

Project Name: Cockley Hill Lane	Project No. CKD/02	Co-ords: 418341.00 - 417947.00	Hole Type RO
Location: Kirkheaton, Huddersfield		Level: 133.00	Date 09/05/2019
Client: Cockley Developments Ltd		Plant Used: Casagrande C6	Scale 1:100
Hole Dia.:	Bit Used:	Flush: Air	Rig Crew: CA, CB
			Logged AH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
							MADE GROUND. Brown and grey slightly clayey sandy fine to coarse subangular GRAVEL of mixed lithologies, including sandstone, mudstone and siltstone.		1
							[Natural Arisings - Infilled opencast workings]		2
									3
									4
									5
									6
									7
									8
	▼								9
					11.50	121.50		Grey MUDSTONE.	11
								[Pennine Lower Coal Measures]	12
									13
									14
					15.00	118.00		End of Borehole at 15.000m	15
									16
									17
									18
									19
									20

Groundwater: Strata wet from 9m
 Backfill: Backfilled on completion, with a cementitious grout plug at the base, followed by arisings, with the upper 1m comprising a bentonite seal.
 Casing: Drill casing not used.
 Remarks: Strata description is based on drillers logs and adjusted by the engineers observations.

Project Name: Cockley Hill Lane	Project No. CKD/02	Co-ords: 418294.00 - 417935.00	Hole Type RO
Location: Kirkheaton, Huddersfield		Level: 128.00	Date 09/05/2019
Client: Cockley Developments Ltd		Plant Used: Casagrande C6	Scale 1:100
Hole Dia.:	Bit Used:	Flush: Air	Rig Crew: CA,CB
			Logged AH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
	▼						MADE GROUND. Brown and grey slightly clayey sandy fine to coarse subangular GRAVEL of mixed lithologies, including sandstone, mudstone and siltstone. [Natural Arisings - Infilled opencast workings]	1 2 3 4 5	
					5.30	122.70	Grey MUDSTONE. [Pennine Lower Coal Measures]	6 7 8	
					9.00	119.00	End of Borehole at 9.000m	9 10 11 12 13 14 15 16 17 18 19 20	

Groundwater:

Backfill: Backfilled on completion, with a cementitious grout plug at the base, followed by arisings, with the upper 1m comprising a bentonite seal.

Casing: Drill casing not used.

Remarks: Strata description is based on drillers logs and adjusted by the engineers observations.

Project Name: Cockley Hill Lane	Project No. CKD/02	Co-ords: 418291.00 - 417886.00	Hole Type RO
Location: Kirkheaton, Huddersfield		Level: 126.00	Date 09/05/2019
Client: Cockley Developments Ltd		Plant Used: Casagrande C6	Scale 1:100
Hole Dia.:	Bit Used:	Flush: Air	Rig Crew: CA,CB
			Logged AH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
							MADE GROUND. Brown and grey slightly clayey sandy fine to coarse subangular GRAVEL of mixed lithologies, including sandstone, mudstone and siltstone.		
							[Natural Arisings - Infilled opencast workings]		
				3.50	122.50		Light grey MUDSTONE.		
							[Pennine Lower Coal Measures]		
				6.20	119.80		COAL. Intact. Full flush returns.		
				6.40	119.60		[Better Bed Coal Seam]		
				6.60	119.40		Light grey MUDSTONE.		
				6.80	119.20		[Pennine Lower Coal Measures]		
							COAL. Intact. Full flush returns.		
				9.00	117.00		[Better Bed Coal Seam]		
							Light grey MUDSTONE.		
							[Pennine Lower Coal Measures]		
							End of Borehole at 9.000m		

Groundwater:

Backfill: Backfilled on completion, with a cementitious grout plug at the base, followed by arisings, with the upper 1m comprising a bentonite seal.

Casing: Drill casing not used.

Remarks: Strata description is based on drillers logs and adjusted by the engineers observations.



Rotary Drilling Log

Project Name: Cockley Hill Lane	Project No. CKD/02	Co-ords: 418291.00 - 417881.00	Hole Type RO
Location: Kirkheaton, Huddersfield		Level: 125.00	Date 09/05/2019
Client: Cockley Developments Ltd		Plant Used: Casagrande C6	Scale 1:100
Hole Dia.:	Bit Used:	Flush: Air	Rig Crew: CA,CB
			Logged AH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					1.00	124.00		Dark grey/dark brown sandy gravelly CLAY. Gravel is fine to coarse and sub-angular of sandstone and mudstone.	1
								[Residual soil derived from weathered bedrock]	2
								Light grey MUDSTONE.	3
								[Pennine Lower Coal Measures]	4
					4.50	120.50		COAL. Intact. Full flush returns.	5
					4.70	120.30		[Better Bed Coal Seam]	6
								Light grey MUDSTONE.	7
								[Pennine Lower Coal Measures]	8
					9.00	116.00		End of Borehole at 9.000m	9
									10
									11
									12
									13
									14
									15
									16
									17
									18
									19
									20












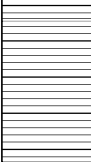
Groundwater:

Backfill: Backfilled on completion, with a cementitious grout plug at the base, followed by arisings, with the upper 1m comprising a bentonite seal.

Casing: Drill casing not used.

Remarks: Strata description is based on drillers logs and adjusted by the engineers observations.

Project Name: Cockley Hill Lane	Project No. CKD/02	Co-ords: 418276.00 - 417878.00	Hole Type RO
Location: Kirkheaton, Huddersfield		Level: 124.00	Date 09/05/2019
Client: Cockley Developments Ltd		Plant Used: Casagrande C6	Scale 1:100
Hole Dia.:	Bit Used:	Flush: Air	Rig Crew: CA, CB
			Logged AH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					1.00	123.00		Dark grey/dark brown sandy gravelly CLAY. Gravel is fine to coarse and sub-angular of sandstone and mudstone.	1
								[Residual soil derived from weathered bedrock]	
								Light grey MUDSTONE.	2
					3.00	121.00		[Pennine Lower Coal Measures]	
					3.20	120.80		COAL. Intact. Full flush returns.	3
								[Better Bed Coal Seam]	
								Light grey MUDSTONE.	4
								[Pennine Lower Coal Measures]	5
								[Pennine Lower Coal Measures]	6
								[Pennine Lower Coal Measures]	7
								[Pennine Lower Coal Measures]	8
					9.00	115.00		End of Borehole at 9.000m	9
									10
									11
									12
									13
									14
									15
									16
									17
									18
									19
									20












Groundwater:

Backfill: Backfilled on completion, with a cementitious grout plug at the base, followed by arisings, with the upper 1m comprising a bentonite seal.

Casing: Drill casing not used.

Remarks: Strata description is based on drillers logs and adjusted by the engineers observations.

Project Name: Cockley Hill Lane	Project No. CKD/02	Co-ords: 418265.00 - 417867.00	Hole Type RO
Location: Kirkheaton, Huddersfield		Level: 123.00	Date 09/05/2019
Client: Cockley Developments Ltd		Plant Used: Casagrande C6	Scale 1:100
Hole Dia.:	Bit Used:	Flush: Air	Rig Crew: CA, CB
			Logged AH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					1.00	122.00		Dark grey/dark brown sandy gravelly CLAY. Gravel is fine to coarse and sub-angular of sandstone and mudstone.	1
					2.80	120.20		[Residual soil derived from weathered bedrock]	2
					3.20	119.80		[Pennine Lower Coal Measures]	3
								COAL. Intact. Full flush returns.	3
								[Better Bed Coal Seam]	4
								Light grey MUDSTONE.	4
								[Pennine Lower Coal Measures]	5
								[Pennine Lower Coal Measures]	6
								[Pennine Lower Coal Measures]	7
								[Pennine Lower Coal Measures]	8
					9.00	114.00		End of Borehole at 9.000m	9
									10
									11
									12
									13
									14
									15
									16
									17
									18
									19
									20

Groundwater:

Backfill: Backfilled on completion, with a cementitious grout plug at the base, followed by arisings, with the upper 1m comprising a bentonite seal.

Casing: Drill casing not used.

Remarks: Strata description is based on drillers logs and adjusted by the engineers observations.



Rotary Drilling Log

Project Name: Cockley Hill Lane	Project No. CKD/02	Co-ords: 418265.00 - 417861.00	Hole Type RO
Location: Kirkheaton, Huddersfield		Level: 122.00	Date 09/05/2019
Client: Cockley Developments Ltd		Plant Used:	Scale 1:100
Hole Dia.:	Bit Used:	Flush: Air	Rig Crew: Casagrande C6
			Logged CA,CB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.80	121.20		Dark grey/dark brown sandy gravelly CLAY. Gravel is fine to coarse and sub-angular of sandstone and mudstone.	1
					2.00	120.00		[Residual soil derived from weathered bedrock]	2
					2.40	119.60		Light grey MUDSTONE.	3
								[Pennine Lower Coal Measures]	4
								COAL. Intact. Full flush returns.	5
								[Better Bed Coal Seam]	6
								Light grey MUDSTONE.	7
								[Pennine Lower Coal Measures]	8
					9.00	113.00		End of Borehole at 9.000m	9
									10
									11
									12
									13
									14
									15
									16
									17
									18
									19
									20

Groundwater:

Backfill: Backfilled on completion, with a cementitious grout plug at the base, followed by arisings, with the upper 1m comprising a bentonite seal.

Casing: Drill casing not used.

Remarks: Strata description is based on drillers logs and adjusted by the engineers observations.



Rotary Drilling Log

Project Name: Cockley Hill Lane	Project No. CKD/02	Co-ords: 418255.48 - 417849.09	Hole Type RO
Location: Kirkheaton, Huddersfield		Level: 121.00	Date 09/05/2019
Client: Cockley Developments Ltd		Plant Used: Casagrande C6	Scale 1:100
Hole Dia.:	Bit Used:	Flush: Air	Rig Crew: CA,CB
			Logged AH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.70	120.30		Dark grey/dark brown sandy gravelly CLAY. Gravel is fine to coarse and sub-angular of sandstone and mudstone.	1
					1.70	119.30		[Residual soil derived from weathered bedrock]	
					1.90	119.10		Light grey MUDSTONE.	2
								[Pennine Lower Coal Measures]	
								COAL. Intact. Full flush returns.	3
								[Better Bed Coal Seam]	
								Light grey MUDSTONE.	4
								[Pennine Lower Coal Measures]	5
									6
									7
									8
					9.00	112.00		End of Borehole at 9.000m	9
									10
									11
									12
									13
									14
									15
									16
									17
									18
									19
									20

Groundwater:


Backfill: Backfilled on completion, with a cementitious grout plug at the base, followed by arisings, with the upper 1m comprising a bentonite seal.

Casing: Drill casing not used.

Remarks: Strata description is based on drillers logs and adjusted by the engineers observations.

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Project Name: Cockley Hill Lane	Project No. CKD/02	Co-ords: 418244.00 - 417857.00	Hole Type RO
Location: Kirkheaton, Huddersfield		Level: 120.00	Date 09/05/2019
Client: Cockley Developments Ltd		Plant Used: Casagrande C6	Scale 1:100
Hole Dia.:	Bit Used:	Flush: Air	Rig Crew: CA,CB
			Logged AH

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.80	119.20		Dark grey/dark brown sandy gravelly CLAY. Gravel is fine to coarse and sub-angular of sandstone and mudstone. [Residual soil derived from weathered bedrock] Light grey MUDSTONE. [Pennine Lower Coal Measures]	1 2 3 4 5 6 7 8
					9.00	111.00		End of Borehole at 9.000m	9 10 11 12 13 14 15 16 17 18 19 20


Groundwater:

Backfill: Backfilled on completion, with a cementitious grout plug at the base, followed by arisings, with the upper 1m comprising a bentonite seal.

Casing: Drill casing not used.

Remarks: Strata description is based on drillers logs and adjusted by the engineers observations.

Project Name: Cockley Hill Lane	Project No. CKD/02	Co-ords: 418349.00 - 417979.00	Hole Type RO
Location: Kirkheaton, Huddersfield		Level: 134.00	Date 10/05/2019
Client: Cockley Developments Ltd		Plant Used: Casagrande C6	Scale 1:100
Hole Dia.:	Bit Used:	Flush: Air	Rig Crew: CA,CB
			Logged CA

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					1.00	133.00		Dark grey/dark brown sandy gravelly CLAY (Drillers Description). [Residual soil derived from weathered bedrock] Grey MUDSTONE (Drillers Description). [Pennine Lower Coal Measures]	1-12
	▼				12.90	121.10		Dark MUDSTONE (Drillers Description).	13
					13.10	120.90			
					13.20	120.80		[Pennine Lower Coal Measures]	
					13.80	120.20		COAL traces. (Drillers Description)	14
					13.90	120.10			
					14.50	119.50		[Better Bed Coal Seam]	
								Dark MUDSTONE. (Drillers Description)	15
								[Pennine Lower Coal Measures]	
								COAL traces. (Drillers Description)	16
								[Better Bed Coal Seam]	
								Dark MUDSTONE. (Drillers Description)	17
								[Pennine Lower Coal Measures]	
					18.00	116.00		Grey MUDSTONE with sandstone bands (Drillers Description).	18
								[Pennine Lower Coal Measures]	
								End of Borehole at 18.000m Coal traces added for positional purposes only.	19-20



Groundwater: Strata wet from 12m.

Backfill: Backfilled on completion, with a cementitious grout plug at the base, followed by arisings, with the upper 1m comprising a bentonite seal.

Casing: Drill casing not used.

Remarks: Strata description is based on drillers logs and adjusted by the engineers observations. Coal seams shown are indicative only.

Project Name: Cockley Hill Lane	Project No. CKD/02	Co-ords: 418342.00 - 417983.00	Hole Type RO
Location: Kirkheaton, Huddersfield		Level: 134.00	Date 10/05/2019
Client: Cockley Developments Ltd		Plant Used: Casagrande C6	Scale 1:100
Hole Dia.:	Bit Used:	Flush: Air	Rig Crew: CA,CB
			Logged CA

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					1.20	132.80	 Dark grey/dark brown sandy gravelly CLAY (Drillers Description). [Residual soil derived from weathered bedrock] Grey MUDSTONE (Drillers Description). [Lower Pennine Coal Measures]	1	
					12.70	121.30	 SOFT GROUND. No returns, (Drillers Description). [Probable backfilled working in the Better Bed Coal Seam]	13	
					14.00	120.00	RECOVERY NO RECOVERY NO SOLID GROUND. No returns, (Drillers Description).	14	
					15.00	119.00	Probable Pennine Lower Coal Measures] End of Borehole at 15.000m	15	



Groundwater: Strata wet from 9m.

Backfill: Backfilled on completion, with a cementitious grout plug at the base, followed by arisings, with the upper 1m comprising a bentonite seal.

Casing: Drill casing not used.

Remarks: Strata description is based on drillers logs and adjusted by the engineers observations.

Project Name: Cockley Hill Lane	Project No. CKD/02	Co-ords: 418365.00 - 417989.00	Hole Type RO
Location: Kirkheaton, Huddersfield		Level: 137.00	Date 10/05/2019
Client: Cockley Developments Ltd		Plant Used: Casagrande C6	Scale 1:100
Hole Dia.:	Bit Used:	Flush: Air	Rig Crew: CA,CB
			Logged CA

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					1.20	135.80	 Dark grey/dark brown sandy gravelly CLAY (Drillers Description). [Residual soil derived from weathered bedrock]  Grey MUDSTONE (Drillers Description). [Pennine Lower Coal Measures]	1	
								2	
								3	
								4	
								5	
								6	
								7	
								8	
								9	
								10	
								11	
								12	
								13	
								14	
				14.60	122.40		Dark MUDSTONE (Drillers Description).	15	
				14.90	122.10				
				15.00	122.00		[Pennine Lower Coal Measures]		
				15.80	121.20		COAL traces (Drillers Description).	16	
				15.90	121.10				
				16.20	120.80		[Better Bed Coal Seam]	17	
							Dark MUDSTONE (Drillers Description).		
							[Pennine Lower Coal Measures]	18	
				18.00	119.00		COAL traces (Drillers Description).		
							[Better Bed Coal Seam]	19	
							Dark MUDSTONE (Drillers Description).		
							[Pennine Lower Coal Measures]	20	

Groundwater: Strata wet from 12m
 Backfill: Backfilled on completion, with a cementitious grout plug at the base, followed by arisings, with the upper 1m comprising a bentonite seal.
 Casing: Drill casing not used.
 Remarks: Strata description is based on drillers logs and adjusted by the engineers observations. Coal seams shown are indicative only.

Rotary Drilling Log

Borehole No.

R113

Sheet 2 of 2

Project Name: Cockley Hill Lane	Project No. CKD/02	Co-ords: 418365.00 - 417989.00	Hole Type RO
Location: Kirkheaton, Huddersfield		Level: 137.00	Date 10/05/2019
Client: Cockley Developments Ltd		Plant Used: Casagrande C6	Scale 1:100
Hole Dia.:	Bit Used:	Flush: Air	Rig Crew: CA,CB
			Logged CA

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
							Mudstone with sandstone bands (Drillers Description). [Pennine Lower Coal Measures] End of Borehole at 18.000m Coal traces added for positional purposes only.	21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40	

Groundwater: Strata wet from 12m

Backfill: Backfilled on completion, with a cementitious grout plug at the base, followed by arisings, with the upper 1m comprising a bentonite seal.

Casing: Drill casing not used.

Remarks: Strata description is based on drillers logs and adjusted by the engineers observations. Coal seams shown are indicative only.



Rotary Drilling Log

Project Name: Cockley Hill Lane		Project No. CKD/02	Co-ords: 418360.00 - 418002.00	Hole Type RO
Location: Kirkheaton, Huddersfield		Level: 138.00		Date 10/05/2019
Client: Cockley Developments Ltd		Plant Used: Casagrande C6		Scale 1:100
Hole Dia.:	Bit Used:	Flush: Air	Rig Crew: CA,CB	Logged CA

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					1.50	136.50	 Dark grey/dark brown sandy gravelly CLAY (Drillers Description). [Residual soil derived from weathered bedrock]	1	
							 Grey MUDSTONE (Drillers Description). [Pennine Lower Coal Measures]	2	
								3	
								4	
								5	
								6	
								7	
								8	
								9	
								10	
								11	
								12	
								13	
								14	
					15.50	122.50	 SOFT GROUND. No flush (Drillers Description).	15	
					16.00	122.00	 [Probable backfilled working in the Better Bed Coal Seam]	16	
							 SOLID GROUND. No flush (Drillers Description).	17	
					18.00	120.00	 [Probable Pennine Lower Coal Measures]	18	
							End of Borehole at 18.000m	19	
								20	

Groundwater: Strata wet from 15m.
 Backfill: Backfilled on completion, with a cementitious grout plug at the base, followed by arisings, with the upper 1m comprising a bentonite seal.
 Casing: Drill casing not used.
 Remarks: Strata description is based on drillers logs and adjusted by the engineers observations.



