole at 5.00 m

Remarks
Hole dry.

AGS

Borehole Log

Borehole No. **WS 13**
Sheet 1 of 1

Project Name: Townsend Lane	Project No. 2015/2631	Co-ords: -	Hole Type WLS
Location: Harpenden		Level:	Scale 1:25
Client: Hill Partnerships		Dates: 12/08/2015 -	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.40	ES					TOPSOIL. Weathered dark brown silty sandy CLAY with angular flint gravel and roots.
		0.40 - 2.10	ES		0.40			Stiff orange brown silty sandy CLAY with lenses of limonite stained sand, lignite staining and angular flint gravel. (Clay with Flints Formation).
		1.00		N=12 (1,3/3,3,3,3)				
		2.00		N=9 (2,2/2,2,2,3)	2.10			CHALK. White firm to stiff putty CHALK with limonite staining and small hard nodular chalk lithorelicts. (Lewes Nodular Chalk & Seaford Chalk Formation - undifferenciated).
		3.00		N=10 (1,2/2,2,3,3)				
		4.00		N=12 (2,3/3,3,3,3)				
		5.00		N=12 (2,3/4,3,2,3)	5.00			End of borehole at 5.00 m

Remarks
Hole dry.

Borehole Log

Borehole No. **WS 14** Sheet 1 of 1

Project Name: Townsend Lane	Project No. 2015/2631	Co-ords: -	Hole Type WLS
Location: Harpenden		Level:	Scale 1:50
Client: Hill Partnerships		Dates: 02/08/2015 -	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.22	ES		0.22			TOPSOIL. Weathered dark brown silty sandy CLAY with angular flint gravel and roots. (Weathered Clay with Flints).
		1.00		N=7 (1,1/1,2,2,2)				Stiff orange brown silty sandy CLAY with lenses of limonite stained sand, lignite and limonite staining and angular flint gravel. Lense of limonite stained sand at 2.6 m. Layer of flint cobbles 2.7 to 3.0 m and 3.80 to 4.00. (Clay with Flints Formation).
		1.00 - 2.00	ES					
		2.00		N=16 (1,2/2,4,4,6)				
		3.00		N=18 (2,2/3,4,5,6)				
		4.00		N=36 (5,6/7,7,11,11)				
		4.00 - 5.00	ES					
		5.00		N=30 (4,5/6,7,8,9)	4.90			Dense orange brown silty clayey limonite stained SAND with some flint gravel and traces of chalk.
					5.00			End of borehole at 5.00 m

Remarks
Hole dry.

Borehole Log

Borehole No. **WS 15** Sheet 1 of 1

Project Name: Townsend Lane	Project No. 2015/2631	Co-ords: -	Hole Type WLS
Location: Harpenden		Level:	Scale 1:25
Client: Hill Partnerships		Dates: 12/08/2015 -	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.40	ES					TOPSOIL. Weathered dark brown silty sandy CLAY with angular flint gravel and roots.
		0.40 - 2.90	ES		0.40			Firm to stiff orange brown silty sandy CLAY with lenses of limonite stained sand, lignite and limonite staining and angular flint gravel. (Clay with Flints Formation).
		1.00		N=18 (2,2/3,4,5,6)				
		2.00		N=9 (2,1/2,2,2,3)				
		3.00		N=6 (1,2/2,1,1,2)	2.90			CHALK. White soft to firm putty CHALK with limonite staining and some small hard nodular chalk lithorelicts. (Lewes Nodular Chalk & Seaford Chalk Formations - undifferentiated).
		4.00		N=12 (2,2/2,4,3,3)	4.00			End of borehole at 4.00 m

Remarks
Hole dry.

Borehole Log

Borehole No. **WS 16**
Sheet 1 of 1

Project Name: Townsend Lane	Project No. 2015/2631	Co-ords: -	Hole Type WLS
Location: Harpenden		Level:	Scale 1:25
Client: Hill Partnerships		Dates: 12/08/2015 -	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.00 - 0.48	ES					TOPSOIL. Weathered dark brown silty sandy CLAY with angular flint gravel and roots.
		0.48 - 2.00	ES		0.48			Stiff to very stiff orange brown silty sandy CLAY with lenses of orange brown limonite stained sand, lignite and limonite staining and angular flint gravel. (Clay with Flints Formation).
					2.00			CHALK. White soft to firm putty CHALK with limonite staining and some small hard chalk lithorelicts. (Lewis Nodular Chalk & Seaford Chalk Formations- undifferentiated).
					3.00			End of borehole at 3.00 m

Remarks
Drilled by hedge for installation. Hole dry.

Appendix F

Geotechnical Test Results

UKAS TESTING
8284

Chelmer
Geotechnical Laboratories
Groundbreaking Services

Laboratory Report

Site	Townsend Lane Harpenden
Client	QTS Environmental
Date	01-Sep-15
Our Ref	34921
CGL Ref	CGL5800

Chelmer Site Investigation Laboratories Ltd
Unit 15 East Hanningfield Industrial Estate, Old Church Road, East Hanningfield, Essex CM3 8AB
Essex: 01245 400930 | London: 0203 6409136 |info@siteinvestigations.co.uk | www.siteinvestigations.com

UKAS TESTING
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Chelmer
Geotechnical Laboratories

Content Summary

This report contains all test results as indicated on the test instruction/summary.

