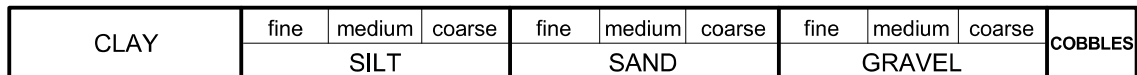


In accordance with clauses 9.2 of BS1377:Part 2:1990

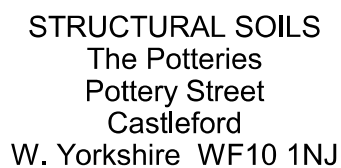
Depth (m): **0.80**



Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

Soil Fraction	Sieve Percentage (%)
GRAVEL	5
SAND	89
SILT/CLAY	6

Red brown slightly clayey slightly gravelly SAND



Date _____

16/07/18

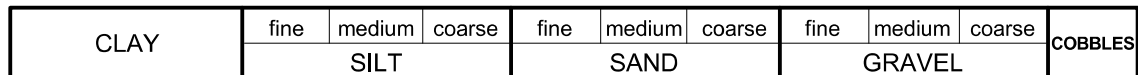
Talbot Mill

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In accordance with clauses 9.2 of BS1377:Part 2:1990

Depth (m): **1.50**



Particle Diameter (mm)	Percent Passing (%)
Sedimentation sample was not pre-treated	

Soil Fraction	Sieve Percentage (%)
GRAVEL	15
SAND	78
SILT/CLAY	7

Soil Description:
Orange brown silty gravelly SAND

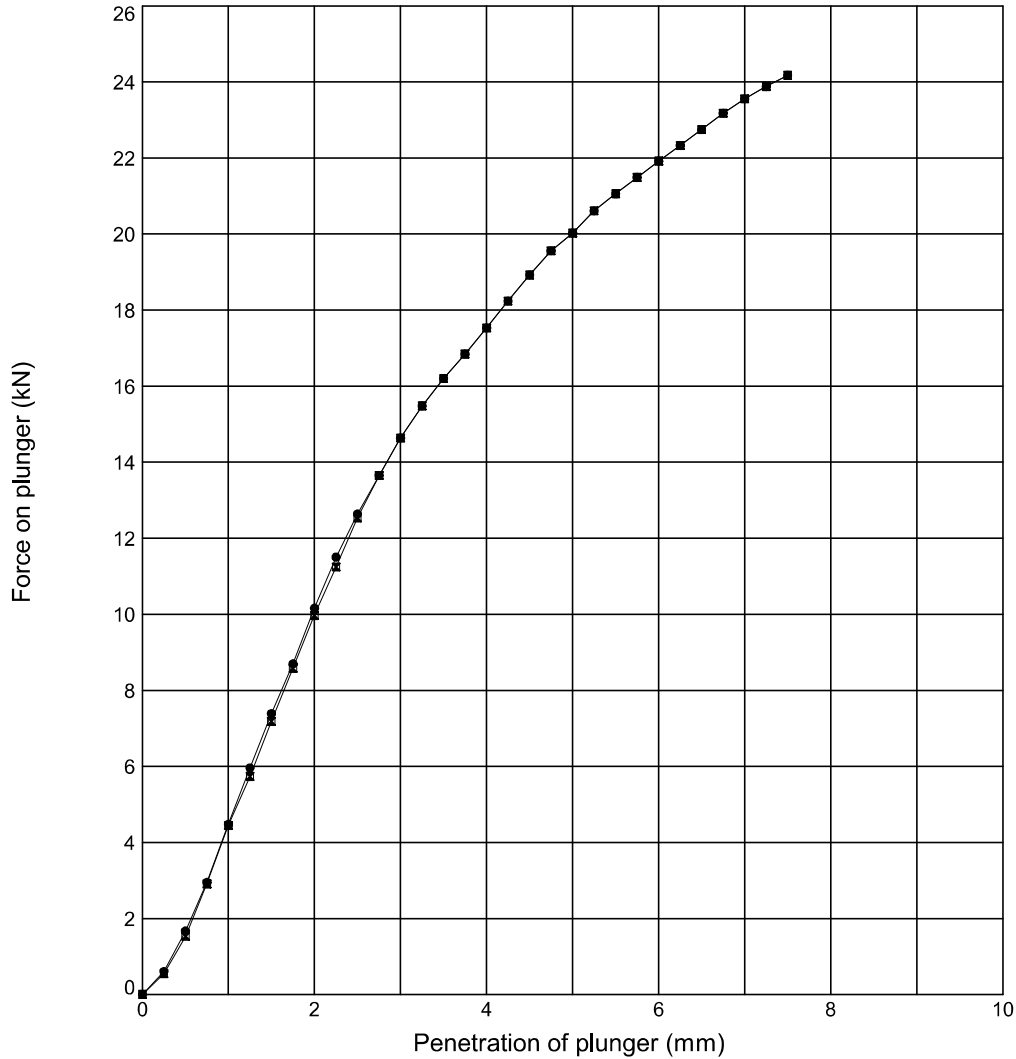


[REDACTED]		Compiled By	Date
[REDACTED]		SARAH MUNDY	16/07/18
Contract Talbot Mill		Contract Ref: 783202	

LABORATORY CALIFORNIA BEARING RATIO TEST

In accordance with clause 7 of BS1377:Part 4:1990

Position ID: **JBH04** Sample Ref: **2** Sample Type: **B** Depth (m): **2.00**



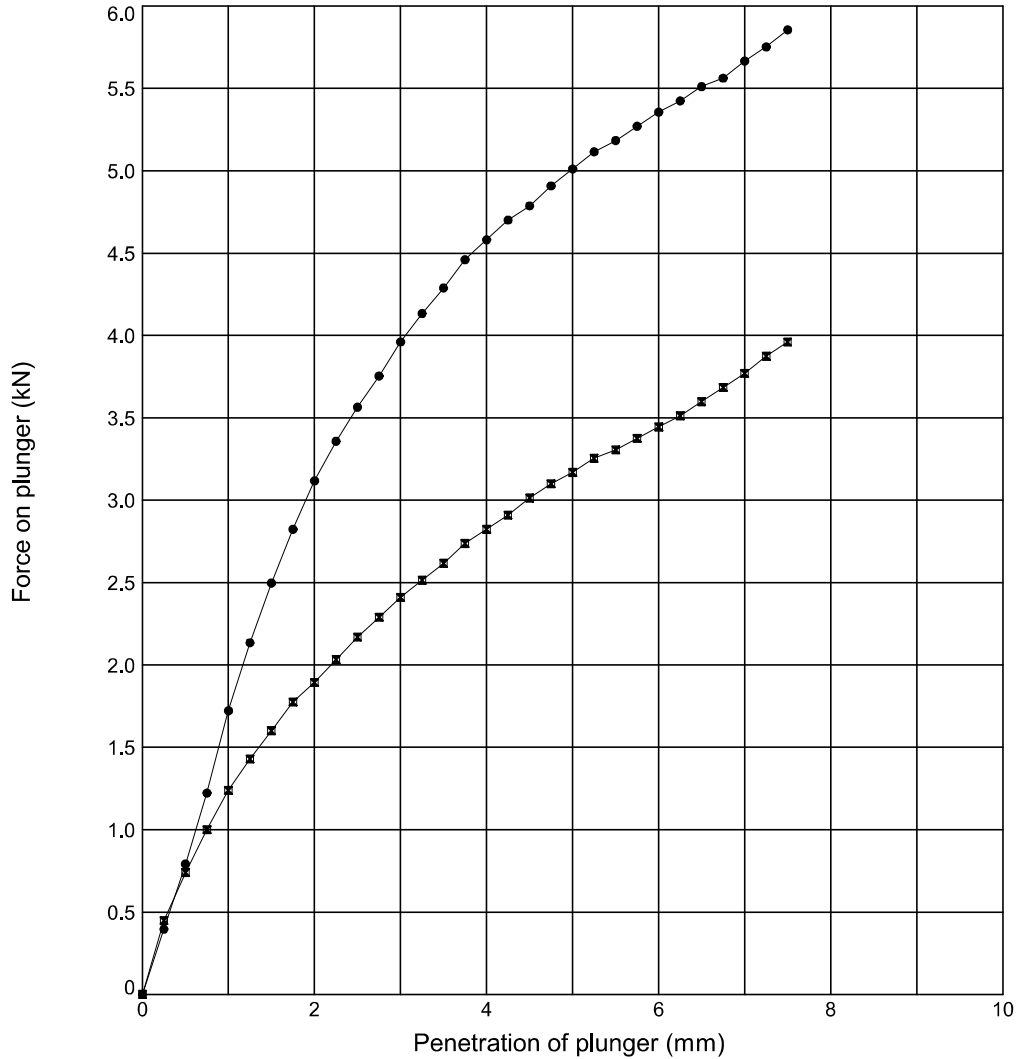
Initial Sample Conditions	Test Details	Test Results	Top	Base
Initial Moisture Content (%) : 8.4	Compaction Type : 2.5 kg Dynamic	Moisture Content (%)	8.4	8.4
Initial Bulk Density (Mg/m ³) : 2.35	Surcharge (kg) : 4.0	CBR value (%)	100	100
Initial Dry Density (Mg/m ³) : 2.17	Soaking Time (hrs) : -	Remarks: None		
% retained on 20mm sieve : 0	Swelling (mm) : -			
Sample Description		Key		
Brown clayey very sandy GRAVEL		● Top ⊠ Base		

 STRUCTURAL SOILS The Potteries Pottery Street Castleford W. Yorkshire WF10 1NJ	Compiled By		Date
	[Redacted]		SARAH MUNDY
	Contract	Contract Ref:	
	Talbot Mill	783202	
			

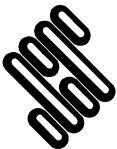
LABORATORY CALIFORNIA BEARING RATIO TEST

In accordance with clause 7 of BS1377:Part 4:1990

Position ID: **JTP31** Sample Ref: **1** Sample Type: **B** Depth (m): **1.50**



Initial Sample Conditions	Test Details	Test Results	Top	Base
Initial Moisture Content (%) : 10	Compaction Type : Vibrating Hammer	Moisture Content (%)	10	10
Initial Bulk Density (Mg/m ³) : 1.87	Surcharge (kg) : 4.0	CBR value (%)	27	16
Initial Dry Density (Mg/m ³) : 1.70	Soaking Time (hrs) : -	Remarks: None		
% retained on 20mm sieve : 3	Swelling (mm) : -			
Sample Description		Key		
Orange brown silty gravelly SAND		● Top ■ Base		

 STRUCTURAL SOILS The Potteries Pottery Street Castleford W. Yorkshire WF10 1NJ	Compiled By		Date
			MAUREEN FISHER
	Contract		Contract Ref:
Talbot Mill		783202	
			

RT03 Point Load Testing (in accordance with ISRM 2007)

Results	Key
$I_a(50)$ Mean Axial tests = 0.3 MN/m² Unable to calculate $I_a(50)$ Strength Anisotropy Index from this dataset. <u>Note:</u> Size Correction Factor (F) calculated using $F = (D_g/50)^{0.45}$ (where D_g is equivalent core diameter).	Type of Test column.: A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, NS_s Denotes Non-standard Test. Point Load Index column.: (V) = included in mean calculations, (X) = excluded from mean calculations Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NU), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

RESULTS

$I_a(50)$ Mean Axial tests = **0.3 MN/m²**
Unable to calculate $I_a(50)$ Strength Anisotropy Index from this dataset.
Note: Size Correction Factor (F) calculated using $F = (D_0/50)^{0.4-0.5}$ (where D_0 is equivalent core diameter).

 STRUCTURAL SOILS The Potteries Pottery Street Castleford W. Yorkshire WF10 1NJ	Contract:		Compiled By	Date	Contract Ref:
	Talbot Mill				

RT03 Point Load Testing (in accordance with ISRM 2007)

Results	Key
$I_s(50)$ Mean Axial tests = 0.49 MN/m² $I_s(50)$ Mean Diametral tests = 0.12 MN/m² $I_s(50)$ Strength Anisotropy Index = 4.16 (calculated from highest and lowest diametral and axial $I_s(50)$ ratio) Note: Size Correction Factor (F) calculated using $F = (D_c/50)^{0.45}$ (where D_c is equivalent core diameter).	Type of Test column: A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, NS_s denotes Non-standard Test. Point Load Index column: (V) = included in mean calculations, (X) = excluded from mean calculations Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NU), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

Type of Test column:, A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, ^{NEW} denotes Non-standard Test.

^(NS) Point Load Index column: (✓) = included in mean calculations, (✗) = excluded from mean calculations

Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NU), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

 STRUCTURAL SOILS The Potteries Pottery Street Castleford W. Yorkshire WF10 1NJ			Compiled By		Date
	Contract:		MAUREEN FISHER 16.07.18		

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Contract Ref:

Talbot Mill

RT03 Point Load Testing (in accordance with ISRM 2007)

Results	Key
$I_s(50)$ Mean Axial tests = 0.4 MN/m² $I_s(50)$ Mean Diametral tests = 0.14 MN/m² $I_s(50)$ Strength Anisotropy Index = 2.79 (calculated from highest and lowest diametral and axial $I_s(50)$ ratio) Note: Size Correction Factor (F) calculated using $F = (D_o/50)^{0.45}$ (where D_o is equivalent core diameter).	Type of Test column: A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, NS_S denotes Non-standard Test. Point Load Index column: (V) = included in mean calculations, (X) = excluded from mean calculations Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NU), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

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RT03 Point Load Testing (in accordance with ISRM 2007)

Results

Results

$I_{\text{a}}(50)$ Mean Axial tests = **0.07** MN/m²
 $I_{\text{s}}(50)$ Mean Diametral tests = **0.01** MN/m²
 $I_{\text{a}}(50)$ Strength Anisotropy Index = **9.2** (calculated from highest and lowest diametral and axial $I_{\text{s}}(50)$ ratio)
 Note: Size Correction Factor (F) calculated using $F = (D_{\text{a}}/50)^{0.45}$ (where D_{a} is equivalent core diameter).

Key

Type of Test column: A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, (NS) denotes Non-standard Test.
 Point Load Index column: ($\checkmark$) = included in mean calculations, ($\times$) = excluded from mean calculations
 Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NU), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

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RT03 Point Load Testing (in accordance with ISRM 2007)

Results

RESULTS

$I_s(50)$ Mean Axial tests = **0.37** MN/m²
 $I_s(50)$ Mean Diametral tests = **0.15** MN/m²
 $I_s(50)$ Strength Anisotropy Index = **2.43** (calculated from highest and lowest diametral and axial $I_s(50)$ ratio)
Note-Size Correction Factor (F) calculated using $F = (D/50)^{0.45}$ (where D is equivalent core diameter).

Key

Type of Test column: A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, $\frac{\Delta \sigma}{\Delta \epsilon}$ denotes Non-standard Test. ^(NS)
Point Load Index column: (✓) = included in mean calculations, (✗) = excluded from mean calculations
Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NU), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

 STRUCTURAL SOILS The Potteries Pottery Street Castleford W. Yorkshire WF10 1NJ			Compiled By		Date	
				MAUREEN FISHER	16.07.18	
	Contract:					
			Talbot Mill			
					Contract Ref:	
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RT03 Point Load Testing (in accordance with ISRM 2007)

Results	Key
$I_0(50)$ Mean Axial tests = 0.19 MN/m² Unable to calculate $I_0(50)$ Strength Anisotropy Index from this dataset. Note: Size Correction Factor (F) calculated using $F = (D_0/50)^{0.45}$ (where D_0 is equivalent core diameter).	Type of Test column: A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, NS₀ Denotes Non-standard Test. Point Load Index column: (V) = included in mean calculations, (X) = excluded from mean calculations Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NU), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

Type of Test column:, A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, ^{NEW} denotes Non-standard Test.