GROUND SOURCE DRILLING AND CONTRACTING
DAILY RETURN
(DRILLING)

Sheet No.	1
Date	Thursday 09/05/2019
Contract Name	COCKLEY HILL LANE - HUDDERSFIELD
Contract No.	5297
Working Day No.	1

Hole No.	Depth	Casing	Dia	Angle	From	To	Description
					PLANT	1 No.	CASAGRANDE C6 RIG
						1 No.	400 cfm COMPRESSOR
						1 No.	VIVARO VAN
						CREW	C. ATKINSON
							C. BROWN
							M. COLE
							J. BUTLER
ALL BOREHOLE POSITIONS / DEPTHS TO BE INSTRUCTED BY ENGINEER - COMMENCED DRILLING USING AIR FLUSHING METHODS							
R101	15.00	0.00	3 7/8"	V	0.00	0.40	TOPSOIL
					0.40	3.70	OVERBURDEN / BACKFILL
					3.70	10.70	MUDSTONE
FULL RETURNS MAINTAINED THROUGHOUT DRILLING					10.70	12.50	DARK MUDSTONE WITH COAL TRACES
BOREHOLE WET FROM 11.00 METRES					12.50	15.00	MUDSTONE / SANDSTONE BANDS
R102	15.00	0.00	3 7/8"	V	0.00	0.40	TOPSOIL
FULL RETURNS MAINTAINED THROUGHOUT DRILLING					0.40	11.50	BACKFILL
BOREHOLE WET FROM 9.00 METRES					11.50	15.00	MUDSTONE / SANDSTONE BANDS
R103	9.00	0.00	3 7/8"	V	0.00	0.40	TOPSOIL
FULL RETURNS MAINTAINED THROUGHOUT DRILLING					0.40	5.30	BACKFILL
BOREHOLE WET FROM 3.00 METRES					5.30	9.00	MUDSTONE / SANDSTONE BANDS
R104	9.00	0.00	3 7/8"	V	0.00	0.40	TOPSOIL
					0.40	3.50	BACKFILL
					3.50	6.20	MUDSTONE
					6.20	6.40	COAL
					6.40	6.60	MUDSTONE
FULL RETURNS MAINTAINED THROUGHOUT DRILLING					6.60	6.80	COAL
					6.80	9.00	MUDSTONE / SANDSTONE BANDS
R105	9.00	0.00	3 7/8"	V	0.00	0.40	TOPSOIL
					0.40	1.00	CLAY
					1.00	4.50	MUDSTONE
FULL RETURNS MAINTAINED THROUGHOUT DRILLING					4.50	4.70	COAL
					4.70	9.00	MUDSTONE / SANDSTONE BANDS
R106	9.00	0.00	3 7/8"	V	0.00	0.40	TOPSOIL
					0.40	1.00	CLAY
					1.00	3.00	MUDSTONE
FULL RETURNS MAINTAINED THROUGHOUT DRILLING					3.00	3.20	COAL
					3.20	9.00	MUDSTONE / SANDSTONE BANDS
6	66.00	0.00	Sheet Total		Crew		Plant
0	0.00	0.00	Previous Sheet Total		C. ATKINSON	C. BROWN	CASAGRANDE C6 RIG
6	66.00	0.00	Cummulative Total		M. COLE	J. BUTLER	400 cfm COMPRESSOR
Signed By G.D.C.					N. LEADBEATER		Client Copy
Signed By Client					10/05/19		Q.S. Copy
							Site Copy

NO CLAIM CAN BE ACCEPTED UNLESS REPORTED IN WRITING WITHIN 14 DAYS OF THIS RETURN



GROUNDSSOURCE DRILLING AND CONTRACTING

**DAILY RETURN
(DRILLING)**

Sheet No.	2
Date	Thursday 09/05/2019
Contract Name	COCKLEY HILL LANE - HUDDERSFIELD
Contract No.	5297
Working Day No.	1

Hole No.	Depth	Casing	Dia	Angle	From	To	Description
R107	9.00	0.00	3 7/8"	V	0.00	0.40	TOPSOIL
					0.40	1.00	CLAY
					1.00	2.80	MUDSTONE
FULL RETURNS MAINTAINED THROUGHOUT DRILLING					2.80	3.20	COAL
					3.20	9.00	MUDSTONE / SANDSTONE BANDS
R108	9.00	0.00	3 7/8"	V	0.00	0.40	TOPSOIL
					0.40	0.80	CLAY
					0.80	2.00	MUDSTONE
FULL RETURNS MAINTAINED THROUGHOUT DRILLING					2.00	2.40	COAL
					2.40	9.00	MUDSTONE / SANDSTONE BANDS
R109	9.00	0.00	3 7/8"	V	0.00	0.40	TOPSOIL
					0.40	0.70	CLAY
					0.70	1.70	MUDSTONE
FULL RETURNS MAINTAINED THROUGHOUT DRILLING					1.70	1.90	COAL
					1.90	9.00	MUDSTONE / SANDSTONE BANDS
NO ABNORMAL GAS LEVELS DETECTED IN ALL HOLES DRILLED							
ALL BOREHOLES BACKFILLED USING DRILLING ARISINGS WITH A CEMENT / BENTONITE SEAL FORMED UP TO SURFACE							
DRILLING TO CONTINUE FRIDAY 10/05/19							
3	27.00	0.00	Sheet Total		Crew		Plant
6	66.00	0.00	Previous Sheet Total		D.HARROD		CASAGRANDE C6 RIG
9	93.00	0.00	Cummulative Total		H.LEADBEATER		400 cfm COMPRESSOR
					N.LEADBEATER		Client Copy

Signed By G.D.C.
Signed By Client

N. Leadbeater

Date 10/05/19
Date _____

Client Copy
Q.S. Copy
Site Copy

NO CLAIM CAN BE ACCEPTED UNLESS REPORTED IN WRITING WITHIN 14 DAYS OF THIS RETURN



GROUND SOURCE DRILLING AND CONTRACTING

**DAILY RETURN
(DRILLING)**

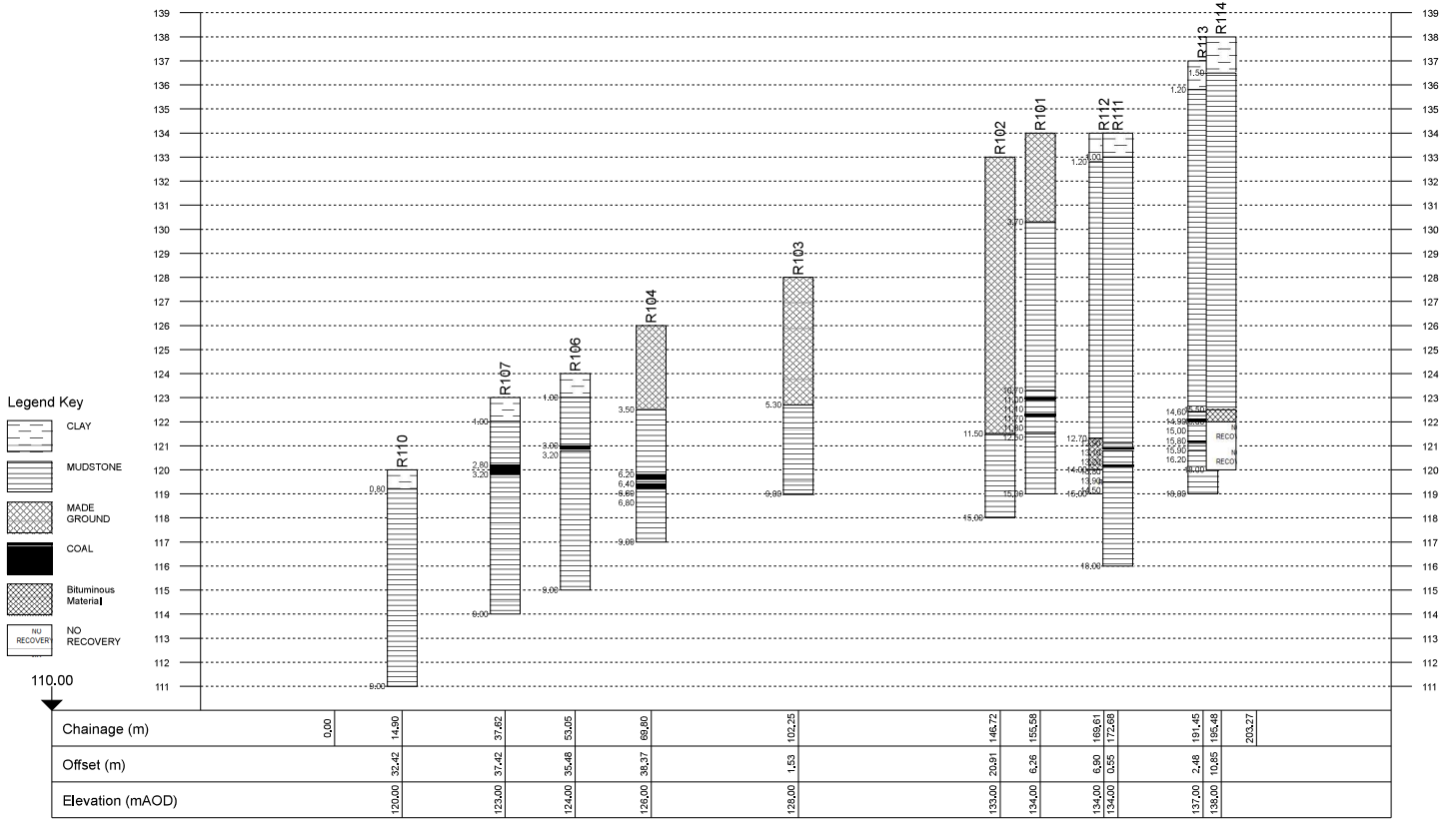
Sheet No.	1
Date	Friday 10/05/2019
Contract Name	COCKLEY HILL LANE - HUDDERSFIELD
Contract No.	5297
Working Day No.	2

Hole No.	Depth	Casing	Dia	Angle	From	To	Description
R110	9.00	0.00	3 7/8"	V	0.00	0.40	TOPSOIL
					0.40	0.80	BACKFILL
FULL RETURNS MAINTAINED THROUGHOUT DRILLING					0.80	9.00	MUDSTONE / SANDSTONE BANDS
R111	18.00	0.00	3 7/8"	V	0.00	0.40	TOPSOIL
					0.40	1.00	CLAY
FULL RETURNS MAINTAINED THROUGHOUT DRILLING					1.00	12.90	MUDSTONE
WET FROM 12.00 METRES					12.90	14.50	DARK MUDSTONE WITH COAL TRACES
					14.50	18.00	MUDSTONE / SANDSTONE BANDS
R112	15.00	0.00	3 7/8"	V	0.00	0.40	TOPSOIL
					0.40	1.20	CLAY
WET FROM 9.00 METRES					1.20	12.70	MUDSTONE
NO RETURNS FROM 12.70 METRES					12.70	14.00	SOFT GROUND
					14.00	15.00	SOLID GROUND
R113	18.00	0.00	3 7/8"	V	0.00	0.40	TOPSOIL
					0.40	1.20	CLAY
FULL RETURNS MAINTAINED THROUGHOUT DRILLING					1.20	14.60	MUDSTONE
WET FROM 12.00 METRES					14.60	16.20	DARK MUDSTONE WITH COAL TRACES
					16.20	18.00	MUDSTONE / SANDSTONE BANDS
R114	18.00	0.00	3 7/8"	V	0.00	0.40	TOPSOIL
					0.40	1.50	CLAY
WET FROM 15.00 METRES					1.50	15.50	MUDSTONE
NO RETURNS FROM 15.50 METRES					15.50	16.00	SOFT GROUND
					16.00	18.00	SOLID GROUND
NO ABNORMAL GAS LEVELS DETECTED IN ALL HOLES DRILLED							
ALL BOREHOLES BACKFILLED USING DRILLING ARISINGS WITH A CEMENT / BENTONITE SEAL FORMED UP TO SURFACE							
NO FURTHER BOREHOLE POSITIONS ISSUED BY ENGINEER							
CONTRACT COMPLETED - COMMENCED DEMOBILISATION							
MATERIALS USED :							10 No. 25kg BAGS OF BENTONITE PELLETS
							10 No. 25kg BAGS OF CEMENT
5	78.00	0.00	Sheet Total		Crew		Plant
9	93.00	0.00	Previous Sheet Total		C. ATKINSON	C. BROWN	CASAGRANDE C6 RIG
14	171.00	0.00	Cummulative Total		M. COLE	J. BUTLER	400 cfm COMPRESSOR
N. LEADBEATER							Client Copy
Signed By G.D.C. <u>N. Leadbeater</u> Date <u>11/05/19</u>							Q.S. Copy
Signed By Client _____ Date _____							Site Copy

NO CLAIM CAN BE ACCEPTED UNLESS REPORTED IN WRITING WITHIN 14 DAYS OF THIS RETURN

Project Id: CKD/02
 Project Title: Cockley Hill Lane
 Location: Kirkheaton, Huddersfield
 Client: Cockley Developments Ltd

Title: Section Line 1 - Northern Fault Block - Long Section
 Vertical Scale: 1:222
 Horizontal Scale: 1:1178
 Engineer: EGH



