

APPENDIX E
SOIL-GAS AND GROUNDWATER MONITORING RESULTS

Soil-Gas and Groundwater Monitoring Results

Monitoring Visit No.	1	Date	16/4/13	Barometric Pressure (mb) -				989			
Weather Conditions:		Cloudy and windy									
Surface Ground Conditions:		Dry									
Ambient Concentration (% Volume):				CH ₄ : 0.0		CO ₂ : 0.0		O ₂ : 21.1			
Monitoring Point		Gas Concentration							Gas Flow		
		Highest			Steady		(Lowest)	Gas Flow Rate	Differential Pressure		
		Ref:	GWL	CH ₄	CO ₂	CH ₄				CO ₂	
		(m) bgl	% lel	% v/v	(%)	% lel	% v/v	(%)	(%)	litre/hr	Pa
	BH1	1.73	0.0	0.0	2.3	0.0	0.0	2.3	18.3	0.0	0
	BH5	0.80	0.0	0.0	1.3	0.0	0.0	0.5	20.5	0.4	1
	BH8	3.64	0.0	0.0	0.0	0.0	0.0	0.0	21.1	0.0	0

Monitoring Visit No.		2	Date		01/05/13		Barometric Pressure (mb) -		1006		
Weather Conditions:			Sunny, warm								
Surface Ground Conditions:			Dry								
Ambient Concentration (% Volume):					CH ₄ : 0.0		CO ₂ : 0.0		O ₂ : 21.2		
Monitoring Point		Gas Concentration							Gas Flow		
		Highest			Steady		(Lowest)	Gas Flow Rate	Differential Pressure		
		Ref:	GWL	CH ₄	CO ₂	CH ₄				CO ₂	
		(m) bgl	% lel	% v/v	(%)	% lel	% v/v	(%)	(%)	litre/hr	Pa
	BH1	1.81	0.0	0.0	1.2	0.0	0.0	1.1	20.1	0.0	0
	BH5	0.80	0.0	0.0	0.0	0.0	0.0	0.0	21.0	0.0	0
	BH8	4.10	0.0	0.0	2.3	0.0	0.0	2.2	19.5	0.0	0

Monitoring Visit No.	3	Date	14/05/13		Barometric Pressure (mb) -			983			
Weather Conditions:		Overcast, Rain. 6.5°C.									
Surface Ground Conditions:		Dry									
Ambient Concentration (% Volume):				CH ₄ : 0.0		CO ₂ : 0.0		O ₂ : 21.3			
Monitoring Point		Gas Concentration						Gas Flow			
		Highest			Steady		(Lowest)	Gas Flow Rate	Differential Pressure		
		Ref:	GWL	CH ₄		CO ₂	O ₂				
		(m) bgl	% lsl	% v/v	(%)	% lsl	% v/v	(%)	(%)	litre/hr	Pa
BH1		Unable to locate due to foliage growth.									
BH5		0.64	0.0	0.0	0.3	0.0	0.0	0.2	20.8	0.1	0
BH6		4.38	0.0	0.0	2.8	0.0	0.0	2.6	19.4	0.0	0

Equipment Used: Geotechnical Instruments (GI) and Solinst	Notes
GI - GA2000 Gas Concentration/Atmospheric Pressure	(m) bgl - metres below ground level
GI - GA2000 Borehole Gas Flow Rate/Borehole Pressure	
Solinst combined dip meter and interface meter - Groundwater Level (GWL)	

	Job Title:	Thorley Drive, Cheadle	Job No:	13052
	Client:	David Wilson Homes Mercia	Table Number:	1

