

WS Atkins (Telford) Ltd				Trialpit No PAN009 Sheet 1 of 1	
Project Name P1AN		Project No. P1AN	Co-ords: 271617E - 195841N Level: -		Date 18/10/2011
Location: Coed Darcy Urban Village			Dimensions: - Depth 1.10m		Scale 1:25
Client: St. Modwen Development Ltd					Logged By Alex Mann

Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description
Depth (m)	Type	Results				
0.20	ES		0.30			MADE GROUND: Brown clayey gravelly SAND. Coarse gravel of brick and sandstone
						Orange brown gravelly clayey SAND. Coarse gravel of sandstone
0.70	ES		0.85 0.90			Sandstone Bedrock

Trialpit Complete at 1.10 m

Remarks: Pit terminated at 1.1m in bedrock
Groundwater: No groundwater encountered



WS Atkins (Telford) Ltd						Trialpit No PAN010 Sheet 1 of 1	
Project Name P1AN			Project No. P1AN		Co-ords: 271632E - 195828N Level: -		Date 18/10/2011
Location: Coed Darcy Urban Village					Dimensions: - Depth 1.20m		Scale 1:25
Client: St. Modwen Development Ltd							Logged By Alex Mann
Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
Depth (m)	Type	Results					
0.50	ES					MADE GROUND: Brown clayey gravelly SAND. Coarse gravel of angular sandstone and concrete	
			1.15 1.20			Sandstone Bedrock Trialpit Complete at 1.20 m	
Remarks: Pit terminated at 1.2m on bedrock							
Groundwater: No groundwater encountered							

A E I C

Summary of Adopted Thresholds

Lowest of the Remedial Target Criterion/Risk Based Screening Level for Commercial land use, Shallow Soil

Contaminant	Minimum RBSL/ RTC 1% (mg/kg)	Minimum of RBSL/ RTC 3% (mg/kg)
Arsenic	500	500
Chromium	365	365
Cadmium	243	243
Mercury (inorganic)	480	480
Nickel	1990	1990
Selenium	8000	8000
Lead	750	750
Vanadium	7590	7590
Copper	115000	115000
Zinc	918000	918000
Benzo(a)pyrene	24.7	24.8
Benzene	5	5
Toluene	1160	1160
Ethylbenzene	122000	122000
Xylene	121000	121000
TPH aromatic C7-C8	1840	1840
TPH aromatic C8-C10	913	913
TPH aromatic C10-C12	26515	26515
TPH aromatic C12-C16	64875	64875
TPH aliphatic C6-C8	≤1.00E+06	≤1.00E+06
TPH aliphatic C8-C10	158890	158890
TPH aliphatic C10-C12	163360	163360
TPH aliphatic C12-C16	169032	169032
TPH aromatic C16-C21	28500	28500
TPH aromatic C21-C35	28500	28500
TPH aliphatic C16-C21	≤1.00E+06	≤1.00E+06
TPH aliphatic C21-C35	≤1.00E+06	≤1.00E+06
Total TPH (Phase 1)	81413	81413
Total TPH (Process Area)	44344	44344
Total TPH (North Tank Farm)	25875	25875
Total TPH (South Tank Farm)	37230	37230
1,2-Dichloroethane	0.401	2
1,1,1-Trichloroethane	443	3140
Tetrachloroethene	103	788
Trichloroethene	7.48	54.9
Vinyl chloride	0.045	0.174
Dichloromethane	158	734
Cis-1,2-Dichloroethene	8.7	53
Trans-1,2 Dichloroethene	13.8	87.7
Chromium III	221000	221000
Acenaphthene	109000 a	106000
Anthracene	539000	545000
Benzo(a)anthracene	222	242
Benzo(b)fluoranthene	246	247
Benzo(g,h,i)perylene	2490	2500
Benzo(k)fluoranthene	2470	2480
Chrysene	24100	24500
Dibenz(a,h)anthracene	24.6	24.9
Fluoranthene	72500	72700
Fluorene	68400	72200
Indeno(1,2,3-cd)pyrene	245	247
Pyrene	54300	54500
Phenol	686	1720
Mercury, methyl	418 a	411
Mercury, elemental	4.3	12.9
Naphthalene	15800 a	29300 a
TPH aliphatic C5-C6	≤1.00E+06	≤1.00E+06
1,1,1,2-Tetrachloroethane	71.4	559
1,1,2,2-Tetrachloroethane	178	1180
Carbon tetrachloride	1.97	14.7
Chlorobenzene (mono)	688 a	2730 a
TPH aromatic C5-C7	17.8	99.8

Notes

a) based on a value produced from following the approach outlined in SR4 for substances at saturation

1. Xylene - the lowest RTC of the three isomers has been presented. Users must consider total exposure from all xylene isomers and not consider them in isolation.

2. TPH aromatic C7-C8 is considered to comprise toluene only by Atkins

3. It is assumed that no visible free product is present within the top 1.0m of soil. The presence of free product should be assessed in accordance with information in the S106

4. In the S106 only one value was presented for 1,2-dichloroethene of 273 mg/kg

5. 'Total' TPH RBSL derived for an area of development, based on individual RBSL and available mass fraction TPH data in soil at time of derivation, using the inverse weighted average approach

6. The values for metals may not be protective of phytotoxic effects

7. Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach

8. No RTC was produced for total TPH as this will be considered further at validation stage

9. Asbestos has not been considered here as it is being considered in a separate report

10. Additivity for TPHs and PAHs to be undertaken in line with guidance in Atkins report 5041216-REM-RPT-000476

11. Elemental mercury is based on the inhalation pathway only and the saturation limit has been presented

12. TPH aromatic C5-C7 is considered to comprise benzene only by Atkins

13. Values for phenol are calculated to be protective of dermal effects in line with the approach used by the Environment Agency to derive the commercial phenol SGV