Project Id: CKD/02

Project Title: Cockley Hill Lane

Location: Kirkheaton, Huddersfield

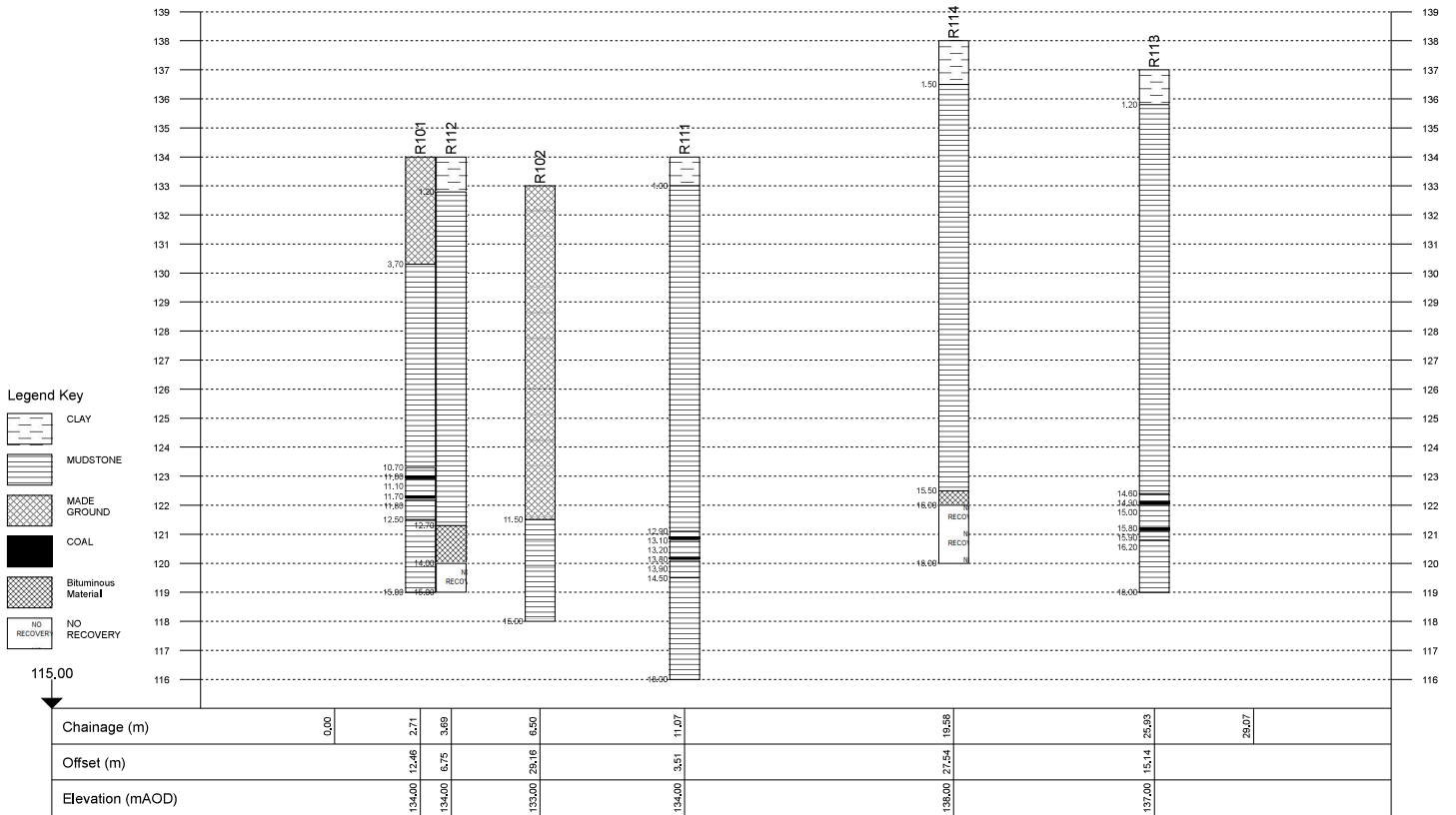
Client: Cockley Developments Ltd

Title: Section Line 2 - Northern Fault Block - NE Site

Vertical Scale: 1:184

Horizontal Scale: 1:169

Engineer: EGH



Project Id: CKD/02

Project Title: Cockley Hill Lane

Location: Kirkheaton, Huddersfield

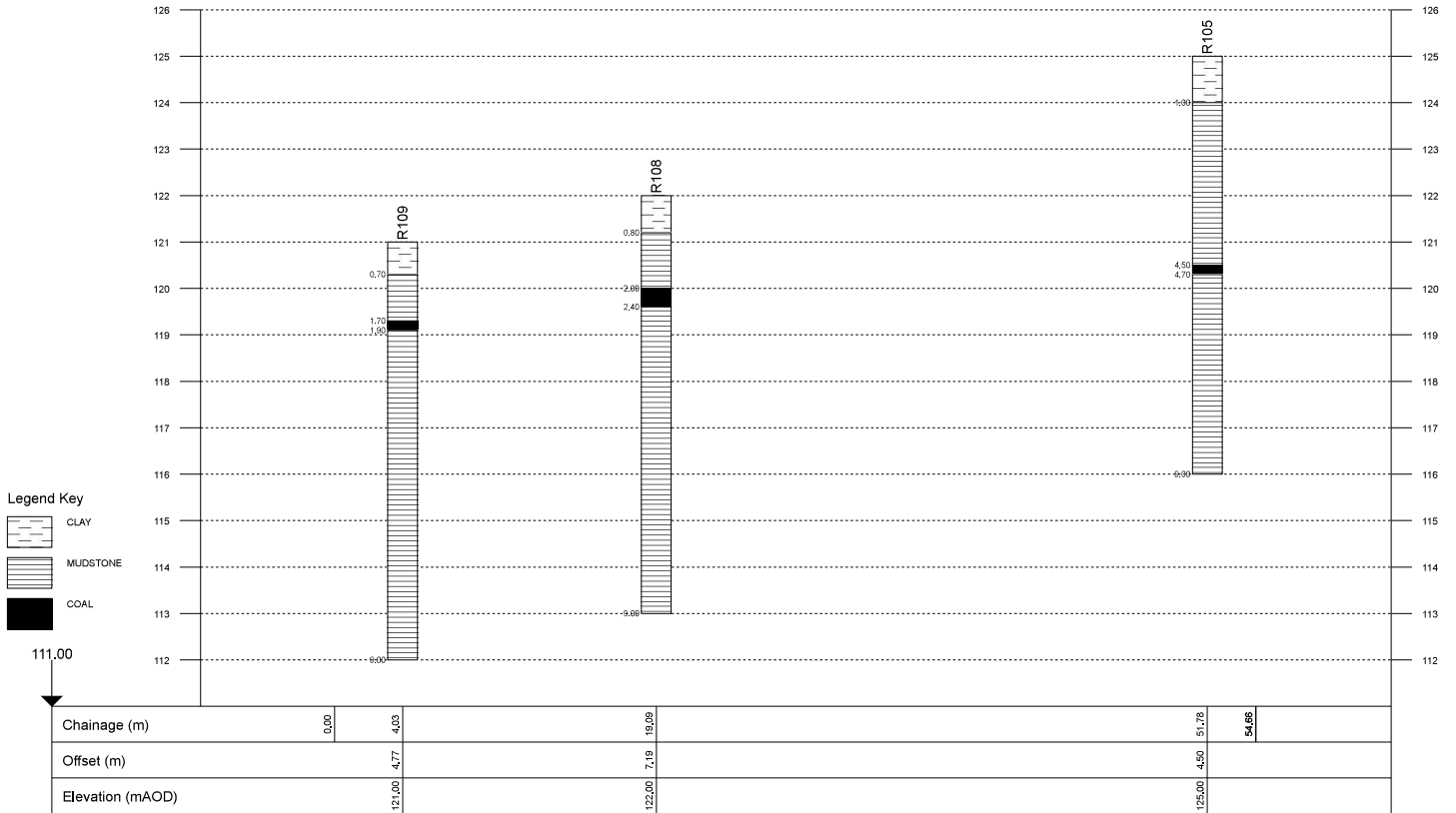
Client: Cockley Developments Ltd

Title: Section Line 3 -Southern Fault Block

Vertical Scale: 1:115

Horizontal Scale: 1:317

Engineer: EGH



APPENDIX J

LABORATORY TEST CERTIFICATES AND SCREENING VALUES



ARP GEOTECHNICAL LIMITED
IMPORTED SOIL CONTAMINANT SCREENING VALUES
RESIDENTIAL WITH HOME-GROWN PRODUCE

Determinand	S4UL (unless stated otherwise) (mg/kg)			C4SL (mg/kg)		
	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM
Arsenic	37			37		
Cadmium	11			22		
Chromium (trivalent) (MAFF)	400					
Chromium (hexavalent)	6			21		
Copper (MAFF)	80#					
Lead				200		
Inorganic Mercury	40			200		
Nickel (MAFF)	50#					
Selenium	250					
Zinc (MAFF)	200#					
Acidity (pH)	*Should be Greater Than 5			*Should be Greater Than 5		
	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM
Naphthalene	2.3	5.6	13	15	36	85
Acenaphthylene	170	420	920			
Acenaphthene	210	510	1,100			
Fluorene	170	400	860			
Phenanthrene	95	220	440			
Anthracene	2,400	5,400	11,000			
Fluoranthene	280	560	890			
Pyrene	620	1,200	2,000			
Benzo(a)anthracene	7.2	11	13			
Chrysene	15	22	27			
Benzo(b)fluoranthene	2.6	3.3	3.7			
Benzo(k)fluoranthene	77	93	100			
Benzo(a)pyrene	2.2	2.7	3			5
Indeno(1,2,3-cd)pyrene	27	36	41			
Dibenzo(a,h)anthracene	0.24	0.28	0.30			
Benzo(g,h,i)perylene	320	340	350			
Phenols	120	200	380			
Total TPH	*Above 500, speciate and compare with values below:					
C5 to C6 Aliphatic	42	78	160			
C6 to C8 Aliphatic	100	230	530			
C8 to C10 Aliphatic	27	65	150			
C10 to C12 Aliphatic	130	330	760			
C12 to C16 Aliphatic	1100	2,400	4,300			
C16 to C35 Aliphatic	65,000	92,000	110,000			
C35 TO C44 Aliphatic	65,000	92,000	110,000			
C5 to C7 Aromatic (Benzene)	70	140	300			
C7 to C8 Aromatic (Toluene)	130	290	660			
C8 to C10 Aromatic	34	83	190			
C10 to C12 Aromatic	74	180	380			
C12 to C16 Aromatic	140	330	660			
C16 to C21 Aromatic	260	540	930			
C21 TO C35 Aromatic	1100	1,500	1,700			
C35 TO C44 Aromatic	1100	1,500	1,700			
Asbestos	*Should be None Detected			*Should be None Detected		

* In House Value/Approach S4UL = Suitable 4 Use Level, CIEH/LQM 2014 C4SL = Cat 4 Screening Level, DEFRA, 2014

Blank cell indicates no published value or in-house value. Some values presented are above saturation limits.

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MAFF: Ministry of Agriculture, Fisheries and Food - "Code of Good Agricultural Practice for the Protection of Soil

#pH dependent. If exceeded, to be compared against appropriate MAFF value for the pH



ARP GEOTECHNICAL LIMITED
SOIL CONTAMINANT SCREENING VALUES
PUBLIC OPEN SPACE NEAR RESIDENTIAL

Determinand	S4UL (mg/kg)			C4SL (mg/kg)		
Arsenic	79			79		
Cadmium	120			220		
Chromium (trivalent)	1500					
Chromium (hexavalent)	7.7			21		
Copper	12000					
Lead				630		
Inorganic Mercury	120			610		
Nickel	230					
Selenium	1100					
Zinc	81000					
Acidity (pH)	*Should be Greater Than 5					
	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM
Naphthalene**	4900	4900	4900	11,000	15,000	17,000
Acenaphthylene	15000	15000	15000			
Acenaphthene	15000	15000	15000			
Fluorene	9900	9900	9900			
Phenanthrene	3100	3100	3100			
Anthracene	74000	74000	74000			
Fluoranthene	3100	3100	3100			
Pyrene	7400	7400	7400			
Benzo(a)anthracene	29	29	29			
Chrysene	57	57	57			
Benzo(b)fluoranthene	7.1	7.2	7.2			
Benzo(k)fluoranthene	190	190	190			
Benzo(a)pyrene	5.7	5.7	5.7			10
Indeno(1,2,3-cd)pyrene	82	82	82			
Dibenzo(a,h)anthracene	0.57	0.57	0.57			
Benzo(g,h,i)perylene	640	640	640			
Phenols	440	690	1300			
Total TPH	*Above 3,800, speciate and compare with values below:					
C5 to C6 Aliphatic	570000	590000	600000			
C6 to C8 Aliphatic	600000	610000	620000			
C8 to C10 Aliphatic	13000	13000	13000			
C10 to C12 Aliphatic	13000	13000	13000			
C12 to C16 Aliphatic	13000	13000	13000			
C16 to C35 Aliphatic	250000	250000	250000			
C35 TO C44 Aliphatic	250000	250000	250000			
C5 to C7 Aromatic (Benzene)	56000	56000	56000			
C7 to C8 Aromatic (Toluene)	56000	56000	56000			
C8 to C10 Aromatic	5000	5000	5000			
C10 to C12 Aromatic	5000	5000	5000			
C12 to C16 Aromatic	5100	5100	5000			
C16 to C21 Aromatic	3800	3800	3800			
C21 TO C35 Aromatic	3800	3800	3800			
C35 TO C44 Aromatic	3800	3800	3800			
Asbestos	*Should be None Detected			*Should be None Detected		

* In House Value/Approach S4UL = Suittable 4 Use Level, CIEH/LQM 2014 C4SL = Cat 4 Screening Level, DEFRA, 2014

Blank cell indicates no published value or in-house value. Some values presented are above saturation limits. ... considered separately.

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ARP GEOTECHNICAL LTD
Chartered Consulting Engineers

CONTROLLED WATERS SCREENING VALUES

Determinand	Screening Value for Potable Use * (µg/l)	Screening Value for Environment # (µg/l)
Arsenic	10	50
Boron	1000	2000
Cadmium	5	0.08-0.25
Chromium (total)	50	4.7
Copper	2000	1-28
Lead	10	7.2
Mercury	1	0.05
Selenium	10	-
Nickel	20	20
Zinc	5000	8-125
Sulphate	250,000	400,000
pH	6.5-10	6-9
Anthracene	-	0.1
Benzo(a)pyrene	0.01	0.05
Benzo(b)fluoranthene	Sum (4) <0.1	Sum (2) <0.03
Benzo(k)fluoranthene		Sum (2) <0.002
Benzo(g,h,i)perylene		
Indeno(1,2,3-c,d)pyrene		
Fluoranthene	-	0.1
Naphthalene	-	2.4
Phenols	0.5 (BWR)	7.7
Benzene	1	10
Toluene	700 (WHO)	50
Ethylbenzene	300 (WHO)	-
Xylene	30 (WHO)	30
Total TPH	-	200 (SWAD)

JUNE 2014

Sources, unless indicated otherwise above:

* = UK Drinking Water Standards (DWS)

= Environmental Quality Standards (EQS), hardness dependent where range shown.

WHO = World Health Organisation Drinking Water

BWR = Bathing Water (Classification) Regulations 1991

SWAD = Surface Water (Abstraction for Drinking Water) (Classification) Regulations 1996



Certificate of Analysis

Certificate Number 16-73934

29-Jul-16

Client ARP Geotechnical
5/6 Northwest Business Park
Servia Hill
Leeds
LS6 2QH

Our Reference 16-73934

Client Reference CKD/01

Order No (not supplied)

Contract Title Cockley Hill Lane, Kirkheaton

Description 12 Soil samples.

Date Received 25-Jul-16

Date Started 25-Jul-16

Date Completed 29-Jul-16

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

A handwritten signature in black ink, appearing to read 'Rob Brown'.

Rob Brown
Business Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 16-73934

Client Ref CKD/01

Contract Title Cockley Hill Lane, Kirkheaton

Lab No	1028404	1028405	1028406	1028407	1028408	1028409
Sample ID	TP1	TP1	TP2	TP3	TP4	TP6
Depth	1.20-1.50	3.20-3.50	0.00-0.20	0.00-0.30	0.00-0.20	0.00-0.20
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	18/07/16	18/07/16	18/07/16	18/07/16	18/07/16	18/07/16
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Metals									
Arsenic mg/kg	DETSC 2301#	0.2	mg/kg	7.0	11	50	51	46	47
Cadmium mg/kg	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1	0.4	0.3	0.4	0.3
Chromium III mg/kg	DETSC 2301*	0.15	mg/kg	23	19	29	28	32	20
Chromium, Hexavalent mg/kg	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper mg/kg	DETSC 2301#	0.2	mg/kg	40	42	48	45	44	40
Lead mg/kg	DETSC 2301#	0.3	mg/kg	23	24	75	75	81	90
Mercury mg/kg	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	0.09	0.10	0.10	0.16
Nickel mg/kg	DETSC 2301#	1	mg/kg	37	39	27	28	28	21
Selenium mg/kg	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	0.5	1.1	1.4	< 0.5
Zinc mg/kg	DETSC 2301#	1	mg/kg	91	94	100	98	100	77
Inorganics									
pH	DETSC 2008#			7.4	6.2	6.2	6.2	6.1	5.3
Organic matter %	DETSC 2002#	0.1	%	2.9	4.4	8.2	5.5	6.2	7.7
Sulphate Aqueous Extract as SO4 mg/l	DETSC 2076#	10	mg/l	240	740	39	33	32	13
Sulphate as SO4, Total %	DETSC 2321#	0.01	%	0.07	0.19	0.11	0.08	0.10	0.10
Petroleum Hydrocarbons									
EPH (C10-C40) mg/kg	DETSC 3311#	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
PAHs									
Naphthalene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1
Acenaphthylene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1
Fluorene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.2	< 0.1
Phenanthrene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	1.1	< 0.1
Anthracene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.3	< 0.1
Fluoranthene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1	1.3	< 0.1
Pyrene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.2	1.1	< 0.1
Benzo(a)anthracene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.5	< 0.1
Chrysene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.5	< 0.1
Benzo(b)fluoranthene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PAH Total mg/kg	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6	< 1.6	5.3	< 1.6
Phenols									
Phenol - Monohydric mg/kg	DETSC 2130#	0.3	mg/kg	< 0.3	0.5	1.0	0.5	0.8	0.7

Summary of Chemical Analysis

Soil Samples

Our Ref 16-73934

Client Ref CKD/01

Contract Title Cockley Hill Lane, Kirkheaton

Lab No	1028410	1028411	1028412	1028413	1028414	1028415
Sample ID	TP7	TP8	TP9	TP10	TP11	TP12
Depth	0.00-0.20	0.00-0.20	0.00-0.30	0.00-0.20	0.00-0.20	0.00-0.30
Other ID						
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	18/07/16	18/07/16	18/07/16	18/07/16	18/07/16	18/07/16
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Metals									
Arsenic mg/kg	DETSC 2301#	0.2	mg/kg	39	57	54	66	51	61
Cadmium mg/kg	DETSC 2301#	0.1	mg/kg	0.2	0.5	0.4	0.4	0.4	0.6
Chromium III mg/kg	DETSC 2301*	0.15	mg/kg	17	28	31	30	27	36
Chromium, Hexavalent mg/kg	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper mg/kg	DETSC 2301#	0.2	mg/kg	33	52	72	60	50	64
Lead mg/kg	DETSC 2301#	0.3	mg/kg	66	110	120	110	110	140
Mercury mg/kg	DETSC 2325#	0.05	mg/kg	0.15	0.25	0.22	0.22	0.16	0.20
Nickel mg/kg	DETSC 2301#	1	mg/kg	20	28	32	25	26	32
Selenium mg/kg	DETSC 2301#	0.5	mg/kg	0.5	0.8	1.0	0.8	< 0.5	1.3
Zinc mg/kg	DETSC 2301#	1	mg/kg	76	120	160	120	110	130
Inorganics									
pH	DETSC 2008#			6.3	6.2	6.3	5.3	5.3	5.5
Organic matter %	DETSC 2002#	0.1	%	6.1	7.1	7.2	9.8	9.7	9.1
Sulphate Aqueous Extract as SO4 mg/l	DETSC 2076#	10	mg/l	13	18	15	15	17	17
Sulphate as SO4, Total %	DETSC 2321#	0.01	%	0.06	0.11	0.09	0.14	0.14	0.13
Petroleum Hydrocarbons									
EPH (C10-C40) mg/kg	DETSC 3311#	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
PAHs									
Naphthalene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene mg/kg	DETSC 3301	0.1	mg/kg	0.2	0.2	0.4	0.2	0.2	< 0.1
Anthracene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	0.1	0.1	< 0.1	< 0.1	< 0.1
Fluoranthene mg/kg	DETSC 3301	0.1	mg/kg	0.3	0.4	0.5	0.3	0.5	< 0.1
Pyrene mg/kg	DETSC 3301	0.1	mg/kg	0.2	0.4	0.4	0.3	0.5	< 0.1
Benzo(a)anthracene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	0.2	0.3	< 0.1	< 0.1	< 0.1
Chrysene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	0.2	0.2	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene mg/kg	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
PAH Total mg/kg	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	2.0	< 1.6	< 1.6	< 1.6
Phenols									
Phenol - Monohydric mg/kg	DETSC 2130#	0.3	mg/kg	0.4	0.7	0.5	1.0	1.0	1.0

Summary of Asbestos Analysis

Soil Samples

Our Ref 16-73934

Client Ref CKD/01

Contract Title Cockley Hill Lane, Kirkheaton

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1028404	TP1 1.20-1.50	SOIL	NAD	none	J Woodmansey
1028405	TP1 3.20-3.50	SOIL	NAD	none	J Woodmansey
1028406	TP2 0.00-0.20	SOIL	NAD	none	J Woodmansey
1028407	TP3 0.00-0.30	SOIL	NAD	none	J Woodmansey
1028408	TP4 0.00-0.20	SOIL	NAD	none	J Woodmansey
1028409	TP6 0.00-0.20	SOIL	NAD	none	J Woodmansey
1028410	TP7 0.00-0.20	SOIL	NAD	none	J Woodmansey
1028411	TP8 0.00-0.20	SOIL	NAD	none	J Woodmansey
1028412	TP9 0.00-0.30	SOIL	NAD	none	J Woodmansey
1028413	TP10 0.00-0.20	SOIL	NAD	none	J Woodmansey
1028414	TP11 0.00-0.20	SOIL	NAD	none	J Woodmansey
1028415	TP12 0.00-0.30	SOIL	NAD	none	J Woodmansey

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 16-73934
 Client Ref CKD/01
 Contract Cockley Hill Lane, Kirkheaton

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1028404	TP1 1.20-1.50 SOIL	18/07/16	GV, PG		
1028405	TP1 3.20-3.50 SOIL	18/07/16	GV, PG		
1028406	TP2 0.00-0.20 SOIL	18/07/16	GV, PG		
1028407	TP3 0.00-0.30 SOIL	18/07/16	GV, PG		
1028408	TP4 0.00-0.20 SOIL	18/07/16	GV, PG		
1028409	TP6 0.00-0.20 SOIL	18/07/16	GV, PG		
1028410	TP7 0.00-0.20 SOIL	18/07/16	GV, PG		
1028411	TP8 0.00-0.20 SOIL	18/07/16	GV, PG		
1028412	TP9 0.00-0.30 SOIL	18/07/16	GV, PG		
1028413	TP10 0.00-0.20 SOIL	18/07/16	GV, PG		
1028414	TP11 0.00-0.20 SOIL	18/07/16	GV, PG		
1028415	TP12 0.00-0.30 SOIL	18/07/16	GV, PG		