CGL Reference : CGL5800
Client Reference : 34921
For the attention of : QTS Environmental
This report comprises of the following : 1 Cover Page
1 Inside Cover/Contents Page
2 Pages of Results
1 Moisture/Shear Strength Chart
1 Plasticty Chart
1 Limitations of Report Page

Notes :

General

Please refer to report summary notes for details pertaining to methods undertaken and their subsequent accreditations

Samples were supplied by Customer

All tests performed in-house unless otherwise stated

Deviant Samples

Samples were received in suitable containers	Yes
A date and time of sampling was provided	Yes
Arrived damaged and/or denatured	No

Laboratory Testing Results

BS 1377 : 1990

Job Number : CGL5800
Client : QTS Environmental
Client Reference : 34921
Site Name : Townsend Lane Harpenden

Date Received : 27/08/2015
Date Testing Started : 27/08/2015
Date Testing Completed : 01/09/2015
Laboratory Used : Chelmer Geotechnical, CM3 8AB

Sample Ref			Sample Type	*Moisture Content (%) [1]	*Soil Faction > 0.425mm (%) [2]	*Liquid Limit (%) [3]	*Plastic Limit (%) [4]	*Plasticity Index (%) [5]	*Liquidity Index (%) [5]	*Modified Plasticity Index (%) [6]	*Soil Class [7]	Filter Paper Contact Time (h) [8]	*Soil Sample Suction (kPa)	Insitu Shear Vane Strength (kPa) [9]	Organic Content (%) [10]	*pH Value [11]	*Sulphate Content (g/l)		
BH/TP/WS	Depth (m)	UID															SO_3 [12]	SO_4 [13]	Class [14]
WS9-TL31G	1.10 - 4.00	65516	D	19	<5	71	25	46	-0.13	44	CV								

Notes :- *UKAS Accredited Tests

[1] BS 1377 : Part 2 : 1990, Test No 3.2

[2] Estimated if <5%, otherwise measured

[3] BS 1377 : Part 2 : 1990, Test No 4.4

[4] BS 1377 : Part 2 : 1990, Test No 5.3

[5] BS 1377 : Part 2 : 1990, Test No 5.4

[6] BRE Digest 240 : 1993

[7] BS 5930 : 1981 : Figure 31 - Plasticity Chart for the classification of fine soils

[8] In-house method S9a adapted from BRE IP 4/93

[9] Values of shear strength were determined in situ by **Chelmer Site Investigations** using a Pilcon hand vane or Geonor vane (GV).

[10] BS 1377 : Part 3 : 1990, Test No 4

[11] BS 1377 : Part 2 : 1990, Test No 9

[12] BS 1377 : Part 3 : 1990, Test No 5.6

[13] $SO_4 = 1.2 \times SO_3$

[14] BRE Special Digest One (Concrete in Aggressive Ground) 2005

Note that if the SO_4 content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4m or DS-5m class respectively unless water soluble magnesium testing is undertaken to prove otherwise

Key

D - Disturbed sample
B - Bulk sample
U - U100 (undisturbed sample)
W - Water sample
ENP - Essentially Non-Plastic
U/S - Underside Foundation

UKAS TESTING
8284

Comments :-

Technician :- HS | Checked By :- MC | Date Checked :- 01-Sep-15

Laboratory Testing Results

BS 1377 : 1990

Chelmer

Job Number : CGL5800
Client : QTS Environmental
Client Reference : 34921
Site Name : Townsend Lane Harpenden

Date Received : 27/08/2015
Date Testing Started : 27/08/2015
Date Testing Completed : 01/09/2015
Laboratory Used : Chelmer Geotechnical, CM3 8AB

Sample Ref			Sample Type	*Moisture Content (%) [1]	*Soil Faction > 0.425mm (%) [2]	*Liquid Limit (%) [3]	*Plastic Limit (%) [4]	*Plasticity Index (%) [5]	*Liquidity Index (%) [5]	*Modified Plasticity Index (%) [6]	*Soil Class [7]	Filter Paper Contact Time (h) [8]	*Soil Sample Suction (kPa)	Insitu Shear Vane Strength (kPa) [9]	Organic Content (%) [10]	*pH Value [11]	*Sulphate Content (g/l)		
BH/TP/WS	Depth (m)	UID															SO_3 [12]	SO_4 [13]	Class [14]
WS10-TL35G	1.00 - 2.00	65517	D	12	47	43	17	26	-0.20	14	CI								

Notes :- *UKAS Accredited Tests

[1] BS 1377 : Part 2 : 1990, Test No 3.2

[2] Estimated if <5%, otherwise measured

[3] BS 1377 : Part 2 : 1990, Test No 4.4

[4] BS 1377 : Part 2 : 1990, Test No 5.3

[5] BS 1377 : Part 2 : 1990, Test No 5.4

[6] BRE Digest 240 : 1993

[7] BS 5930 : 1981 : Figure 31 - Plasticity Chart for the classification of fine soils

[8] In-house method S9a adapted from BRE IP 4/93

[9] Values of shear strength were determined in situ by **Chelmer Site Investigations** using a Pilcon hand vane or Geonor vane (GV).