Soil-Gas and Groundwater Monitoring Results

Monitoring Visit No.		4	Date		30/05/13		Barometric Pressure (mb) -			994						
Weather Conditions:			Overcast, windy, 13.5°C.													
Surface Ground Conditions:			Dry/Damp													
Ambient Concentration (% Volume):					CH ₄ :		0.0		CO ₂ :		0.0		O ₂ :		21.1	
Monitoring Point		Gas Concentration									Gas Flow					
		Highest				Steady				(Lowest)	Gas Flow Rate		Differential Pressure			
		Ref:	GWL	CH ₄		CO ₂	CH ₄		CO ₂	O ₂						
		(m) bgl	% lel	% v/v	(%)	% lel	% v/v	(%)	(%)	(%)	litre/hr	Pa				
	BH1	1.14	0.0	0.0	3.3	0.0	0.0	9.2	17.4	0.0	0					
	BH5	0.32	0.0	0.0	0.3	0.0	0.0	0.1	20.7	1.5	4					
	BH8	3.37	0.0	0.0	3.3	0.0	0.0	3.2	18.9	0.0	0					

Monitoring Visit No.		5		Date		20/06/13		Barometric Pressure (mb)		994	
Weather Conditions:		Overcast, windy, 16.5°C.									
Surface Ground Conditions:		Dry									
Ambient Concentration (% Volume):						CH ₄ : 0.0		CO ₂ : 0.0		O ₂ : 21.0	
Monitoring Point		Gas Concentration								Gas Flow	
		Highest				Steady		(Lowest)		Gas Flow Rate	Differential Pressure
Ref:	GWL	CH ₄		CO ₂	CH ₄		CO ₂	O ₂			
	(m) bgl	% lel	% v/v	(%)	% lel	% v/v	(%)	(%)	litre/hr	Pa	
BH1	1.69	0.0	0.0	0.8	0.0	0.0	0.8	20.2	0.0	0	
BH5	0.52	0.0	0.0	0.2	0.0	0.0	0.1	20.8	0.0	0	
BH8	4.05	0.0	0.0	2.3	0.0	0.0	2.3	19.6	0.0	0	

Equipment Used: Geotechnical Instruments (GI) and Soilinst			Notes	
GI - GA2000 Gas Concentration/Atmospheric Pressure			(m) bgl - metres below ground level	
GI - GA2000 Borehole Gas Flow Rate/Borehole Pressure				
Soilinst combined dip meter and interface meter - Groundwater Level (GWL)				
	Job Title:		Job No:	
	Client:		Table Number:	
	Thorley Drive, Cheadle		13052	
	David Wilson Homes Mercia		1	

APPENDIX F
CHEMICAL TEST RESULTS

Georisk Management Limited
Summit Point
Summit Crescent Industrial Estate
Smethwick, Birmingham
B66 1BT

FAO Mark Gill
09 April 2013

Dear Mark Gill

Test Report Number 226728
Your Project Reference 13052 - Thorley Drive, Cheadle

Please find enclosed the results of analysis for the samples received 28 March 2013.

All soil samples will be retained for a period of one month and all water samples will be retained for 7 days following the date of the test report. Should you require an extended retention period then please detail your requirements in an email to customerservices@chemtest.co.uk. Please be aware that charges may be applicable for extended sample storage.

If you require any further assistance, please do not hesitate to contact the Customer Services team.

Yours sincerely



Keith Jones, Technical Manager



Notes to accompany report:

- The sign < means 'less than'
- Tests marked 'U' hold UKAS accreditation
- Tests marked 'M' hold MCertS (and UKAS) accreditation
- Tests marked 'N' do not currently hold UKAS accreditation
- Tests marked 'S' were subcontracted to an approved laboratory
- n/e means 'not evaluated'
- i/s means 'insufficient sample'
- u/s means 'unsuitable sample'
- Comments or interpretations are beyond the scope of UKAS accreditation
- The results relate only to the items tested
- All results are expressed on a dry weight basis
- The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, phenols
- For all other tests the samples were dried at < 37°C prior to analysis
- Uncertainties of measurement for the determinands tested are available upon request
- None of the test results included in this report have been recovery corrected