Key: G-Glass P-Plastic V-Vial G-Bag

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



LABORATORY REPORT



4043

Contract Number: PSL16/3385

Report Date: 02 August 2016
Client's Reference: CKD/01/01
Client Name: ARP Associates
Northwest House
5/6 Northwest Business Park
Servia Hill
Leeds
LS6 2QH

For the attention of: Elliot Heatherington

Contract Title: Land At Cockley Lane, Kirkheaton
Date Received: 20/7/2016
Date Commenced: 20/7/2016
Date Completed: 2/8/2016

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson
(Director)

A Watkins
(Director)

R Berriman
(Quality Manager)

D Lambe
(Senior Technician)

S Royle
(Senior Technician)

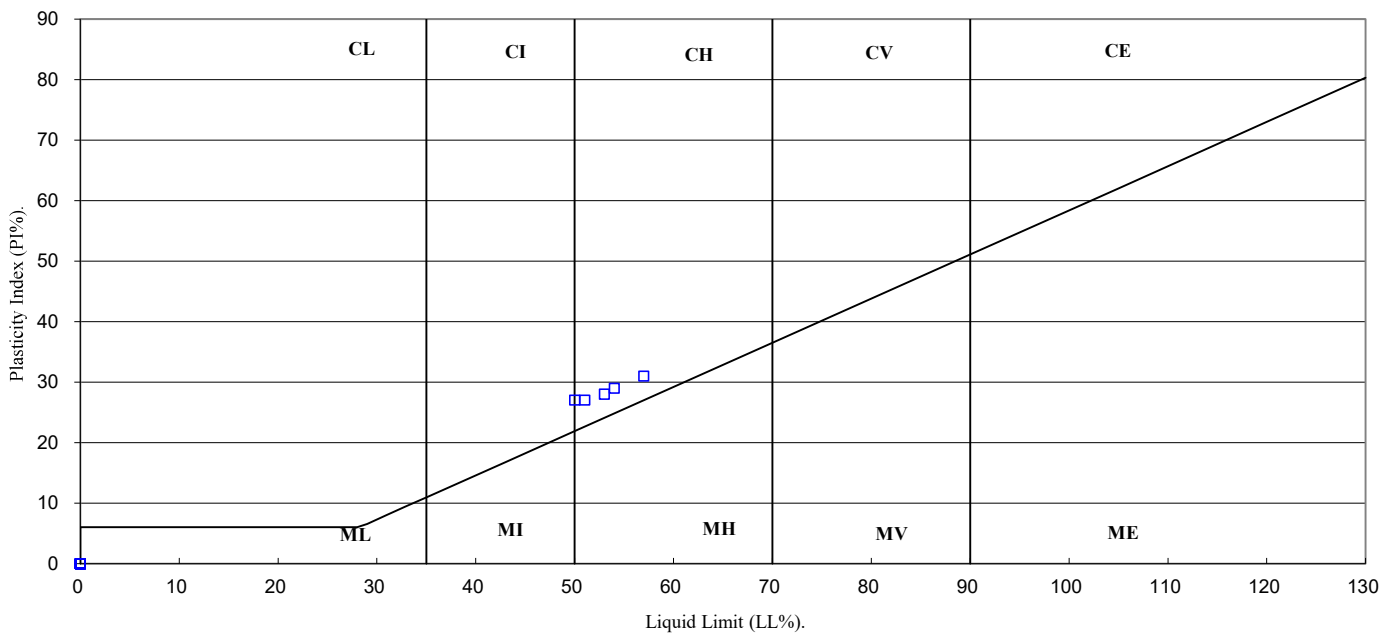
L Knight
(Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

Page 1 of

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(BS5930 :2015)



Checked /Approved	<i>[Signature]</i>	Date	02/08/16	Contract No:	PSL16/3385
Land At Cockley Lane, Kirkheaton				Client Ref:	CKD/01



Certificate of Analysis

Certificate Number 16-73870

28-Jul-16

Client Professional Soils Laboratory Ltd
5/7 Hexthorpe Road
Hexthorpe
DN4 0AR

Our Reference 16-73870

Client Reference PSL16/3385

Order No (not supplied)

Contract Title Land at Cockley Lane, Kirkheaton

Description 5 Soil samples.

Date Received 23-Jul-16

Date Started 23-Jul-16

Date Completed 28-Jul-16

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

A handwritten signature in black ink, appearing to read "Rob Brown".

Rob Brown
Business Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 16-73870

Client Ref PSL16/3385

Contract Title Land at Cockley Lane, Kirkheaton

Lab No	1028160	1028161	1028162	1028163	1028164
Sample ID	TP3	TP4	TP5	TP8	TP10
Depth	1.50-1.80	0.50-0.80	0.50-0.80	1.20-1.40	1.60-1.80
Other ID					
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	n/s	n/s	n/s	n/s	n/s
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
Inorganics								
pH	DETSC 2008#			6.4	6.9	7.3	7.7	6.9
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	74	340	98	40	< 10

Information in Support of the Analytical Results

Our Ref 16-73870
 Client Ref PSL16/3385
 Contract Land at Cockley Lane, Kirkheaton

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1028160	TP3 1.50-1.80 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1028161	TP4 0.50-0.80 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1028162	TP5 0.50-0.80 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1028163	TP8 1.20-1.40 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1028164	TP10 1.60-1.80 SOIL		PT 1L	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.
 Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.
 The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
 Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



Certificate of Analysis

Certificate Number 16-73935

28-Jul-16

Client ARP Geotechnical
5/6 Northwest Business Park
Servia Hill
Leeds
LS6 2QH

Our Reference 16-73935

Client Reference CKD/01

Order No (not supplied)

Contract Title Cockley Hill Lane, Kirkheaton

Description 8 Soil samples.

Date Received 25-Jul-16

Date Started 25-Jul-16

Date Completed 28-Jul-16

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

A handwritten signature in black ink, appearing to read "Rob Brown".

Rob Brown
Business Manager





Summary of Chemical Analysis Soil Samples

Our Ref 16-73935
 Client Ref CKD/01
 Contract Title Cockley Hill Lane, Kirkheaton

Lab No	1028416	1028417	1028418	1028419	1028420	1028421	1028422	1028423
Sample ID	TP2	TP4	TP5	TP6	TP7	TP9	TP11	TP12
Depth	1.20-1.50	1.50-1.80	2.10-2.40	1.50-1.80	1.60-1.80	1.80-2.00	0.60-0.80	1.20-1.30
Other ID								
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	18/07/16	18/07/16	18/07/16	18/07/16	18/07/16	18/07/16	18/07/16	18/07/16
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units								
Inorganics											
pH	DETS 2008#			6.8	7.4	7.7	6.9	6.7	7.3	6.1	6.6
Sulphate Aqueous Extract as SO4	DETS 2076#	10	mg/l	11	< 10	11	< 10	12	17	< 10	< 10

Information in Support of the Analytical Results

Our Ref 16-73935
 Client Ref CKD/01
 Contract Cockley Hill Lane, Kirkheaton

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1028416	TP2 1.20-1.50 SOIL	18/07/16	GV, PG		
1028417	TP4 1.50-1.80 SOIL	18/07/16	GV, PG		
1028418	TP5 2.10-2.40 SOIL	18/07/16	GV, PG		
1028419	TP6 1.50-1.80 SOIL	18/07/16	GV, PG		
1028420	TP7 1.60-1.80 SOIL	18/07/16	GV, PG		
1028421	TP9 1.80-2.00 SOIL	18/07/16	GV, PG		
1028422	TP11 0.60-0.80 SOIL	18/07/16	GV, PG		
1028423	TP12 1.20-1.30 SOIL	18/07/16	GV, PG		

Key: G-Glass P-Plastic V-Vial G-Bag

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Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.
 Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.
 The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
 Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



Certificate of Analysis

Certificate Number 16-85734

12-Dec-16

Client ARP Geotechnical
5/6 Northwest Business Park
Servia Hill
Leeds
LS6 2QH

Our Reference 16-85734

Client Reference CKD/01

Order No (not supplied)

Contract Title Cockley Hill, Kirkheaton

Description 3 Soil samples, 3 Leachate samples.

Date Received 05-Dec-16

Date Started 05-Dec-16

Date Completed 12-Dec-16

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

A handwritten signature in black ink, appearing to read 'Rob Brown'.

Rob Brown
Business Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 16-85734

Client Ref CKD/01

Contract Title Cockley Hill, Kirkheaton

Lab No	1094216	1094217	1094218
Sample ID	H1	H2	H3
Depth			
Other ID			
Sample Type	SOIL	SOIL	SOIL
Sampling Date	01/12/16	01/12/16	01/12/16
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Metals						
Arsenic Gastric % Bioaccessible (% of "Total As")	DETSC 2400*	0	%	25	19	25
Arsenic Gastric mg/kg Bioaccessible	DETSC 2400*	0.5	mg/kg	15	6.2	12
Arsenic Gastro Intestinal % Bioaccessible (% of "Total As")	DETSC 2400*	0	%	7.1	5.3	6.1
Arsenic Gastro Intestinal mg/kg Bioaccessible	DETSC 2400*	0.5	mg/kg	4.1	1.7	2.8
Arsenic	DETSC 2301#	0.2	mg/kg	58	32	46

Summary of Chemical Analysis

Leachate Samples

Our Ref 16-85734

Client Ref CKD/01

Contract Title Cockley Hill, Kirkheaton

Lab No	1094219	1094220	1094221
Sample ID	H1	H2	H3
Depth			
Other ID			
Sample Type	LEACHATE	LEACHATE	LEACHATE
Sampling Date	01/12/16	01/12/16	01/12/16
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Preparation						
NRA Leachate Preparation	DETS 036*			Y	Y	Y
Metals						
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.23	< 0.16	< 0.16

Information in Support of the Analytical Results

Our Ref 16-85734
 Client Ref CKD/01
 Contract Cockley Hill, Kirkheaton

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1094216	H1 SOIL	01/12/16	GV, PG		
1094217	H2 SOIL	01/12/16	GV, PG		
1094218	H3 SOIL	01/12/16	GV, PG		
1094219	H1 LEACHATE	01/12/16	GV, PG		
1094220	H2 LEACHATE	01/12/16	GV, PG		
1094221	H3 LEACHATE	01/12/16	GV, PG		

Key: G-Glass P-Plastic V-Vial G-Bag
 DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.
 Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.
 The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
 Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months



ANALYTICAL TEST REPORT

Contract no: 76910(1)
Contract name: Cockley Hill Lane, Kirkheaton
Client reference: CKD/02
Clients name: ARP Associates
Clients address: 5 & 6 Northwest Business Park
Servia Hill
Leeds
LS6 2QH

Samples received: 20 February 2019
Analysis started: 20 February 2019
Analysis completed: 07 March 2019
Report issued: 07 March 2019

This is a supplementary report to report number 76910 issued 27 February 2019.

Notes: Opinions and interpretations expressed herein are outside the UKAS accreditation scope. Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling. Methods, procedures and performance data are available on request. Results reported herein relate only to the material supplied to the laboratory. This report shall not be reproduced except in full, without prior written approval. Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed. BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.

Key: U UKAS accredited test
M MCERTS & UKAS accredited test
\$ Test carried out by an approved subcontractor
I/S Insufficient sample to carry out test
N/S Sample not suitable for testing
NAD No Asbestos Detected

Approved by:

John Campbell
Director

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
76910-1	TP1	0.00-0.35	Clayey Sand with Gravel	-	-	19.5
76910-2	TP2	0.10-0.20	Clayey Sand with Gravel	-	-	21.8
76910-3	TP3	0.00-0.15	Clayey Sand with Gravel	-	-	28.5
76910-4	TP3	2.60-3.00	Clay with Gravel	-	-	9.5
76910-5	TP4	1.00-1.20	Clay with Gravel	-	-	20.4
76910-6	TP5	0.00-0.10	Clay with Gravel	-	-	25.4
76910-7	TP5	1.00-1.10	Clay with Gravel	-	-	15.9
76910-8	TP8	1.00-1.20	Clay with Mudstone	-	-	9.5
76910-9	WS1	0.10-0.20	Sandy Clay with Gravel	-	-	23.2
76910-10	WS1	0.50-0.60	Sandy Clay with Gravel	-	-	23.5
76910-11	WS2	0.10-0.20	Sandy Clay with Gravel	-	-	32.1
76910-12	WS3	0.10-0.20	Sandy Clay with Gravel	-	-	27.8
76910-13	WS4	0.10-0.20	Sandy Clay with Gravel	-	-	26.2
76910-14	WS5	2.50-2.60	Sandy Clay with Gravel	-	-	28.3
76910-15	WS5	4.50-4.60	Sandy Clay with Gravel	-	-	12.0
76910-16	WS6	0.10-0.20	Sandy Clay with Gravel	-	-	21.2
76910-17	WS7	0.20-0.50	Sandy Clay with Gravel	-	-	17.6

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SOILS

Lab number			76910-1	76910-2	76910-3	76910-4	76910-5	76910-6
Sample id			TP1	TP2	TP3	TP3	TP4	TP5
Depth (m)			0.00-0.35	0.10-0.20	0.00-0.15	2.60-3.00	1.00-1.20	0.00-0.10
Date sampled			18/02/2019	18/02/2019	18/02/2019	18/02/2019	18/02/2019	18/02/2019
Test	Method	Units						
Arsenic (total)	CE127 ^M	mg/kg As	50	51	38	4.7	12	24
Arsenic (bioaccessible)	CE124	mg/kg As	7.1	-	-	-	-	-
Arsenic (bioaccessible fraction)	CE124	% w/w	14.3	-	-	-	-	-
Cadmium (total)	CE127 ^M	mg/kg Cd	0.3	0.2	0.3	<0.2	<0.2	0.3
Chromium (total)	CE127 ^M	mg/kg Cr	48	50	50	40	40	59
Chromium (III)	-	mg/kg CrIII	48	50	50	40	40	59
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Copper (total)	CE127 ^M	mg/kg Cu	71	38	38	32	33	39
Lead (total)	CE127 ^M	mg/kg Pb	227	68	78	22	33	94
Mercury (total)	CE127 ^M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel (total)	CE127 ^M	mg/kg Ni	36	28	31	46	36	33
Selenium (total)	CE127 ^M	mg/kg Se	1.3	1.2	1.3	1.0	1.2	1.4
Zinc (total)	CE127 ^M	mg/kg Zn	162	86	105	106	84	109
pH	CE004 ^M	units	7.8	7.4	7.3	7.6	7.2	7.3
Sulphate (2:1 water soluble)	CE061 ^M	mg/l SO ₄	32	15	25	56	92	12
Sulphate (total)	CE062 ^M	mg/kg SO ₄	971	479	901	305	356	578
Phenols (total)	CE078	mg/kg PhOH	0.7	1.4	0.8	<0.5	<0.5	1.0
Total Organic Carbon (TOC)	CE072 ^M	% w/w C	6.9	3.5	4.5	0.8	4.3	3.9
Estimate of OMC (calculated from TOC)	CE072 ^M	% w/w	11.9	6.0	7.7	1.3	7.4	6.8
PAH								
Naphthalene	CE087 ^M	mg/kg	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	CE087 ^M	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Acenaphthene	CE087 ^M	mg/kg	0.03	0.03	0.06	<0.02	<0.02	<0.02
Fluorene	CE087 ^U	mg/kg	0.03	<0.02	0.04	<0.02	<0.02	<0.02
Phenanthrene	CE087 ^M	mg/kg	0.77	0.26	0.41	0.04	0.06	0.27
Anthracene	CE087 ^U	mg/kg	0.36	0.09	0.11	<0.02	<0.02	0.14
Fluoranthene	CE087 ^M	mg/kg	1.35	0.34	0.40	<0.02	<0.02	0.96
Pyrene	CE087 ^M	mg/kg	1.19	0.31	0.37	<0.02	<0.02	0.89
Benzo(a)anthracene	CE087 ^U	mg/kg	0.65	0.19	0.22	<0.02	0.04	0.57
Chrysene	CE087 ^M	mg/kg	0.64	0.16	0.21	<0.03	<0.03	0.49
Benzo(b)fluoranthene	CE087 ^M	mg/kg	0.84	0.19	0.23	<0.02	<0.02	0.65
Benzo(k)fluoranthene	CE087 ^M	mg/kg	0.36	0.09	0.10	<0.03	<0.03	0.34
Benzo(a)pyrene	CE087 ^U	mg/kg	0.68	0.16	0.17	<0.02	<0.02	0.59
Indeno(123cd)pyrene	CE087 ^M	mg/kg	0.43	0.10	0.10	<0.02	<0.02	0.37
Dibenz(ah)anthracene	CE087 ^M	mg/kg	0.09	<0.02	<0.02	<0.02	<0.02	0.05
Benzo(ghi)perylene	CE087 ^M	mg/kg	0.42	0.07	0.07	<0.02	<0.02	0.33
PAH (total of USEPA 16)	CE087	mg/kg	7.88	1.99	2.47	<0.34	<0.34	5.67
TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-	-	-	-	-	-
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-	-	-	-	-	-
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-	-	-	-	-	-

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SOILS

Lab number			76910-1	76910-2	76910-3	76910-4	76910-5	76910-6
Sample id			TP1	TP2	TP3	TP3	TP4	TP5
Depth (m)			0.00-0.35	0.10-0.20	0.00-0.15	2.60-3.00	1.00-1.20	0.00-0.10
Date sampled			18/02/2019	18/02/2019	18/02/2019	18/02/2019	18/02/2019	18/02/2019
Test	Method	Units						
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	-	-	-	-	-	-
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	-	-	-	-	-	-
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	-	-	-	-	-	-
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	-	-	-	-	-	-
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	-	-	-	-	-	-
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-	-	-	-	-	-
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-	-	-	-	-	-
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-	-	-	-	-	-
EPH Aliphatic (>C10-C12)	CE068	mg/kg	-	-	-	-	-	-
EPH Aliphatic (>C12-C16)	CE068	mg/kg	-	-	-	-	-	-
EPH Aliphatic (>C16-C35)	CE068	mg/kg	-	-	-	-	-	-
EPH Aliphatic (>C35-C44)	CE068	mg/kg	-	-	-	-	-	-
VPH (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EPH (>C10-C35)	CE033	mg/kg	144	48	57	<7	<7	70
TPH (>C8-C35)	-	mg/kg	144	48	57	<10	<10	70
Subcontracted analysis								
Asbestos (qualitative)	\$	-	NAD	NAD	NAD	NAD	NAD	NAD