[10] BS 1377 : Part 3 : 1990, Test No 4

[11] BS 1377 : Part 2 : 1990, Test No 9

[12] BS 1377 : Part 3 : 1990, Test No 5.6

[13] $SO_4 = 1.2 \times SO_3$

[14] BRE Special Digest One (Concrete in Aggressive Ground) 2005

Note that if the SO_4 content falls into the DS-4 or DS-5 class, it would be prudent to consider the sample as falling into the DS-4m or DS-5m class respectively unless water soluble magnesium testing is undertaken to prove otherwise

Key
D - Disturbed sample
B - Bulk sample
U - U100 (undisturbed sample)
W - Water sample
ENP - Essentially Non-Plastic
UFS - Underside Foundation

UKAS TESTING
8284

Comments :-

Technician :- HS | Checked By :- MC | Date Checked :- 01-Sep-15

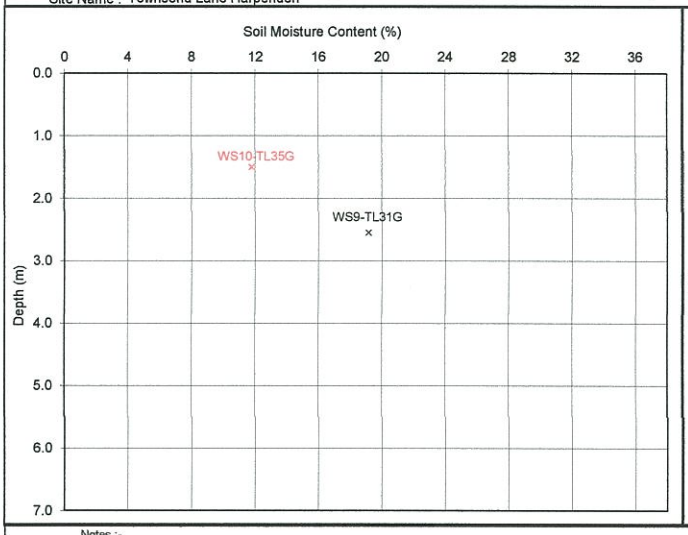
Laboratory Testing Results

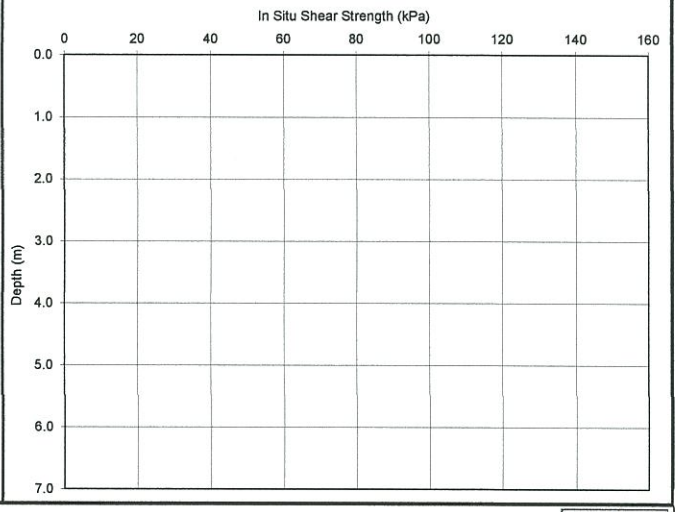
Moisture Content/Shear Strength Profile

Chelmer Geotechnical Laboratories

Job Number : CGL5800
Client : QTS Environmental
Client Reference : 34921
Site Name : Townsend Lane Harpenden

Date Received : 27/08/2015
Date Testing Started : 27/08/2015
Date Testing Completed : 01/09/2015
Laboratory : Chelmer Geotechnical Laboratories, CM3 8AB





Notes :-

1. If the Soil Fraction > 0.425mm exceeds 5% the Equivalent Moisture Content of the remainder (calculated in accordance with BS 1377: Part 2 : 1990, cl.3.2.4 note 1) is also plotted and the alternative profile additionally shown as an appropriately coloured broken line.
2. If plotted, 0.4 LL and PL+2 (after Driscoll, 1983) should only be applied to London Clay (and similarly over consolidated clays) at shallow depths.