Lowest of the Remedial Target Criterion/Risk Based Screening Level for Commercial land use, Deep Soil (>1m)

Contaminant	Minimum RBSL/ RTC 1% (mg/kg)	Minimum of RBSL/ RTC 3% (mg/kg)
Benzo(a)pyrene	>sat	>sat
Benzene	5	5
Toluene	389	389
Ethylbenzene	>sat	>sat
Xylene	>sat	>sat
TPH aromatic C7-C8	617	617
TPH aromatic C8-C10	547	547
TPH aromatic C10-C12	>sat	>sat
TPH aromatic C12-C16	>sat	>sat
TPH aliphatic C6-C8	>sat	>sat
TPH aliphatic C8-C10	>sat	>sat
TPH aliphatic C10-C12	>sat	>sat
TPH aliphatic C12-C16	>sat	>sat
TPH aliphatic C16-C21	None	None
TPH aliphatic C21-C35	None	None
TPH aromatic C16-C21	None	None
TPH aromatic C21-C35	None	None
Total TPH (Phase 1)	81956	81956
Total TPH (Process Area)	35014	35014
Total TPH (North Tank Farm)	13974	13974
Total TPH (South Tank Farm)	34797	34797
1,2-Dichloroethane	0.65	0.65
1,1,1-Trichloroethane	3250	3250
Tetrachloroethene	368	368
Trichloroethene	28	28
Vinyl chloride	0.154	0.214
Dichloromethane	665	665
Cis-1,2-Dichloroethene	35.1	67
Trans-1,2 Dichloroethene	53.4	91
Acenaphthene	>sat	>sat
Anthracene	>sat	>sat
Benzo(a)anthracene	>sat	>sat
Benzo(b)fluoranthene	>sat	>sat
Benzo(g,h,i)perylene	>sat	>sat
Benzo(k)fluoranthene	>sat	>sat
Chrysene	>sat	>sat
Dibenz(a,h)anthracene	>sat	>sat
Fluoranthene	>sat	>sat
Fluorene	>sat	>sat
Indeno(1,2,3-cd)pyrene	>sat	>sat
Pyrene	>sat	>sat
Phenol	>sat	>sat
Mercury, methyl	>sat	>sat
Mercury, elemental	>sat	>sat
Naphthalene	>sat	>sat
1,1,1,2-Tetrachloroethane	278	768
1,1,2,2-Tetrachloroethane	718	1720
Carbon tetrachloride	7.34	19
Chlorobenzene (mono)	>sat	>sat
TPH aliphatic C5-C6	>sat	>sat
TPH aromatic C5-C7	71	152

Notes

- Where the lower of the vapour or aqueous saturation limits have been exceeded by the RTC calculated, the hazard quotient is considered to be less than 1 and as such >sat has been presented
- Xylene - the lowest RTC of the three isomers has been presented. Users must consider total exposure from all xylene isomers and not consider them in isolation
- TPH >C16 are not considered to be volatile according to TPHCWG. Consequently the inhalation of vapour pathways have not been considered and therefore no RTC value has been presented here
- "None" indicates theoretical RBSL greater than solubility limit
- In the S106 only one value was presented for 1,2-dichloroethene of 91 mg/kg
- 'Total' TPH RBSL derived for an area of development, based on individual RBSL and available mass fraction TPH data in soil at time of derivation, using the inverse weighted average approach
- Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach
- TPH aromatic C7-C8 is considered to comprise toluene only by Atkins
- No RTC was produced for total TPH as this will be considered further at validation stage
- Asbestos has not been considered here as it is being considered in a separate report
- Additivity for TPHs and PAHs to be undertaken in line with guidance in Atkins report 5041216-REM-RPT-000476
- The potential presence of free product should be assessed in accordance with information in the S106
- TPH aromatic C5-C7 is considered to comprise benzene only by Atkins
- Values for phenol are calculated to be protective of dermal effects in line with the approach used by the Environment Agency to derive the commercial phenol SGV

Contaminant	Lowest of RTC and RBSL
Benzo(a)pyrene	>sat
Benzene	6
Toluene	229
Ethylbenzene	506
Total xylene	607
TPH aromatic C7-C8	97
TPH aromatic C8-C10	>sat
TPH aromatic C10-C12	>sat
TPH aromatic C12-C16	>sat
TPH aromatic C16-C21	none
TPH aromatic C21-C35	none
TPH aliphatic C6-C8	>sat
TPH aliphatic C8-C10	>sat
TPH aliphatic C10-C12	>sat
TPH aliphatic C12-C16	>sat
TPH aliphatic C16-C21	none
TPH aliphatic C21-C35	none
1,2-Dichloroethane	0.82
1,1,1-Trichloroethane	989
Tetrachloroethene	115
Trichloroethene	13
Vinyl chloride	0.3
Dichloromethane	624
Cis-1,2 Dichloroethene	68
Trans-1,2 Dichloroethene	68
Acenaphthene	>sat
Anthracene	>sat
Benzo(a)anthracene	>sat
Benzo(b)fluoranthene	>sat
Benzo(g,h,i)perylene	>sat
Benzo(k)fluoranthene	>sat
Chrysene	>sat
Dibenz(ah)anthracene	>sat
Fluoranthene	>sat
Fluorene	>sat
Indeno(1,2,3-cd)pyrene	>sat
Pyrene	>sat
Phenol	>sat
Mercury (methyl)	>sat
Mercury (elemental)	>sat
TPH aliphatic C5-C6	>sat
1,1,1,2-Tetrachloroethane	133
1,1,2,2-Tetrachloroethane	879
Carbon tetrachloride	2.87
Chlorobenzene (mono)	>sat
Naphthalene	>sat
TPH aromatic C5-C7	11.5