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SOILS

Lab number			76910-7	76910-8	76910-9	76910-10	76910-11	76910-12
Sample id			TP5	TP8	WS1	WS1	WS2	WS3
Depth (m)			1.00-1.10	1.00-1.20	0.10-0.20	0.50-0.60	0.10-0.20	0.10-0.20
Date sampled			18/02/2019	18/02/2019	18/02/2019	18/02/2019	18/02/2019	18/02/2019
Test	Method	Units						
Arsenic (total)	CE127 ^M	mg/kg As	8.6	10	9.0	25	49	48
Arsenic (bioaccessible)	CE124	mg/kg As	-	-	-	-	6.2	-
Arsenic (bioaccessible fraction)	CE124	% w/w	-	-	-	-	12.9	-
Cadmium (total)	CE127 ^M	mg/kg Cd	<0.2	<0.2	0.3	<0.2	0.2	0.3
Chromium (total)	CE127 ^M	mg/kg Cr	72	71	63	37	40	52
Chromium (III)	-	mg/kg CrIII	72	71	63	37	40	52
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Copper (total)	CE127 ^M	mg/kg Cu	36	50	14	36	39	36
Lead (total)	CE127 ^M	mg/kg Pb	27	31	39	64	107	106
Mercury (total)	CE127 ^M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel (total)	CE127 ^M	mg/kg Ni	53	68	14	23	24	30
Selenium (total)	CE127 ^M	mg/kg Se	1.9	1.7	0.9	1.2	1.5	1.5
Zinc (total)	CE127 ^M	mg/kg Zn	100	194	56	54	71	103
pH	CE004 ^M	units	7.7	7.6	7.1	5.0	5.6	5.7
Sulphate (2:1 water soluble)	CE061 ^M	mg/l SO ₄	<10	27	11	37	15	40
Sulphate (total)	CE062 ^M	mg/kg SO ₄	132	376	444	1226	1625	785
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5	1.2	10	4.4	<0.5
Total Organic Carbon (TOC)	CE072 ^M	% w/w C	0.9	2.0	2.5	6.2	7.5	4.1
Estimate of OMC (calculated from TOC)	CE072 ^M	% w/w	1.6	3.4	4.3	10.6	12.9	7.1
PAH								
Naphthalene	CE087 ^M	mg/kg	<0.02	<0.02	<0.02	0.07	0.03	<0.02
Acenaphthylene	CE087 ^M	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Acenaphthene	CE087 ^M	mg/kg	<0.02	<0.02	<0.02	0.07	0.03	<0.02
Fluorene	CE087 ^U	mg/kg	<0.02	<0.02	<0.02	0.04	<0.02	<0.02
Phenanthrene	CE087 ^M	mg/kg	0.07	0.07	0.04	0.97	0.36	0.24
Anthracene	CE087 ^U	mg/kg	<0.02	<0.02	<0.02	0.38	0.14	0.11
Fluoranthene	CE087 ^M	mg/kg	0.13	<0.02	0.07	2.14	0.75	0.36
Pyrene	CE087 ^M	mg/kg	0.14	<0.02	0.05	1.83	0.67	0.32
Benzo(a)anthracene	CE087 ^U	mg/kg	0.09	<0.02	0.06	1.02	0.42	0.19
Chrysene	CE087 ^M	mg/kg	0.08	<0.03	0.03	0.97	0.36	0.16
Benzo(b)fluoranthene	CE087 ^M	mg/kg	0.12	<0.02	0.06	1.36	0.57	0.20
Benzo(k)fluoranthene	CE087 ^M	mg/kg	0.06	<0.03	0.03	0.56	0.30	0.09
Benzo(a)pyrene	CE087 ^U	mg/kg	0.11	<0.02	0.04	0.99	0.38	0.16
Indeno(123cd)pyrene	CE087 ^M	mg/kg	0.07	<0.02	0.03	0.66	0.26	0.09
Dibenz(ah)anthracene	CE087 ^M	mg/kg	<0.02	<0.02	<0.02	0.13	0.02	<0.02
Benzo(ghi)perylene	CE087 ^M	mg/kg	0.05	<0.02	<0.02	0.63	0.22	0.07
PAH (total of USEPA 16)	CE087	mg/kg	0.92	<0.34	0.40	11.8	4.49	1.99
TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-	-	-	-	-	-
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-	-	-	-	-	-
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-	-	-	-	-	-

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SOILS

Lab number			76910-7	76910-8	76910-9	76910-10	76910-11	76910-12
Sample id			TP5	TP8	WS1	WS1	WS2	WS3
Depth (m)			1.00-1.10	1.00-1.20	0.10-0.20	0.50-0.60	0.10-0.20	0.10-0.20
Date sampled			18/02/2019	18/02/2019	18/02/2019	18/02/2019	18/02/2019	18/02/2019
Test	Method	Units						
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	-	-	-	-	-	-
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	-	-	-	-	-	-
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	-	-	-	-	-	-
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	-	-	-	-	-	-
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	-	-	-	-	-	-
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-	-	-	-	-	-
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-	-	-	-	-	-
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-	-	-	-	-	-
EPH Aliphatic (>C10-C12)	CE068	mg/kg	-	-	-	-	-	-
EPH Aliphatic (>C12-C16)	CE068	mg/kg	-	-	-	-	-	-
EPH Aliphatic (>C16-C35)	CE068	mg/kg	-	-	-	-	-	-
EPH Aliphatic (>C35-C44)	CE068	mg/kg	-	-	-	-	-	-
VPH (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EPH (>C10-C35)	CE033	mg/kg	<7	<7	32	402	91	44
TPH (>C8-C35)	-	mg/kg	<10	<10	32	402	91	44
Subcontracted analysis								
Asbestos (qualitative)	\$	-	NAD	NAD	NAD	NAD	NAD	NAD

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SOILS

Lab number			76910-13	76910-14	76910-15	76910-16	76910-17
Sample id			WS4	WS5	WS5	WS6	WS7
Depth (m)			0.10-0.20	2.50-2.60	4.50-4.60	0.10-0.20	0.20-0.50
Date sampled			18/02/2019	18/02/2019	18/02/2019	18/02/2019	18/02/2019
Test	Method	Units					
Arsenic (total)	CE127 ^M	mg/kg As	36	7.3	7.8	49	67
Arsenic (bioaccessible)	CE124	mg/kg As	-	-	-	-	-
Arsenic (bioaccessible fraction)	CE124	% w/w	-	-	-	-	-
Cadmium (total)	CE127 ^M	mg/kg Cd	<0.2	<0.2	<0.2	0.3	1.0
Chromium (total)	CE127 ^M	mg/kg Cr	45	36	33	48	57
Chromium (III)	-	mg/kg CrIII	45	36	33	48	57
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1
Copper (total)	CE127 ^M	mg/kg Cu	41	36	36	42	5032
Lead (total)	CE127 ^M	mg/kg Pb	104	25	24	70	331
Mercury (total)	CE127 ^M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel (total)	CE127 ^M	mg/kg Ni	26	42	40	32	51
Selenium (total)	CE127 ^M	mg/kg Se	1.1	1.0	1.1	1.4	1.7
Zinc (total)	CE127 ^M	mg/kg Zn	81	91	96	101	1910
pH	CE004 ^M	units	6.5	6.1	6.6	6.8	6.7
Sulphate (2:1 water soluble)	CE061 ^M	mg/l SO ₄	21	73	68	19	338
Sulphate (total)	CE062 ^M	mg/kg SO ₄	830	108	391	353	5290
Phenols (total)	CE078	mg/kg PhOH	0.8	<0.5	<0.5	1.0	0.8
Total Organic Carbon (TOC)	CE072 ^M	% w/w C	6.3	3.2	3.2	3.5	16.2
Estimate of OMC (calculated from TOC)	CE072 ^M	% w/w	10.8	5.6	5.5	6.1	27.9
PAH							
Naphthalene	CE087 ^M	mg/kg	0.02	<0.02	<0.02	<0.02	0.40
Acenaphthylene	CE087 ^M	mg/kg	<0.02	<0.02	<0.02	<0.02	0.77
Acenaphthene	CE087 ^M	mg/kg	<0.02	<0.02	<0.02	<0.02	0.44
Fluorene	CE087 ^U	mg/kg	<0.02	<0.02	<0.02	<0.02	0.98
Phenanthrene	CE087 ^M	mg/kg	0.14	0.08	0.09	0.13	11.53
Anthracene	CE087 ^U	mg/kg	0.04	<0.02	<0.02	0.02	3.04
Fluoranthene	CE087 ^M	mg/kg	0.16	<0.02	<0.02	0.19	17.20
Pyrene	CE087 ^M	mg/kg	0.14	<0.02	<0.02	0.18	14.20
Benzo(a)anthracene	CE087 ^U	mg/kg	0.10	0.03	0.03	0.12	7.58
Chrysene	CE087 ^M	mg/kg	0.08	<0.03	<0.03	0.10	7.38
Benzo(b)fluoranthene	CE087 ^M	mg/kg	0.09	<0.02	<0.02	0.17	9.55
Benzo(k)fluoranthene	CE087 ^M	mg/kg	0.05	<0.03	<0.03	0.06	4.54
Benzo(a)pyrene	CE087 ^U	mg/kg	0.10	<0.02	<0.02	0.09	8.30
Indeno(123cd)pyrene	CE087 ^M	mg/kg	0.07	<0.02	<0.02	0.07	5.49
Dibenz(ah)anthracene	CE087 ^M	mg/kg	<0.02	<0.02	<0.02	<0.02	1.23
Benzo(ghi)perylene	CE087 ^M	mg/kg	0.04	<0.02	<0.02	0.04	5.08
PAH (total of USEPA 16)	CE087	mg/kg	1.03	<0.34	<0.34	1.16	97.7
TPH							
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-	-	-	-	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-	-	-	-	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-	-	-	-	<0.01

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SOILS

Lab number			76910-13	76910-14	76910-15	76910-16	76910-17
Sample id			WS4	WS5	WS5	WS6	WS7
Depth (m)			0.10-0.20	2.50-2.60	4.50-4.60	0.10-0.20	0.20-0.50
Date sampled			18/02/2019	18/02/2019	18/02/2019	18/02/2019	18/02/2019
Test	Method	Units					
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	-	-	-	-	<1
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	-	-	-	-	4
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	-	-	-	-	52
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	-	-	-	-	48
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	-	-	-	-	6
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-	-	-	-	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-	-	-	-	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-	-	-	-	<0.1
EPH Aliphatic (>C10-C12)	CE068	mg/kg	-	-	-	-	8
EPH Aliphatic (>C12-C16)	CE068	mg/kg	-	-	-	-	142
EPH Aliphatic (>C16-C35)	CE068	mg/kg	-	-	-	-	1096
EPH Aliphatic (>C35-C44)	CE068	mg/kg	-	-	-	-	162
VPH (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
EPH (>C10-C35)	CE033	mg/kg	59	<7	20	46	1350
TPH (>C8-C35)	-	mg/kg	59	<10	20	46	1350
Subcontracted analysis							
Asbestos (qualitative)	\$	-	NAD	NAD	NAD	NAD	NAD

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PREPARED LEACHATES

Lab number			76910-17L
Sample id			WS7
Depth (m)			0.20-0.50
Test	Method	Units	
Arsenic (dissolved)	CE128 ^u	µg/l As	6.32
Copper (dissolved)	CE128 ^u	µg/l Cu	9.6
Lead (dissolved)	CE128 ^u	µg/l Pb	2.2

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE124	Arsenic (bioaccessible)	Extractions, ICP-MS	Dry		1	mg/kg As
CE124	Arsenic (bioaccessible fraction)	Calculation: (As (bio)*100)/As (total)	Dry		0.1	% w/w
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
CE127	Chromium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cr
-	Chromium (III)	Calculation: Cr (total) - Cr (VI)	Dry		1	mg/kg CrIII
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Zinc (total)	Aqua regia digest, ICP-MS	Dry	M	5	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	M	10	mg/l SO ₄
CE062	Sulphate (total)	Acid extraction, ICP-OES	Dry	M	100	mg/kg SO ₄
CE078	Phenols (total)	Extraction, Continuous Flow Colorimetry	As received		0.5	mg/kg PhOH
CE072	Total Organic Carbon (TOC)	Removal of IC by acidification, Carbon Analyser	Dry	M	0.1	% w/w C
CE072	Estimate of OMC (calculated from TOC)	Calculation from Total Organic Carbon	Dry	M	0.1	% w/w
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.01	mg/kg
CE068	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC35-EC44)	Solvent extraction, GC-FID	As received		1	mg/kg

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg
CE068	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C35-C44)	Solvent extraction, GC-FID	As received		10	mg/kg
CE067	VPH (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg
CE033	EPH (>C10-C35)	Solvent extraction, GC-FID	As received		7	mg/kg
-	TPH (>C8-C35)	Sum of VPH (>C8-C10) & EPH (>C10-C35)	As received		10	mg/kg
\$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

METHOD DETAILS

METHOD	PREPARED LEACHATES	METHOD SUMMARY	STATUS	LOD	UNITS
CE001	Leachate preparation (EA)	L:S 10:1		-	-
CE128	Arsenic (dissolved)	ICP-MS	U	0.06	µg/l As
CE128	Copper (dissolved)	ICP-MS	U	0.4	µg/l Cu
CE128	Lead (dissolved)	ICP-MS	U	0.2	µg/l Pb

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DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
76910-1	TP1	0.00-0.35	N	
76910-2	TP2	0.10-0.20	N	
76910-3	TP3	0.00-0.15	N	
76910-4	TP3	2.60-3.00	N	
76910-5	TP4	1.00-1.20	N	
76910-6	TP5	0.00-0.10	N	
76910-7	TP5	1.00-1.10	N	
76910-8	TP8	1.00-1.20	N	
76910-9	WS1	0.10-0.20	N	
76910-10	WS1	0.50-0.60	N	
76910-11	WS2	0.10-0.20	N	
76910-12	WS3	0.10-0.20	N	
76910-13	WS4	0.10-0.20	N	
76910-14	WS5	2.50-2.60	N	
76910-15	WS5	4.50-4.60	N	
76910-16	WS6	0.10-0.20	N	
76910-17	WS7	0.20-0.50	N	



ANALYTICAL TEST REPORT

Contract no: 76973
Contract name: Cockley Hill Lane, Kirkheaton
Client reference: CKD/02
Clients name: ARP Associates
Clients address: 5 & 6 Northwest Business Park
Servia Hill
Leeds
LS6 2QH
Samples received: 20 February 2019
Analysis started: 21 February 2019
Analysis completed: 28 February 2019
Report issued: 28 February 2019

Notes: Opinions and interpretations expressed herein are outside the UKAS accreditation scope. Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling. Methods, procedures and performance data are available on request. Results reported herein relate only to the material supplied to the laboratory. This report shall not be reproduced except in full, without prior written approval. Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

Key: U UKAS accredited test
M MCERTS & UKAS accredited test
\$ Test carried out by an approved subcontractor
I/S Insufficient sample to carry out test
N/S Sample not suitable for testing
NAD No Asbestos Detected

Approved by:

Dave Bowerbank
Customer Services Co-ordinator

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.
Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
76973-1	TP2	0.90-1.00	Sandy Clay with Gravel	-	-	10.0
76973-2	WS5	0.50-0.60	Sandy Clay with Gravel	-	-	13.9

Chemtech Environmental Limited

SOILS

Lab number			76973-1	76973-2
Sample id			TP2	WS5
Depth (m)			0.90-1.00	0.50-0.60
Date sampled			18/02/2019	18/02/2019
Test	Method	Units		
Arsenic (total)	CE127 ^M	mg/kg As	13	5.6
Cadmium (total)	CE127 ^M	mg/kg Cd	<0.2	<0.2
Chromium (total)	CE127 ^M	mg/kg Cr	27	33
Chromium (III)	-	mg/kg CrIII	27	33
Chromium (VI)	CE146	mg/kg CrVI	<1	<1
Copper (total)	CE127 ^M	mg/kg Cu	22	36
Lead (total)	CE127 ^M	mg/kg Pb	20	22
Mercury (total)	CE127 ^M	mg/kg Hg	<0.5	<0.5
Nickel (total)	CE127 ^M	mg/kg Ni	29	45
Selenium (total)	CE127 ^M	mg/kg Se	1.2	1.1
Zinc (total)	CE127 ^M	mg/kg Zn	70	98
pH	CE004 ^M	units	6.0	5.9
Sulphate (2:1 water soluble)	CE049 ^U	mg/l SO ₄	85	92
Sulphate (total)	CE062 ^M	mg/kg SO ₄	789	3507
Phenols (total)	CE078	mg/kg PhOH	<0.5	<0.5
Total Organic Carbon (TOC)	CE072 ^M	% w/w C	2.4	2.1
Estimate of OMC (calculated from TOC)	CE072 ^M	% w/w	4.1	3.6
PAH				
Naphthalene	CE087 ^M	mg/kg	<0.02	<0.02
Acenaphthylene	CE087 ^M	mg/kg	<0.02	<0.02
Acenaphthene	CE087 ^M	mg/kg	<0.02	<0.02
Fluorene	CE087 ^U	mg/kg	<0.02	<0.02
Phenanthrene	CE087 ^M	mg/kg	0.09	0.09
Anthracene	CE087 ^U	mg/kg	<0.02	<0.02
Fluoranthene	CE087 ^M	mg/kg	0.05	<0.02
Pyrene	CE087 ^M	mg/kg	<0.02	<0.02
Benzo(a)anthracene	CE087 ^U	mg/kg	<0.02	<0.02
Chrysene	CE087 ^M	mg/kg	<0.03	<0.03
Benzo(b)fluoranthene	CE087 ^M	mg/kg	<0.02	<0.02
Benzo(k)fluoranthene	CE087 ^M	mg/kg	<0.03	<0.03
Benzo(a)pyrene	CE087 ^U	mg/kg	<0.02	<0.02
Indeno(123cd)pyrene	CE087 ^M	mg/kg	<0.02	<0.02
Dibenz(ah)anthracene	CE087 ^M	mg/kg	<0.02	<0.02
Benzo(ghi)perylene	CE087 ^M	mg/kg	0.04	<0.02
PAH (total of USEPA 16)	CE087	mg/kg	<0.34	<0.34
TPH				
VPH (>C8-C10)	CE067	mg/kg	<0.1	<0.1
EPH (>C10-C35)	CE033	mg/kg	<10	<10
TPH (>C8-C35)	-	mg/kg	<10	<10
Subcontracted analysis				
Asbestos (qualitative)	\$	-	NAD	NAD