Unless otherwise stated, values of Shear Strength were determined in situ by Chelmer Site Investigations using a Pilcon Hand Vane the calibration of which is limited to a maximum reading of 140 kPa. (Not UKAS accredited)

UKAS TESTING 8284

Comments :-

Checked By :- MC

Date Checked :- 01-Sep-15

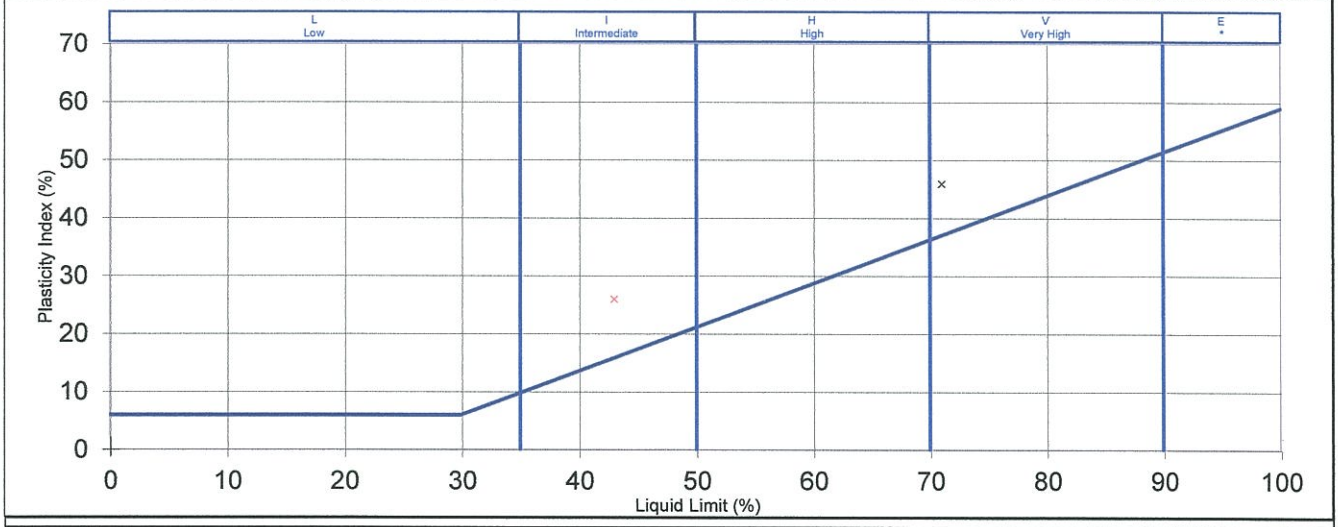
Laboratory Testing Results

Plasticity Chart for the classification of fine soils and the finer part of coarse soils
In Compliance with BS5930 : 1999

Chelmer Geotechnical Laboratories

Job Number : CGL5800
Client : QTS Environmental
Client Reference : 34921
Site Name : Townsend Lane Harpenden

Date Received : 27/08/2015
Date Testing Started : 27/08/2015
Date Testing Completed : 01/09/2015
Laboratory : Chelmer Geotechnical Laboratories, CM3 8AB



Notes :-
SILT (M-SOIL), M, plots below A-Line
CLAY, C, plots above A-Line }M and C may be combined as FINE SOIL, F.

Key :- WS9-TL31G
WS10-TL35G

UKAS TESTING
8284

Comments :-

Checked By :- MC

Date Checked :- 01-Sep-15

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Geotechnical Laboratories

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Where our involvement consists exclusively of testing samples, the results and comments (if provided) relate only to the samples tested.

Any samples that are deemed to be subject to deviation will be recorded as such within the test summary.

UKAS TESTING
8284

Chelmer
Geotechnical Laboratories
Groundbreaking Services

Laboratory Report

Site	Townsend Lane Harpenden
Client	QTS Environmental
Date	01-Sep-15
Our Ref	34923
CGL Ref	CGL5801

Chelmer Site Investigation Laboratories Ltd
Unit 15 East Hanningfield Industrial Estate, Old Church Road, East Hanningfield, Essex CM3 8AB
Essex: 01245 400930 | London: 0203 6409136 | info@siteinvestigations.co.uk | www.siteinvestigations.com

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Chelmer Geotechnical Laboratories

Content Summary

This report contains all test results as indicated on the test instruction/summary.

CGL Reference : CGL5801

Client Reference : 34923

For the attention of : QTS Environmental

This report comprises of the following : 1 Cover Page

1 Inside Cover/Contents Page

1 Particle Size Distribution - Wet Sieving Chart

1 Limitations of Report

Notes :

General

Please refer to report summary notes for details pertaining to methods undertaken and their subsequent accreditations

Samples were supplied by Customer

All tests performed in-house unless otherwise stated

Deviant Samples

Samples were received in suitable containers	Yes
A date and time of sampling was provided	Yes
Arrived damaged and/or denatured	No