^(NS) Point Load Index column: (✓) = included in mean calculations, (✗) = excluded from mean calculations

Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NU), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

 STRUCTURAL SOILS The Potteries Pottery Street Castleford W. Yorkshire WF10 1NJ			Compiled By	Date	Contract Ref: 783202
	Contract:			MAUREEN FISHER 16.07.18	
Talbot Mill					

UNIAXIAL COMPRESSIVE STRENGTH

RT05 UCS of Rock-Sample Preparation (In-house method based on ASTM D4543-08 and Eurocode 7 Part 2 W.1.1)
RT06 UCS of Rock (In-house method based on ISRM 2007, ASTM D4543-08 and Eurocode 7 Part 2 W.1.1)

Borehole: **JBH01** Sample Ref: **3** Sample Type: **C** Depth (m): **4.70**

Bulk Density (Mg/m³): **2.11** Dry Density (Mg/m³): **1.92** Moisture Content (%): **10**
Length (mm): **151.20** Diameter (mm): **86.18** Length/Diameter Ratio: **1.75**
Test Duration (mins:secs): **8** Stress Rate (kN/min): **4.2** Load at Failure (kN): **48.3**
UCS (MPa): **8.3** Failure Type: **Shear**

Note: **Axis of loading parallel to core axis**
Description: **Brown/red SANDSTONE**
Specimen Preparation: **Specimen was not recored.**
Sample tolerance checks: Straightness: **PASS**. Flatness: **PASS**. Perpendicularity: **PASS**.
Non-standard notes: **Non Standard Test Ratio 1.75:1**



Front view (pre-test)



Rear view (pre-test)



Front view (post-test)



Rear view (post-test)

Samples delivered from site to storage facility. Samples are stored in a frost free environment, at temperatures >4°C
Compression machine: Impact CT340 2000kN Auto Compression Machine Serial No. CT340-22. SSL No. 011076



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The Potteries
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Date

MAUREEN FISHER

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UNIAXIAL COMPRESSIVE STRENGTH

RT05 UCS of Rock-Sample Preparation (In-house method based on ASTM D4543-08 and Eurocode 7 Part 2 W.1.1)
RT06 UCS of Rock (In-house method based on ISRM 2007, ASTM D4543-08 and Eurocode 7 Part 2 W.1.1)

Borehole: **JBH01** Sample Ref: **5** Sample Type: **C** Depth (m): **10.40**

Bulk Density (Mg/m^3): **1.98** Dry Density (Mg/m^3): **1.82** Moisture Content (%): **8.9**
Length (mm): **201.83** Diameter (mm): **86.70** Length/Diameter Ratio: **2.33**
Test Duration (mins:secs): **6** Stress Rate (kN/min): **4.2** Load at Failure (kN): **29.2**
UCS (MPa): **4.9** Failure Type: **Explosive**

Note: **Axis of loading parallel to core axis**
Description: **Brown/red SANDSTONE**
Specimen Preparation: **Specimen was not recored.**
Sample tolerance checks: Straightness: **PASS**. Flatness: **PASS**. Perpendicularity: **PASS**.



Front view (pre-test)



Rear view (pre-test)



Front view (post-test)



Rear view (post-test)

Samples delivered from site to storage facility. Samples are stored in a frost free environment, at temperatures $>4^{\circ}\text{C}$
Compression machine: Impact CT340 2000kN Auto Compression Machine Serial No. CT340-22. SSL No. 011076



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UNIAXIAL COMPRESSIVE STRENGTH

RT05 UCS of Rock-Sample Preparation (In-house method based on ASTM D4543-08 and Eurocode 7 Part 2 W.1.1)
RT06 UCS of Rock (In-house method based on ISRM 2007, ASTM D4543-08 and Eurocode 7 Part 2 W.1.1)

Borehole: **JBH02** Sample Ref: **4** Sample Type: **C** Depth (m): **10.80**

Bulk Density (Mg/m³): **1.97** Dry Density (Mg/m³): **1.76** Moisture Content (%): **12**
Length (mm): **202.73** Diameter (mm): **86.32** Length/Diameter Ratio: **2.35**
Test Duration (mins:secs): **3** Stress Rate (kN/min): **5.4** Load at Failure (kN): **19.3**
UCS (MPa): **3.3** Failure Type: **Shear**

Note: **Axis of loading parallel to core axis**
Description: **Brown.red SANDSTONE**
Specimen Preparation: **Specimen was not recored.**
Sample tolerance checks: Straightness: **PASS**. Flatness: **PASS**. Perpendicularity: **PASS**.



Front view (pre-test)



Rear view (pre-test)



Front view (post-test)



Rear view (post-test)

Samples delivered from site to storage facility. Samples are stored in a frost free environment, at temperatures >4°C
Compression machine: Impact CT340 2000kN Auto Compression Machine Serial No. CT340-22. SSL No. 011076



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UNIAXIAL COMPRESSIVE STRENGTH

RT05 UCS of Rock-Sample Preparation (In-house method based on ASTM D4543-08 and Eurocode 7 Part 2 W.1.1)
RT06 UCS of Rock (In-house method based on ISRM 2007, ASTM D4543-08 and Eurocode 7 Part 2 W.1.1)

Borehole: **JBH02** Sample Ref: **6** Sample Type: **C** Depth (m): **14.00**

Bulk Density (Mg/m³): **2.00** Dry Density (Mg/m³): **1.85** Moisture Content (%): **8.1**
Length (mm): **172.60** Diameter (mm): **85.84** Length/Diameter Ratio: **2.01**
Test Duration (mins:secs): **11** Stress Rate (kN/min): **2.4** Load at Failure (kN): **38.3**
UCS (MPa): **6.6** Failure Type: **Shear**

Note: **Axis of loading parallel to core axis**
Description: **Brown/red SANDSTONE**
Specimen Preparation: **Specimen was not recored.**
Sample tolerance checks: Straightness: **PASS**. Flatness: **PASS**. Perpendicularity: **PASS**.



Front view (pre-test)



Rear view (pre-test)



Front view (post-test)



Rear view (post-test)

Samples delivered from site to storage facility. Samples are stored in a frost free environment, at temperatures >4°C
Compression machine: Impact CT340 2000kN Auto Compression Machine Serial No. CT340-22. SSL No. 011076



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UNIAXIAL COMPRESSIVE STRENGTH

RT05 UCS of Rock-Sample Preparation (In-house method based on ASTM D4543-08 and Eurocode 7 Part 2 W.1.1)
RT06 UCS of Rock (In-house method based on ISRM 2007, ASTM D4543-08 and Eurocode 7 Part 2 W.1.1)

Borehole: **JBH03** Sample Ref: **3** Sample Type: **C** Depth (m): **4.80**

Bulk Density (Mg/m³): **2.02** Dry Density (Mg/m³): **1.95** Moisture Content (%): **3.8**
Length (mm): **218.43** Diameter (mm): **85.66** Length/Diameter Ratio: **2.55**
Test Duration (mins:secs): **18** Stress Rate (kN/min): **2.4** Load at Failure (kN): **63.3**
UCS (MPa): **11.0** Failure Type: **Shear**

Note: **Axis of loading parallel to core axis**
Description: **Red/brown SANDSTONE**
Specimen Preparation: **Specimen was not recored.**
Sample tolerance checks: Straightness: **PASS**. Flatness: **PASS**. Perpendicularity: **PASS**.



Front view (pre-test)



Rear view (pre-test)



Front view (post-test)



Rear view (post-test)

Samples delivered from site to storage facility. Samples are stored in a frost free environment, at temperatures >4°C
Compression machine: Impact CT340 2000kN Auto Compression Machine Serial No. CT340-22. SSL No. 011076



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Compiled By		Date
[Redacted]		16/07/18
MAUREEN FISHER		
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Talbot Mill	783202	



TESTING VERIFICATION CERTIFICATE



1774

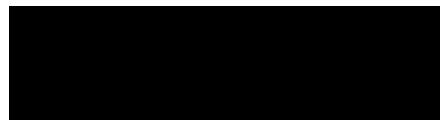
The test results included in this report are certified as:-

ISSUE STATUS: **FINAL**

In accordance with the Structural Soils Ltd Laboratory Quality Management System, results sheets and summaries of results issued by the laboratory are checked by an approved signatory. The integrity of the test data and results are ensured by control of the computer system employed by the laboratory as part of the Software Verification Program as detailed in the Laboratory Quality Manual.

This testing verification certificate covers all testing compiled on or before the following datetime: **16/07/2018 15:26:08.**

Testing reported after this date is not covered by this Verification Certificate.



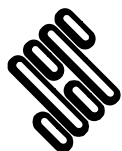
Approved Signatory
Mark Athorne (Laboratory Manager)

(Head Office)
Bristol Laboratory
Unit 1A, Princess Street
Bedminster
Bristol
BS3 4AG

Castleford Laboratory
The Potteries, Pottery Street
Castleford
West Yorkshire
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Hemel Laboratory
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Hemel Hempstead
Hertfordshire
HP3 9RT

Tonbridge Laboratory
Anerley Court, Half Moon Lane
Hildenborough
Tonbridge
TN11 9HU



**STRUCTURAL
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Contract:

Talbot Mill

Job No:

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FINAL ANALYTICAL TEST REPORT

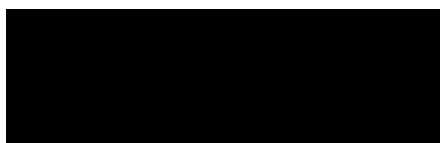
Envirolab Job Number: 18/04796
Issue Number: 1

Date: 22 June, 2018

Client: Structural Soils Limited (Castleford Lab)
The Potteries
Pottery Street
Castleford
West Yorkshire
UK
WF10 1NJ

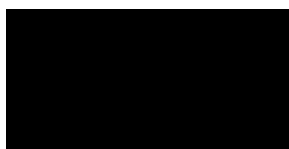
Project Manager: Mark Athorne
Project Name: Talbot Mill
Project Ref: 783202
Order No: N/A
Date Samples Received: 14/06/18
Date Instructions Received: 18/06/18
Date Analysis Completed: 22/06/18

Prepared by:



Holly Neary-King
Sales Executive

Approved by:



Georgia King
Admin & Client Services Supervisor

Envirolab Job Number: 18/04796

Client Project Name: Talbot Mill

Client Project Ref: 783202

Lab Sample ID	18/04796/1	18/04796/2	18/04796/3	18/04796/4	18/04796/5	18/04796/6	18/04796/7	18/04796/8	Units	Method ref
Client Sample No										
Client Sample ID	JBH01	JBH01	JBH01	JBH02	JBH02	JBH02	JBH03	JBH04		
Depth to Top	1.60	1.70	6.20	4.80	6.70	11.70	1.20	2.00		
Depth To Bottom	1.70	3.20	7.70	5.70	7.20	13.20	1.70			
Date Sampled	16-May-18			15-May-18			17-May-18	15-May-18		
Sample Type	Soil - D	Soil	Soil	Soil - D	Soil	Soil	Solid	Soil - D		
Sample Matrix Code	1	1A	1A	1A	1A	1A	7	4A		
% Stones >10mm _A	<0.1	<0.1	<0.1	<0.1	<0.1	3.2	<0.1	23.2	% w/w	A-T-044
pH BRE _D ^{M#}	8.25	8.13	7.51	7.64	7.60	7.70	8.37	8.02	pH	A-T-031s
Chloride BRE, SO4 equiv. (water sol 2:1) _D ^{M#}	<7	<7	<7	<7	<7	<7	<7	<7	mg/l	A-T-026s
Sulphate BRE (water sol 2:1) _D ^{M#}	13	16	40	<10	<10	<10	<10	22	mg/l	A-T-026s

Envirolab Job Number: 18/04796

Client Project Name: Talbot Mill

Client Project Ref: 783202

Lab Sample ID	18/04796/9	18/04796/10	18/04796/11	18/04796/12	18/04796/13	18/04796/14	18/04796/15	18/04796/16	Units	Method ref
Client Sample No			1				2			
Client Sample ID	JTP05	JTP10A	JTP20	JTP23	JTP24	JTP30	JTP31	JBH02		
Depth to Top	0.50	0.50	0.20	0.40	0.90	0.80	1.50	1.20		
Depth To Bottom	0.65	0.80	0.40	0.60	1.00	1.50	1.80			
Date Sampled	17-May-18	17-May-18	15-May-18	16-May-18	16-May-18	15-May-18	14-May-18			
Sample Type	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Soil - D	Solid		
Sample Matrix Code	4A	4A	4A	4A	4	1	4A	7		
% Stones >10mm _A	29.0	29.9	25.5	37.9	12.1	<0.1	10.1	<0.1	% w/w	A-T-044
pH BRE _D ^{M#}	8.03	8.04	7.64	8.22	8.23	8.67	7.71	8.34	pH	A-T-031s
Chloride BRE, SO4 equiv. (water sol 2:1) _D ^{M#}	<7	<7	123	<7	<7	<7	<7	<7	mg/l	A-T-026s
Sulphate BRE (water sol 2:1) _D ^{M#}	89	247	1150	<10	<10	<10	64	23	mg/l	A-T-026s

Envirolab Job Number: 18/04796

Client Project Name: Talbot Mill

Client Project Ref: 783202

Lab Sample ID	18/04796/17	18/04796/18							Units	Method ref
Client Sample No		1								
Client Sample ID	JBH01	JTP06								
Depth to Top	4.70	0.75								
Depth To Bottom	6.20	0.95								
Date Sampled		15-May-18								
Sample Type	Soil - D	Soil - D								
Sample Matrix Code	1A	6A								
% Stones >10mm _A	<0.1	17.0							% w/w	A-T-044
pH BRE _D ^{M#}	8.15	7.13							pH	A-T-031s
Chloride BRE, SO4 equiv. (water sol 2:1) _D ^{M#}	<7	104							mg/l	A-T-026s
Sulphate BRE (water sol 2:1) _D ^{M#}	14	214							mg/l	A-T-026s

REPORT NOTES

General:

This report shall not be reproduced, except in full, without written approval from Envirolab.

All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.