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
CE127	Chromium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cr
-	Chromium (III)	Calculation: Cr (total) - Cr (VI)	Dry		1	mg/kg CrIII
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Zinc (total)	Aqua regia digest, ICP-MS	Dry	M	5	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE049	Sulphate (2:1 water soluble)	Aqueous extraction, IC- COND	Dry	U	10	mg/l SO ₄
CE062	Sulphate (total)	Acid extraction, ICP-OES	Dry	M	100	mg/kg SO ₄
CE078	Phenols (total)	Extraction, Continuous Flow Colorimetry	As received		0.5	mg/kg PhOH
CE072	Total Organic Carbon (TOC)	Removal of IC by acidification, Carbon Analyser	Dry	M	0.1	% w/w C
CE072	Estimate of OMC (calculated from TOC)	Calculation from Total Organic Carbon	Dry	M	0.1	% w/w
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
CE067	VPH (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg
CE033	EPH (>C10-C35)	Solvent extraction, GC-FID	As received	M	10	mg/kg
-	TPH (>C8-C35)	Calculation from VPH & EPH	As received		10	mg/kg
\$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
76973-1	TP2	0.90-1.00	N	
76973-2	WS5	0.50-0.60	N	



LABORATORY REPORT



4043

Contract Number: PSL19/1182

Report Date: 26 February 2019
Client's Reference: CKD/02
Client Name: ARP Associates
Northwest House
5/6 Northwest Business Park
Servia Hill
Leeds
LS6 2QH

For the attention of: Elliot Heatherington

Contract Title: Cockley Hill Lane, Kirkheaton, Huddersfield
Date Received: 20/2/2019
Date Commenced: 20/2/2019
Date Completed: 26/2/2019

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:


R Gunson
(Director)

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

S Eyre
(Senior Technician)

L Knight
(Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

Page 1 of



SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

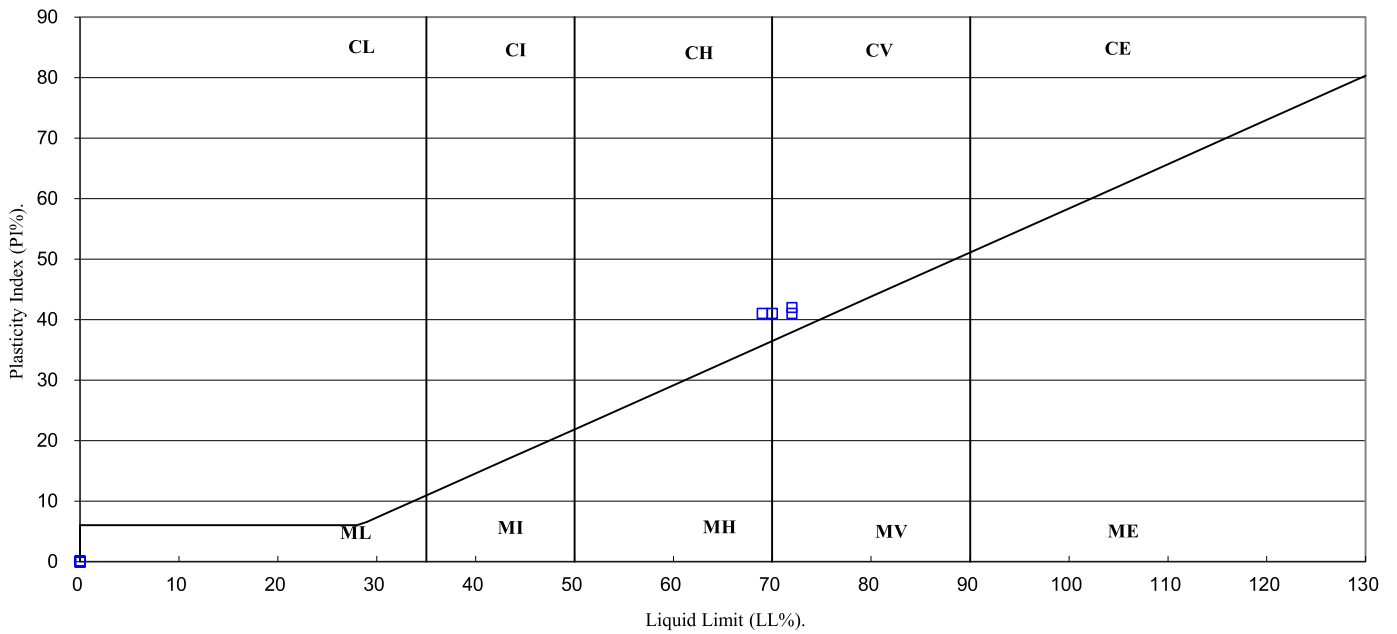
Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % <small>Clause 3.2</small>	Linear Shrinkage % <small>Clause 6.5</small>	Particle Density Mg/m ³ <small>Clause 8.2</small>	Liquid Limit % <small>Clause 4.3/4</small>	Plastic Limit % <small>Clause 5.3</small>	Plasticity Index % <small>Clause 5.4</small>	Passing .425mm %	Remarks
TP1		D	0.90	1.00	28			72	31	41	100	Very high plasticity CV.
WS4		D	1.70	1.80	28			72	30	42	100	Very high plasticity CV.
WS2		D	0.20	0.50	30			69	28	41	100	High plasticity CH.
WS6		D	1.80	1.90	22			70	29	41	100	High plasticity CH.

SYMBOLS : NP : Non Plastic

* : Liquid Limit and Plastic Limit Wet Sieved.

 4043		Cockley Hill Lane, Kirkheaton, Huddersfield	Contract No:
			PSL19/1182
			Client Ref:
			CKD/02

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



PSL
Professional Soils Laboratory

Cockley Hill Lane, Kirkheaton, Huddersfield

Contract No:

PSL19/1182

Client Ref:

CKD/02



DETS

Certificate of Analysis

Certificate Number 19-03421

27-Feb-19

Client Professional Soils Laboratory Ltd
5/7 Hexthorpe Road
Hexthorpe
DN4 0AR

Our Reference 19-03421

Client Reference PSL19/1182

Order No (not supplied)

Contract Title Cockley Hill Lane, Kirkheaton, Huddersfeild

Description 6 Soil samples.

Date Received 22-Feb-19

Date Started 22-Feb-19

Date Completed 27-Feb-19

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By



Adam Fenwick
Contracts Manager



Summary of Chemical Analysis Soil Samples

Our Ref 19-03421

Client Ref PSL19/1182

Contract Title Cockley Hill Lane, Kirkheaton, Huddersfeild

Lab No	1464358	1464359	1464360	1464361	1464362	1464363
Sample ID	TP1	WS4	WS2	WS6	TP5	TP7
Depth	0.90-1.00	1.70-1.80	0.20-0.50	1.80-1.95	2.50-2.60	0.90-1.00
Other ID	1	4	2	6	5	7
Sample Type	D	D	D	D	D	D
Sampling Date	n/s	n/s	n/s	n/s	n/s	n/s
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Inorganics									
pH	DETSC 2008#			6.6	6.1	6.5	5.9	7.4	6.8
Sulphate Aqueous Extract as SO ₄	DETSC 2076#	10	mg/l	62	34	24	70	39	76

Information in Support of the Analytical Results

Our Ref 19-03421
 Client Ref PSL19/1182
 Contract Cockley Hill Lane, Kirkheaton, Huddersfeild

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1464358	TP1 0.90-1.00 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1464359	WS4 1.70-1.80 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1464360	WS2 0.20-0.50 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1464361	WS6 1.80-1.95 SOIL		PT 500ml	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1464362	TP5 2.50-2.60 SOIL		PG	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	
1464363	TP7 0.90-1.00 SOIL		PG	Sample date not supplied, Anions 2:1 (365 days), pH + Conductivity (7 days)	

Key: P-Plastic T-Tub G-Bag

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

ARP GEOTECHNICAL LIMITED

PAH DOUBLE PLOT RATIOS TO DETERMINE PAH ORIGINS

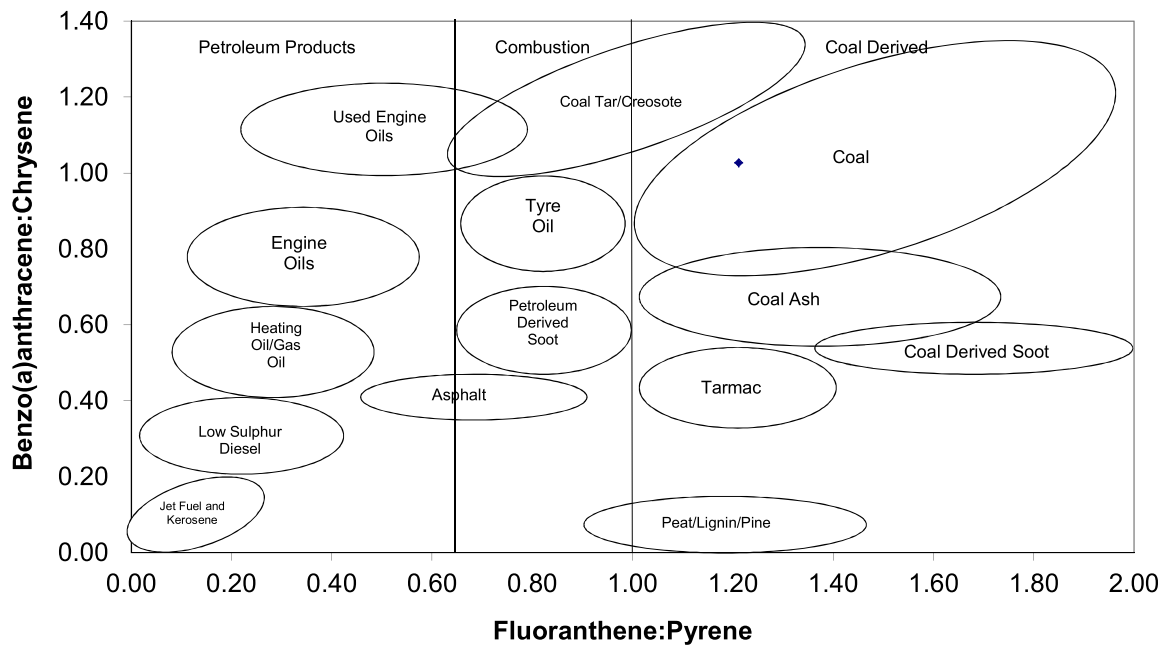
Material: GENERAL MADE GROUND AT/AROUND WS7

Site: COCKLEY HILL LANE, KIRKHEATON **Client:** COCKLEY DEVELOPMENTS LTD **Job No:** CKD/02

Sample	Fluoranthene	Pyrene	Ratio Fl:Py	BAP Conc.	Benzo(a) anthracene	Chysene	Ratio B:Ch
WS7	17.2	14.2	1.21	8.3	7.58	7.38	1.03

If Fl/Py is >1 then petrogenic source is indicated (e.g coal). If <1, then pyrogenic source is indicated (from combustion)

PAH Double Ratio Plot



APPENDIX K

CLEA SOFTWARE RISK ANALYSIS FOR ARSENIC

STEP 1: REPORT DETAILS

Clear All Details

Back to Guide

User	EGH
Company	ARP Geotechnical Ltd.
Contact number	
Report title	Land at Cockley Hill Lane, Kirkheaton
Job Number	CKD/01
Notes	Arsenic only.

STEP 2: BASIC SETTINGS

Apply Settings to Model

Back to Guide

SELECT LAND USE Residential with produce

RATIO MODE

LAND USE OPTIONS

RECEPTOR Female (res)

BUILDING Small terraced house

START AC 1

END AC 6

SOIL TYPE Sandy loam

pH 7

SOM (%) 6

EXPOSURE PATHWAYS

ORAL ROUTES

- direct soil and dust ingestion
- consumption of homegrown produce
- soil attached to homegrown produce

DERMAL ROUTES

- indoor
- outdoor

INHALATION ROUTES

- indoor dust
- outdoor dust
- indoor vapour
- outdoor vapour

ADVANCED SETTINGS

Restore Defaults

Back to Menu

90th Percentile Consumption Rate (g FW kg⁻¹ BW day⁻¹) by Age Class

Home Produce		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	1	
No.	Name																				
1	Green vegetables	7.12	6.85	6.85	6.85	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	3.74	2.94	2.94	0.00	
2	Root vegetables	10.69	3.30	3.30	3.30	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.77	1.40	1.40	0.00	
3	Tuber vegetables	16.03	5.46	5.46	5.46	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	3.38	1.79	1.79	0.00	
4	Herbaceous fruit	1.83	3.96	3.96	3.96	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.61	1.61	0.00	
5	Shrub fruit	2.23	0.54	0.54	0.54	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.22	0.22	0.00	
6	Tree fruit	3.82	11.96	11.96	11.96	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	2.97	2.97	0.00	

Gardener type **Average**

Apply Top 2

Mean Consumption Rate (g FW kg ⁻¹ BW day ⁻¹) by Age Class																		Dry Weight Conversion Factor	Homegrown Fraction (average)	Homegrown Fraction (high end)
2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	g DW g ⁻¹ FW	dimensionless	dimensionless	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.096	0.05	0.33	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.103	0.06	0.4	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.02	0.13	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.058	0.06	0.4	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.166	0.09	0.6	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.157	0.04	0.27	

Soil loading factor	Preparation correction factor
$\text{g g}^{-1} \text{ DW}$	dimensionless
1.00E-03	2.00E-01
1.00E-03	1.00E+00
1.00E-03	1.00E+00
1.00E-03	6.00E-01
1.00E-03	6.00E-01
1.00E-03	6.00E-01

ADVANCED SETTINGS

Restore Defaults Back to Menu

LAND USE		AGE CLASS						AGE CLASS						AGE CLASS					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
EF (soil and dust ingestion)	day yr ⁻¹	180	365	365	365	365	365	0	0	0	0	0	0	0	0	0	0	0	0
EF (consumption of homegrown produce)	day yr ⁻¹	180	365	365	365	365	365	0	0	0	0	0	0	0	0	0	0	0	0
EF (skin contact, indoor)	day yr ⁻¹	180	365	365	365	365	365	0	0	0	0	0	0	0	0	0	0	0	0
EF (skin contact, outdoor)	day yr ⁻¹	180	365	365	365	365	365	0	0	0	0	0	0	0	0	0	0	0	0
EF (inhalation of dust and vapour, indoor)	day yr ⁻¹	365	365	365	365	365	365	0	0	0	0	0	0	0	0	0	0	0	0
EF (inhalation of dust and vapour, outdoor)	day yr ⁻¹	365	365	365	365	365	365	0	0	0	0	0	0	0	0	0	0	0	0
Occupancy Period (indoor)	hr day ⁻¹	23.0	23.0	23.0	23.0	19.0	19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Occupancy Period (outdoor)	hr day ⁻¹	1.0	1.0	1.0	1.0	1.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Soil to skin adherence factor (indoor)	mg cm ⁻² day ⁻¹	6.00E-02	6.00E-02	6.00E-02	6.00E-02	6.00E-02	6.00E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Soil to skin adherence factor (outdoor)	mg cm ⁻² day ⁻¹	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Soil and dust ingestion rate	g day ⁻¹	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RECEPTOR		AGE CLASS						AGE CLASS						AGE CLASS					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Body weight	kg	5.60	9.80	12.70	15.10	16.90	19.70	22.10	25.30	27.50	31.40	35.70	41.30	47.20	51.20	56.70	59.00	70.00	70.90
Body height	m	0.70	0.80	0.90	0.90	1.00	1.10	1.20	1.20	1.30	1.30	1.40	1.40	1.40	1.50	1.60	1.60	1.60	1.60
Inhalation rate	m ³ day ⁻¹	8.50	13.30	12.70	12.20	12.20	12.40	12.40	12.40	12.40	12.40	12.40	13.40	13.40	13.40	13.40	13.40	14.80	12.00
Max exposed skin fraction (indoor)	m ² m ⁻²	0.32	0.33	0.32	0.35	0.35	0.33	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.21	0.21	0.33
Max exposed skin fraction (outdoor)	m ² m ⁻²	0.26	0.26	0.25	0.28	0.28	0.26	0.15	0.15	0.15	0.15	0.14	0.14	0.14	0.14	0.14	0.14	0.27	0.27

ADVANCED SETTINGS

Restore Defaults

Back to Menu

SOIL PROPERTIES for		Sandy loam	
Porosity, total	$\text{cm}^3 \text{cm}^{-3}$		0.53
Porosity, air-filled	$\text{cm}^3 \text{cm}^{-3}$		0.20
Porosity, water-filled	$\text{cm}^3 \text{cm}^{-3}$		0.33
Residual soil water Content	$\text{cm}^3 \text{cm}^{-3}$		0.12
Saturated hydraulic conductivity	cm s^{-1}		3.56E-03
van Genuchten shape parameter (<i>m</i>)	dimensionless		3.20E-01
Bulk density	g cm^{-3}		1.21
Threshold value of wind speed at 10m	m s^{-1}		7.20
Empirical function (F_s) for dust model	dimensionless		1.22
Ambient soil temperature	K		283

BUILDING PROPERTIES for		Small terraced house	
Building footprint	m^2		2.80E+01
Living space air exchange rate	hr^{-1}		0.50
Living space height (above ground)	m		4.8
Living space height (below ground)	m		0.0
Pressure difference (soil to enclosed space)	Pa		3.1
Foundation thickness	m		1.50E-01
Floor crack area	cm^2		4.23E+02
Dust loading factor	$\mu\text{g m}^{-3}$		5.00E+01

AIR DISPERSION MODEL		
Mean annual windspeed (10 m)	m s^{-1}	5.00
Air dispersion factor at height of 0.8 m	$\text{g m}^{-2} \text{s}^{-1} \text{per kg m}^{-3}$	2400.0
Air dispersion factor at height of 1.6 m	$\text{g m}^{-2} \text{s}^{-1} \text{per kg m}^{-3}$	0.0
Fraction of site with hard or vegetative cover	$\text{m}^2 \text{m}^{-2}$	0.75

VAPOUR MODEL		
Use default soil gas ingress rate		<input checked="" type="checkbox"/>
Default soil gas ingress rate	$\text{cm}^3 \text{s}^{-1}$	25.00
Depth to top of source (beneath building)	cm	65
Depth to top of source (no building)	cm	0

Use limited source thickness		<input type="checkbox"/>
Thickness of contaminant layer	cm	200

Time average period for surface emissions	years	6
User defined effective air permeability	cm^2	3.05E-08

STEP 1: REPORT DETAILS

Clear All Details

Back to Guide

User	EGH
Company	ARP
Contact number	
Report title	Cockley Hill Lane, Kirkheaton
Job Number	CKD/02
Notes	

STEP 2: BASIC SETTINGS

Apply Settings to Model

Back to Guide

SELECT LAND USE Residential with homegrown produce

RATIO MODE

LAND USE OPTIONS

RECEPTOR Female (res)