PARTICLE SIZE DISTRIBUTION

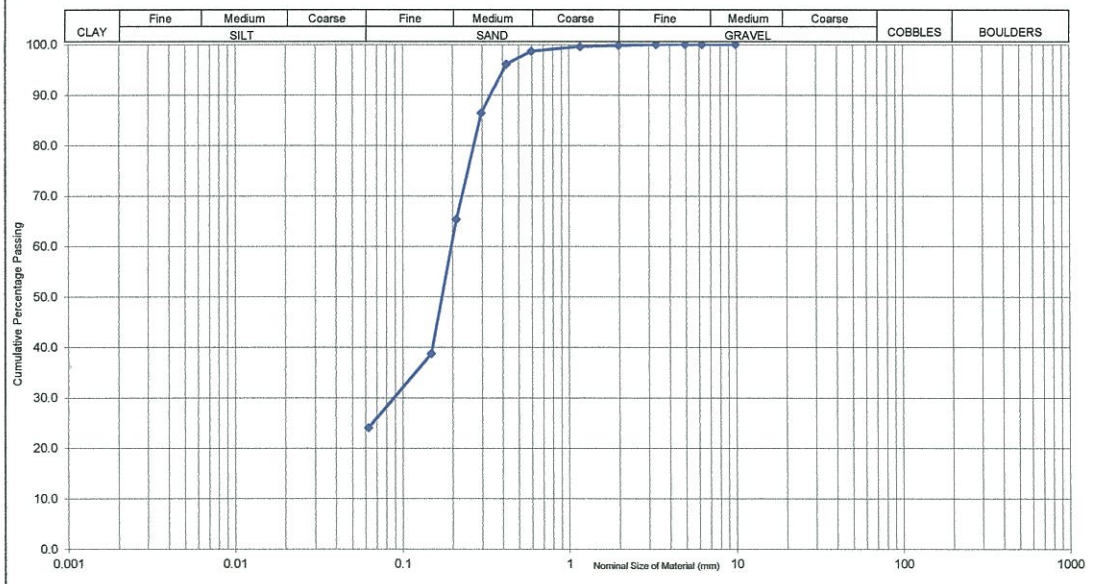
BS 1377-2:1990

Chelmer Geotechnical Laboratories

Job Number : CGL5801
Sample Number : WS14-TL45
Depth (m) : 4.00 - 5.00m
Sample UID : 164171

Site Name : Townsend Lane, Harpenden

Type of Sieving : Washed
Date : 27-Aug-15
Tested By : HS
Laboratory : Chelmer Geotechnical CM3 8AB



Sieve Size (mm)	% Passing
90.0	100.0
75.0	100.0
63.0	100.0
50.0	100.0
37.5	100.0
28.0	100.0
20.0	100.0
14.0	100.0
10.0	100.0
6.3	100.0
5.0	100.0
3.35	100.0
2.00	99.8
1.18	99.6
0.600	98.7
0.425	96.1
0.300	86.5
0.212	65.3
0.150	38.7
0.063	24.1

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Calculations :-

$$f = \frac{(M_1 - M_2) + P}{M_1} \times 100$$

$f = 100P/M_1$ (dry sieving)

f = Percentage of fines passing 0.063mm
M_1 = Mass of dried test sample before washing (kg)
M_2 = Mass of dried residue retained on the 0.063m (kg)
P = Mass of screened material remaining in the pan (kg)

Comments :-

Checked By :- MC

Date Checked :- 01-Sep-15

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Chelmer
Geotechnical Laboratories

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Where our involvement consists exclusively of testing samples, the results and comments (if provided) relate only to the samples tested.

Any samples that are deemed to be subject to deviation will be recorded as such within the test summary.

Appendix G

Results of Chemical Analyses

Jeff Green
Hill Partnerships Ltd
The Power House
Gunpowder Mill
Powdermill Lane
Waltham Abbey
Essex
EN9 1BN

QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 15-34918

Site Reference:	Townsend Lane Harpenden
Project / Job Ref:	None Supplied
Order No:	None Supplied
Sample Receipt Date:	13/08/2015
Sample Scheduled Date:	26/08/2015
Report Issue Number:	1
Reporting Date:	02/09/2015

Authorised by:

Russell Jarvis
Director
On behalf of QTS Environmental Ltd

Authorised by:

Kevin Old
Director
On behalf of QTS Environmental Ltd

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME
UKAS TESTING
4480

Soil Analysis Certificate						
QTS Environmental Report No: 15-34918	Date Sampled	10/08/15	10/08/15	10/08/15	10/08/15	10/08/15
Hill Partnerships Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Townsend Lane Harpenden	TP / BH No	WS1	WS1	WS2	WS2	WS3
Project / Job Ref: None Supplied	Additional Refs	TL1	TL2	TL7	TL8	TL11
Order No: None Supplied	Depth (m)	0.75 - 1.00	1.00 - 2.00	GL - 1.00	1.00 - 2.00	GL - 0.45
Reporting Date: 02/09/2015	QTSE Sample No	164141	164142	164143	164144	164145