LABORATORY TEST REPORT

Results of analysis of 15 samples
received 28 March 2013

FAO Mark Gill

13052 - Thorley Drive, Cheadle

Report Date
09 April 2013



Login Batch No

Chemtest LIMS ID

Sample ID

Sample No

Sampling Date

Depth

Matrix

SOP ↓ Determinand ↓

CAS No ↓

Units ↓

*

Units ↓

Units ↓

Units ↓

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226728

Sample ID	Sample No	Sampling Date	Depth	Matrix	SOP ↓	Determinand ↓	CAS No ↓	Units ↓	A148396 BH1 D1 25/3/2013 0.4m SOIL	A148397 BH2 D1 25/3/2013 0.4m SOIL	A148398 BH3 D1 25/3/2013 0.4m SOIL	A148399 BH4 D1 25/3/2013 0.4m SOIL	A148400 BH5 D1 25/3/2013 0.3m SOIL	A148401 BH6 D1 25/3/2013 0.4m SOIL
2010 pH									6.5	6.6	6.3	6.1	6.3	6.2
2300 Cyanide (total)								mg kg ⁻¹	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2120 Boron (hot water soluble)								mg kg ⁻¹	0.9	<0.4	<0.4	0.6	1.0	0.6
Sulfate (2:1 water soluble) as SO ₄								g l ⁻¹	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2450 Arsenic								mg kg ⁻¹	6.9	4.0	<2.0	4.0	6.9	5.3
Cadmium								mg kg ⁻¹	0.36	0.12	<0.10	0.25	0.39	0.17
Chromium								mg kg ⁻¹	17	15	14	12	14	12
Copper								mg kg ⁻¹	28	12	11	13	23	14
Mercury								mg kg ⁻¹	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nickel								mg kg ⁻¹	17	20	17	13	15	14
Lead								mg kg ⁻¹	39	14	6.9	25	47	19
Selenium								mg kg ⁻¹	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Zinc								mg kg ⁻¹	82	61	42	48	76	51
2700 Naphthalene								mg kg ⁻¹	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene								mg kg ⁻¹	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene								mg kg ⁻¹	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene								mg kg ⁻¹	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene								mg kg ⁻¹	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene								mg kg ⁻¹	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene								mg kg ⁻¹	0.22	<0.1	<0.1	<0.1	<0.1	0.26
Pyrene								mg kg ⁻¹	0.13	<0.1	<0.1	<0.1	<0.1	0.47
Benzo[a]anthracene								mg kg ⁻¹	0.11	<0.1	<0.1	<0.1	<0.1	0.31
Chrysene								mg kg ⁻¹	0.14	<0.1	<0.1	<0.1	<0.1	0.15
Benzo[b]fluoranthene								mg kg ⁻¹	<0.1	<0.1	<0.1	<0.1	<0.1	0.19
								mg kg ⁻¹	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

All tests undertaken between 28/03/2013 and 08/04/2013

* Accreditation status

This report should be interpreted in conjunction with the notes on the accompanying cover page.