APPENDIX G LABORATORY CERTIFICATES FOR GROUNDWATER

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 18/04274

Issue Number: 1

Date: 13 June, 2018

Client: RSK Environment Ltd Manchester
Fourways House
57 Hilton Street
Manchester
Lancashire
UK
M1 2EJ

Project Manager: Emma Hobbs

Project Name: Talbot Mill

Project Ref: 11264

Order No: N/A

Date Samples Received: 30/05/18

Date Instructions Received: 31/05/18

Date Analysis Completed: 13/06/18

Prepared by:



Melanie Marshall
Laboratory Coordinator

Approved by:



John Gustafson
Managing Director

Envirolab Job Number: 18/04274

Client Project Name: Talbot Mill

Client Project Ref: 11264

Lab Sample ID	18/04274/1	18/04274/2	18/04274/3						Units	Method ref
Client Sample No										
Client Sample ID	JBH01	JBH02	JBH03							
Depth to Top	7.00	6.50	5.00							
Depth To Bottom										
Date Sampled	29-May-18	29-May-18	29-May-18							
Sample Type	Water - EW	Water - EW	Water - EW							
Sample Matrix Code	N/A	N/A	N/A							
pH (w) _A [#]	6.95	6.95	7.59						pH	A-T-031w
Hardness Total _A [#]	265	460	248						mg/l Ca CO ₃	A-T-049w
Chloride (w) _A [#]	29	103	31						mg/l	A-T-026w
Sulphate (w) _A [#]	135	165	23						mg/l	A-T-026w
DOC (w) _A [#]	2.7	2.2	1.3						mg/l	A-T-032w
Arsenic (dissolved) _A [#]	1	<1	1						µg/l	A-T-025w
Cadmium (dissolved) _A [#]	<0.2	<0.2	<0.2						µg/l	A-T-025w
Copper (dissolved) _A [#]	2	2	2						µg/l	A-T-025w
Chromium (dissolved) _A [#]	9	7	14						µg/l	A-T-025w
Lead (dissolved) _A [#]	3	1	<1						µg/l	A-T-025w
Magnesium (dissolved) _A [#]	18	16	18						mg/l	A-T-049w
Mercury (dissolved) _A [#]	<0.1	<0.1	<0.1						µg/l	A-T-025w
Nickel (dissolved) _A [#]	2	5	1						µg/l	A-T-025w
Selenium (dissolved) _A [#]	1	<1	<1						µg/l	A-T-025w
Zinc (dissolved) _A [#]	14	13	2						µg/l	A-T-025w

Envirolab Job Number: 18/04274

Client Project Name: Talbot Mill

Client Project Ref: 11264

Lab Sample ID	18/04274/1	18/04274/2	18/04274/3						Units	Method ref
Client Sample No										
Client Sample ID	JBH01	JBH02	JBH03							
Depth to Top	7.00	6.50	5.00							
Depth To Bottom										
Date Sampled	29-May-18	29-May-18	29-May-18							
Sample Type	Water - EW	Water - EW	Water - EW							
Sample Matrix Code	N/A	N/A	N/A							
PAH 16MS (w)										
Acenaphthene (w) _A [#]	<0.01	<0.01	0.03						µg/l	A-T-019w
Acenaphthylene (w) _A [#]	<0.01	<0.01	<0.01						µg/l	A-T-019w
Anthracene (w) _A [#]	<0.01	<0.01	0.01						µg/l	A-T-019w
Benzo(a)anthracene (w) _A [#]	<0.01	<0.01	0.04						µg/l	A-T-019w
Benzo(a)pyrene (w) _A [#]	<0.01	<0.01	0.04						µg/l	A-T-019w
Benzo(b)fluoranthene (w) _A [#]	<0.01	<0.01	0.04						µg/l	A-T-019w
Benzo(ghi)perylene (w) _A [#]	<0.01	<0.01	0.02						µg/l	A-T-019w
Benzo(k)fluoranthene (w) _A [#]	<0.01	<0.01	0.02						µg/l	A-T-019w
Chrysene (w) _A [#]	<0.01	<0.01	0.06						µg/l	A-T-019w
Dibenzo(ah)anthracene (w) _A [#]	<0.01	<0.01	<0.01						µg/l	A-T-019w
Fluoranthene (w) _A [#]	<0.01	0.02	0.09						µg/l	A-T-019w
Fluorene (w) _A [#]	<0.01	<0.01	0.01						µg/l	A-T-019w
Indeno(123-cd)pyrene (w) _A [#]	<0.01	<0.01	0.02						µg/l	A-T-019w
Naphthalene (w) _A [#]	<0.01	<0.01	<0.01						µg/l	A-T-019w
Phenanthrene (w) _A [#]	<0.01	0.01	0.08						µg/l	A-T-019w
Pyrene (w) _A [#]	0.09	0.02	0.10						µg/l	A-T-019w
Total PAH 16MS (w) _A [#]	0.09	0.05	0.56						µg/l	A-T-019w

Envirolab Job Number: 18/04274

Client Project Name: Talbot Mill

Client Project Ref: 11264

Lab Sample ID	18/04274/1	18/04274/2	18/04274/3						Units	Method ref
Client Sample No										
Client Sample ID	JBH01	JBH02	JBH03							
Depth to Top	7.00	6.50	5.00							
Depth To Bottom										
Date Sampled	29-May-18	29-May-18	29-May-18							
Sample Type	Water - EW	Water - EW	Water - EW							
Sample Matrix Code	N/A	N/A	N/A							
TPH CWG										
Ali >C5-C6 (w) _A [#]	<1	<1	3						µg/l	A-T-022w
Ali >C6-C8 (w) _A [#]	<1	<1	<1						µg/l	A-T-022w
Ali >C8-C10 (w) _A [#]	<1	<1	<1						µg/l	A-T-022w
Ali >C10-C12 (w) _A [#]	<5	<5	<5						µg/l	A-T-023w
Ali >C12-C16 (w) _A [#]	<5	<5	<5						µg/l	A-T-023w
Ali >C16-C21 (w) _A [#]	<5	<5	<5						µg/l	A-T-023w
Ali >C21-C35 (w) _A [#]	<5	<5	<5						µg/l	A-T-023w
Total Aliphatics (w) _A	<5	<5	<5						µg/l	A-T-022+23w
Aro >C5-C7 (w) _A [#]	<1	<1	<1						µg/l	A-T-022w
Aro >C7-C8 (w) _A [#]	<1	<1	<1						µg/l	A-T-022w
Aro >C8-C9 (w) _A [#]	<1	<1	<1						µg/l	A-T-022w
Aro >C9-C10 (w) _A [#]	<1	<1	<1						µg/l	A-T-022w
Aro >C10-C12 (w) _A [#]	<5	<5	<5						µg/l	A-T-023w
Aro >C12-C16 (w) _A [#]	<5	<5	<5						µg/l	A-T-023w
Aro >C16-C21 (w) _A [#]	<5	<5	<5						µg/l	A-T-023w
Aro >C21-C35 (w) _A [#]	<5	<5	<5						µg/l	A-T-023w
Total Aromatics (w) _A	<5	<5	<5						µg/l	A-T-022+23w
TPH (Ali & Aro) (w) _A	<5	<5	<5						µg/l	A-T-022+23w
BTEX - Benzene (w) _A [#]	<1	<1	<1						µg/l	A-T-022w
BTEX - Toluene (w) _A [#]	<1	<1	<1						µg/l	A-T-022w
BTEX - Ethyl Benzene (w) _A [#]	<1	<1	<1						µg/l	A-T-022w
BTEX - m & p Xylene (w) _A [#]	<1	<1	<1						µg/l	A-T-022w
BTEX - o Xylene (w) _A [#]	<1	<1	<1						µg/l	A-T-022w
MTBE (w) _A [#]	<1	<1	3						µg/l	A-T-022w

REPORT NOTES

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For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.



APPENDIX H

GROUND GAS MONITORING DATA SHEETS

IN-SITU GAS MONITORING RESULTS

[Pressures]	Previous	During	Start	End	Equipment Used & Remarks
Round 1	-	-	1023	-	GA2000 + Weather: Clear + Ground: Dry + Wind: Light + Air Temp: 13DegC
Round 2	-	-	1016	-	GA2000 + YSI556 SN-07L100518 + Peristaltic pump SN-25083312 + Weather: Clear + Ground: Dry + Wind: Light + Air Temp: 18DegC
Round 3	Falling	-	-	-	GA2000 + Weather: Cloudy and windy + Ground: Dry + Wind: Strong + Air Temp: 17DegC
Round 4	-	-	1009	-	GA2000 SN-GA10789 + Weather: Cloudy with gusty winds + Ground: Dry + Wind: Medium + Air Temp: 21DegC
Round 5	-	-	1008	-	GA2000 SN-GA10789 + Weather: Sunny + Ground: Dry + Wind: None + Air Temp: 22DegC
Round 6	-	-	1374	-	GA2000 SN-GA10789 + Weather: Dry and sunny + Ground: Dry + Wind: None + Air Temp: 24DegC

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
JBH01	1	50	1	8.00	7.92	3.00 to 8.00	23/05/2018 08:30:00	1023	1023	0.0 _(l)	2.82	0.2	0.0	20.8	-	0.8	3	0
JBH01	1	50	1		---	3.00 to 8.00	15 secs	-	-	0.0 _(SS)	-	0.2	0.0	20.1	-	-	6	0
JBH01	1	50	1		---	3.00 to 8.00	30 secs	-	-	-	-	0.5	0.0	20.0	-	-	5	0
JBH01	1	50	1		---	3.00 to 8.00	60 secs	-	-	-	-	0.5	0.0	19.9	-	-	5	0
JBH01	1	50	1		---	3.00 to 8.00	90 secs	-	-	-	-	0.5	0.0	19.9	-	-	5	0
JBH01	1	50	1		---	3.00 to 8.00	120 secs	-	-	-	-	0.5	0.0	19.9	-	-	4	0
JBH01	1	50	1		---	3.00 to 8.00	180 secs	-	-	-	-	0.5	0.0	19.9	-	-	5	0
JBH01	1	50	1		---	3.00 to 8.00	240 secs	-	-	-	-	0.5	0.0	19.9	-	-	4	0
JBH01	1	50	1		---	3.00 to 8.00	300 secs	-	-	-	-	0.5	0.0	19.9	-	-	4	0
JBH01	1	50	1		---	3.00 to 8.00	360 secs	-	-	-	-	0.5	0.0	19.9	-	-	4	0
JBH01	1	50	1		---	3.00 to 8.00	420 secs	-	-	-	-	0.5	0.0	19.9	-	-	4	0
JBH01	1	50	2	8.00	7.94	3.00 to 8.00	29/05/2018 10:05:00	1016	1016	0.4 _(l)	2.27	0.0	0.0	20.8	-	1.1	0	0
JBH01	1	50	2		---	3.00 to 8.00	15 secs	-	-	0.0 _(SS)	-	0.4	0.0	20.3	-	-	2	0
JBH01	1	50	2		---	3.00 to 8.00	30 secs	-	-	-	-	0.4	0.0	20.0	-	-	4	0
JBH01	1	50	2		---	3.00 to 8.00	60 secs	-	-	-	-	0.4	0.0	20.0	-	-	4	0
JBH01	1	50	2		---	3.00 to 8.00	90 secs	-	-	-	-	0.4	0.0	20.0	-	-	3	0
JBH01	1	50	2		---	3.00 to 8.00	120 secs	-	-	-	-	0.4	0.0	20.0	-	-	3	0
JBH01	1	50	2		---	3.00 to 8.00	180 secs	-	-	-	-	0.4	0.0	20.0	-	-	3	0

Key: I = Initial, P = Peak, SS = Steady State, Note: LEL = Lower Explosive Limit = 5% v/v.

 RSK Environment Ltd Fourways House 57 Hilton Street Piccadilly Manchester M1 2EJ	Completed By 	Date 10/08/18	Checked By 	Date 10/08/18	Contract Ref: 11264
	Page: Talbot Mill 1 of 10				

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Pipe diameter ref (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
JBH01	1 50	2		---	3.00 to 8.00	240 secs	-	-	-	-	0.4	0.0	20.0	-	-	3	0
JBH01	1 50	2		---	3.00 to 8.00	300 secs	-	-	-	-	0.4	0.0	20.0	-	-	3	0
JBH01	1 50	3	8.00	7.84	3.00 to 8.00	14/06/2018 08:20:00	996	997	0.0 _(l)	2.15	0.2	0.0	21.0	0.0	-	0	0
JBH01	1 50	3		---	3.00 to 8.00	15 secs	-	-	0.1 _(ss)	-	0.9	0.0	19.5	0.0	-	1	0
JBH01	1 50	3		---	3.00 to 8.00	30 secs	-	-	-	-	0.9	0.0	19.3	0.0	-	4	0
JBH01	1 50	3		---	3.00 to 8.00	60 secs	-	-	-	-	0.9	0.0	19.3	0.0	-	3	0
JBH01	1 50	3		---	3.00 to 8.00	90 secs	-	-	-	-	0.9	0.0	19.3	0.0	-	4	0
JBH01	1 50	3		---	3.00 to 8.00	120 secs	-	-	-	-	0.9	0.0	19.3	0.0	-	3	0
JBH01	1 50	3		---	3.00 to 8.00	180 secs	-	-	-	-	0.9	0.0	19.3	0.0	-	3	0
JBH01	1 50	3		---	3.00 to 8.00	240 secs	-	-	-	-	0.9	0.0	19.3	0.0	-	3	0
JBH01	1 50	3		---	3.00 to 8.00	300 secs	-	-	-	-	0.9	0.0	19.3	0.0	-	3	0
JBH01	1 50	4	8.00	7.83	3.00 to 8.00	20/06/2018 10:48:00	1009	1009	-0.1 _(l)	2.29	1.2	0.0	20.1	0.0	-	1	0
JBH01	1 50	4		---	3.00 to 8.00	15 secs	-	-	0.1 _(ss)	-	1.3	0.0	19.1	0.0	-	1	0
JBH01	1 50	4		---	3.00 to 8.00	30 secs	-	-	-	-	1.3	0.0	19.2	0.0	-	1	0
JBH01	1 50	4		---	3.00 to 8.00	60 secs	-	-	-	-	1.2	0.0	19.2	0.0	-	1	0
JBH01	1 50	4		---	3.00 to 8.00	90 secs	-	-	-	-	1.2	0.0	19.2	0.0	-	1	0
JBH01	1 50	4		---	3.00 to 8.00	120 secs	-	-	-	-	1.2	0.0	19.3	0.0	-	1	0
JBH01	1 50	4		---	3.00 to 8.00	180 secs	-	-	-	-	1.1	0.0	19.4	0.0	-	1	0
JBH01	1 50	4		---	3.00 to 8.00	240 secs	-	-	-	-	1.0	0.0	19.5	0.0	-	1	0
JBH01	1 50	4		---	3.00 to 8.00	300 secs	-	-	-	-	0.9	0.0	19.6	0.0	-	1	0
JBH01	1 50	4		---	3.00 to 8.00	360 secs	-	-	-	-	0.9	0.0	19.7	0.0	-	1	0
JBH01	1 50	4		---	3.00 to 8.00	420 secs	-	-	-	-	0.9	0.0	19.7	0.0	-	1	0
JBH01	1 50	4		---	3.00 to 8.00	480 secs	-	-	-	-	0.8	0.0	19.7	0.0	-	1	0
JBH01	1 50	4		---	3.00 to 8.00	540 secs	-	-	-	-	0.8	0.0	19.7	0.0	-	1	0
JBH01	1 50	4		---	3.00 to 8.00	600 secs	-	-	-	-	0.8	0.0	19.7	0.0	-	1	0

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 RSK Environment Ltd Fourways House 57 Hilton Street Piccadilly Manchester M1 2EJ	Compiled By	Date	Checked By	Date	Contract Ref:
		10/08/18		10/08/18	11264
Talbot Mill				Page:	
				2 of 10	
				AGS	