Determinand	Unit	RL	Accreditation					
Asbestos Screen	N/a	N/a	ISO17025	Not Detected				Not Detected
pH	pH Units	N/a	MCERTS	8.2				7.1
Total Cyanide	mg/kg	< 2	NONE	< 2				< 2
Total Sulphate as SO_4	mg/kg	< 200	NONE	352				525
Total Sulphate as SO_4	%	< 0.02	NONE	0.04				0.05
Sulphide	mg/kg	< 5	NONE	< 5				6
Organic Matter	%	< 0.1	MCERTS	0.9				2.3
Total Organic Carbon (TOC)	%	< 0.1	MCERTS	0.5				1.4
Arsenic (As)	mg/kg	< 2	MCERTS	16	33	28	10	18
Barium (Ba)	mg/kg	< 5	NONE		79	57	28	
Beryllium (Be)	mg/kg	< 0.5	NONE		2.7	1.3	0.6	
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	25	31	45	14	25
Copper (Cu)	mg/kg	< 4	MCERTS	13	20	12	6	24
Lead (Pb)	mg/kg	< 3	MCERTS	25	19	27	7	78
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	17	32	17	8	16
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE		81	63	31	
Zinc (Zn)	mg/kg	< 3	MCERTS	56	77	48	24	70
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2				< 2
EPH (C10 - C40)	mg/kg	< 6	MCERTS	< 6				< 6

Analytical results are expressed on a dry weight basis where samples are 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: Marcus Jones

RL: Reporting Limit

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

Subcontracted analysis [S]

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate							
QTS Environmental Report No: 15-34918	Date Sampled	10/08/15					
Hill Partnerships Ltd	Time Sampled	None Supplied					
Site Reference: Townsend Lane Harpenden	TP / BH No	WS3					
Project / Job Ref: None Supplied	Additional Refs	TL14					
Order No: None Supplied	Depth (m)	2.00 - 3.00					
Reporting Date: 02/09/2015	QTSE Sample No	164146					

Determinand	Unit	RL	Accreditation					
Asbestos Screen	N/a	N/a	ISO17025					
pH	pH Units	N/a	MCERTS					
Total Cyanide	mg/kg	< 2	NONE					
Total Sulphate as SO_4	mg/kg	< 200	NONE					
Total Sulphate as SO_4	%	< 0.02	NONE					
Sulphide	mg/kg	< 5	NONE					
Organic Matter	%	< 0.1	MCERTS					
Total Organic Carbon (TOC)	%	< 0.1	MCERTS					
Arsenic (As)	mg/kg	< 2	MCERTS	90				
Barium (Ba)	mg/kg	< 5	NONE	37				
Beryllium (Be)	mg/kg	< 0.5	NONE	2.7				
W/S Boron	mg/kg	< 1	NONE	< 1				
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.6				
Chromium (Cr)	mg/kg	< 2	MCERTS	53				
Copper (Cu)	mg/kg	< 4	MCERTS	14				
Lead (Pb)	mg/kg	< 3	MCERTS	20				
Mercury (Hg)	mg/kg	< 1	NONE	< 1				
Nickel (Ni)	mg/kg	< 3	MCERTS	31				
Selenium (Se)	mg/kg	< 3	NONE	< 3				
Vanadium (V)	mg/kg	< 2	NONE	132				
Zinc (Zn)	mg/kg	< 3	MCERTS	66				
Total Phenols (monohydric)	mg/kg	< 2	NONE					
EPH (C10 - C40)	mg/kg	< 6	MCERTS					

Analytical results are expressed on a dry weight basis where samples are 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: Marcus Jones

RL: Reporting Limit

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

Subcontracted analysis [S]

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
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Tel : 01622 850410

4480

Soil Analysis Certificate - Speciated PAHs						
QTS Environmental Report No: 15-34918	Date Sampled	10/08/15	10/08/15			
Hill Partnerships Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Townsend Lane Harpenden	TP / BH No	WS1	WS3			
Project / Job Ref: None Supplied	Additional Refs	TL1	TL11			
Order No: None Supplied	Depth (m)	0.75 - 1.00	GL - 0.45			
Reporting Date: 02/09/2015	QTSE Sample No	164141	164145			

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.17			
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	0.16			
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1			
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6			

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

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Soil Analysis Certificate - TPH CWG Banded						
QTS Environmental Report No: 15-34918	Date Sampled	10/08/15	10/08/15			
Hill Partnerships Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Townsend Lane Harpenden	TP / BH No	WS1	WS3			
Project / Job Ref: None Supplied	Additional Refs	TL1	TL11			
Order No: None Supplied	Depth (m)	0.75 - 1.00	GL - 0.45			
Reporting Date: 02/09/2015	QTSE Sample No	164141	164145			

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	< 2			
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	< 2	< 2			
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3			
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10			
Aromatic (C5 - C35)	mg/kg	< 21	NONE	< 21	< 21			
Total >C5 - C35	mg/kg	< 42	NONE	< 42	< 42			