Column page 1

Report page 1 of 2

LIMS sample ID range A148396 to A148410

Results of analysis of 15 samples
received 28 March 2013

Report Date
09 April 2013

13052 - Thorley Drive, Cheadle

FAO Mark Gill

Login Batch No		226728																	
Chemtest LIMS ID		A148402		A148403		A148404		A148405		A148406		A148407							
Sample ID		BH7		BH8		BH9		BH10		BH11		BH12							
Sample No		D1		D1		D1		D1		D1		D1							
Sampling Date		25/3/2013		25/3/2013		25/3/2013		25/3/2013		25/3/2013		25/3/2013							
Depth		0.3m		0.2m		0.3m		0.4m		0.3m		0.2m							
Matrix		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL							
SOP ↓ Determinand ↓																			
2010 pH		M		M		M		M		M		M							
2300 Cyanide (total)		5.4		5.5		6.5		5.4		5.7		5.8							
		mg kg ⁻¹		<0.5		<0.5		<0.5		<0.5		<0.5							
2120 Boron (hot water soluble)		M		M		M		M		M		M							
Sulfate (2:1 water soluble) as SO ₄		M		M		M		M		M		M							
2450 Arsenic		14808798		g l ⁻¹		0.01		<0.01		<0.01		<0.01							
Cadmium		7440382		mg kg ⁻¹		10		11		14		11							
Chromium		7440439		mg kg ⁻¹		0.51		0.69		0.60		0.32							
Copper		7440473		mg kg ⁻¹		17		24		75		27							
Mercury		7440508		mg kg ⁻¹		32		48		42		67							
Nickel		7439976		mg kg ⁻¹		0.11		0.14		0.10		<0.10							
Lead		7440020		mg kg ⁻¹		19		34		55		49							
Selenium		7439921		mg kg ⁻¹		73		110		77		48							
Zinc		7782492		mg kg ⁻¹		<0.20		<0.20		<0.20		<0.20							
Naphthalene		7440666		mg kg ⁻¹		110		160		120		100							
Acenaphthylene		91203		mg kg ⁻¹		<0.1		<0.1		<0.1		<0.1							
Acenaphthene		208968		mg kg ⁻¹		0.75		<0.1		<0.1		0.97							
Fluorene		83329		mg kg ⁻¹		0.98		<0.1		1.2		<0.1							
Phenanthrene		86737		mg kg ⁻¹		1.1		<0.1		<0.1		0.78							
Anthracene		85018		mg kg ⁻¹		1.9		0.36		0.35		1.9							
Fluoranthene		120127		mg kg ⁻¹		0.53		0.28		0.16		0.59							
Pyrene		206440		mg kg ⁻¹		1.1		0.53		0.24		1.3							
Benzo[a]anthracene		129000		mg kg ⁻¹		0.75		0.39		0.15		0.83							
Chrysene		56553		mg kg ⁻¹		0.46		0.24		0.22		0.53							
Benzo[b]fluoranthene		218019		mg kg ⁻¹		0.56		0.35		0.22		0.65							
		205992		mg kg ⁻¹		0.54		0.3		<0.1		0.69							

LABORATORY TEST REPORT

Results of analysis of 15 samples
received 28 March 2013

FAO Mark Gill

13052 - Thorley Drive, Cheadle

Report Date
09 April 2013

Login Batch No

Chemtest LIMS ID

Sample ID

Sample No.

Sampling Date

Depth

Matrix

SOP ↓ Determinand ↓

2010 pH

2300 Cyanide (total)

2120 Boron (hot water soluble)

Sulfate (2:1 water soluble) as SO₄

2450 Arsenic

Chromium

Copper

Mercury

Nickel

Lead

Selenium

Zinc

2700 Naphthalene

Acenaphthylene

Acenaphthene

Fluorene

Phenanthrene

Anthracene

Fluoranthene

Pyrene

Benzo[a]anthracene

Chrysene

Benzo[b]fluoranthene

CAS No ↓

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226728

AI48408

BH2

D2

25/3/2013

1.5m

SOIL

SOIL

6.9

7.6

<0.01

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AI48410

BH11

D3

25/3/2013

1.6m

SOIL

SOIL

6.5

6.5

<0.01

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Results of analysis of 15 samples
received 28 March 2013

Report Date
09 April 2013

13052 - Thorley Drive, Cheadle

FAO Mark Gill

		226728					
		AI48396	AI48397	AI48398	AI48399	AI48400	AI48401
		BH1	BH2	BH3	BH4	BH5	BH6
		D1	D1	D1	D1	D1	D1
25/3/2013		25/3/2013	25/3/2013	25/3/2013	25/3/2013	25/3/2013	25/3/2013
0.4m		0.4m	0.4m	0.4m	0.4m	0.3m	0.4m
SOIL		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
2700 Benzo[k]fluoranthene	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo[a]pyrene	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo[a,h]anthracene	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Indeno[1,2,3-cd]pyrene	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzo[g,h,i]perylene	M	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Total (of 16) PAHs	M	< 2	< 2	< 2	< 2	< 2	< 2
2920 Phenols (total)	N	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