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Pipe diameter ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
JBH01	1	50	5	8.00	7.82	3.00 to 8.00	05/07/2018 11:23:00	1007	1008	-0.4 _(l)	2.39	0.0	0.0	20.3	0.0	-	0	0
JBH01	1	50	5		---	3.00 to 8.00	15 secs	-	-	-0.4 _(ss)	-	1.5	0.0	18.1	0.0	-	4	0
JBH01	1	50	5		---	3.00 to 8.00	30 secs	-	-	-	-	1.3	0.0	18.0	0.0	-	4	0
JBH01	1	50	5		---	3.00 to 8.00	60 secs	-	-	-	-	1.4	0.0	17.9	0.0	-	4	0
JBH01	1	50	5		---	3.00 to 8.00	90 secs	-	-	-	-	1.4	0.0	17.9	0.0	-	4	0
JBH01	1	50	5		---	3.00 to 8.00	120 secs	-	-	-	-	1.4	0.0	17.9	0.0	-	4	0
JBH01	1	50	5		---	3.00 to 8.00	180 secs	-	-	-	-	1.4	0.0	17.9	0.0	-	4	0
JBH01	1	50	5		---	3.00 to 8.00	240 secs	-	-	-	-	1.4	0.0	17.9	0.0	-	5	0
JBH01	1	50	5		---	3.00 to 8.00	300 secs	-	-	-	-	1.4	0.0	17.9	0.0	-	4	0
JBH01	1	50	6	8.00	7.80	3.00 to 8.00	16/07/2018 14:31:00	988	1374	0.4 _(l)	2.34	0.0	0.0	20.5	0.0	0.0	0	0
JBH01	1	50	6		---	3.00 to 8.00	15 secs	-	-	0.4 _(ss)	-	1.6	0.0	18.4	0.0	-	1	0
JBH01	1	50	6		---	3.00 to 8.00	30 secs	-	-	-	-	1.5	0.1	17.9	1.0	-	2	0
JBH01	1	50	6		---	3.00 to 8.00	60 secs	-	-	-	-	1.5	0.1	17.9	1.0	-	2	0
JBH01	1	50	6		---	3.00 to 8.00	90 secs	-	-	-	-	1.5	0.1	17.8	1.0	-	2	0
JBH01	1	50	6		---	3.00 to 8.00	120 secs	-	-	-	-	1.5	0.1	17.8	1.0	-	2	0
JBH01	1	50	6		---	3.00 to 8.00	180 secs	-	-	-	-	1.5	0.1	17.8	1.0	-	2	0
JBH01	1	50	6		---	3.00 to 8.00	240 secs	-	-	-	-	1.5	0.1	17.8	1.0	-	2	0
JBH01	1	50	6		---	3.00 to 8.00	300 secs	-	-	-	-	1.5	0.1	17.8	1.0	-	2	0
JBH02	1	50	1	8.00	7.64	3.00 to 8.00	23/05/2018 10:50:00	1024	1024	0.0 _(l)	3.18	0.0	0.0	21.1	-	0.5	1	0
JBH02	1	50	1		---	3.00 to 8.00	15 secs	-	-	0.0 _(ss)	-	0.4	0.0	20.9	-	-	1	0
JBH02	1	50	1		---	3.00 to 8.00	30 secs	-	-	-	-	0.4	0.0	20.7	-	-	0	0
JBH02	1	50	1		---	3.00 to 8.00	60 secs	-	-	-	-	0.4	0.0	20.7	-	-	0	0
JBH02	1	50	1		---	3.00 to 8.00	90 secs	-	-	-	-	0.4	0.0	20.6	-	-	0	0
JBH02	1	50	1		---	3.00 to 8.00	120 secs	-	-	-	-	0.4	0.0	20.6	-	-	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

 RSK Environment Ltd Fourways House 57 Hilton Street Piccadilly Manchester M1 2EJ	Checked By: 		Date	10/08/18	Contract Ref:	11264
	Date		10/08/18	Page: 3 of 10		
Talbot Mill						

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Pipe diameter ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
JBH02	1	50	1		---	3.00 to 8.00	180 secs	-	-	-	-	0.4	0.0	20.6	-	-	0	0
JBH02	1	50	1		---	3.00 to 8.00	240 secs	-	-	-	-	0.4	0.0	20.5	-	-	0	0
JBH02	1	50	1		---	3.00 to 8.00	300 secs	-	-	-	-	0.4	0.0	20.4	-	-	0	0
JBH02	1	50	1		---	3.00 to 8.00	360 secs	-	-	-	-	0.4	0.0	20.4	-	-	0	0
JBH02	1	50	1		---	3.00 to 8.00	420 secs	-	-	-	-	0.4	0.0	20.4	-	-	0	0
JBH02	1	50	1		---	3.00 to 8.00	29/05/2018 10:55:00	1015	1016	0.0 _(l)	3.17	0.1	0.0	21.0	-	-	0	0
JBH02	1	50	2	8.00	7.61	3.00 to 8.00	15 secs	-	-	0.0 _(ss)	-	0.5	0.0	20.8	-	-	0	0
JBH02	1	50	2		---	3.00 to 8.00	30 secs	-	-	-	-	0.5	0.0	20.7	-	-	0	0
JBH02	1	50	2		---	3.00 to 8.00	60 secs	-	-	-	-	0.5	0.0	20.7	-	-	0	0
JBH02	1	50	2		---	3.00 to 8.00	90 secs	-	-	-	-	0.5	0.0	20.7	-	-	1	0
JBH02	1	50	2		---	3.00 to 8.00	120 secs	-	-	-	-	0.5	0.0	20.7	-	-	1	0
JBH02	1	50	2		---	3.00 to 8.00	180 secs	-	-	-	-	0.5	0.0	20.7	-	-	1	0
JBH02	1	50	2		---	3.00 to 8.00	240 secs	-	-	-	-	0.5	0.0	20.7	-	-	1	0
JBH02	1	50	2		---	3.00 to 8.00	300 secs	-	-	-	-	0.5	0.0	20.7	-	-	1	0
JBH02	1	50	3	8.00	---	3.00 to 8.00	14/06/2018 08:10:00	996	998	0.1 _(l)	-	0.7	0.0	20.4	0.0	-	0	0
Remarks: Could not remove bug. No cone over borehole and gas taps, too high to properly close cover. Unable to take depth readings.																		
JBH02	1	50	3		---	3.00 to 8.00	15 secs	-	-	0.1 _(ss)	-	0.8	0.0	20.4	0.0	-	0	0
JBH02	1	50	3		---	3.00 to 8.00	30 secs	-	-	-	-	0.7	0.0	20.3	0.0	-	0	0
JBH02	1	50	3		---	3.00 to 8.00	60 secs	-	-	-	-	0.7	0.0	20.3	0.0	-	0	0
JBH02	1	50	3		---	3.00 to 8.00	90 secs	-	-	-	-	0.7	0.0	20.3	0.0	-	0	0
JBH02	1	50	3		---	3.00 to 8.00	120 secs	-	-	-	-	0.7	0.0	20.3	0.0	-	0	0
JBH02	1	50	3		---	3.00 to 8.00	180 secs	-	-	-	-	0.7	0.0	20.3	0.0	-	0	0
JBH02	1	50	3		---	3.00 to 8.00	240 secs	-	-	-	-	0.7	0.0	20.3	0.0	-	0	0
JBH02	1	50	3		---	3.00 to 8.00	300 secs	-	-	-	-	0.7	0.0	20.3	0.0	-	0	0
JBH02	1	50	4	8.00	7.83	3.00 to 8.00	20/06/2018 10:21:00	1009	1009	0.1 _(l)	2.29	0.9	0.0	20.2	0.0	-	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

 RSK Environment Ltd Fourways House 57 Hilton Street Piccadilly Manchester M1 2EJ	Compiled By 	Checked By 	Date 10/08/18	Date 10/08/18	Contract Ref: 11264
	Talbot Mill			Page: 4 of 10	

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Pipe diameter ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
JBH02	1	50	4		---	3.00 to 8.00	15 secs	1009	1009	0.1 _(SS)	-	0.8	0.0	20.2	0.0	-	0	0
JBH02	1	50	4		---	3.00 to 8.00	30 secs	-	-	-	-	0.8	0.0	20.2	0.0	-	0	0
JBH02	1	50	4		---	3.00 to 8.00	60 secs	-	-	-	-	0.8	0.0	20.2	0.0	-	0	0
JBH02	1	50	4		---	3.00 to 8.00	90 secs	-	-	-	-	0.8	0.0	20.2	0.0	-	0	0
JBH02	1	50	4		---	3.00 to 8.00	120 secs	-	-	-	-	0.8	0.0	20.3	0.0	-	0	0
JBH02	1	50	4		---	3.00 to 8.00	180 secs	-	-	-	-	0.9	0.0	20.3	0.0	-	0	0
JBH02	1	50	4		---	3.00 to 8.00	240 secs	-	-	-	-	0.9	0.0	20.3	0.0	-	0	0
JBH02	1	50	4		---	3.00 to 8.00	300 secs	-	-	-	-	0.9	0.0	20.3	0.0	-	0	0
JBH02	1	50	4		---	3.00 to 8.00	360 secs	-	-	-	-	0.9	0.0	20.3	0.0	-	0	0
JBH02	1	50	4		---	3.00 to 8.00	420 secs	-	-	-	-	0.9	0.0	20.3	0.0	-	0	0
JBH02	1	50	4		---	3.00 to 8.00	480 secs	-	-	-	-	0.9	0.0	20.4	0.0	-	0	0
JBH02	1	50	4		---	3.00 to 8.00	540 secs	-	-	-	-	0.9	0.0	20.4	0.0	-	0	0
JBH02	1	50	4		---	3.00 to 8.00	600 secs	-	-	-	-	0.9	0.0	20.4	0.0	-	0	0
JBH02	1	50	5	8.00	---	3.00 to 8.00	05/07/2018 11:10:00	1007	1008	-0.1 _(I)	-	0.0	0.0	20.7	0.0	-	0	0
JBH02	1	50	5		---	3.00 to 8.00	15 secs	-	-	-0.1 _(SS)	-	0.9	0.0	20.0	0.0	-	0	0
JBH02	1	50	5		---	3.00 to 8.00	30 secs	-	-	-	-	0.9	0.0	20.0	0.0	-	0	0
JBH02	1	50	5		---	3.00 to 8.00	60 secs	-	-	-	-	0.9	0.0	20.0	0.0	-	0	0
JBH02	1	50	5		---	3.00 to 8.00	90 secs	-	-	-	-	0.9	0.0	19.9	0.0	-	0	0
JBH02	1	50	5		---	3.00 to 8.00	120 secs	-	-	-	-	0.9	0.0	19.9	0.0	-	0	0
JBH02	1	50	5		---	3.00 to 8.00	180 secs	-	-	-	-	0.9	0.0	19.9	0.0	-	0	0
JBH02	1	50	5		---	3.00 to 8.00	240 secs	-	-	-	-	0.9	0.0	19.9	0.0	-	0	0
JBH02	1	50	5		---	3.00 to 8.00	300 secs	-	-	-	-	0.9	0.0	19.9	0.0	-	0	0
JBH02	1	50	6	8.00	---	3.00 to 8.00	16/07/2018 14:15:00	1004	1004	0.6 _(I)	-	0.0	0.0	20.6	0.0	-	0	0
JBH02	1	50	6		---	3.00 to 8.00	15 secs	-	-	0.5 _(SS)	-	0.9	0.0	19.9	0.0	-	0	0
JBH02	1	50	6		---	3.00 to 8.00	30 secs	-	-	-	-	0.9	0.0	19.9	0.0	-	0	0

Key: I = Initial, P = Peak, SS = Steady State, Note: LEL = Lower Explosive Limit = 5% v/v.

 RSK Environment Ltd Fourways House 57 Hilton Street Piccadilly Manchester M1 2EJ	Compiled By: [REDACTED]		Date	10/08/18	Checked By	[REDACTED]	Date	10/08/18	Contract Ref: 11264	
	Co: [REDACTED]		Talbot Mill							Page: 5 of 10

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Pipe diameter ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
JBH02	1	50	6		---	3.00 to 8.00	60 secs	-	-	-	-	0.9	0.0	19.9	0.0	-	0	0
JBH02	1	50	6		---	3.00 to 8.00	90 secs	-	-	-	-	1.0	0.0	19.8	0.0	-	0	0
JBH02	1	50	6		---	3.00 to 8.00	120 secs	-	-	-	-	1.0	0.0	19.8	0.0	-	0	0
JBH02	1	50	6		---	3.00 to 8.00	180 secs	-	-	-	-	1.0	0.0	19.8	0.0	-	0	0
JBH02	1	50	6		---	3.00 to 8.00	240 secs	-	-	-	-	1.0	0.0	19.8	0.0	-	0	0
JBH02	1	50	6		---	3.00 to 8.00	300 secs	-	-	-	-	1.0	0.0	19.8	0.0	-	0	0
JBH03	1	50	1	8.00	5.83	3.00 to 8.00	23/05/2018 09:44:00	1022	1022	-0.1 _(l)	2.68	0.0	0.0	21.4	-	0.5	114	0
JBH03	1	50	1		---	3.00 to 8.00	15 secs	-	-	0.0 _(SS)	-	0.0	0.0	21.4	-	-	113	0
JBH03	1	50	1		---	3.00 to 8.00	30 secs	-	-	-	-	0.0	0.0	21.3	-	-	102	0
JBH03	1	50	1		---	3.00 to 8.00	60 secs	-	-	-	-	0.0	0.0	21.3	-	-	98	0
JBH03	1	50	1		---	3.00 to 8.00	90 secs	-	-	-	-	0.0	0.0	21.3	-	-	96	0
JBH03	1	50	1		---	3.00 to 8.00	120 secs	-	-	-	-	0.0	0.0	21.3	-	-	95	0
JBH03	1	50	1		---	3.00 to 8.00	180 secs	-	-	-	-	0.0	0.0	21.3	-	-	91	0
JBH03	1	50	1		---	3.00 to 8.00	240 secs	-	-	-	-	0.0	0.0	21.3	-	-	88	0
JBH03	1	50	1		---	3.00 to 8.00	300 secs	-	-	-	-	0.0	0.0	21.3	-	-	86	0
JBH03	1	50	1		---	3.00 to 8.00	360 secs	-	-	-	-	0.0	0.0	21.3	-	-	85	0
JBH03	1	50	1		---	3.00 to 8.00	420 secs	-	-	-	-	0.0	0.0	21.3	-	-	85	0
JBH03	1	50	2	8.00	5.83	3.00 to 8.00	29/05/2018 10:20:00	1016	1016	0.0 _(l)	2.69	0.2	0.0	20.2	-	-	10	0
JBH03	1	50	2		---	3.00 to 8.00	15 secs	-	-	0.0 _(SS)	-	0.0	0.0	20.5	-	-	37	0
JBH03	1	50	2		---	3.00 to 8.00	30 secs	-	-	-	-	0.0	0.0	20.5	-	-	38	0
JBH03	1	50	2		---	3.00 to 8.00	60 secs	-	-	-	-	0.0	0.0	20.6	-	-	36	0
JBH03	1	50	2		---	3.00 to 8.00	90 secs	-	-	-	-	0.0	0.0	20.6	-	-	34	0
JBH03	1	50	2		---	3.00 to 8.00	120 secs	-	-	-	-	0.0	0.0	20.6	-	-	33	0
JBH03	1	50	2		---	3.00 to 8.00	180 secs	-	-	-	-	0.0	0.0	20.6	-	-	31	0

Key: I = Initial, P = Peak, SS = Steady State, Note: LEL = Lower Explosive Limit = 5% v/v.