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

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Soil Analysis Certificate - BTEX / MTBE						
QTS Environmental Report No: 15-34918	Date Sampled	10/08/15	10/08/15			
Hill Partnerships Ltd	Time Sampled	None Supplied	None Supplied			
Site Reference: Townsend Lane Harpenden	TP / BH No	WS1	WS3			
Project / Job Ref: None Supplied	Additional Refs	TL1	TL11			
Order No: None Supplied	Depth (m)	0.75 - 1.00	GL - 0.45			
Reporting Date: 02/09/2015	QTSE Sample No	164141	164145			

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

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

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Leachate Analysis Certificate						
QTS Environmental Report No: 15-34918	Date Sampled	10/08/15				
Hill Partnerships Ltd	Time Sampled	None Supplied				
Site Reference: Townsend Lane Harpenden	TP / BH No	WS1				
Project / Job Ref: None Supplied	Additional Refs	TL1				
Order No: None Supplied	Depth (m)	0.75 - 1.00				
Reporting Date: 02/09/2015	QTSE Sample No	164147				

Determinand	Unit	RL	Accreditation					
Arsenic	ug/l	< 5	ISO17025	< 5				
Barium	ug/l	< 5	ISO17025	8				
Beryllium	ug/l	< 3	ISO17025	< 3				
Boron	ug/l	< 5	ISO17025	42				
Cadmium	ug/l	< 0.4	ISO17025	< 0.4				
Chromium	ug/l	< 5	ISO17025	< 5				
Copper	ug/l	< 5	ISO17025	< 5				
Lead	ug/l	< 5	ISO17025	< 5				
Mercury	ug/l	< 0.05	ISO17025	< 0.05				
Nickel	ug/l	< 5	ISO17025	< 5				
Selenium	ug/l	< 5	ISO17025	< 5				
Vanadium	ug/l	< 5	ISO17025	< 5				
Zinc	ug/l	< 2	ISO17025	5				

Subcontracted analysis [S]

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Soil Analysis Certificate - Sample Descriptions
QTS Environmental Report No: 15-34918
Hill Partnerships Ltd
Site Reference: Townsend Lane Harpenden
Project / Job Ref: None Supplied
Order No: None Supplied
Reporting Date: 02/09/2015

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
$ 164141	WS1	TL1	0.75 - 1.00	12.3	Light brown clayey gravel
$ 164142	WS1	TL2	1.00 - 2.00	15.5	Light brown clay
$ 164143	WS2	TL7	GL - 1.00	9.6	Grey clay
$ 164144	WS2	TL8	1.00 - 2.00	9.2	Orange sand
$ 164145	WS3	TL11	GL - 0.45	12	Light brown clayey gravel with vegetation
$ 164146	WS3	TL14	2.00 - 3.00	14.8	Orange sandy clay

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S

$ samples exceeded recommended holding times

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Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 15-34918
Hill Partnerships Ltd
Site Reference: Townsend Lane Harpenden
Project / Job Ref: None Supplied
Order No: None Supplied
Reporting Date: 02/09/2015

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

QTS Environmental Ltd
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Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 15-34918
Hill Partnerships Ltd
Site Reference: Townsend Lane Harpenden
Project / Job Ref: None Supplied
Order No: None Supplied
Reporting Date: 02/09/2015

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by co	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR detect	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethane	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	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 liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	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 liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

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Hill Partnerships Ltd
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Gunpowder Mill
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QTS Environmental Report No: 15-34919

Site Reference:	Townsend Lane Harpenden
Project / Job Ref:	None Supplied
Order No:	None Supplied
Sample Receipt Date:	13/08/2015
Sample Scheduled Date:	26/08/2015
Report Issue Number:	1
Reporting Date:	02/09/2015

Authorised by:

Russell Jarvis
Director
On behalf of QTS Environmental Ltd

Authorised by

Kevin Old
Director
On behalf of QTS Environmental Ltd

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Soil Analysis Certificate						
QTS Environmental Report No: 15-34919	Date Sampled	10/08/15	10/08/15	10/08/15	10/08/15	10/08/15
Hill Partnerships Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Townsend Lane Harpenden	TP / BH No	WS4	WS4	WS5	WS5	WS6
Project / Job Ref: None Supplied	Additional Refs	TL16	TL17	TL18	TL19	TL21
Order No: None Supplied	Depth (m)	0.60 - 1.00	1.00 - 2.00	GL - 0.50	0.50 - 2.30	GL - 0.30
Reporting Date: 02/09/2015	QTSE Sample No	164148	164149	164150	164151	164152