BUILDING Semi-detached house

SOIL TYPE Sandy clay loam

START AC 1

END AC 6

pH 6.6

SOM (%) 7.9

EXPOSURE PATHWAYS

ORAL ROUTES

- direct soil and dust ingestion
- consumption of homegrown produce
- soil attached to homegrown produce

DERMAL ROUTES

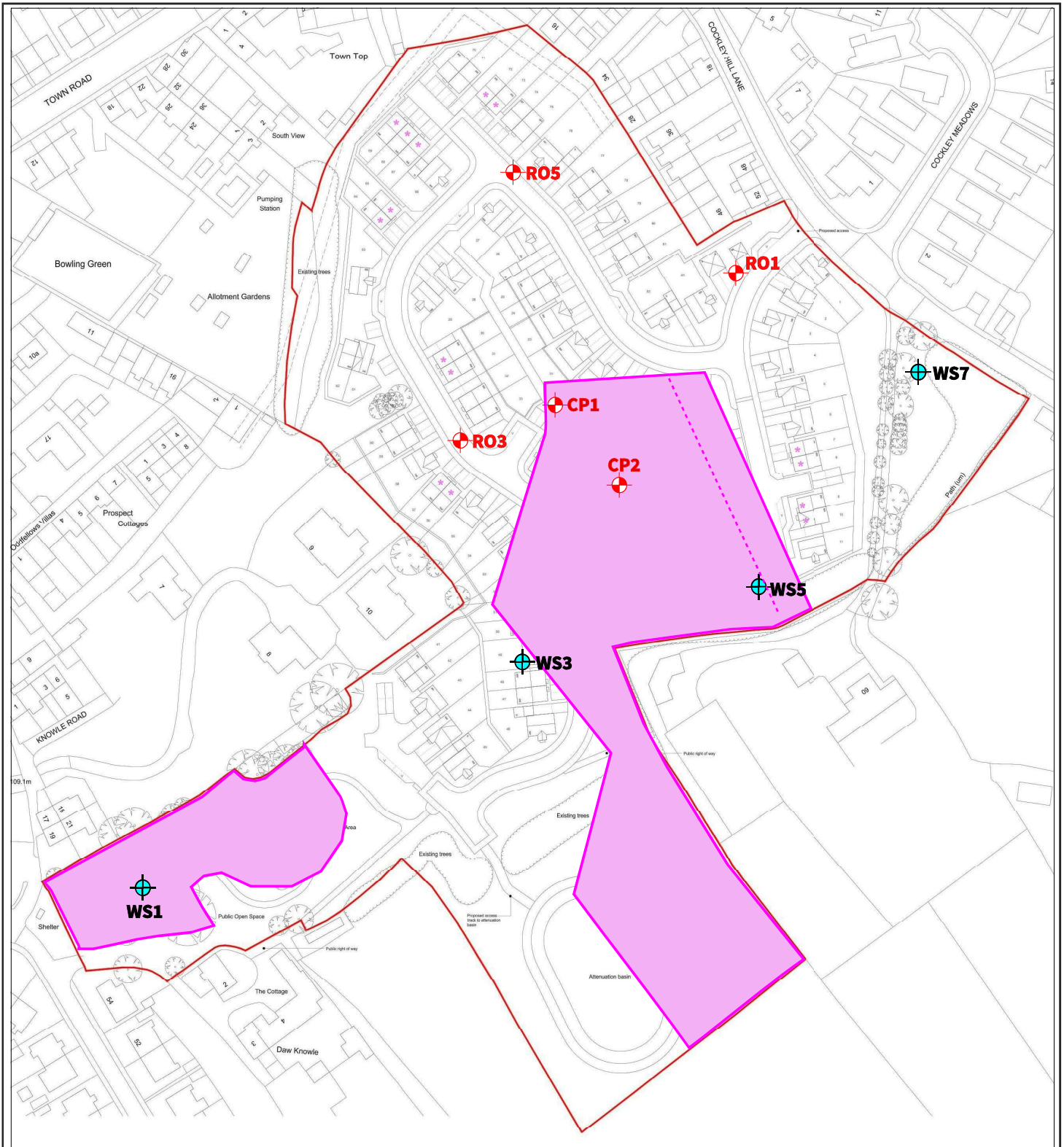
- indoor
- outdoor

INHALATION ROUTES




- indoor dust
- outdoor dust
- indoor vapour
- outdoor vapour


APPENDIX L

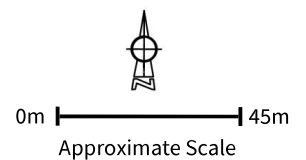
GAS MONITORING RESULTS



KEY:

-  **R01** Rotary borehole location August 2016
-  **CP1** Cable percussion borehole location August 2016
-  **WS1** Windowless sample borehole location February 2019

 ARP GEOTECHNICAL LTD CHARTERED CONSULTING ENGINEERS <small>Northwest House 5-8 Northwest Business Park, Servia Hill, Leeds LS6 2QH Telephone: 0113 245 8498 Fax: 0113 244 3864 E-Mail: leeds@arpconsultants.co.uk</small>	Project COCKLEY HILL LANE KIRKHEATON, HUDDERSFIELD	Title GAS MONITORING WELL LOCATION PLAN	Drawn JR	Scale AS SHOWN
	Client GLEESON HOMES LTD	Date AUGUST 2025	Job No. GHO/11	



ARP GEOTECHNICAL BOREHOLE MONITORING RESULTS

JOB NO: GHO/11 **CLIENT:** Gleeson Homes

SITE: Cockley Hill Lane, Kirkheaton

BH: CP1 Response Zone: 1.0m to 5.0m

Date	BH Steady Flow Rate (l/hr)*	Peak CH ₄ %	Qhg CH ₄ (l/hr)	Peak CO ₂ %	Qhg CO ₂ (l/hr)	Min. O ₂ %	Depth to G Water (m)	Comment
03/10/2016			0.000		0.000			Bung missing
26/10/2016	0.10	0.00	0.000	4.80	0.005	15.40	3.67	
01/12/2016	0.10	0.00	0.000	3.60	0.004	17.20	#	
04/01/2017	0.10	0.00	0.000	2.40	0.002	19.10	3.43	
24/01/2017	0.10	0.10	0.000	1.20	0.001	20.20	3.41	
18/04/2017	0.10	0.00	0.000	2.20	0.002	19.90	3.42	

* Where no flow is detected, detection limit of 0.1l/hr should be inserted

Qhg = Hazardous gas flow rate, in accordance with BS8485:2007

Reading not possible - faulty dip meter

ARP GEOTECHNICAL BOREHOLE MONITORING RESULTS

JOB NO: GHO/11 **CLIENT:** Gleeson Homes

SITE: Cockley Hill Lane, Kirkheaton

BH: CP2 Response Zone: 3.0m to 7.5m

Date	BH Steady Flow Rate (l/hr)*	Peak CH ₄ %	Qhg CH ₄ (l/hr)	Peak CO ₂ %	Qhg CO ₂ (l/hr)	Min. O ₂ %	Depth to G Water (m)	Comment
03/10/2016			0.000		0.000			Bung missing
26/10/2016	0.10	0.00	0.000	2.90	0.003	17.10	Dry	
01/12/2016	0.10	0.80	0.001	1.90	0.002	7.00	#	Surface waterlogged
04/01/2017	0.10	0.00	0.000	2.60	0.003	2.80	0.89	Surface waterlogged
24/01/2017	0.10	0.20	0.000	1.50	0.002	9.60	0.98	
18/04/2017	0.10	0.00	0.000	2.20	0.002	9.80	0.97	

* Where no flow is detected, detection limit of 0.1l/hr should be inserted

Qhg = Hazardous gas flow rate, in accordance with BS8485:2007

Faulty dip meter

Orange: data cannot be used as groundwater is above the response zone

ARP GEOTECHNICAL BOREHOLE MONITORING RESULTS

JOB NO: GHO/11 **CLIENT:** Gleeson Homes

SITE: Cockley Hill Lane, Kirkheaton

BH: R1A Response Zone: 1.0m to 3.0m

Date	BH Steady Flow Rate (l/hr)*	Peak CH ₄ %	Qhg CH ₄ (l/hr)	Peak CO ₂ %	Qhg CO ₂ (l/hr)	Min. O ₂ %	Depth to G Water (m)	Comment
03/10/2016	0.1	0.0	0.000	2.6	0.003	18.9	Dry	
26/10/2016	0.1	0.0	0.000	3.6	0.004	17.9	Dry	
01/12/2016	0.1	0.0	0.000	4.8	0.005	14.9	#	
04/01/2017	0.1	0.0	0.000	5.0	0.005	15.9	1.39	
24/01/2017	0.1	0.0	0.000	6.0	0.006	14.3	1.42	
18/04/2017	0.1	0.0	0.000	3.8	0.004	17.6	1.40	

* Where no flow is detected, detection limit of 0.1l/hr should be inserted

Qhg = Hazardous gas flow rate, in accordance with BS8485:2007

Faulty dip meter

ARP GEOTECHNICAL BOREHOLE MONITORING RESULTS

JOB NO: GHO/11 **CLIENT:** Gleeson Homes

SITE: Cockley Hill Lane, Kirkheaton

BH: R3A Response Zone: 1.0m to 3.0m

Date	BH Steady Flow Rate (l/hr)*	Peak CH ₄ %	Qhg CH ₄ (l/hr)	Peak CO ₂ %	Qhg CO ₂ (l/hr)	Min. O ₂ %	Depth to G Water (m)	Comment
03/10/2016	0.1	0.0	0.000	2.7	0.003	18.7	Dry	
26/10/2016	0.1	0.0	0.000	6.0	0.006	16.6	1.38	
01/12/2016	0.1	0.5	0.001	3.1	0.003	13.1	#	
04/01/2017	0.1	0.0	0.000	5.1	0.005	15.6	0.52	
24/01/2017	0.1	0.5	0.001	3.0	0.003	17.2	0.43	
18/04/2017	0.1	0.0	0.000	4.1	0.004	15.6	0.67	

* Where no flow is detected, detection limit of 0.1l/hr should be inserted

Qhg = Hazardous gas flow rate, in accordance with BS8485:2007

Faulty dip meter

Orange: data cannot be used as groundwater is above the response zone

ARP GEOTECHNICAL BOREHOLE MONITORING RESULTS

JOB NO: GHO/11 **CLIENT:** Gleeson Homes

SITE: Cockley Hill Lane, Kirkheaton

BH: R5A Response Zone: 1.0m to 3.0m

Date	BH Steady Flow Rate (l/hr)*	Peak CH ₄ %	Qhg CH ₄ (l/hr)	Peak CO ₂ %	Qhg CO ₂ (l/hr)	Min. O ₂ %	Depth to G Water (m)	Comment
03/10/2016	0.1	0.0	0.000	2.5	0.003	18.8	Dry	
26/10/2016	0.1	0.0	0.000	5.0	0.005	12.5	1.50	
01/12/2016	0.1	0.1	0.000	4.8	0.005	10.1	#	
04/01/2017	0.1	0.1	0.000	3.6	0.004	9.2	0.87	Surface Waterlogged
24/01/2017			0.000		0.000			Surface Waterlogged
18/04/2017	0.1	0.0	0.000	2.6	0.003	10.5	0.92	

* Where no flow is detected, detection limit of 0.1l/hr should be inserted

Qhg = Hazardous gas flow rate, in accordance with BS8485:2007

Faulty dip meter

Orange: data cannot be used as groundwater is above the response zone

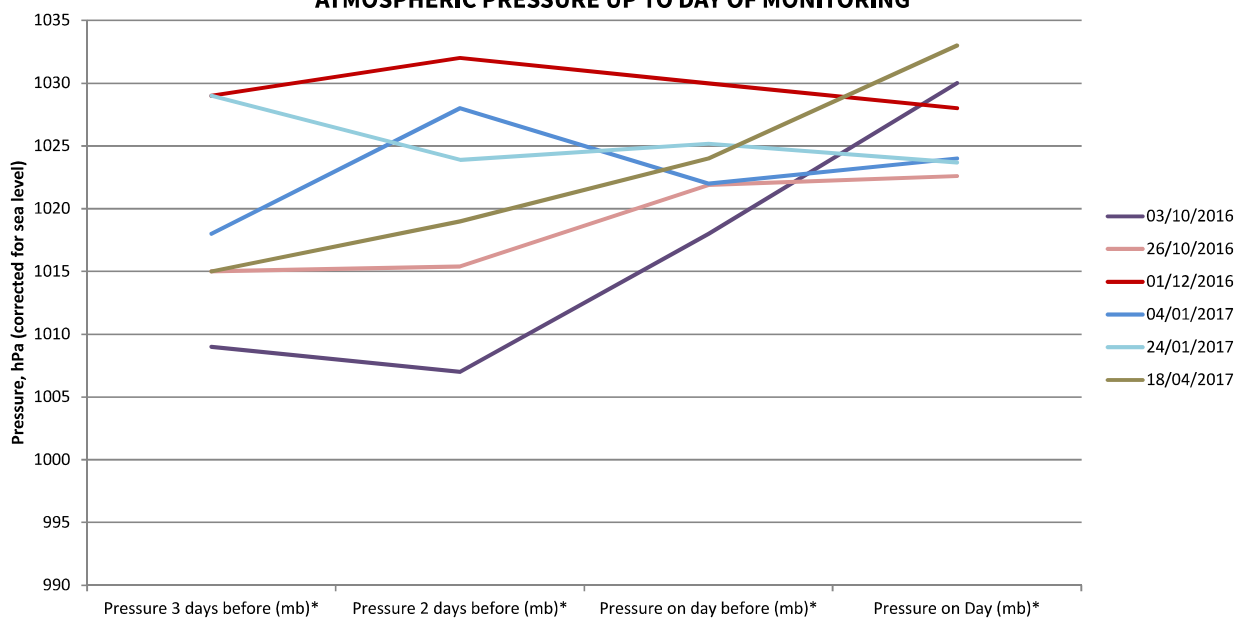
ARP GEOTECHNICAL BOREHOLE MONITORING RESULTS**JOB NO.** GHO/11**CLIENT:** Gleeson Homes**SITE:** Cockley Hill Lane, Kirkheaton**BAROMETRIC PRESSURES**

Monitor Date	Weather on Day	Pressure on Day (mb)*	Pressure on day before (mb)*	Pressure 2 days before (mb)*	Pressure 3 days before (mb)*	3 Day Trend*
03/10/2016	Cold, sunny	1030	1018	1007	1009	Rising
26/10/2016	Cold, sunny	1023	1022	1015	1015	Rising
01/12/2016	Overcast	1028	1030	1032	1029	Falling
04/01/2017	Overcast, cold	1024	1022	1028	1018	Falling
24/01/2017	Cold, frost,	1024	1025	1024	1029	Generally high
18/04/2017	Cloudy	1033	1024	1019	1015	Rising

*Pressures at midday (EGNM) corrected to sea level.

<https://www.timeanddate.com/weather/uk/leeds/historic>

ATMOSPHERIC PRESSURE UP TO DAY OF MONITORING



ARP GEOTECHNICAL BOREHOLE MONITORING RESULTS**JOB NO:** GHO/11 **CLIENT:** Gleeson Homes**SITE:** Cockley Hill Lane, Kirkheaton**BH:** WS1 Response Zone: 1.0m to 2.0m

Date	BH Steady Flow Rate (l/hr)*	Peak CH ₄ %	Qhg CH ₄ (l/hr)	Peak CO ₂ %	Qhg CO ₂ (l/hr)	Min. O ₂ %	Depth to G Water (m)	Comment
04/03/2019	1.00	0.00	0.000	0.40	0.004	20.20	Dry	
19/03/2019	0.50	0.00	0.000	0.80	0.004	19.80	1.83	
02/04/2019	0.40	1.00	0.004	1.80	0.007	18.40	Dry	
17/04/2019	0.10	0.00	0.000	1.20	0.001	19.60	1.99	
26/04/2019	0.30	0.00	0.000	0.40	0.001	20.00	Dry	
14/05/2019	0.40	0.00	0.000	1.00	0.004	16.60	Dry	

* Where no flow is detected, detection limit of 0.1l/hr should be inserted

Qhg = Hazardous gas flow rate, in accordance with BS8485:2007

ARP GEOTECHNICAL BOREHOLE MONITORING RESULTS

JOB NO: GHO/11 **CLIENT:** Gleeson Homes

SITE: Cockley Hill Lane, Kirkheaton

BH: WS3 Response Zone: 1.0m to 2.0m

Date	BH Steady Flow Rate (l/hr)*	Peak CH ₄ %	Qhg CH ₄ (l/hr)	Peak CO ₂ %	Qhg CO ₂ (l/hr)	Min. O ₂ %	Depth to G Water (m)	Comment
04/03/2019	1.00	0.00	0.000	0.80	0.008	19.8	0.69	
19/03/2019	0.60	0.00	0.000	0.70	0.004	20.1	0.60	
02/04/2019	1.00	0.30	0.003	0.90	0.009	4.7	Dry	
17/04/2019	0.10	0.00	0.000	0.30	0.000	20.7	0.71	
26/04/2019	0.70	0.00	0.000	0.60	0.004	19.4	Dry	
14/05/2019	0.40	0.00	0.000	0.70	0.003	9.7	Dry	

* Where no flow is detected, detection limit of 0.1l/hr should be inserted

Qhg = Hazardous gas flow rate, in accordance with BS8485:2007

Orange: data cannot be used as groundwater is above the response zone

ARP GEOTECHNICAL BOREHOLE MONITORING RESULTS

JOB NO: GHO/11 **CLIENT:** Gleeson Homes

SITE: Cockley Hill Lane, Kirkheaton

BH: WS5 Response Zone: 1.0m to 5.0m

Date	BH Steady Flow Rate (l/hr)*	Peak CH ₄ %	Qhg CH ₄ (l/hr)	Peak CO ₂ %	Qhg CO ₂ (l/hr)	Min. O ₂ %	Depth to G Water (m)	Comment
04/03/2019	1.0	0.0	0.000	0.3	0.003	20.2	Dry	
19/03/2019	0.6	0.0	0.000	0.6	0.004	20.4	dry	
02/04/2019	0.7	0.5	0.004	6.0	0.042	19.2	0.56	
17/04/2019	0.0	0.0	0.000	7.4	0.000	4.3	dry	
26/04/2019	0.1	0.0	0.000	0.1	0.000	20.4	0.68	
14/05/2019	0.1	0.0	0.000	6.1	0.006	19.1	0.79	