 RSK Environment Ltd Fourways House 57 Hilton Street Piccadilly Manchester M1 2EJ	Compiled By: 	Checked By: 	Contract Ref: 11264
	Date: 10/08/18	Date: 10/08/18	Page: 6 of 10
Talbot Mill			

IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Pipe diameter ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
JBH03	1	50	2		---	3.00 to 8.00	240 secs	-	-	-	-	0.0	0.0	20.7	-	-	30	0
JBH03	1	50	2		---	3.00 to 8.00	300 secs	-	-	-	-	0.0	0.0	20.7	-	-	29	0
JBH03	1	50	3	8.00	5.87	3.00 to 8.00	14/06/2018 08:00:00	997	998	0.1 _(l)	2.68	0.0	0.0	21.0	0.0	-	0	0
JBH03	1	50	3		---	3.00 to 8.00	15 secs	-	-	0.1 _(ss)	-	0.0	0.0	20.9	0.0	-	1	0
JBH03	1	50	3		---	3.00 to 8.00	30 secs	-	-	-	-	0.0	0.0	20.9	0.0	-	2	0
JBH03	1	50	3		---	3.00 to 8.00	60 secs	-	-	-	-	0.0	0.0	20.9	0.0	-	2	0
JBH03	1	50	3		---	3.00 to 8.00	90 secs	-	-	-	-	0.0	0.0	20.9	0.0	-	2	0
JBH03	1	50	3		---	3.00 to 8.00	120 secs	-	-	-	-	0.0	0.0	21.0	0.0	-	0	0
JBH03	1	50	3		---	3.00 to 8.00	180 secs	-	-	-	-	0.0	0.0	21.0	0.0	-	0	0
JBH03	1	50	4	8.00	---	3.00 to 8.00	20/06/2018 10:35:00	-	-	-	-	-	-	-	-	-	-	-
Remarks: Unable to find well position as cars parked in the area.																		
JBH03	1	50	5	8.00	5.73	3.00 to 8.00	05/07/2018 10:32:00	1006	1008	0.0 _(l)	2.79	0.0	0.0	20.8	0.0	-	0	0
JBH03	1	50	5		---	3.00 to 8.00	15 secs	-	-	0.0 _(ss)	-	0.0	0.0	20.7	0.0	-	0	0
JBH03	1	50	5		---	3.00 to 8.00	30 secs	-	-	-	-	0.0	0.0	20.7	0.0	-	1	0
JBH03	1	50	5		---	3.00 to 8.00	60 secs	-	-	-	-	0.0	0.0	20.7	0.0	-	0	0
JBH03	1	50	5		---	3.00 to 8.00	90 secs	-	-	-	DRY	0.0	0.0	20.8	0.0	-	0	0
JBH03	1	50	5		---	3.00 to 8.00	120 secs	-	-	-	-	0.0	0.0	20.8	0.0	-	0	0
JBH03	1	50	5		---	3.00 to 8.00	180 secs	-	-	-	-	0.0	0.0	20.8	0.0	-	0	0
JBH03	1	50	5		---	3.00 to 8.00	240 secs	-	-	-	-	0.0	0.0	20.9	0.0	-	0	0
JBH03	1	50	5		---	3.00 to 8.00	300 secs	-	-	-	-	0.0	0.0	20.9	0.0	-	0	0
JBH03	1	50	6	8.00	5.73	3.00 to 8.00	16/07/2018 14:10:00	1005	1004	0.3 _(l)	2.74	0.0	0.0	20.6	0.0	0.0	0	0
JBH03	1	50	6		---	3.00 to 8.00	15 secs	-	-	0.3 _(ss)	-	0.1	0.0	20.1	0.0	-	0	0
JBH03	1	50	6		---	3.00 to 8.00	30 secs	-	-	-	-	0.1	0.0	20.3	0.0	-	3	0
JBH03	1	50	6		---	3.00 to 8.00	60 secs	-	-	-	-	0.1	0.0	20.4	0.0	-	3	0
JBH03	1	50	6		---	3.00 to 8.00	90 secs	-	-	-	-	0.1	0.0	20.4	0.0	-	3	0

Key: I = Initial, P = Peak, SS = Steady State, Note: LEL = Lower Explosive Limit = 5% v/v.

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IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Pipe diameter ref (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
JBH03	1 50	6		---	3.00 to 8.00	120 secs	-	-	-	-	0.1	0.0	20.4	0.0	-	3	0
JBH03	1 50	6		---	3.00 to 8.00	180 secs	-	-	-	-	0.1	0.0	20.4	0.0	-	3	0
JBH03	1 50	6		---	3.00 to 8.00	240 secs	-	-	-	-	0.1	0.0	20.4	0.0	-	3	0
JBH03	1 50	6		---	3.00 to 8.00	300 secs	-	-	-	-	0.1	0.0	20.4	0.0	-	3	0
JBH04	1 50	1	8.00	6.55	3.00 to 8.00	23/05/2018 11:30:00	1021	1021	0.0 _(l)	5.65	0.6	0.0	20.5	-	0.9	7	0
JBH04	1 50	1		---	3.00 to 8.00	15 secs	-	-	0.0 _(ss)	-	0.6	0.0	20.2	-	-	11	0
JBH04	1 50	1		---	3.00 to 8.00	30 secs	-	-	-	-	0.6	0.0	20.2	-	-	11	0
JBH04	1 50	1		---	3.00 to 8.00	60 secs	-	-	-	-	0.6	0.0	20.2	-	-	10	0
JBH04	1 50	1		---	3.00 to 8.00	90 secs	-	-	-	-	0.6	0.0	20.2	-	-	10	0
JBH04	1 50	1		---	3.00 to 8.00	120 secs	-	-	-	-	0.6	0.0	20.2	-	-	10	0
JBH04	1 50	1		---	3.00 to 8.00	180 secs	-	-	-	-	0.6	0.0	20.2	-	-	10	0
JBH04	1 50	1		---	3.00 to 8.00	240 secs	-	-	-	-	0.6	0.0	20.2	-	-	10	0
JBH04	1 50	1		---	3.00 to 8.00	300 secs	-	-	-	-	0.6	0.0	20.3	-	-	9	0
JBH04	1 50	1		---	3.00 to 8.00	360 secs	-	-	-	-	0.6	0.0	20.3	-	-	9	0
JBH04	1 50	1		---	3.00 to 8.00	420 secs	-	-	-	-	0.6	0.0	20.3	-	-	9	0
JBH04	1 50	2	8.00	5.57	3.00 to 8.00	29/05/2018 11:15:00	1016	1016	0.0 _(l)	4.86	0.3	0.0	20.5	-	0.7	1	0
JBH04	1 50	2		---	3.00 to 8.00	15 secs	-	-	0.0 _(ss)	-	0.3	0.0	20.2	-	-	0	0
JBH04	1 50	2		---	3.00 to 8.00	30 secs	-	-	-	-	0.4	0.0	20.1	-	-	0	0
JBH04	1 50	2		---	3.00 to 8.00	60 secs	-	-	-	-	0.4	0.0	20.1	-	-	0	0
JBH04	1 50	2		---	3.00 to 8.00	90 secs	-	-	-	-	0.4	0.0	20.1	-	-	1	0
JBH04	1 50	2		---	3.00 to 8.00	120 secs	-	-	-	-	0.4	0.0	20.1	-	-	1	0
JBH04	1 50	2		---	3.00 to 8.00	180 secs	-	-	-	-	0.4	0.0	20.1	-	-	1	0
JBH04	1 50	2		---	3.00 to 8.00	240 secs	-	-	-	-	0.4	0.0	20.1	-	-	1	0
JBH04	1 50	2		---	3.00 to 8.00	300 secs	-	-	-	-	0.4	0.0	20.1	-	-	1	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

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IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Pipe diameter ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
JBH04	1	50	3	8.00	5.55	3.00 to 8.00	14/06/2018 08:30:00	996	998	0.0 _(l)	4.83	0.0	0.0	21.0	0.0	-	0	0
JBH04	1	50	3		---	3.00 to 8.00	15 secs	-	-	0.1 _(ss)	-	0.9	0.0	20.0	0.0	-	1	0
JBH04	1	50	3		---	3.00 to 8.00	30 secs	-	-	-	-	0.9	0.0	19.5	0.0	-	0	0
JBH04	1	50	3		---	3.00 to 8.00	60 secs	-	-	-	-	0.9	0.0	19.4	0.0	-	0	0
JBH04	1	50	3		---	3.00 to 8.00	90 secs	-	-	-	-	0.9	0.0	19.4	0.0	-	0	0
JBH04	1	50	3		---	3.00 to 8.00	120 secs	-	-	-	-	0.9	0.0	19.4	0.0	-	0	0
JBH04	1	50	3		---	3.00 to 8.00	180 secs	-	-	-	-	0.9	0.0	19.4	0.0	-	0	0
JBH04	1	50	3		---	3.00 to 8.00	240 secs	-	-	-	-	0.9	0.0	19.4	0.0	-	0	0
JBH04	1	50	3		---	3.00 to 8.00	300 secs	-	-	-	-	0.9	0.0	19.4	0.0	-	0	0
JBH04	1	50	4	8.00	5.57	3.00 to 8.00	20/06/2018 11:04:00	1008	1008	0.1 _(l)	4.86	0.7	0.0	19.9	0.0	-	0	0
Remarks: Very soft well base red clay on meter tip.																		
JBH04	1	50	4		---	3.00 to 8.00	15 secs	-	-	0.1 _(ss)	-	1.0	0.0	19.3	0.0	-	0	0
JBH04	1	50	4		---	3.00 to 8.00	30 secs	-	-	-	-	1.0	0.0	19.2	0.0	-	0	0
JBH04	1	50	4		---	3.00 to 8.00	60 secs	-	-	-	-	1.0	0.0	19.2	0.0	-	0	0
JBH04	1	50	4		---	3.00 to 8.00	90 secs	-	-	-	-	1.0	0.0	19.2	0.0	-	0	0
JBH04	1	50	4		---	3.00 to 8.00	120 secs	-	-	-	-	1.0	0.0	19.2	0.0	-	0	0
JBH04	1	50	4		---	3.00 to 8.00	180 secs	-	-	-	-	1.0	0.0	19.3	0.0	-	0	0
JBH04	1	50	4		---	3.00 to 8.00	240 secs	-	-	-	-	1.0	0.0	19.3	0.0	-	0	0
JBH04	1	50	4		---	3.00 to 8.00	300 secs	-	-	-	-	1.0	0.0	19.3	0.0	-	0	0
JBH04	1	50	4		---	3.00 to 8.00	360 secs	-	-	-	-	1.0	0.0	19.4	0.0	-	0	0
JBH04	1	50	4		---	3.00 to 8.00	420 secs	-	-	-	-	1.0	0.0	19.4	0.0	-	0	0
JBH04	1	50	4		---	3.00 to 8.00	480 secs	-	-	-	-	1.0	0.0	19.5	0.0	-	0	0
JBH04	1	50	4		---	3.00 to 8.00	540 secs	-	-	-	-	1.0	0.0	19.5	0.0	-	0	0
JBH04	1	50	4		---	3.00 to 8.00	600 secs	-	-	-	-	1.0	0.0	19.6	0.0	-	0	0
JBH04	1	50	5	8.00	5.48	3.00 to 8.00	05/07/2018 10:50:00	1008	1009	0.0 _(l)	4.90	0.0	0.0	21.0	0.0	-	0	0

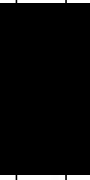
Key: I = Initial, P = Peak, SS = Steady State, Note: LEL = Lower Explosive Limit = 5% v/v.

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IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Pipe diameter ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
JBH04	1	50	5		---	3.00 to 8.00	15 secs	-	-	0.0 _(SS)	-	1.2	0.0	19.4	0.0	-	0	0
JBH04	1	50	5		---	3.00 to 8.00	30 secs	-	-	-	-	1.2	0.0	19.3	0.0	-	0	0
JBH04	1	50	5		---	3.00 to 8.00	60 secs	-	-	-	-	1.2	0.0	19.3	0.0	-	0	0
JBH04	1	50	5		---	3.00 to 8.00	90 secs	-	-	-	-	1.2	0.0	19.3	0.0	-	0	0
JBH04	1	50	5		---	3.00 to 8.00	120 secs	-	-	-	-	1.2	0.0	19.3	0.0	-	0	0
JBH04	1	50	5		---	3.00 to 8.00	180 secs	-	-	-	-	1.2	0.0	19.3	0.0	-	0	0
JBH04	1	50	5		---	3.00 to 8.00	240 secs	-	-	-	-	1.2	0.0	19.4	0.0	-	0	0
JBH04	1	50	5		---	3.00 to 8.00	300 secs	-	-	-	-	1.2	0.0	19.4	0.0	-	0	0
JBH04	1	50	6	8.00	5.48	3.00 to 8.00	16/07/2018 13:50:00	1004	1007	0.7 _(I)	4.87	0.0	0.0	20.9	0.0	-	0	0
JBH04	1	50	6		---	3.00 to 8.00	15 secs	-	-	0.6 _(SS)	-	0.0	0.0	18.9	0.0	-	0	0
JBH04	1	50	6		---	3.00 to 8.00	30 secs	-	-	-	-	1.1	0.0	18.9	0.0	-	0	0
JBH04	1	50	6		---	3.00 to 8.00	60 secs	-	-	-	-	1.1	0.0	18.8	0.0	-	0	0
JBH04	1	50	6		---	3.00 to 8.00	90 secs	-	-	-	-	1.1	0.0	18.8	0.0	-	0	0
JBH04	1	50	6		---	3.00 to 8.00	120 secs	-	-	-	-	1.2	0.0	18.8	0.0	-	0	0
JBH04	1	50	6		---	3.00 to 8.00	180 secs	-	-	-	-	1.2	0.0	18.8	0.0	-	0	0
JBH04	1	50	6		---	3.00 to 8.00	240 secs	-	-	-	-	1.2	0.0	18.8	0.0	-	0	0
JBH04	1	50	6		---	3.00 to 8.00	300 secs	-	-	-	-	1.2	0.0	18.8	0.0	-	0	0

Key: I = Initial, P = Peak, SS = Steady State, Note: LEL = Lower Explosive Limit = 5% v/v.

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APPENDIX I

GROUNDWATER QUALITY MONITORING

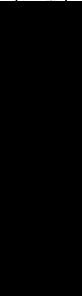
RECORDS

IN-SITU WATER MONITORING RESULTS

Weather		Ground Conditions		Wind Conditions		Air Temperature (°C)		Equipment Used & Remarks	
Round 2	Clear	Dry		Light	18			GA2000 + YSI556 SN-07L 100518 + Peristaltic pump SN-25083312	

Exploratory Position ID	Pipe Ref	Pipe Diameter	Monitoring Round / Test Number	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring	Water Depth (mbgl)	pH	Redox (mV)	Conductivity (uS/cm)	Temperature (°C)	Dissolved Oxygen (mg/l)	Remarks
JBH01	1	50	2 / 1	8.00	7.94	3.00 to 8.00	29/05/2018 13:16	2.29	7.21	335	905	12.6	5.9	
JBH01	1	50	2 / 1				29/05/2018 13:19	2.18	7.26	323	886	13.1	3.4	
JBH01	1	50	2 / 1				29/05/2018 13:22	2.18	7.27	302	874	13.1	2.2	
JBH01	1	50	2 / 1				29/05/2018 13:25	2.18	7.28	302	862	13.2	1.4	
JBH01	1	50	2 / 1				29/05/2018 13:28	2.18	7.28	293	852	13.1	1.0	
JBH01	1	50	2 / 1				29/05/2018 13:31	2.18	7.29	287	849	13.1	0.9	
JBH01	1	50	2 / 1				29/05/2018 13:34	2.18	7.29	284	847	13.1	0.8	
JBH02	1	50	2 / 1	8.00	7.62	3.00 to 8.00	29/05/2018 15:14	3.19	7.23	272	1034	13.3	7.9	
JBH02	1	50	2 / 1				29/05/2018 15:17	3.10	7.14	267	1037	13.2	7.9	
JBH02	1	50	2 / 1				29/05/2018 15:20	3.10	7.13	265	1036	13.3	7.9	
JBH02	1	50	2 / 1				29/05/2018 15:23	3.10	7.13	263	1032	13.2	8.0	
JBH02	1	50	2 / 1				29/05/2018 15:26	3.10	7.13	261	1034	13.3	8.1	
JBH03	1	50	2 / 1	8.00	5.83	3.00 to 8.00	29/05/2018 14:17	2.73	7.80	261	544	11.3	7.6	
JBH03	1	50	2 / 1				29/05/2018 14:20	2.63	7.67	264	526	11.3	7.2	
JBH03	1	50	2 / 1				29/05/2018 14:23	2.63	7.64	265	525	11.1	7.4	
JBH03	1	50	2 / 1				29/05/2018 14:26	2.63	7.65	266	528	11.0	7.5	

Key: NDA denotes 'no data available'.