Notes

1. Xylene - the lowest RTC of the three isomers has been presented. Users must consider total exposure from all xylene isomers and not consider them in isolation.
2. TPH aromatic C7-C8 is considered to comprise toluene only by Atkins.
3. "None" indicates theoretical RBSL greater than solubility limit.
4. In the S106, only one value was presented for 1,2-Dichloroethene of 68 mg/l.
5. Where indoor and outdoor values were presented by RBCA, these have been integrated in line with SNIFFER (2003). Where both indoor and outdoor values derived by RBCA were greater than the saturation limit, >sat has been presented. Where indoor values were presented by RBCA, and the outdoor values were >sat, only the indoor values have been presented. Therefore >sat indicates that the theoretical RTC is greater than solubility limit.
6. TPH >C16 are not considered to be volatile according to TPHCWG. Consequently the inhalation of vapour pathways have not been considered.
7. The potential presence of free product should be assessed in accordance with information in the S106.
8. Additivity for TPHs and PAHs to be undertaken in line with guidance in Atkins report 5041216-REM-RPT-000476.
9. TPH aromatic C5-C7 is considered to comprise benzene only by Atkins.

A E I

Laboratory Certificates



Atkins Global Ltd
Project Jonah site office
Llan Coed House
Suite 24
Coed Darcy
Llandarcy
SA10 6HJ

Attention: Selina Bamforth

CERTIFICATE OF ANALYSIS

Date: 18 March 2013
Customer: H_ATKINS_LDC
Sample Delivery Group (SDG): 130130-16
Your Reference: Phase 22 - Asbestos
Location: Coed Darcy
Report No: 216230

This report has been revised and directly supersedes 213346 in its entirety.

We received 7 samples on Wednesday January 30, 2013 and 7 of these samples were scheduled for analysis which was completed on Monday March 18, 2013. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

SDG:	130130-16	Location:	Coed Darcy	Order Number:	CD0347
Job:	H_ATKINS_LDC-161	Customer:	Atkins Global Ltd	Report Number:	216230
Client Reference:	Phase 22 - Asbestos	Attention:	Selina Bamforth	Superseded Report:	213346

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
6838177	PHS22ASB-1			29/01/2013
6838178	PHS22ASB-2			29/01/2013
6838179	PHS22ASB-3			29/01/2013
6838180	PHS22ASB-4			29/01/2013
6838186	PHS22ASB-5			29/01/2013
6838188	PHS22ASB-6			29/01/2013
6838194	PHS22ASB-7			29/01/2013

Only received samples which have had analysis scheduled will be shown on the following pages.



SDG: 130130-16
Job: H_ATKINS_LDC-161
Client Reference: Phase 22 - Asbestos

Location: Coed Darcy
Customer: Atkins Global Ltd
Attention: Selina Bamforth

Order Number: CD0347
Report Number: 216230
Superseded Report: 213346

SOLID**Results Legend**

Test

No Determination
Possible**Lab Sample No(s)****Customer
Sample Reference****AGS Reference****Depth (m)****Container**

6838194	PHS22ASB-7			400g Tub (ALE214)
6838188	PHS22ASB-6			400g Tub (ALE214)
6838186	PHS22ASB-5			400g Tub (ALE214)
6838180	PHS22ASB-4			400g Tub (ALE214)
6838179	PHS22ASB-3			400g Tub (ALE214)
6838178	PHS22ASB-2			400g Tub (ALE214)
6838177	PHS22ASB-1			400g Tub (ALE214)

Asbestos Identification (Soil)

All

NDPs: 0
Tests: 7

X	X	X	X	X	X	X
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Asbestos Quant. - Waste Limit

All

NDPs: 0
Tests: 4

X		X		X		X
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Asbestos Quantification - Full

All

NDPs: 0
Tests: 4

X		X		X		X
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CERTIFICATE OF ANALYSIS

SDG: 130130-16
Job: H_ATKINS_LDC-161
Client Reference: Phase 22 - Asbestos

Location: Coed Darcy
Customer: Atkins Global Ltd
Attention: Selina Bamforth

Order Number: CD0347
Report Number: 216230
Superseded Report: 213346

Asbestos Identification - Soil

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	PHS22ASB-1 SOLID 29/01/2013 00:00:00 130130-16 6838177 TM048	11/02/13	Kevin Bowron	Loose fibres in soil	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	PHS22ASB-2 SOLID 29/01/2013 00:00:00 130130-16 6838178 TM048	11/02/13	Kevin Bowron	Loose fibres in soil	Detected (#)	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	PHS22ASB-3 SOLID 29/01/2013 00:00:00 130130-16 6838179 TM048	11/02/13	Kevin Bowron	Loose fibres in soil	Not Detected (#)	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	PHS22ASB-4 SOLID 29/01/2013 00:00:00 130130-16 6838180 TM048	11/02/13	Kevin Bowron	Loose fibres in soil	Detected (#)	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	PHS22ASB-5 SOLID 29/01/2013 00:00:00 130130-16 6838186 TM048	11/02/13	Kevin Bowron	Soil containing loose fibres and ACM debris	Detected (#)	Detected (#)	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



CERTIFICATE OF ANALYSIS

SDG:	130130-16	Location:	Coed Darcy	Order Number:	CD0347
Job:	H_ATKINS_LDC-161	Customer:	Atkins Global Ltd	Report Number:	216230
Client Reference:	Phase 22 - Asbestos	Attention:	Selina Bamforth	Superseded Report:	213346

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	PHS22ASB-6 SOLID 29/01/2013 00:00:00 130130-16 6838188 TM048	11/02/13	Kevin Bowron	Loose fibres in soil	Not Detected (#)	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	PHS22ASB-7 SOLID 29/01/2013 00:00:00 130130-16 6838194 TM048	11/02/13	Kevin Bowron	Loose fibres in soil	Not Detected (#)	Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected



SDG: 130130-16
Job: H_ATKINS_LDC-161
Client Reference: Phase 22 - Asbestos

Location: Coed Darcy
Customer: Atkins Global Ltd
Attention: Selina Bamforth

Order Number: CD0347
Report Number: 216230
Superseded Report: 213346

Asbestos Quantification - Full

		Additional Asbestos Components (Using TM048)	Analysts Comments	Asbestos Quantification - Gravimetric - %	Asbestos Quantification - PCOM Evaluation - %	Asbestos Quantification - Total - %
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	PHS22ASB-1 SOLID 29/01/2013 00:00:00 12/03/2013 11:33:16 130130-16 6838177 TM 304	Chrysotile (#)	Fibres found during gravimetric stage, but too few to weigh	<0.001 (#)	<0.001 (#)	<0.001 (#)
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	PHS22ASB-3 SOLID 29/01/2013 00:00:00 12/03/2013 11:33:16 130130-16 6838179 TM 304	None (#)	N/C	<0.001 (#)	<0.001 (#)	<0.001 (#)
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	PHS22ASB-5 SOLID 29/01/2013 00:00:00 12/03/2013 11:33:16 130130-16 6838186 TM 304	None (#)	N/C	0.0014 (#)	<0.001 (#)	0.0018 (#)
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	PHS22ASB-7 SOLID 29/01/2013 00:00:00 12/03/2013 11:33:16 130130-16 6838194 TM 304	None (#)	Fibres found during gravimetric stage, but too few to weigh	<0.001 (#)	<0.001 (#)	<0.001 (#)



SDG:	130130-16	Location:	Coed Darcy	Order Number:	CD0347
Job:	H_ATKINS_LDC-161	Customer:	Atkins Global Ltd	Report Number:	216230
Client Reference:	Phase 22 - Asbestos	Attention:	Selina Bamforth	Superseded Report:	213346

Asbestos Quantification - Waste Limit

Additional Asbestos Components (Using TM048)	Analysts Comments	Waste Limit, Total - %
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Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	PHS22ASB-1 SOLID 29/01/2013 00:00:00 12/03/2013 11:33:16 130130-16 6838177 TM 304	Chrysotile (#)	Some loose fibres found during gravimetric analysis but to small/few to accurately weigh	<0.1 (#)
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	PHS22ASB-3 SOLID 29/01/2013 00:00:00 12/03/2013 11:33:16 130130-16 6838179 TM 304	None (#)	N/C	<0.1 (#)
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	PHS22ASB-5 SOLID 29/01/2013 00:00:00 12/03/2013 11:33:16 130130-16 6838186 TM 304	Crocidolite (#)	N/C	<0.1 (#)
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Received SDG Original Sample Method Number	PHS22ASB-7 SOLID 29/01/2013 00:00:00 12/03/2013 11:33:16 130130-16 6838194 TM 304	None (#)	N/C	<0.1 (#)



SDG:	130130-16	Location:	Coed Darcy	Order Number:	CD0347
Job:	H_ATKINS_LDC-161	Customer:	Atkins Global Ltd	Report Number:	216230
Client Reference:	Phase 22 - Asbestos	Attention:	Selina Bamforth	Superseded Report:	213346

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
ASB_PREP				
TM 304				
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.



SDG:	130130-16	Location:	Coed Darcy	Order Number:	CD0347
Job:	H_ATKINS_LDC-161	Customer:	Atkins Global Ltd	Report Number:	216230
Client Reference:	Phase 22 - Asbestos	Attention:	Selina Bamforth	Superseded Report:	213346

Test Completion Dates

Lab Sample No(s)	6838177	6838178	6838179	6838180	6838186	6838188	6838194
Customer Sample Ref.	PHS22ASB-1	PHS22ASB-2	PHS22ASB-3	PHS22ASB-4	PHS22ASB-5	PHS22ASB-6	PHS22ASB-7
AGS Ref.							
Depth							
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
Asbestos Identification (Soil)	12-Feb-2013	12-Feb-2013	12-Feb-2013	12-Feb-2013	12-Feb-2013	12-Feb-2013	12-Feb-2013
Asbestos Quant. - Waste Limit	25-Feb-2013		25-Feb-2013		25-Feb-2013		25-Feb-2013
Asbestos Quantification - Full	18-Mar-2013		18-Mar-2013		18-Mar-2013		18-Mar-2013



SDG: 130130-16
Job: H_ATKINS_LDC-161
Client Reference: Phase 22 - Asbestos

Location: Coed Darcy
Customer: Atkins Global Ltd
Attention: Selina Bamforth

Order Number: CD0347
Report Number: 216230
Superseded Report: 213346

Appendix General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICS and SVOC TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 2 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible. The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill /made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
§	Sampled on date not provided
+	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than :
 -

Trace -Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



Atkins Global Ltd
Project Jonah site office
Llan Coed House
Suite 24
Coed Darcy
Llandarcy
SA10 6HJ

Attention: Alex Mann

CERTIFICATE OF ANALYSIS

Date: 01 November 2011
Customer: H_ATKINS_LDC
Sample Delivery Group (SDG): 111024-1
Your Reference: P1A and Stockpile.
Location: Coed Darcy Urban Village
Report No: 157436

We received 42 samples on Friday October 21, 2011 and 41 of these samples were scheduled for analysis which was completed on Tuesday November 01, 2011. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan

Operations Manager





SDG: 111024-1
Job: H_ATKINS_LDC-132
Client Reference: P1A and Stockpile.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0179
Report Number: 157436
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
4562231	PAN001		0.40	18/10/2011
4562233	PAN001		0.90	18/10/2011
4562234	PAN002		0.50	18/10/2011
4562235	PAN003		0.20	18/10/2011
4562236	PAN003		0.70	18/10/2011
4562237	PAN004		0.30	18/10/2011
4562238	PAN004		0.90	18/10/2011
4562239	PAN005		0.10	18/10/2011
4562240	PAN006		0.30	18/10/2011
4562241	PAN007		0.20	18/10/2011
4562242	PAN009		0.20	18/10/2011
4562243	PAN009		0.70	18/10/2011
4562245	PAN010		0.50	18/10/2011
4562247	PAN011		0.40	18/10/2011
4562219	SP35001			20/10/2011
4562220	SP35002			20/10/2011
4562221	SP35003			20/10/2011
4562224	SP35004			20/10/2011
4562225	SP35005			20/10/2011
4562226	SP35006			20/10/2011
4562227	SP35007			20/10/2011
4562228	SP35008			20/10/2011
4562229	SP35009			20/10/2011
4562230	SP35010			20/10/2011
4562199	SP38005			20/10/2011
4562200	SP38006			20/10/2011
4562201	SP38007			20/10/2011
4562203	SP38008			20/10/2011
4562204	SP38009			20/10/2011
4562205	SP38010			20/10/2011
4562206	SP38011			20/10/2011
4562207	SP38012			20/10/2011
4562208	SP38013			20/10/2011
4562209	SP38014			20/10/2011
4562210	SP38015			20/10/2011
4562211	SP38016			20/10/2011
4562212	SP38017			20/10/2011
4562214	SP38018			20/10/2011
4562215	SP38019			20/10/2011
4562216	SP38020			20/10/2011
4562217	SP38021			20/10/2011
4562218	SP38022			20/10/2011

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

SDG: 111024-1
Job: H_ATKINS_LDC-132
Client Reference: P1A and Stockpile.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0179
Report Number: 157436
Superseded Report:

SOLID Results Legend X Test N No Determination Possible	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container	
	4562216		SP38020						400g Tub (ALE214)	
	4562215		SP38019						250g Amber Jar (AL 60g VOC (ALE215))	
	4562214		SP38018						400g Tub (ALE214)	
	4562212		SP38017						250g Amber Jar (AL 400g Tub (ALE214))	
EPH CWG (Aliphatic) GC (S)	4562211		SP38016						400g Tub (ALE214)	
	4562210		SP38015						250g Amber Jar (AL 60g VOC (ALE215))	
	4562209		SP38014						400g Tub (ALE214)	
	4562208		SP38013						250g Amber Jar (AL 400g Tub (ALE214))	
	4562207		SP38012						250g Amber Jar (AL 60g VOC (ALE215))	
	4562206		SP38011						400g Tub (ALE214)	
	4562205		SP38010						250g Amber Jar (AL 400g Tub (ALE214))	
	4562204		SP38009						250g Amber Jar (AL 60g VOC (ALE215))	
	4562203		SP38008						400g Tub (ALE214)	
	4562201		SP38007						250g Amber Jar (AL 60g VOC (ALE215))	
EPH CWG (Aromatic) GC (S)	4562200		SP38006						400g Tub (ALE214)	
	4562199		SP38005						250g Amber Jar (AL 400g Tub (ALE214))	
GRO by GC-FID (S)										
Metals by iCap-OES (Soil)										
PAH by GCMS										
pH										

SOLID

Lab Sample No(s)

Test

No Determination Possible

**Customer
Sample Reference**

AGS Reference

Depth (m)

Container

Sample description

All

NDPs: 0
Tests: 41

TPH CWG GC (S)

All

NDPs: 0
Tests: 27[illegible]



CERTIFICATE OF ANALYSIS

SDG: 111024-1
Job: H_ATKINS_LDC-132
Client Reference: P1A and Stockpile.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0179
Report Number: 157436
Superseded Report:

SOLID Results Legend X Test N No Determination Possible	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container	
	4562218		SP38022						400g Tub (ALE214)	
	4562217		SP38021						250g Amber Jar (AL 60g VOC (ALE215))	
	4562230		SP35010						400g Tub (ALE214)	
	4562229		SP35009						250g Amber Jar (AL 60g VOC (ALE215))	
EPH CWG (Aliphatic) GC (S)	4562228		SP35008						400g Tub (ALE214)	
	4562227		SP35007						250g Amber Jar (AL 60g VOC (ALE215))	
	4562226		SP35006						400g Tub (ALE214)	
	4562225		SP35005						250g Amber Jar (AL 60g VOC (ALE215))	
	4562224		SP35004						400g Tub (ALE214)	
	4562221		SP35003						250g Amber Jar (AL 60g VOC (ALE215))	
	4562220		SP35002						400g Tub (ALE214)	
	4562219		SP35001						250g Amber Jar (AL 60g VOC (ALE215))	
	4562235		PAN003				0.70	0.20	250g Amber Jar (AL 60g VOC (ALE215))	
	4562234		PAN002				0.50		400g Tub (ALE214)	
EPH CWG (Aromatic) GC (S)	4562231		PAN001				0.40		250g Amber Jar (AL 60g VOC (ALE215))	
GRO by GC-FID (S)										
Metals by iCap-OES (Soil)										
PAH by GCMS										
pH										