Determinand	Unit	RL	Accreditation					
Asbestos Screen	N/a	N/a	ISO17025				Not Detected	
pH	pH Units	N/a	MCERTS				7.5	
Total Cyanide	mg/kg	< 2	NONE				< 2	
Total Sulphate as SO_4	mg/kg	< 200	NONE				229	
Total Sulphate as SO_4	%	< 0.02	NONE				0.02	
Sulphide	mg/kg	< 5	NONE				< 5	
Organic Matter	%	< 0.1	MCERTS				0.3	
Total Organic Carbon (TOC)	%	< 0.1	MCERTS				0.2	
Arsenic (As)	mg/kg	< 2	MCERTS	18	35	18	51	19
Barium (Ba)	mg/kg	< 5	NONE	77	119	72		77
Beryllium (Be)	mg/kg	< 0.5	NONE	< 0.5	0.7	< 0.5		< 0.5
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.3	< 0.2	0.2	< 0.2	< 0.2
Chromium (Cr)	mg/kg	< 2	MCERTS	27	52	26	39	26
Copper (Cu)	mg/kg	< 4	MCERTS	20	27	18	23	19
Lead (Pb)	mg/kg	< 3	MCERTS	50	21	37	25	40
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	16	68	18	34	18
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	< 3
Vanadium (V)	mg/kg	< 2	NONE	41	97	43		47
Zinc (Zn)	mg/kg	< 3	MCERTS	66	94	60	73	58
Total Phenols (monohydric)	mg/kg	< 2	NONE				< 2	
EPH (C10 - C40)	mg/kg	< 6	MCERTS				< 6	

Analytical results are expressed on a dry weight basis where samples are 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: Graham Revell

RL: Reporting Limit

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

Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
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Tel : 01622 850410

4480

Soil Analysis Certificate						
QTS Environmental Report No: 15-34919	Date Sampled	10/08/15	10/08/15	10/08/15	10/08/15	
Hill Partnerships Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Townsend Lane Harpenden	TP / BH No	WS6	WS7	WS7	WS8	
Project / Job Ref: None Supplied	Additional Refs	TL22	TL24	TL25	TL27	
Order No: None Supplied	Depth (m)	0.30 - 1.50	GL - 0.35	0.35 - 1.00	GL - 0.50	
Reporting Date: 02/09/2015	QTSE Sample No	164153	164154	164155	164156	

Determinand	Unit	RL	Accreditation					
Asbestos Screen	N/a	N/a	ISO17025					
pH	pH Units	N/a	MCERTS					
Total Cyanide	mg/kg	< 2	NONE					
Total Sulphate as SO_4	mg/kg	< 200	NONE					
Total Sulphate as SO_4	%	< 0.02	NONE					
Sulphide	mg/kg	< 5	NONE					
Organic Matter	%	< 0.1	MCERTS					
Total Organic Carbon (TOC)	%	< 0.1	MCERTS					
Arsenic (As)	mg/kg	< 2	MCERTS	41	18	26	19	
Barium (Ba)	mg/kg	< 5	NONE	95	79	64	74	
Beryllium (Be)	mg/kg	< 0.5	NONE	< 0.5	< 0.5	< 0.5	< 0.5	
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	< 0.2	0.3	< 0.2	0.2	
Chromium (Cr)	mg/kg	< 2	MCERTS	46	25	39	26	
Copper (Cu)	mg/kg	< 4	MCERTS	30	19	13	16	
Lead (Pb)	mg/kg	< 3	MCERTS	29	41	16	40	
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	
Nickel (Ni)	mg/kg	< 3	MCERTS	64	18	24	16	
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	
Vanadium (V)	mg/kg	< 2	NONE	106	45	88	44	
Zinc (Zn)	mg/kg	< 3	MCERTS	102	60	54	56	
Total Phenols (monohydric)	mg/kg	< 2	NONE					
EPH (C10 - C40)	mg/kg	< 6	MCERTS					

Analytical results are expressed on a dry weight basis where samples are 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: Graham Revell

RL: Reporting Limit

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Subcontracted analysis [5]

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Soil Analysis Certificate - Speciated PAHs						
QTS Environmental Report No: 15-34919	Date Sampled	10/08/15				
Hill Partnerships Ltd	Time Sampled	None Supplied				
Site Reference: Townsend Lane Harpenden	TP / BH No	WS5				
Project / Job Ref: None Supplied	Additional Refs	TL19				
Order No: None Supplied	Depth (m)	0.50 - 2.30				
Reporting Date: 02/09/2015	QTSE Sample No	164151				

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				
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6				

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Soil Analysis Certificate - TPH CWG Banded						
QTS Environmental Report No: 15-34919	Date Sampled	10/08/15				
Hill Partnerships Ltd	Time Sampled	None Supplied				
Site Reference: Townsend Lane Harpenden	TP / BH No	WS5				
Project / Job Ref: None Supplied	Additional Refs	TL19				
Order No: None Supplied	Depth (m)	0.50 - 2.30				
Reporting Date: 02/09/2015	QTSE Sample No	164151				

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				

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Soil Analysis Certificate - BTEX / MTBE						
QTS Environmental Report No: 15-34919	Date Sampled	10/08/15				
Hill Partnerships Ltd	Time Sampled	None Supplied				
Site Reference: Townsend Lane Harpenden	TP / BH No	WS5				
Project / Job Ref: None Supplied	Additional Refs	TL19				
Order No: None Supplied	Depth (m)	0.50 - 2.30				
Reporting Date: 02/09/2015	QTSE Sample No	164151				

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			

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