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IN-SITU WATER MONITORING RESULTS

Exploratory Position ID	Pipe ref	Pipe Diameter	Monitoring Round / Test Number	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring	Water Depth (mbgl)	pH	Redox (mV)	Conduc- tivity (uS/cm)	Temp- erature (°C)	Dissolved Oxygen (mg/l)	Remarks
JBH03	1	50	2 / 1				29/05/2018 14:29	2.63	7.65	267	527	11.1	7.6	

Key: NDA denotes 'no data available'.

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	[REDACTED]		Date	10/08/18	Checked By		Date	10/08/18	Contract Ref:		11264



APPENDIX J

HUMAN HEALTH GENERIC ASSESSMENT CRITERIA

Generic assessment criteria for human health: residential scenario without home-grown produce

Background

RSK's generic assessment criteria (GAC) were initially prepared following the publication by the Environment Agency (EA) of soil guideline value (SGV) and toxicological (TOX) reports, and associated publications in 2009⁽¹⁾. RSK GAC were updated following the publication of GAC by LQM/CIEH in 2009⁽²⁾. RSK GAC are periodically revised when updated information on toxicological, land use or receptor parameters is published.

Updates to the RSK GAC

In 2014, the publication of Category 4 Screening Levels (C4SL)^(3,4), as part of the Defra-funded research project SP1010, included modifications to certain exposure assumptions documented within EA Science Report SC050221/SR3 (herein after referred to as SR3)⁽⁵⁾ used in the generation of SGVs.

C4SL were published for six substances (cadmium, arsenic, benzene, benzo(a)pyrene, chromium VI and lead) for a sandy loam soil type with 6% soil organic matter, based on a low level of toxicological concern (LLTC; see Section 2.3 of research project report SP1010⁽³⁾). Where a C4SL has been published, the RSK GAC duplicates the C4SL published values using all input parameters within the SP1010 final project report⁽³⁾ and associated appendices⁽⁶⁾, and adopts them as GAC for these six substances.

For all other substances the C4SL exposure modifications relevant for residential without home-grown produce end use have been applied to the current RSK GAC. These include alterations to daily inhalation rates for residential and commercial scenarios, reducing soil adherence factors in children (age classes 1 to 12 only) and reducing exposure frequency for dermal contact outdoors.

The RSK GAC have also been revised with updated toxicology published by LQM/CIEH in 2015⁽⁷⁾ or by the USEPA⁽¹⁴⁾, where a C4SL has not been published.

RSK GAC derivation for metals and organic compounds

Model selection

Soil assessment criteria (SAC) were calculated using the Contaminated Land Exposure Assessment (CLEA) tool v1.071, supporting EA guidance^(5,8,9) and revised exposure scenarios published for the C4SL⁽³⁾. The SAC are also termed GAC.

Conceptual model

In accordance with SR3⁽⁵⁾, the residential without home-grown produce scenario considers risks to a female child between the ages of 0 and 6 years old as the highest risk scenario. In accordance with Box 3.1 of SR3⁽⁵⁾, the pathways considered for production of the SAC in the residential without home-grown produce scenario are

- direct soil and dust ingestion in areas of soft landscaping
- dermal contact with soil and indoor dust

- inhalation of indoor and outdoor dust and vapours.

Figure 1 is a conceptual model illustrating these linkages.

In line with guidance in the EA SGV report for cadmium⁽¹⁾, the RSK GAC for cadmium has been derived based on estimates representative of lifetime exposure. Although young children are generally more likely to have higher exposures to soil contaminants, the renal toxicity of cadmium, and the derivation of the TDI_{oral} and TDI_{inh} , are based on considerations of the kidney burden accumulated over 50 years or so. It is therefore reasonable to consider exposure not just in childhood but averaged over a longer period.

With respect to volatilisation, the CLEA model assumes a simple linear partitioning of a chemical in the soil between the sorbed, dissolved and vapour phase⁽⁹⁾. The upper boundaries of this partitioning are represented by the maximum aqueous solubility and pure saturated vapour concentration of the chemical. The CLEA model estimates saturated soil concentrations where these limits are reached⁽⁹⁾. The CLEA software uses a traffic light system to identify when individual and/or combined assessment criteria exceed the lower of either the aqueous- or vapour-based soil saturation limits. Model output cells are flagged red where the saturated soil concentration has been exceeded and the contribution of the indoor and outdoor vapour pathway to total exposure is greater than 10%. In this case, further consideration of the following is required⁽⁹⁾:

- Free phase contamination may be present.
- Exposure from the vapour pathways will be over-predicted by the model, as in reality the vapour phase concentration will not increase at concentrations above saturation limits
- Where the vapour pathway contribution is greater than 90%, it is unlikely the relevant health criteria value (HCV) will be exceeded at soil concentrations at least a factor of ten higher than the relevant HCV.

Where the vapour pathway is the predominant pathway (contributes greater than 90% of exposure) or the only exposure route considered and the cell is highlighted red (SAC exceeds saturation limit), the risk based on the assumed conceptual model is likely to be negligible as the vapour risk is assumed to be tolerable at maximum possible soil concentrations. In such circumstances, the vapour pathway exposure should be considered based on the presence of free phase or non-aqueous phase liquid sources and the measured concentrations of volatile organic compounds (VOC) in the vapour phase. Screening could be considered based on setting the SAC as the modelled soil saturation limits. However, as stated within the CLEA handbook⁽⁹⁾, this is likely to not be practical in many cases because of the very low saturation limits and, in any case, is highly conservative.

It should also be noted that for mixtures of compounds, free phase may be present where soil (or groundwater) concentrations are well below saturation limits for individual compounds.

Where the vapour pathway is only one of the exposure pathways considered, an additional approach can then be utilised as detailed within Section 4.12 of the CLEA model handbook⁽⁹⁾, which explains how to calculate an effective assessment criterion manually.

SR3⁽⁵⁾ states that, as a general rule of thumb, it is recognised that estimating vapour phase concentrations from dissolved and sorbed phase contamination by petroleum hydrocarbons are at least a factor of ten higher than those likely to be measured on-site. RSK has therefore applied an empirical subsurface to indoor air correction factor of 10 into the CLEA model chemical database for all petroleum hydrocarbon fractions (including BTEX, trimethylbenzenes and the

polycyclic aromatic hydrocarbons (PAH) naphthalene, acenaphthene and acenaphthylene) to reduce this conservatism.

Input selection

The most up-to-date published chemical and toxicological data was obtained from EA Report SC050021/SR7⁽¹⁰⁾, the EA TOX⁽¹⁾ reports, the C4SL SP1010 project report and associated appendices^(3,6), the 2015 LQM/CIEH report⁽⁷⁾ or the USEPA IRIS database⁽¹⁴⁾. Where a C4SL has been published, the RSK GAC have duplicated the C4SL published values using all input parameters within the SP1010 final project report⁽³⁾ and associated appendices⁽⁶⁾, and has adopted them as GAC for these six substances. Toxicological and specific chemical parameters for 1,2,4-trimethylbenzene and methyl tertiary-butyl ether (MTBE) were obtained from the CL:AIRE Soil Generic Assessment Criteria report⁽¹¹⁾.

For TPH, aromatic hydrocarbons C₅–C₈ were not modelled, as this range comprises benzene (>EC5-EC7) and toluene (>EC7-EC8), which are modelled separately.

Physical parameters

For the residential without home-grown produce scenario, the CLEA default building is a small, two-storey terrace house with a concrete ground-bearing slab. SR3⁽⁵⁾ notes this residential building type to be the most conservative in terms of potential for vapour intrusion. The building parameters used in the production of the RSK GACs are the default CLEA v1.06 inputs presented in Table 3.3 of SR3⁽³⁾, with a dust loading factor detailed in Section 9.3 of SR3⁽⁵⁾. The parameters for a sandy loam soil type were used in line with Table 4.4 of SR3⁽⁵⁾. This includes a value of 6% for the percentage of soil organic matter (SOM) within the soil. In RSK's experience, this is rather high for many sites. To avoid undertaking site-specific risk assessments for this SOM, RSK has produced an additional set of GAC for SOM of 1% and 2.5% for all substances using the CLEA tool.

Summary of modifications to the default CLEA SR3⁽⁵⁾ input parameters for residential without home-grown produce

In summary, the RSK GAC were produced using the default input parameters for soil properties, the air dispersion model, building properties and the vapour model detailed in SR3⁽⁵⁾. Modifications to the default SR3⁽⁵⁾ exposure scenarios based on the C4SL exposure scenarios⁽³⁾ are presented in Table 2 below.

The final selected GAC are presented by pathway in Table 3 and the combined GAC in Table 4.

Table 1: Exposure assessment parameters for residential scenario without home-grown produce – inputs for CLEA model

Parameter	Value	Justification
Land use	Residential without home-grown produce	Chosen land use
Receptor	Female child	Key generic assumption given in Box 3.1, SR3 ⁽⁵⁾
Building	Small terraced house	Key generic assumption given in Box 3.1, SR3 ⁽⁵⁾ . Small, two-storey terraced house chosen, as it is the most conservative residential building type in terms of protection from vapor intrusion (Section 3.4.6, SR3) ⁽⁵⁾
Soil type	Sandy loam	Most common UK soil type (Section 4.3.1, from Table 3.1, SR3) ⁽⁵⁾
Start age class (AC)	1	Range of age classes corresponding to key generic assumption that the critical receptor is a young female child aged 0–6.
End AC	6	From Box 3.1, SR3 ⁽⁵⁾
SOM (%)	6	Representative of sandy loamy soil according to EA guidance note dated January 2009 entitled 'Changes We Have Made to the CLEA Framework Documents' ⁽¹³⁾
pH	1	To provide SAC for sites where SOM <6% as often observed by RSK
	2.5	
	7	Model default

Figure 1: Conceptual model for CLEA residential scenario without home-grown produce

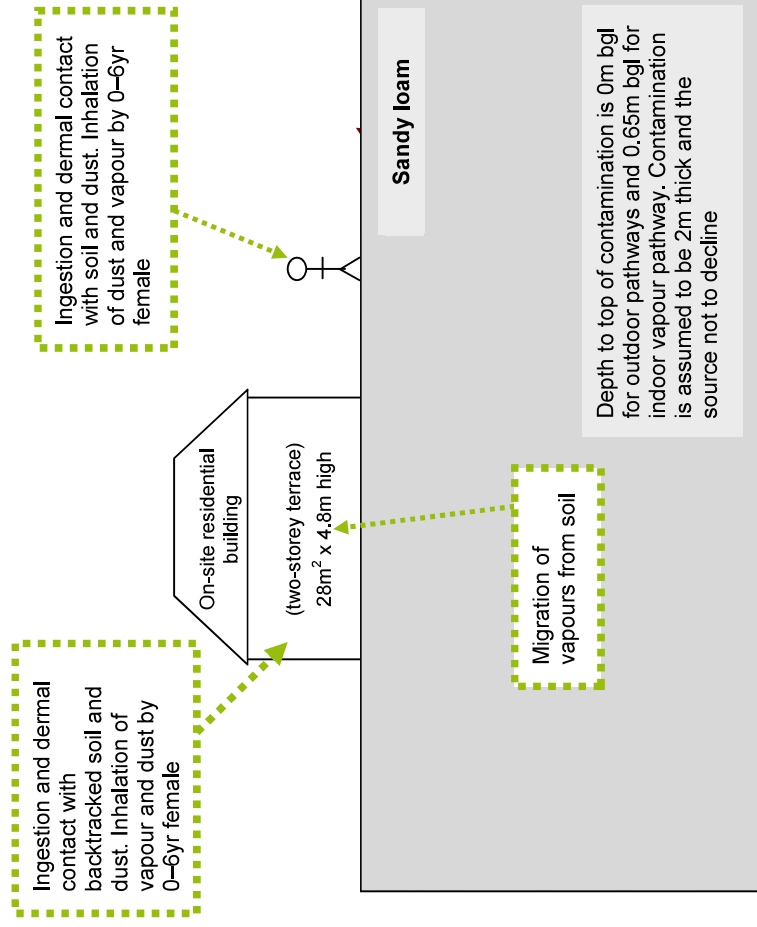


Table 2: Residential without home-grown produce – modified receptor data

Parameter	Unit	Age class					
		1	2	3	4	5	6
Soil to skin adherence factor – (outdoor)	mg soil/cm ² skin	0.1	0.1	0.1	0.1	0.1	0.1
Justification		Table 3.5, SP1010 ⁽³⁾					
Inhalation rate	m ³ day ⁻¹	5.4	8.0	8.9	10.1	10.1	10.1
Justification		Mean value USEPA, 2011 ⁽¹²⁾ ; Table 3.2, SP1010 ⁽³⁾					
Notes: For cadmium , the exposure assessment for a residential land use is based on estimates representative of lifetime exposure AC1-18. This is because the TDI _{oral} and TDI _{inh} are based on considerations of the kidney burden accumulated over 50 years. It is therefore reasonable to consider exposure not just in childhood but averaged over a longer period. See the Environment Agency Science Report SC05002/ TOX 3 ⁽¹⁾ , Science Report SC050021/Cadmium SGV ⁽¹⁾ and the project report SP1010 ⁽³⁾ for more information.							