SOLID Results Legend X Test N No Determination Possible	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container	
	4562218		SP38022			400g Tub (AL E214)				
	4562217		SP38021			250g Amber Jar (AL 60g VOC (AL E215)				
	4562230		SP35010			400g Tub (AL E214)				
	4562229		SP35009			250g Amber Jar (AL 60g VOC (AL E215)				
	4562228		SP35008			400g Tub (AL E214)				
	4562227		SP35007			250g Amber Jar (AL 60g VOC (AL E215)				
	4562226		SP35006			400g Tub (AL E214)				
	4562225		SP35005			250g Amber Jar (AL 60g VOC (AL E215)				
	4562224		SP35004			400g Tub (AL E214)				
4562221		SP35003			250g Amber Jar (AL 60g VOC (AL E215)					
4562220		SP35002			400g Tub (AL E214)					
4562219		SP35001			250g Amber Jar (AL 60g VOC (AL E215)					
4562236		PAN003		0.70	250g Amber Jar (AL 60g VOC (AL E215)					
4562235		PAN003		0.20	400g Tub (AL E214)					
4562234		PAN002		0.50	250g Amber Jar (AL 60g VOC (AL E215)					
4562231		PAN001		0.40	400g Tub (AL E214)					
					250g Amber Jar (AL 60g VOC (AL E215)					
Sample description	All	NDPs: 0 Tests: 41								
TPH CWG GC (S)	All	NDPs: 0 Tests: 27								



CERTIFICATE OF ANALYSIS

SDG: 111024-1
Job: H_ATKINS_LDC-132
Client Reference: P1A and Stockpile.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0179
Report Number: 157436
Superseded Report:

SOLID Results Legend X Test N No Determination Possible	Lab Sample No(s)		4562236	4562237	4562238	4562239	4562240	4562241	4562242	4562243	4562245	4562247
	Customer Sample Reference		PAND03	PAND04	PAND04	PAND05	PAND06	PAND07	PAND09	PAND09	PAND10	PAND11
	AGS Reference											
	Depth (m)		0.70	0.30	0.90	0.10	0.30	0.20	0.20	0.70	0.50	0.40
	Container		400g Tub (ALE214) 60g VOC (ALE215)	250g Amber Jar (AL) 400g Tub (ALE214) 60g VOC (ALE215)	400g Tub (ALE214) 250g Amber Jar (AL) 60g VOC (ALE215)	400g Tub (ALE214) 60g VOC (ALE215)	400g Tub (ALE214) 250g Amber Jar (AL) 60g VOC (ALE215)	400g Tub (ALE214) 250g Amber Jar (AL) 60g VOC (ALE215)	400g Tub (ALE214) 250g Amber Jar (AL) 60g VOC (ALE215)	400g Tub (ALE214) 250g Amber Jar (AL) 60g VOC (ALE215)	400g Tub (ALE214) 250g Amber Jar (AL) 60g VOC (ALE215)	400g Tub (ALE214) 250g Amber Jar (AL) 60g VOC (ALE215)
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 27		X	X	X	X	X	X	X	X	X
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 27		X	X	X	X	X	X	X	X	X
GRO by GC-FID (S)	All	NDPs: 0 Tests: 27	X	X	X	X	X	X	X	X	X	X
Metals by iCap-OES (Soil)	Arsenic	NDPs: 0 Tests: 41		X	X	X	X	X	X	X	X	X
	Cadmium	NDPs: 0 Tests: 41		X	X	X	X	X	X	X	X	X
	Chromium	NDPs: 0 Tests: 41		X	X	X	X	X	X	X	X	X
	Copper	NDPs: 0 Tests: 41		X	X	X	X	X	X	X	X	X
	Lead	NDPs: 0 Tests: 41		X	X	X	X	X	X	X	X	X
	Mercury	NDPs: 0 Tests: 41		X	X	X	X	X	X	X	X	X
	Nickel	NDPs: 0 Tests: 41		X	X	X	X	X	X	X	X	X
	Selenium	NDPs: 0 Tests: 41		X	X	X	X	X	X	X	X	X
	Vanadium	NDPs: 0 Tests: 41		X	X	X	X	X	X	X	X	X
	Zinc	NDPs: 0 Tests: 41		X	X	X	X	X	X	X	X	X
PAH by GCMS	All	NDPs: 0 Tests: 41		X	X	X	X	X	X	X	X	X
pH	All	NDPs: 0 Tests: 41	X	X	X	X	X	X	X	X	X	X

SDG:	111024-1	Location:	Coed Darcy Urban Village	Order Number:	CD0179
Job:	H_ATKINS_LDC-132	Customer:	Atkins Global Ltd	Report Number:	157436
Client Reference:	P1A and Stockpile.	Attention:	Alex Mann	Superseded Report:	

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CERTIFICATE OF ANALYSIS

SDG: 111024-1
Job: H_ATKINS_LDC-132
Client Reference: P1A and Stockpile.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0179
Report Number: 157436
Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
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Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
4562231	PAN001	0.40	Dark Brown	Sandy Clay Loam	0.1 - 2 mm	Stones	None
4562234	PAN002	0.50	Dark Brown	Top Soil	0.1 - 2 mm	Stones	None
4562235	PAN003	0.20	Light Brown	Clay Loam	0.063 - 0.1 mm	Stones	None
4562236	PAN003	0.70	Dark Brown	Sandy Clay Loam	0.1 - 2 mm	Stones	None
4562237	PAN004	0.30	Light Brown	Clay Loam	0.063 - 0.1 mm	Stones	None
4562238	PAN004	0.90	Dark Brown	Clay Loam	0.063 - 0.1 mm	Stones	None
4562239	PAN005	0.10	Dark Brown	Clay Loam	0.063 - 0.1 mm	Stones	Vegetation
4562240	PAN006	0.30	Dark Brown	Clay Loam	0.063 - 0.1 mm	Stones	None
4562241	PAN007	0.20	Dark Brown	Clay Loam	0.063 - 0.1 mm	Stones	None
4562242	PAN009	0.20	Dark Brown	Clay Loam	0.063 - 0.1 mm	Stones	Vegetation
4562243	PAN009	0.70	Dark Brown	Clay Loam	0.063 - 0.1 mm	Stones	Vegetation
4562245	PAN010	0.50	Dark Brown	Sandy Clay Loam	0.1 - 2 mm	Stones	Vegetation
4562247	PAN011	0.40	Light Brown	Clay Loam	0.063 - 0.1 mm	Stones	None
4562219	SP35001		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
4562220	SP35002		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
4562221	SP35003		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
4562224	SP35004		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
4562225	SP35005		Light Brown	Silt Loam	0.063 - 0.1 mm	Stones	N/A
4562226	SP35006		Dark Brown	Silty Clay Loam	0.063 - 0.1 mm	Stones	N/A
4562227	SP35007		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
4562228	SP35008		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
4562229	SP35009		Light Brown	Sandy Loam	0.1 - 2 mm	Stones	None
4562230	SP35010		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
4562199	SP38005		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
4562200	SP38006		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
4562201	SP38007		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
4562203	SP38008		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
4562204	SP38009		Dark Brown	Sandy Clay Loam	0.063 - 0.1 mm	Stones	N/A
4562205	SP38010		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
4562206	SP38011		Dark Brown	Sandy Clay Loam	0.063 - 0.1 mm	Stones	N/A
4562207	SP38012		Dark Brown	Sandy Clay Loam	0.063 - 0.1 mm	Stones	N/A
4562208	SP38013		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
4562209	SP38014		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
4562210	SP38015		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
4562211	SP38016		Dark Brown	Sandy Clay	0.1 - 2 mm	Stones	None
4562212	SP38017		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
4562214	SP38018		Dark Brown	Sandy Clay Loam	0.1 - 2 mm	Stones	None
4562215	SP38019		Dark Brown	Sandy Clay Loam	0.1 - 2 mm	Stones	None