LABORATORY TEST REPORT

Results of analysis of 15 samples
received 28 March 2013

13052 - Thorley Drive, Cheadle

Report Date
09 April 2013

226728

	A148402 BH7	A148403 BH8	A148404 BH9	A148405 BH10	A148406 BH11	A148407 BH12
	D1	D1	D1	D1	D1	D1
2700 Benzo[k]fluoranthene	25/3/2013	25/3/2013	25/3/2013	25/3/2013	25/3/2013	25/3/2013
	0.3m	0.2m	0.3m	0.4m	0.3m	0.2m
	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
207089	0.47	0.21	< 0.1	0.48	0.17	0.65
50328	0.46	0.17	< 0.1	0.26	0.2	0.8
Dibenzo[a,h]anthracene	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.26
193395	0.16	< 0.1	< 0.1	0.29	< 0.1	0.45
191242	0.14	< 0.1	< 0.1	0.39	< 0.1	0.45
Total (of 16) PAHs	9.9	2.8	< 2	11	2.3	14
2920 Phenols (total)	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Results of analysis of 15 samples
received 28 March 2013

13052 - Thorley Drive, Cheadle

FAO Mark Gill

		226728		A148408		A148409		A148410	
				BH2		BH9		BH11	
				D2		D2		D3	
				25/3/2013		25/3/2013		25/3/2013	
				1.5m		2.5m		1.6m	
				SOIL		SOIL		SOIL	

**APPENDIX G
GEOTECHNICAL TEST RESULTS**

Determination of Moisture Content and Atterberg Limits

Client: Georisk Management
Client Address: Suit F3 Summit Point
Summit Crescent Industrial Estate
Smethwick, West Midlands
Postcode: B66 1BT
Site: Thorley Drive Cheadle

Report No: 50171620/13/01
Batch Number: DAM0040615
Client Reference 13052
Sampled by: Client
Date Sampled: Not Advised
Date Received: 28.03.13
Tested From: 05.04.13-09.04.13
Sample Type: Disturbed

Test Results:

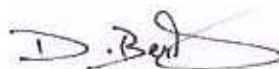
Laboratory Reference	Location	Depth (m)	Description	Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Passing 425µm (Estimated)
45181379	BH1	0.90	Firm Grey Orange CLAY	30	47	25	22	100
45181380	BH1	1.80	Firm Grey Orange CLAY	21	48	24	24	100
45181381	BH4	0.90	Red CLAY with mudstone	19	35	20	15	100
45181382	BH4	1.40	Red CLAY with mudstone	15	36	19	17	100
45181383	BH5	1.70	Brown Mudstone	11	40	19	21	100
45181384	BH6	1.40	Firm Grey Brown CLAY	18	35	18	17	100

Sample Preparation: As Received
* Washed over 425µm BS Test Sieve
** Estimated % passing 425µm

Certified that the laboratory testing was carried out in accordance with BS 1377-2: 1990: Method 3.2, 4.4 and 5

Page: 1 of 1
Date Reported: 15.04.13

Signed



For and on behalf of Environmental Scientifics Group

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

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[] M. Carr - Section Manager
[✓] D. Berrill - Laboratory Manager

Determination of Moisture Content and Atterberg Limits

Client:	Georisk Management	Report No:	50171620/13/02
Client Address:	Suit F3 Summit Point Summit Crescent Industrial Estate Smethwick, West Midlands	Batch Number:	DAM0040615
Postcode:	B66 1BT	Client Reference	13052
Site:	Thorley Drive Cheadle	Sampled by:	Client
		Date Sampled:	Not Advised
		Date Received:	28.03.13
		Tested From:	05.04.13-09.04.13
		Sample Type:	Disturbed