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GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - RESIDENTIAL WITHOUT HOME-GROWN PRODUCE

Table 3

Human Health Generic Assessment Criteria by Pathway for Residential Scenario Without Home-Grown Produce

Compound	Notes	SAC Appropriate to Pathway SOM 1% (mg/kg)			Soil Saturation Limit (mg/kg)	SAC Appropriate to Pathway SOM 2.5% (mg/kg)			Soil Saturation Limit (mg/kg)	SAC Appropriate to Pathway SOM 6% (mg/kg)			Soil Saturation Limit (mg/kg)	
		Oral	Inhalation	Combined		Oral	Inhalation	Combined		Oral	Inhalation	Combined		
Metals														
Arsenic	(a,b)	3.99E+01	5.26E+02	NR	NR	NR	NR	3.99E+01	5.26E+02	NR	NR	NR	NR	
Cadmium	(a)	1.95E+02	4.88E+02	1.49E+02	NR	NR	1.49E+02	1.95E+02	4.88E+02	1.49E+02	NR	NR	NR	
Chromium (III) - trivalent	(c)	1.98E+04	9.07E+02	NR	NR	NR	NR	1.98E+04	9.07E+02	NR	NR	NR	NR	
Chromium (VI) - hexavalent	(a,d)	5.91E+01	2.06E+01	NR	NR	NR	NR	5.91E+01	2.06E+01	NR	NR	NR	NR	
Copper		1.08E+04	1.41E+04	7.19E+03	NR	NR	7.19E+03	1.08E+04	1.41E+04	7.19E+03	NR	NR	NR	
Lead	(a)	3.14E+02	NR	NR	NR	NR	NR	3.14E+02	NR	NR	NR	NR	NR	
Elemental Mercury (Hg ⁰)	(d)	NR	2.41E+01	NR	4.31E+00	NR	NR	NR	5.74E+01	NR	1.07E+01	NR	2.58E+01	
Inorganic Mercury (Hg ²⁺)		5.71E+01	3.63E+03	5.62E+01	NR	NR	5.62E+01	5.71E+01	3.63E+03	5.62E+01	NR	NR	NR	
Methyl Mercury (Hg ⁴⁺)		1.80E+01	1.87E+01	9.18E+00	7.33E+01	NR	1.20E+01	1.80E+01	3.62E+01	1.42E+02	1.80E+01	7.88E+01	3.04E+02	
Nickel	(d)	1.88E+02	1.81E+02	NR	NR	NR	NR	1.88E+02	1.81E+02	NR	NR	NR	NR	
Selenium	(b)	4.31E+02	NR	NR	NR	NR	NR	4.31E+02	NR	NR	NR	NR	NR	
Zinc	(b)	4.05E+04	3.63E+07	NR	NR	NR	NR	4.05E+04	3.63E+07	NR	NR	NR	NR	
Cyanide (free)		4.03E+01	1.37E+04	4.02E+01	NR	NR	4.02E+01	4.03E+01	1.37E+04	4.02E+01	NR	NR	NR	
Volatile Organic Compounds														
Benzene	(a)	7.36E+01	9.01E+01	8.90E+01	1.22E+03	NR	1.64E+00	7.36E+01	1.68E+00	1.64E+00	2.26E+03	3.48E+00	3.39E+00	4.71E+03
Toluene		2.87E+04	9.08E+02	8.80E+02	8.69E+02	NR	2.00E+03	2.87E+04	2.00E+03	1.87E+03	1.92E+03	4.55E+03	3.93E+03	4.36E+03
Ethylbenzene		1.29E+04	8.34E+01	8.29E+01	5.18E+02	NR	1.96E+02	1.29E+04	1.96E+02	1.93E+02	1.22E+03	4.58E+02	4.42E+02	2.84E+03
Xylene - m		2.32E+04	8.25E+01	8.22E+01	6.25E+02	NR	1.95E+02	2.32E+04	1.95E+02	1.93E+02	1.47E+03	4.56E+02	4.47E+02	3.46E+03
Xylene - o		2.32E+04	8.87E+01	8.83E+01	4.78E+02	NR	2.08E+02	2.32E+04	2.08E+02	2.06E+02	1.12E+03	4.86E+02	4.76E+02	2.62E+03
Xylene - p		2.32E+04	7.93E+01	7.90E+01	5.76E+02	NR	1.86E+02	2.32E+04	1.86E+02	1.85E+02	1.35E+03	4.36E+02	4.28E+02	3.17E+03
Total xylene		2.32E+04	7.93E+01	7.90E+01	6.25E+02	NR	1.86E+02	2.32E+04	1.86E+02	1.85E+02	1.47E+03	4.36E+02	4.28E+02	3.46E+03
Methyl tertiary-Butyl ether (MTBE)		3.87E+04	1.04E+02	1.04E+02	2.04E+04	NR	1.69E+02	3.87E+04	1.69E+02	1.69E+02	3.31E+04	3.21E+02	3.19E+02	6.27E+04
Trichloroethene		6.45E+01	1.72E+02	1.72E+02	1.54E+03	NR	3.99E+02	6.45E+01	3.99E+02	3.99E+02	3.32E+03	7.98E+02	7.97E+02	7.14E+03
Tetrachloroethene		7.13E+02	1.79E+01	1.79E+01	4.24E+02	NR	4.02E+01	7.13E+02	4.02E+01	4.02E+01	9.51E+02	9.21E+01	9.20E+01	2.18E+03
1,1,1-Trichloroethane		7.74E+04	9.01E+00	9.01E+00	1.43E+03	NR	1.84E+01	7.74E+04	1.84E+01	1.84E+01	2.92E+03	4.04E+01	4.04E+01	6.39E+03
1,1,1,2 Tetrachloroethane		7.34E+02	1.54E+00	1.53E+00	2.60E+03	NR	3.56E+00	7.34E+02	3.56E+00	3.55E+00	6.02E+03	8.29E+00	8.20E+00	1.40E+04
1,1,2,2-Tetrachloroethane		7.34E+02	3.92E+02	3.90E+00	2.67E+03	NR	7.95E+00	7.34E+02	8.04E+00	7.95E+00	5.46E+03	1.76E+01	1.72E+01	1.20E+04
Carbon Tetrachloride		5.15E+02	2.58E+02	2.58E+02	1.52E+03	NR	5.65E+02	5.15E+02	5.65E+02	5.64E+02	3.32E+03	1.28E+01	1.28E+01	7.54E+03
1,2-Dichloroethane		1.55E+01	9.20E+03	9.20E+03	3.41E+03	NR	1.33E+02	1.55E+01	1.33E+02	1.33E+02	4.91E+03	2.28E+02	2.27E+02	8.43E+03
Vinyl Chloride		1.81E+00	7.73E+04	7.73E+04	1.36E+03	NR	1.00E+03	1.81E+00	1.00E+03	9.99E+04	1.76E+03	1.53E+03	1.53E+03	2.69E+03
1,2,4-Trimethylbenzene		NR	5.58E+00	NR	4.74E+02	NR	1.29E+01	NR	NR	NR	1.16E+03	NR	NR	2.76E+03
1,3,5-Trimethylbenzene	(e)	NR	NR	NR	2.30E+02	NR	NR	NR	NR	NR	5.52E+02	NR	NR	1.30E+03
Semi-Volatile Organic Compounds														
Acenaphthene		7.64E+03	4.86E+04	6.60E+03	5.70E+01	NR	7.17E+03	7.64E+03	1.18E+05	7.17E+03	1.41E+02	2.88E+05	7.43E+03	3.36E+02
Acenaphthylene		7.65E+03	4.59E+04	6.53E+03	8.61E+01	NR	7.15E+03	7.65E+03	1.11E+05	7.15E+03	2.12E+02	2.53E+05	7.42E+03	5.06E+02
Anthracene		3.82E+04	1.53E+05	3.06E+04	1.17E+00	NR	3.47E+04	3.82E+04	3.77E+05	3.47E+04	2.91E+00	8.76E+05	3.66E+04	6.96E+00
Benz(a)anthracene		1.98E+01	2.47E+01	1.10E+01	1.71E+00	NR	1.36E+01	1.98E+01	4.37E+01	1.36E+01	2.28E+00	6.26E+01	1.50E+01	1.03E+01
Benz(a)pyrene	(a)	5.34E+00	3.51E+01	NR	9.11E+01	NR	NR	5.34E+00	3.77E+01	NR	2.28E+00	3.89E+01	NR	5.46E+00
Benz(b)fluoranthene		4.97E+00	1.93E+01	3.95E+00	1.22E+01	NR	4.03E+00	4.97E+00	2.13E+01	4.03E+00	3.04E+00	2.22E+01	4.06E+00	7.29E+00
Benz(g,h,i)perylene		4.38E+02	1.87E+03	3.55E+02	1.54E+02	NR	3.58E+02	4.38E+02	1.94E+03	3.58E+02	3.85E+02	1.97E+03	3.59E+02	9.23E+02
Benz(k)fluoranthene		1.31E+02	5.41E+02	1.06E+02	6.87E+01	NR	1.07E+02	1.31E+02	5.76E+02	1.07E+02	1.31E+02	5.91E+02	1.07E+02	4.12E+00
Chrysene		3.95E+01	1.19E+02	2.97E+01	4.40E+01	NR	3.12E+01	3.95E+01	1.49E+02	3.12E+01	1.10E+00	1.66E+02	3.19E+01	2.64E+00
Dibenz(a,h)anthracene		3.95E+01	1.45E+00	3.10E+01	3.93E+03	NR	3.18E+01	3.95E+01	1.64E+00	3.18E+01	9.82E+03	1.74E+00	3.22E+01	2.36E+02
Fluoranthene		1.59E+03	3.83E+04	1.53E+03	1.89E+01	NR	1.56E+03	1.59E+03	8.87E+04	1.56E+03	4.73E+01	1.83E+05	1.58E+03	1.13E+02
Fluorene		5.09E+03	6.20E+03	2.80E+03	3.09E+01	NR	3.82E+03	5.09E+03	1.53E+04	3.82E+03	7.65E+01	3.62E+04	4.47E+03	1.83E+02
Indeno(1,2,3-cd)pyrene		5.65E+01	2.12E+02	4.46E+01	6.13E+02	NR	2.38E+02	5.65E+01	2.38E+02	2.38E+02	1.53E+01	2.50E+02	4.60E+01	3.68E+01

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - RESIDENTIAL WITHOUT HOME-GROWN PRODUCE



Table 3

Human Health Generic Assessment Criteria by Pathway for Residential Scenario Without Home-Grown Produce

Compound	Notes			SAC Appropriate to Pathway SOM 1% (mg/kg)			Soil Saturation Limit (mg/kg)			SAC Appropriate to Pathway SOM 2.5% (mg/kg)			Soil Saturation Limit (mg/kg)			SAC Appropriate to Pathway SOM 6% (mg/kg)			Soil Saturation Limit (mg/kg)
	Oral	Inhalation	Combined	Oral	Inhalation	Combined	Oral	Inhalation	Combined	Oral	Inhalation	Combined	Oral	Inhalation	Combined	Oral	Inhalation	Combined	
Naphthalene	2.50E+03	2.33E+01	2.31E+01	2.50E+03	5.58E+01	5.46E+01	2.50E+03	5.58E+01	5.46E+01	2.50E+03	1.31E+02	1.25E+02	1.83E+02	1.31E+02	1.25E+02	2.50E+03	1.31E+02	1.25E+02	4.32E+02
Phenanthrene	1.58E+03	7.17E+03	1.30E+03	1.58E+03	1.76E+04	1.45E+03	1.58E+03	1.76E+04	1.45E+03	1.58E+03	4.07E+04	1.52E+03	8.96E+01	4.07E+04	1.52E+03	1.58E+03	4.07E+04	1.52E+03	2.14E+02
Pyrene	3.82E+03	6.79E+04	3.66E+03	3.82E+03	2.04E+05	3.75E+03	3.82E+03	2.04E+05	3.75E+03	3.82E+03	4.23E+05	3.79E+03	5.49E+00	4.23E+05	3.79E+03	3.82E+03	4.23E+05	3.79E+03	1.32E+01
Phenol	6.48E+04	4.58E+02	4.55E+02	6.48E+04	6.96E+02	6.88E+02	6.48E+04	6.96E+02	6.88E+02	6.48E+04	1.19E+03	1.17E+03	3.81E+04	1.19E+03	1.17E+03	6.48E+04	1.19E+03	1.17E+03	7.03E+04
Total Petroleum Hydrocarbons																			
Aliphatic hydrocarbons EC ₉ -EC ₉	3.23E+05	4.24E+01	4.24E+01	3.23E+05	7.79E+01	7.79E+01	3.23E+05	7.79E+01	7.79E+01	3.23E+05	1.61E+02	1.61E+02	5.58E+02	1.61E+02	1.61E+02	3.23E+05	1.61E+02	1.61E+02	1.15E+03
Aliphatic hydrocarbons >EC ₉ -EC ₉	3.23E+05	1.04E+02	1.04E+02	3.23E+05	2.31E+02	2.31E+02	3.23E+05	2.31E+02	2.31E+02	3.23E+05	5.29E+02	5.29E+02	3.22E+02	5.29E+02	5.29E+02	3.23E+05	5.29E+02	5.29E+02	7.38E+02
Aliphatic hydrocarbons >EC ₉ -EC ₁₀	6.45E+03	2.68E+01	2.68E+01	6.45E+03	6.55E+01	6.53E+01	6.45E+03	6.55E+01	6.53E+01	6.45E+03	1.56E+02	1.56E+02	1.90E+02	1.56E+02	1.56E+02	6.45E+03	1.56E+02	1.56E+02	4.51E+02
Aliphatic hydrocarbons >EC ₁₀ -EC ₁₂	6.45E+03	1.33E+02	1.32E+02	6.45E+03	3.31E+02	3.27E+02	6.45E+03	3.31E+02	3.27E+02	6.45E+03	7.93E+02	7.67E+02	1.18E+02	7.93E+02	7.67E+02	6.45E+03	7.93E+02	7.67E+02	2.83E+02
Aliphatic hydrocarbons >EC ₁₂ -EC ₁₆	6.45E+03	1.11E+03	1.06E+03	6.45E+03	2.78E+03	2.42E+03	6.45E+03	2.78E+03	2.42E+03	6.45E+03	6.67E+03	4.37E+03	5.91E+01	6.67E+03	4.37E+03	6.45E+03	6.67E+03	4.37E+03	1.42E+02
Aliphatic hydrocarbons >EC ₁₆ -EC ₃₅	6.50E+04	NR	NR	6.50E+04	9.25E+04	NR	6.50E+04	9.25E+04	NR	6.50E+04	1.11E+05	NR	2.12E+01	1.11E+05	NR	6.50E+04	1.11E+05	NR	5.09E+01
Aliphatic hydrocarbons >EC ₃₅ -EC ₄₄	6.50E+04	NR	NR	6.50E+04	9.25E+04	NR	6.50E+04	9.25E+04	NR	6.50E+04	1.11E+05	NR	2.12E+01	1.11E+05	NR	6.50E+04	1.11E+05	NR	5.09E+01
Aromatic hydrocarbons >EC ₉ -EC ₁₀	2.58E+03	4.74E+01	4.72E+01	2.58E+03	6.13E+02	1.15E+02	2.58E+03	6.13E+02	1.15E+02	2.58E+03	2.77E+02	2.69E+02	8.99E+02	2.77E+02	2.69E+02	2.58E+03	2.77E+02	2.69E+02	3.58E+03
Aromatic hydrocarbons >EC ₁₀ -EC ₁₂	2.58E+03	2.58E+02	2.52E+02	2.58E+03	6.39E+02	5.94E+02	2.58E+03	6.39E+02	5.94E+02	2.58E+03	1.52E+03	1.24E+03	1.52E+02	1.52E+03	1.24E+03	2.58E+03	1.52E+03	1.24E+03	2.15E+03
Aromatic hydrocarbons >EC ₁₂ -EC ₁₆	2.58E+03	2.85E+03	1.80E+03	2.58E+03	7.07E+03	2.30E+03	2.58E+03	7.07E+03	2.30E+03	2.58E+03	1.68E+04	2.48E+03	4.19E+02	1.68E+04	2.48E+03	2.58E+03	1.68E+04	2.48E+03	1.00E+03
Aromatic hydrocarbons >EC ₁₆ -EC ₂₁	1.86E+03	NR	NR	1.86E+03	5.37E+01	NR	1.86E+03	5.37E+01	NR	1.86E+03	1.92E+03	NR	1.34E+02	1.92E+03	NR	1.86E+03	1.92E+03	NR	3.21E+02
Aromatic hydrocarbons >EC ₂₁ -EC ₃₅	1.93E+03	NR	NR	1.93E+03	4.83E+00	NR	1.93E+03	4.83E+00	NR	1.93E+03	1.21E+01	NR	1.21E+01	1.21E+01	NR	1.93E+03	1.21E+01	NR	2.90E+01
Aromatic hydrocarbons >EC ₃₅ -EC ₄₄	1.93E+03	NR	NR	1.93E+03	4.83E+00	NR	1.93E+03	4.83E+00	NR	1.93E+03	1.21E+01	NR	1.21E+01	1.21E+01	NR	1.93E+03	1.21E+01	NR	2.90E+01

Notes:

EC - equivalent carbon. GRAC - groundwater assessment criteria. SAC - soil assessment criteria.

The CLEA model output is colour coded depending upon whether the soil saturation limit has been exceeded.