CERTIFICATE OF ANALYSIS

SDG:	111024-1	Location:	Coed Darcy Urban Village	Order Number:	CD0179
Job:	H_ATKINS_LDC-132	Customer:	Atkins Global Ltd	Report Number:	157436
Client Reference:	P1A and Stockpile.	Attention:	Alex Mann	Superseded Report:	

			Colour	Description	Grain size	Inclusions	Inclusions 2
4562216	SP38020		Dark Brown	Top Soil	0.1 - 2 mm	Stones	None
4562217	SP38021		Dark Brown	Sandy Clay Loam	0.1 - 2 mm	Stones	None
4562218	SP38022		Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

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Report Number: 157436
Superseded Report:

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CERTIFICATE OF ANALYSIS

SDG: 111024-1
Job: H_ATKINS_LDC-132
Client Reference: P1A and Stockpile.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0179
Report Number: 157436
Superseded Report:

TPH CWG (S)

Results Legend			Customer Sample R		PAN001	PAN002	PAN003	PAN003	PAN004	PAN004
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.40	0.50	0.20	0.70	0.30	0.90
M	mCERTS accredited.				Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
\$	Deviating sample.				18/10/2011	18/10/2011	18/10/2011	18/10/2011	18/10/2011	18/10/2011
aq	Aqueous / settled sample.				21/10/2011	21/10/2011	21/10/2011	21/10/2011	21/10/2011	21/10/2011
diss.filt	Dissolved / filtered sample.				111024-1	111024-1	111024-1	111024-1	111024-1	111024-1
tot.unfilt	Total / unfiltered sample.				4562231	4562234	4562235	4562236	4562237	4562238
*	Subcontracted test.									
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery									
(F)	Trigger breach confirmed									
Component	LOD/Units	Method								
GRO Surrogate % recovery**	%	TM089			109	39	101	27	85	64
GRO >C5-C12	<44 µg/kg	TM089			179	2120	<44	39100	365	42200
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089			<5	<5	<5	<5	<5	<5
Benzene	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Toluene	<2 µg/kg	TM089			<2	4.68	<2	<2	<2	<2
Ethylbenzene	<3 µg/kg	TM089			<3	<3	<3	<3	<3	<3
m,p-Xylene	<6 µg/kg	TM089			<6	<6	<6	<6	<6	<6
o-Xylene	<3 µg/kg	TM089			<3	<3	<3	<3	<3	<3
sum of detected mpo xylene by GC	<9 µg/kg	TM089			<9	<9	<9	<9	<9	<9
sum of detected BTEX by GC	<24 µg/kg	TM089			<24	<24	<24	<24	<24	<24
Aliphatics >C5-C6	<10 µg/kg	TM089			10.7	18.7	<10	<10	<10	<10
Aliphatics >C6-C8	<10 µg/kg	TM089			15.5	44.5	<10	212	42.7	475
Aliphatics >C8-C10	<10 µg/kg	TM089			41.7	247	<10	5830	78.1	9260
Aliphatics >C10-C12	<10 µg/kg	TM089			46.4	982	<10	17500	110	15800
Aliphatics >C12-C16	<100 µg/kg	TM173			15600	15600	5500	146000	13100	194000
Aliphatics >C16-C21	<100 µg/kg	TM173			14500	29600	9680	127000	123000	179000
Aliphatics >C21-C35	<100 µg/kg	TM173			16600	176000	22200	142000	50300	43700
Aliphatics >C35-C44	<100 µg/kg	TM173			7860	42800	6780	129000	1850	4450
Total Aliphatics >C12-C44	<100 µg/kg	TM173			54700	264000	44100	544000	188000	422000
Aromatics >EC5-EC7	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aromatics >EC7-EC8	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10	<10 µg/kg	TM089			30.9	171	<10	3890	53.7	6170
Aromatics >EC10-EC12	<10 µg/kg	TM089			30.9	654	<10	11700	73.2	10500
Aromatics >EC12-EC16	<100 µg/kg	TM173			7030	7190	2390	26600	2660	53900
Aromatics >EC16-EC21	<100 µg/kg	TM173			4010	13200	3260	56800	58800	87500
Aromatics >EC21-EC35	<100 µg/kg	TM173			10800	107000	21100	194000	62800	40300
Aromatics >EC35-EC44	<100 µg/kg	TM173			9830	56300	13500	220000	3840	10900
Aromatics >EC40-EC44	<100 µg/kg	TM173			4750	21100	5510	118000	745	5360
Total Aromatics >EC12-EC44	<100 µg/kg	TM173			31700	184000	40200	497000	128000	193000
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173			86500	449000	84300	1080000	317000	656000
Total Aliphatics >C5-35	<100 µg/kg	TM173			46900	222000	37300	438000	187000	443000
Total Aromatics >C5-35	<100 µg/kg	TM173			21900	128000	26800	293000	124000	198000
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173			68800	350000	64100	731000	311000	641000