* Where no flow is detected, detection limit of 0.1l/hr should be inserted

Qhg = Hazardous gas flow rate, in accordance with BS8485:2007

Orange: data cannot be used as groundwater is above the response zone

ARP GEOTECHNICAL BOREHOLE MONITORING RESULTS

JOB NO: GHO/11 **CLIENT:** Gleeson Homes

SITE: Cockley Hill Lane, Kirkheaton

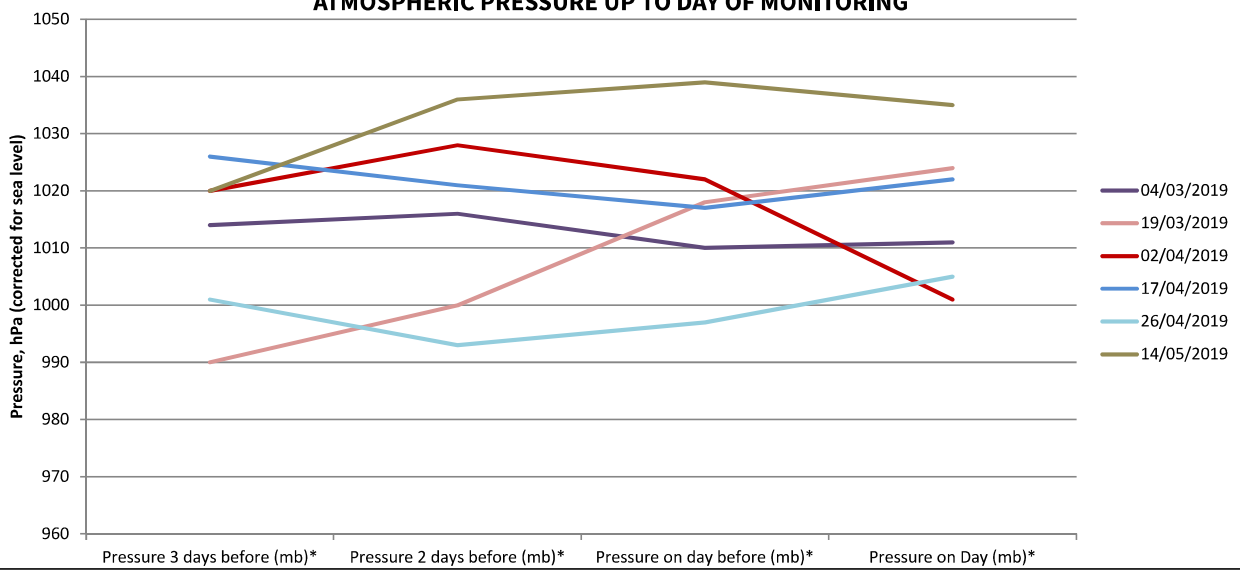
BH: WS7 Response Zone: 1.0m to 2.0m

Date	BH Steady Flow Rate (l/hr)*	Peak CH ₄ %	Qhg CH ₄ (l/hr)	Peak CO ₂ %	Qhg CO ₂ (l/hr)	Min. O ₂ %	Depth to G Water (m)	Comment
04/03/2019	1.8	0.0	0.000	0.5	0.009	19.9	Dry	
19/03/2019	0.7	0.0	0.000	0.6	0.004	19.8	dry	
02/04/2019	0.1	0.9	0.001	0.7	0.001	18.6	1.98	
17/04/2019	0.0	0.0	0.000	0.8	0.000	17.2	dry	
26/04/2019	0.4	0.0	0.000	0.7	0.003	19.7	1.89	
14/05/2019	0.3	0.0	0.000	0.4	0.001	20.1	Dry	

* Where no flow is detected, detection limit of 0.1l/hr should be inserted

Qhg = Hazardous gas flow rate, in accordance with BS8485:2007

ATMOSPHERIC PRESSURE UP TO DAY OF MONITORING



APPENDIX M

CONTAMINATION REMEDIATION STATEMENT

A close-up photograph of an excavator bucket, showing the metal structure and the soil it is digging. The bucket is positioned on the left side of the page, with a red geometric pattern in the background.

CONTAMINATION REMEDIATION STATEMENT

FOR
COCKLEY HILL LANE
KIRKHEATON
ON BEHALF OF
GLEESON HOMES LTD



ARP GEOTECHNICAL LTD

CHARTERED CONSULTING ENGINEERS

Northwest House 5/6 Northwest Business Park Servia Hill Leeds LS6 2QH

☎ 0113 245 8498 ✉ leeds@arpgeotechnical.co.uk 🌐 www.arpconsultingengineers.co.uk

CLIENT: GLEESON HOMES LTD
 JOB NUMBER: GHO/11
 PROJECT: COCKLEY HILL LANE, KIRKHEATON
 REPORT TYPE: CONTAMINATION REMEDIATION STATEMENT
 REPORT REFERENCE: GHO/11rem1

	Name	Signature
Prepared By:	John Race BSc CGeol FGS EurGeol	
Authorised By:	Owain Gwilym BSc MSc FGS	

ISSUE	DATE	STATUS
1	29 th OCTOBER 2025	V1 FINAL

1.0 Introduction

- 1.1 This document has been prepared to provide information for the Client and other interested parties, such as the regulatory authorities, outlining how contamination encountered on the site will be managed to ensure that the site is environmentally suitable for the intended residential use. The document should be agreed, prior to implementation, with the relevant regulatory authorities, usually the local planning authority and building control provider.

2.0 The Site

- 2.1 The ARP Geotechnical Ltd Stage 1/Stage 2 Geo-environmental Report, dated October 2025, under reference GHO/11r1, makes an assessment of contamination, along with other aspects.
- 2.2 The conceptual site model is for a residential development with private gardens.
- 2.3 The site is mainly a large sloping grassed agricultural field. In the eastern corner is a triangular shaped wooded area, separated from the field area by a gravel access road. In the southwestern corner is a cover of hardstanding, and sporadic young to mature trees. Ground levels slope downwards from northeast to southwest. The site is steeper in the northeast, and less steep in the southwest, with a maximum gradient of around 1 in 5.
- 2.4 Geological maps show the majority of the site to be underlain by undifferentiated strata of the Lower Coal Measures. Southwestern and northwestern areas of the site are shown to be underlain by Grenoside Sandstone. The Better Bed Coal seam outcrops on the site, roughly north to south, and a fault crosses the south of the site, from west to northeast.
- 2.5 The strata beneath the site are classed as a 'Secondary A' Aquifer. There are no sensitive groundwater abstractions within 1km of the site.
- 2.6 Any surface water run-off from the site is likely to be intercepted by the road drainage of Shop Lane, or adjoined residential side roads, probably eventually reaching Oxfield Beck approximately 800m to the southwest. There are no surface water abstractions within 1km of the site. The site is not at risk from river flooding.
- 2.7 Borehole monitoring has shown that CS₂ gas protection measures are required for the proposed properties, comprising a membrane and ventilated sub floor void. Methane up to 1%, and carbon dioxide up to 7.4%, was detected. CS₂ gas protection will also protect against radon.
- 2.8 Ordnance Survey Archive Maps show that the majority of site has remained undeveloped. A coal seam has been worked by opencasting, across the central portion, and a small portion of the southwest was quarried for sandstone, which later had a small building and associated car parking. A triangular area on the east once had cluster of small buildings. A well (and later trough) was present at or close to where the site abuts Shop Lane.

- 2.9 The majority of the site is generally underlain by up to 0.35m thickness of made ground, overlying natural residual soils derived from in situ weathering of solid strata. In the south-central area of the site, opencast backfill material is present (made ground of reworked natural material) to proven depths of up to 11.5m. In the southwest, a backfilled quarry is present, to depths of at least 3.2m, again generally infilled with reworked natural material.
- 2.10 Contamination testing showed the topsoil and made ground to be essentially uncontaminated and compatible with the proposed residential development. An exception was demolition rubble in the eastern triangle (WS7), which contained elevated copper at 5,032mg/kg, lead at 331mg/kg, and elevated PAH compounds, including benzo(a)pyrene at 8.3mg/kg. There was no significant leachability. There is a large ground slab at the southwestern boundary, which could not be penetrated during the investigations. This area is proposed for POS and any contamination beneath the slab is unlikely to present any significant contamination risk. However, if the slab is removed, the underlying material should be sampled and tested.

3.0 Remediation Strategy (Eastern Triangle Only)

- 3.1 The eastern triangle is proposed for POS. Therefore, where only turf is proposed, provision of clean topsoil of a minimum 0.3m thickness is likely to provide adequate protection. In any proposed planted areas, 0.6m thickness should be provided, and may include subsoil as well as topsoil. Alternatively, the made ground could be removed from site. It would be inadvisable to move the material to proposed residential plot areas, but if this was to occur, 0.6m cover would be required in the garden areas.
- 3.2 The proposed profile is provided on the table below. In areas of hardstanding or building footprints, the cover blanket or hard break layer are not required.

Proposed Profile in Turfed POS

Thickness (m)	Description
Minimum 0.3	Topsoil

Proposed Profile in Planted POS

Thickness (m)	Description
Minimum 0.3	Topsoil (full 0.6m thickness may be topsoil)
Minimum 0.3	Subsoil (if full 0.6m is not topsoil)

- 3.3 Any soils used in the cover blanket, whether imported or site-won, will need to be verified as suitable by inspection and testing, in accordance with guidance supplied in the document produced by the Yorkshire and Lincolnshire Pollution Advisory Group (YALPAG): "Guidance on the Verification Requirements for Cover Systems". The measures described below will be required to ensure compliance with the document.
- 3.4 If removal of made ground from site is required to achieve the cover soil thickness, the waste receiver may require Waste Acceptance Criteria Testing (WAC) and asbestos quantification.

4.0 Validation

- 4.1 Following placement of the cover soils in the eastern triangle, it will be necessary to confirm the required cover of uncontaminated soil has been placed, by excavating trial pits to 0.6m depth across these areas on the basis of a maximum 25m spacing. The trial pits will be photographed, to include a reference scale, and the photographs included within any report to enable the location on site to be identified.
- 4.2 If the contaminated made ground is removed from site to form an uncontaminated area or site, then the surface will need to be inspected by an Engineer, and sampled and tested on a maximum 25m spacing to confirm its uncontaminated status. The area will be photographed and all the details included within a Validation Letter Report. The disposal/transfer documents should be retained for inclusion in the Validation Report.

5.0 Laboratory Testing

- 5.1 If any imported subsoil and topsoil is to be used, the source will need to be confirmed, and the material tested for the attached suite of contaminants, to comply with the maximum screening values listed. The frequency of testing is given on the table below.

Material Type	Number of Samples
Topsoil or subsoil from greenfield / manufactured source	Minimum 3No. or 1 per 250m ³ (whichever is greater)
Topsoil or subsoil from brownfield / screened source.	Minimum 6No. or 1 per 100m ³ (whichever is greater)

- 5.2 When a potential source of soil is identified, the Client may provide ARP Geotechnical Ltd with supplier certificates, and we will comment on the apparent acceptability of the material. If no certificates are available, the Client may wish us to sample the material at source prior to import, or sample an example load delivered to site, to minimise potential for any problems later. The test results will be available approximately one week, or slightly more, after the site visit.
- 5.3 Provided the results of the above are acceptable, there are two options for validation:-
- A. Import a stockpile of material to site sufficient to complete the required areas, and invite ARP to take sufficient further samples of the stockpile for testing to fully approve it as a source. The stockpile should be isolated from any other materials on the site (becoming a "Quarantined Stockpile"), fenced off to avoid any cross contamination, and must not be added to without further testing. The test results will be available approximately one week, or slightly more, after the site visit.

OR:

- B. Import and place the material as and when required, and invite ARP to sample the material when in place, during the inspection pits noted in Section 4.1. The samples will be issued to the laboratory for contamination testing to confirm acceptability. The test results will be available approximately one week, or slightly more, after the site visit. Our letter report will be available a day or two later. Therefore, Clients should allow for receiving the final letter report two weeks after the site visit.

5.4 Any cross contamination of materials should be avoided, and further testing carried out where any cross contamination is suspected to have occurred.

5.5 The results of all the laboratory analysis, excavation logs, plans, photographs, and import documents will form part of the Remediation Validation Report for the group of plots.

6.0 Unexpected Contamination

6.1 Any unexpected contamination uncovered during the works (including below the concrete slab in the southwest, if this is to be removed) shall be inspected, sampled and analysed in laboratory for the suite of determinands appended to this Remediation Statement, and compared to the maximum concentration levels listed on the enclosure. Works on the affected materials shall cease until the appraisal is complete and, if necessary, a revised Remediation Statement is to be prepared and approved by the Planning Authority before work is recommenced.

7.0 Protection of Workers and the Public During Development Works

7.1 Damping down of the contaminated made ground must be implemented during dry periods, and timely placement of the contaminated material below barriers.

7.2 Washing facilities and a clean mess room should be provided.

7.3 Site fencing will be provided to exclude access to members of the public, and contaminated material will be contained within the site boundary and placed below barriers as soon as possible.

7.4 Workers will be educated to use adequate hygiene and PPE.

7.5 Movement of contamination off-site on vehicle wheels shall be minimised by cleaning of vehicle wheels and/or use of road sweeper, as required.



ARP GEOTECHNICAL LIMITED
IMPORTED SOIL CONTAMINANT SCREENING VALUES
RESIDENTIAL WITH HOME-GROWN PRODUCE

Determinand	S4UL (unless stated otherwise) (mg/kg)			C4SL (mg/kg)		
	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM
Arsenic	37			37		
Cadmium	11			22		
Chromium (trivalent) (MAFF)	400					
Chromium (hexavalent)	6			21		
Copper (MAFF)	80#					
Lead				200		
Inorganic Mercury	40			200		
Nickel (MAFF)	50#					
Selenium	250					
Zinc (MAFF)	200#					
Acidity (pH)	*Should be Greater Than 5			*Should be Greater Than 5		
	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM
Naphthalene	2.3	5.6	13	15	36	85
Acenaphthylene	170	420	920			
Acenaphthene	210	510	1,100			
Fluorene	170	400	860			
Phenanthrene	95	220	440			
Anthracene	2,400	5,400	11,000			
Fluoranthene	280	560	890			
Pyrene	620	1,200	2,000			
Benzo(a)anthracene	7.2	11	13			
Chrysene	15	22	27			
Benzo(b)fluoranthene	2.6	3.3	3.7			
Benzo(k)fluoranthene	77	93	100			
Benzo(a)pyrene	2.2	2.7	3			5
Indeno(1,2,3-cd)pyrene	27	36	41			
Dibenzo(a,h)anthracene	0.24	0.28	0.30			
Benzo(g,h,i)perylene	320	340	350			
Phenols	120	200	380			
Total TPH	*Above 500, speciate and compare with values below:					
C5 to C6 Aliphatic	42	78	160			
C6 to C8 Aliphatic	100	230	530			
C8 to C10 Aliphatic	27	65	150			
C10 to C12 Aliphatic	130	330	760			
C12 to C16 Aliphatic	1100	2,400	4,300			
C16 to C35 Aliphatic	65,000	92,000	110,000			
C35 TO C44 Aliphatic	65,000	92,000	110,000			
C5 to C7 Aromatic (Benzene)	70	140	300			
C7 to C8 Aromatic (Toluene)	130	290	660			
C8 to C10 Aromatic	34	83	190			
C10 to C12 Aromatic	74	180	380			
C12 to C16 Aromatic	140	330	660			
C16 to C21 Aromatic	260	540	930			
C21 TO C35 Aromatic	1100	1,500	1,700			
C35 TO C44 Aromatic	1100	1,500	1,700			
Asbestos	*Should be None Detected			*Should be None Detected		

* In House Value/Approach S4UL = Suitable 4 Use Level, CIEH/LQM 2014 C4SL = Cat 4 Screening Level, DEFRA, 2014

Blank cell indicates no published value or in-house value. Some values presented are above saturation limits.

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MAFF: Ministry of Agriculture, Fisheries and Food - "Code of Good Agricultural Practice for the Protection of Soil

#pH dependent. If exceeded, to be compared against appropriate MAFF value for the pH



ARP GEOTECHNICAL LIMITED
SOIL CONTAMINANT SCREENING VALUES
PUBLIC OPEN SPACE NEAR RESIDENTIAL

Determinand	S4UL (mg/kg)			C4SL (mg/kg)		
Arsenic	79			79		
Cadmium	120			220		
Chromium (trivalent)	1500					
Chromium (hexavalent)	7.7			21		
Copper	12000					
Lead				630		
Inorganic Mercury	120			610		
Nickel	230					
Selenium	1100					
Zinc	81000					
Acidity (pH)	*Should be Greater Than 5					
	1% SOM	2.5% SOM	6% SOM	1% SOM	2.5% SOM	6% SOM
Naphthalene**	4900	4900	4900	11,000	15,000	17,000
Acenaphthylene	15000	15000	15000			
Acenaphthene	15000	15000	15000			
Fluorene	9900	9900	9900			
Phenanthrene	3100	3100	3100			
Anthracene	74000	74000	74000			
Fluoranthene	3100	3100	3100			
Pyrene	7400	7400	7400			
Benzo(a)anthracene	29	29	29			
Chrysene	57	57	57			
Benzo(b)fluoranthene	7.1	7.2	7.2			
Benzo(k)fluoranthene	190	190	190			
Benzo(a)pyrene	5.7	5.7	5.7			10
Indeno(1,2,3-cd)pyrene	82	82	82			
Dibenzo(a,h)anthracene	0.57	0.57	0.57			
Benzo(g,h,i)perylene	640	640	640			
Phenols	440	690	1300			
Total TPH	*Above 3,800, speciate and compare with values below:					
C5 to C6 Aliphatic	570000	590000	600000			
C6 to C8 Aliphatic	600000	610000	620000			
C8 to C10 Aliphatic	13000	13000	13000			
C10 to C12 Aliphatic	13000	13000	13000			
C12 to C16 Aliphatic	13000	13000	13000			
C16 to C35 Aliphatic	250000	250000	250000			
C35 TO C44 Aliphatic	250000	250000	250000			
C5 to C7 Aromatic (Benzene)	56000	56000	56000			
C7 to C8 Aromatic (Toluene)	56000	56000	56000			
C8 to C10 Aromatic	5000	5000	5000			
C10 to C12 Aromatic	5000	5000	5000			
C12 to C16 Aromatic	5100	5100	5000			
C16 to C21 Aromatic	3800	3800	3800			
C21 TO C35 Aromatic	3800	3800	3800			
C35 TO C44 Aromatic	3800	3800	3800			
Asbestos	*Should be None Detected			*Should be None Detected		

* In House Value/Approach S4UL = Suittable 4 Use Level, CIEH/LQM 2014 C4SL = Cat 4 Screening Level, DEFRA, 2014

Blank cell indicates no published value or in-house value. Some values presented are above saturation limits. Considered separately.

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