Calculated SAC exceeds soil saturation limit and may significantly affect the interpretation of any exceedances as the contribution of the indoor and outdoor vapour pathway to total exposure is >10%.

Calculated SAC exceeds soil saturation limit but the exceedance will not affect the SAC significantly as the contribution of the indoor and outdoor vapour pathway to total exposure is <10%.

Calculated SAC does not exceed the soil saturation limit.

The SAC for organic compounds are dependant upon soil organic matter (SOM) (%) content. To obtain SOM from total organic carbon (TOC) (%) divide by 0.58. 1% SOM is 0.58% TOC. DL Rowell Soil Science: Methods and Applications, Longmans, 1994.
SAC for TPH fractions, PAHs naphthalene, acenaphthene and acenaphthylene, BTEX and trimethylbenzene compounds were produced using an attenuation factor for the indoor air inhalation pathway of 10 to reduce conservatism associated with the vapour inhalation pathway (Section 10.1.1, SR3)

(a) SAC for arsenic, benzo(a)pyrene, cadmium, chromium VI and lead are derived using the CASL toxicology data.

(b) SAC for selenium should not include the inhalation pathway as no expert group HCV has been derived; aliphatic and aromatic hydrocarbons >EC16 should not include inhalation pathway due to their non-volatile nature and inhalation exposure being minimal (oral, dermal and inhalation exposure is compared to the oral HCV); arsenic should only be based on oral contribution (rather than combined) owing to the relative small contribution from inhalation in accordance with the SGV report. The Oral SAC should be adopted for zinc and benzo(a)pyrene.

(c) SAC for CrIII should be based on the lower of the oral and inhalation SAC (see LQM/CIQH 2015 Section 6.8)

(d) SAC for elemental mercury, chromium VI and nickel should be based on the inhalation pathway only.

(e) SAC for 1,3,5-trimethylbenzene is not recorded owing to the lack of toxicological data. SAC for 1,2,4 trimethylbenzene may be used.

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - RESIDENTIAL WITHOUT HOME-GROWN PRODUCE



Table 4
Human health generic assessment criteria for residential without home-grown produce

Compound	SAC for Soil SOM 1% (mg/kg)	SAC for Soil SOM 2.5% (mg/kg)	SAC for Soil SOM 6% (mg/kg)
Metals			
Arsenic	40	40	40
Cadmium	149	149	149
Chromium (III) - trivalent	910	910	910
Chromium (VI) - hexavalent	21	21	21
Copper	7,100	7,100	7,100
Lead	310	310	310
Elemental Mercury (Hg ⁰)	0.2	0.6	1.2
Inorganic Mercury (Hg ²⁺)	56	56	56
Methyl Mercury (Hg ⁴⁺)	9	12	15
Nickel	180	180	180
Selenium	430	430	430
Zinc	40,000	40,000	40,000
Cyanide (free)	40	40	40
Volatile Organic Compounds			
Benzene	0.9	1.6	3.3
Toluene	900 (869)	1,900	3,900
Ethylbenzene	80	190	440
Xylene - m	80	190	450
Xylene - o	90	210	480
Xylene - p	80	180	430
Total xylene	80	180	430
Methyl tertiary-Butyl ether (MTBE)	100	170	320
Trichloroethene	0.02	0.04	0.08
Tetrachloroethene	0.2	0.4	0.9
1,1,1-Trichloroethane	9.0	18.4	40.4
1,1,1,2-Tetrachloroethane	1.5	3.5	8.2
1,1,2,2-Tetrachloroethane	3.9	8.0	17.2
Carbon Tetrachloride	0.026	0.056	0.128
1,2-Dichloroethane	0.009	0.013	0.023
Vinyl Chloride	0.0008	0.0010	0.0015
1,2,4-Trimethylbenzene	5.6	12.9	26.9
1,3,5-Trimethylbenzene	NR	NR	NR
Semi-Volatile Organic Compounds			
Acenaphthene	6,600 (57)	7,200	7,400
Acenaphthylene	6,600 (86)	7,200	7,400
Anthracene	31,000 (1.17)	35,000	37,000
Benzo(a)anthracene	11.0	13.6	15.0
Benzo(a)pyrene	5.3	5.3	5.3
Benzo(b)fluoranthene	4.0	4.0	4.1
Benzo(g,h,i)perylene	355	358	359
Benzo(k)fluoranthene	106	107	107
Chrysene	30	31	32
Dibenzo(a,h)anthracene	0.31	0.32	0.32
Fluoranthene	1,500	1,600	1,600
Fluorene	2,800 (31)	3,800 (77)	4,500 (183)
Indeno(1,2,3-cd)pyrene	45	46	46
Naphthalene	23	55	125
Phenanthrene	1,300 (36)	1,450	1,520
Pyrene	3,700	3,800	3,800
Phenol	440*	688	1,170
Total Petroleum Hydrocarbons			
Aliphatic hydrocarbons EC ₅ -EC ₆	42	78	161
Aliphatic hydrocarbons >EC ₆ -EC ₈	100	230	530
Aliphatic hydrocarbons >EC ₈ -EC ₁₀	27	65	155
Aliphatic hydrocarbons >EC ₁₀ -EC ₁₂	130 (48)	330 (118)	770 (283)
Aliphatic hydrocarbons >EC ₁₂ -EC ₁₆	1,100 (24)	2,400 (59)	4,400 (142)
Aliphatic hydrocarbons >EC ₁₆ -EC ₃₅	65,000 (8)	92,000 (21)	111,000
Aliphatic hydrocarbons >EC ₃₅ -EC ₄₄	65,000 (8)	92,000 (21)	111,000
Aromatic hydrocarbons >EC ₈ -EC ₁₀	47	115	269
Aromatic hydrocarbons >EC ₁₀ -EC ₁₂	300	600	1,200
Aromatic hydrocarbons >EC ₁₂ -EC ₁₆	1,800 (169)	2,300 (419)	2,500
Aromatic hydrocarbons >EC ₁₆ -EC ₂₁	1,900	1,900	1,900
Aromatic hydrocarbons >EC ₂₁ -EC ₃₅	1,900	1,900	1,900
Aromatic hydrocarbons >EC ₃₅ -EC ₄₄	1,900	1,900	1,900
Minerals			
Asbestos	No asbestos detected with ID or <0.001% dry weight ¹		
Notes:			
* - Generic assessment criteria not calculated owing to low volatility of substance and therefore no pathway, or an absence of toxicological data.			
NR - SAC for 1,3,5-trimethylbenzene is not recorded owing to the lack of toxicological data, SAC for 1,2,4 trimethylbenzene may be used			
EC - equivalent carbon. SAC - soil assessment criteria.			
¹ LOD for weight of asbestos per unit weight of soil calculated on a dry weight basis using PLM, handpicking and gravimetry.			
The SAC for organic compounds are dependent on Soil Organic Matter (SOM) (%) content. To obtain SOM from total organic carbon (TOC) (%) divide by 0.58.			
1% SOM is 0.58% TOC. DL Rowell Soil Science: Methods and Applications, Longmans, 1994.			
SAC for TPH fractions, PAHs naphthalene, acenaphthene and acenaphthylene, BTEX and trimethylbenzene compounds were produced using an attenuation factor for the indoor air inhalation pathway of 10 to reduce conservatism associated with the vapour inhalation pathway, section 10.1.1, SR3.			
(VALUE IN BRACKETS)			
RSK has adopted an approach for petroleum hydrocarbons in accordance with LQM/CIEH whereby the concentration modelled for each petroleum hydrocarbon fraction has been tabulated as the SAC with the corresponding solubility or vapour saturation limits given in brackets.			

APPENDIX K

GENERIC ASSESSMENT CRITERIA FOR CONTROLLED WATERS

GENERIC ASSESSMENT CRITERIA FOR CONTROLLED WATERS

Protection of the water environment

The water environment in the United Kingdom is protected under a number of regulatory regimes. The relevant environmental regulator is consulted where there may be a risk that pollution of 'controlled waters' may occur or may have occurred in the past.

The term 'controlled waters' refers to coastal waters, inland freshwaters and groundwater. The EU Water Framework Directive (WFD) (2000/60/EC) is implemented via domestic regulations and guidance, covering aspects of groundwater and surface water protection as well as drinking water supply policy. Domestic legislation and guidance will vary across the United Kingdom. Therefore, the relevant legislation for England, Wales, Northern Ireland and Scotland should be reviewed, alongside guidance provided by the Environment Agency (EA), Natural Resource Wales (NRW), the Scottish Environmental Protection Agency (SEPA) or the Northern Ireland Environment Agency (NIEA), as appropriate.

The main objectives of the protection and remediation of groundwater under threat from land contamination are set out within "The Environment Agency's approach to groundwater protection", version 1.0 (March 2017)⁽¹⁾ and the associated guidance "Land contamination groundwater compliance points: quantitative risk assessments (March 2017)^(1a) that have replaced the previous guidance document "Groundwater Principles and Practice (GP3)". When assessing risks to groundwater, the following need to be considered:

- Where pollutants have not yet entered groundwater, all necessary and reasonable measures must be taken to:
 - **prevent the input of *hazardous* substances into groundwater** (see description of hazardous substances below)
 - **limit the entry of other (non-hazardous) pollutants into groundwater to avoid pollution, deterioration in the status of groundwater bodies and to prevent sustained, upward trends in pollutant concentrations in groundwater.**
- Where pollutants have already entered groundwater, the priority is to take all necessary and reasonable measures to:
 - **minimise further entry of "contaminants" where there is a defined source**
 - **limit the pollution of groundwater or any effect on the status of the groundwater body from the future expansion of the 'plume', if necessary, by actively reducing its extent.**

Within the context of groundwater risk assessments on sites affected by land contamination, "reasonable" means feasible without involving disproportionate costs. What costs are "disproportionate" depends on site-specific circumstances, which may include:

- Considerations of technical feasibility such as identified by the remedial options appraisal, this may be due to the distribution or nature of the contamination and the available remedial methods to treat the identified contamination;
- Sustainability considerations.

DEFINITIONS AND SUBSTANCE CLASSIFICATIONS

Risks to surface waters:

When assessing risks to surface waters, the following list of definitions should be understood:

Priority substances (PS) are harmful substances originally identified under the Water Framework Directive (WFD) 2000/60/EC as substances 'presenting a significant risk to or via the aquatic environment' at a European level. Member States are required to incorporate the identified **PS** into their country-wide monitoring programmes. There are currently 33 **PS** defined within the Priority Substances Directive (2013/39/EU; Annex 1), with a further 12 additional substances due to come into force from 22 December 2018. Directive 2013/39/EU has been transposed into domestic legislation for England and Wales by The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.

Under the umbrella of **PS**, there is a sub-set of substances identified as being "hazardous", and these are referred to as **Priority hazardous substances (PHS)**. The list of **PHS** is defined at EU level within the Priority Substances Directive (2013/39/EU). The WFD defines hazardous substances as 'substances (or groups of substances) that are toxic, persistent and liable to bio-accumulate, and other substances or groups of substances that give rise to an equivalent level of concern.' There are currently 15 **PHS**, with a further 6 additional substances due to come into force from 22 December 2018.

There is also another group of substances defined at EU level and which are referred to as **other pollutants (OP)** in Directive 2013/39/EU. These are additional substances which although not **priority substances**, have EQS which are identical to those laid down in the legislation which applied prior to 13 January 2009 (Directive 2008/105/EU). The **OP** are listed along with the **priority substance (PS)** within the Priority Substances Directive (2013/39/EU), and their associated EQS are also listed therein. There are 6 **OP** defined within the Priority Substances Directive (2013/39/EU).

In addition to the EU level substances, there are also a group of pollutants defined at a Member State level, referred to as **Specific pollutants (SP)**. These substances are pollutants which are released in significant quantities into water bodies in each of the individual European Member States. Under the WFD, Member States are required to set their own EQS for these substances. An indicative list of **SP** is given in Annex VIII of the WFD. Many of the substances categorised as **SP** in the UK were formerly List 2 substances under the old Groundwater Directive (80/68/EEC). The **SP** are defined within Part 2 (Table 1) of The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.

Risks to groundwater:

When assessing risks to groundwater, the following definitions should be understood:

Under the requirements of the Groundwater Daughter Directive (2006/118/EU), the UK has published a list of substances it considers to be **hazardous substances** with respect to groundwater. In their advisory capacity to the government, this list has been derived by the UK Joint Agencies Groundwater Directive Advisory Group (JAGDAG), of which the Environment Agency is a member. The JAGDAG list of **hazardous substances** was published in January 2017 and the Environment Agency will use the updated list of hazardous substances from this date for all new activities that may lead to the discharge of hazardous substances to groundwater. The list is extensive and can be found in full at:

<https://www.wfduk.org/stakeholders/jagdag>

Selecting the appropriate assessment criteria

When assessing the risks to controlled waters, various assessment criteria apply, depending on the nature of the assessment and the conceptual site model.

Where a surface water body is involved, then Environmental Quality Standards (EQS) are the relevant assessment criteria as they are designed to be protective of surface water ecology.

Where a public water supply or a Principal aquifer is involved, then the standards defined in The Water Supply (Water Quality) Regulations⁽²⁾ are the primary source of assessment criteria. The Private Water Supplies Regulations⁽³⁾ may also be applicable in some cases. For instances where there are no UK assessment criteria, then the World Health Organisation (WHO) drinking water guidelines⁽⁴⁾ may be used.

This appendix presents the generic assessment criteria (GAC) that RSK considers suitable for assessing risks to controlled waters for our most commonly encountered determinants. A full list of EQS for England and Wales are included in The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.

The RSK GAC for controlled waters are presented in **Table 1** and **Table 2**. In line with the Environment Agency's Remedial Targets Methodology, the GAC for controlled waters are termed 'target concentrations'.

The appropriate target concentrations should be selected with consideration to:

- the site conceptual model (i.e. the receptor at potential risk);
- whether the substance is already present in groundwater at the site;
- whether or not the substance is classified as a priority hazardous substance under the Priority Substances Directive (2013/39/EC) (see above), or as a hazardous substance according to the current list of JAGDAG determinations⁽⁵⁾; and
- background concentrations in the aquifer (if applicable).

It is important to remember that the WFD and Environment Agency guidance^(1 & 1a) support a sustainable, risk-based approach be applied to groundwater contamination. Exceedance of any target concentration does not necessarily imply that an unacceptable risk exists or that remediation is inevitably required.

Target concentrations shaded in green are <u>statutory values</u>	Target concentrations shaded in orange are <u>non-statutory values</u>
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Note: Units µg/l throughout (unless otherwise stated)

Table 1: Target concentrations for controlled waters (excluding TPH CWG fractions)

Substance classification		Determinant	Target concentrations (µg/l)		
Groundwater receptors ⁽⁵⁾	Surface water receptors ⁽⁶⁾		Minimum reporting value	UK drinking water standard (or best equivalent)	EQS or best equivalent
				Freshwater	Transitional (estuaries) and coastal waters
Metals & other inorganics					
Hazardous substance	Specific pollutant	Arsenic	-	10 ⁽²⁾	50 ^(6a)
Non-hazardous pollutant	Priority substance	Cadmium	0.1 ⁽⁷⁾	5 ⁽²⁾	≤0.08, 0.08, 0.09, 0.15, 0.25 ^(6b)
(Not determined)	-	Chromium (total)	-	50 ⁽²⁾	Sum values for chromium III and VI
(None)	Specific pollutant	Chromium (III)	-	Use value for total chromium	
Hazardous substance	Specific pollutant	Chromium (VI)	-	4.7 ^(6a)	-
				3.4 ^(6a)	0.6 ^(6a)