Test Results:

Laboratory Reference	Location	Depth (m)	Description	Moisture Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	% Passing 425µm (Estimated)
45181385	BH7	0.90	Firm Grey Brown CLAY	40	72	27	45	100
45181386	BH7	1.60	Firm Brown CLAY with Mudstone	17	65	26	39	100
45181387	BH8	0.90	Brown Grey CLAY with Mudstone	17	40	18	22	100
45181388	BH8	2.80	Brown, Orange, Black Sandy CLAY with Mudstone	49	59	35	24	100
45181389	BH11	2.70	Soft and Firm Grey/Brown Mottled CLAY	25	48	25	23	100
45181390	BH12	1.40	Black CLAY with Mudstone	21	77	29	48	100

Sample Preparation: As Received
 * Washed over 425µm BS Test Sieve
 ** Estimated % passing 425µm

Certified that the laboratory testing was carried out in accordance with BS 1377-2: 1990: Method 3.2, 4.4 and 5

Page: 1 of 1
Date Reported: 15.04.13

Signed

D. Berrill

[] M. Carr - Section Manager
[✓] D. Berrill - Laboratory Manager

For and on behalf of Environmental Scientifics Group

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

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APPENDIX H
CIEH STATISTICAL CALCULATION SHEETS

Client/client ref	Thorley Drive, Cheadle
Project ref	13052
Site ref	-
Data description	All test data from investigation
Contaminant(s)	Standard 'brownfield' testing suite
Test scenario	Planning: is true mean lower than critical concentration ($\mu < C_c$)?
Date	10 June 2013
User details	AMG

Statistics calculator (version 1)

Input data

This spreadsheet has been produced based on the document 'Guidance on Comparing Soil Contamination Data with a Critical Concentration (CIEH/CIL/AIRE, 2003)'. Users of this spreadsheet should always refer to this guidance, the User Manual and to relevant guidance on UK legislation and policy, in order to understand how the procedure should be applied in an appropriate context.

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Go to summary

Data sheet

Project details

Easting	Northing	Soil Analysis Results													
		As	Cd	Cr	Cu	Hg	Mn	Pb	Se	Zn	CN	Pheno	Bar	Sulphur	
BH	1	0.4	0.36	17	28	<0.1	17	39	<0.2	37	<0.3	<0.3	<0.1	<0.1	
BH	2	0.4	0.12	15	32	<0.1	20	14	<0.2	61	<0.3	<0.3	<0.1	<0.1	
BH	3	0.4	<0.1	14	11	<0.1	17	7	<0.2	42	<0.3	<0.3	<0.1	<0.1	
BH	4	0.4	4	12	13	<0.1	13	25	<0.2	42	<0.3	<0.3	<0.1	<0.1	
BH	5	0.3	0.25	14	23	<0.1	15	47	<0.2	76	<0.3	<0.3	<0.1	<0.1	
BH	6	0.4	0.17	12	14	<0.1	14	19	<0.2	51	<0.3	<0.3	<0.1	<0.1	
BH	7	0.3	0.31	17	32	0.11	19	73	<0.2	115	<0.5	<0.3	0.46	<0.1	
BH	8	0.2	0.69	24	43	0.14	34	110	<0.2	162	<0.5	<0.3	0.17	<0.1	
BH	9	0.3	0.6	29	42	0.1	35	77	<0.2	129	<0.5	<0.3	<0.1	<0.1	
BH	10	0.4	0.32	43	67	<0.1	48	48	<0.2	109	<0.5	<0.3	0.28	<0.1	
BH	11	0.3	0.64	27	43	<0.1	37	58	<0.2	150	<0.5	<0.3	0.2	<0.1	
BH	12	0.2	0.57	17	84	0.33	16	94	<0.2	169	<0.5	<0.3	0.6	<0.1	

[illegible]