CERTIFICATE OF ANALYSIS

SDG: 111024-1
Job: H_ATKINS_LDC-132
Client Reference: P1A and Stockpile.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0179
Report Number: 157436
Superseded Report:

TPH CWG (S)

Results Legend			Customer Sample R		PAN005	PAN006	PAN007	PAN009	PAN009	PAN010
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.10 Soil/Solid 18/10/2011 21/10/2011 111024-1 4562239	0.30 Soil/Solid 18/10/2011 21/10/2011 111024-1 4562240	0.20 Soil/Solid 18/10/2011 21/10/2011 111024-1 4562241	0.20 Soil/Solid 18/10/2011 21/10/2011 111024-1 4562242	0.70 Soil/Solid 18/10/2011 21/10/2011 111024-1 4562243	0.50 Soil/Solid 18/10/2011 21/10/2011 111024-1 4562245
M	mCERTS accredited.									
S	Deviating sample.									
aq	Aqueous / settled sample.									
diss.filt	Dissolved / filtered sample.									
tot.unfilt	Total / unfiltered sample.									
*	Subcontracted test.									
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery									
(F)	Trigger breach confirmed									
Component	LOD/Units	Method								
GRO Surrogate % recovery**	%	TM089			87	99	78	69	58	74
GRO >C5-C12	<44 µg/kg	TM089			1370	111	<44	286	12500	<44
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089		#	<5	<5	<5	<5	<5	<5
Benzene	<10 µg/kg	TM089		M	<10	<10	<10	<10	<10	<10
Toluene	<2 µg/kg	TM089		M	<2	<2	2.42	<2	<2	<2
Ethylbenzene	<3 µg/kg	TM089		M	<3	<3	<3	<3	<3	<3
m,p-Xylene	<6 µg/kg	TM089		M	<6	<6	<6	<6	<6	<6
o-Xylene	<3 µg/kg	TM089		M	<3	<3	<3	<3	<3	<3
sum of detected mpo xylene by GC	<9 µg/kg	TM089			<9	<9	<9	<9	<9	<9
sum of detected BTEX by GC	<24 µg/kg	TM089			<24	<24	<24	<24	<24	<24
Aliphatics >C5-C6	<10 µg/kg	TM089			<10	<10	<10	<10	10.8	<10
Aliphatics >C6-C8	<10 µg/kg	TM089			17.4	22.8	<10	48.4	101	<10
Aliphatics >C8-C10	<10 µg/kg	TM089			172	22.8	<10	58.1	1520	<10
Aliphatics >C10-C12	<10 µg/kg	TM089			632	23.9	<10	73.8	5930	<10
Aliphatics >C12-C16	<100 µg/kg	TM173			11200	3500	19100	11400	16500	6290
Aliphatics >C16-C21	<100 µg/kg	TM173			59400	3650	11300	20700	23500	10900
Aliphatics >C21-C35	<100 µg/kg	TM173			40800	8770	17400	107000	120000	59100
Aliphatics >C35-C44	<100 µg/kg	TM173			4450	2070	3480	24500	31100	20000
Total Aliphatics >C12-C44	<100 µg/kg	TM173			116000	18000	51300	164000	191000	96300
Aromatics >EC5-EC7	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aromatics >EC7-EC8	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10	<10 µg/kg	TM089			115	18.2	<10	44.8	1020	<10
Aromatics >EC10-EC12	<10 µg/kg	TM089			422	16	<10	48.4	3950	<10
Aromatics >EC12-EC16	<100 µg/kg	TM173			4170	341	4420	3820	4940	<100
Aromatics >EC16-EC21	<100 µg/kg	TM173			19300	<100	5250	6040	6600	5290
Aromatics >EC21-EC35	<100 µg/kg	TM173			48800	4990	14800	76200	67800	32100
Aromatics >EC35-EC44	<100 µg/kg	TM173			14600	2850	4110	35100	30600	15000
Aromatics >EC40-EC44	<100 µg/kg	TM173			4740	1260	1120	13300	11500	6090
Total Aromatics >EC12-EC44	<100 µg/kg	TM173			86900	8190	28600	121000	110000	52400
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173			204000	26300	79900	286000	313000	149000
Total Aliphatics >C5-35	<100 µg/kg	TM173			112000	16000	47800	140000	167000	76300
Total Aromatics >C5-35	<100 µg/kg	TM173			72800	5370	24500	86200	84300	37400
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173			185000	21400	72300	226000	251000	114000



CERTIFICATE OF ANALYSIS

SDG: 111024-1
Job: H_ATKINS_LDC-132
Client Reference: P1A and Stockpile.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0179
Report Number: 157436
Superseded Report:

TPH CWG (S)

Results Legend			Customer Sample R		PAN011	SP35001	SP35003	SP35005	SP35007	SP35009
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.40	.	.	.	.	.
M	mCERTS accredited.				Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
\$	Deviating sample.				18/10/2011	20/10/2011	20/10/2011	20/10/2011	20/10/2011	20/10/2011
aq	Aqueous / settled sample.				21/10/2011	21/10/2011	21/10/2011	21/10/2011	21/10/2011	21/10/2011
diss.filt	Dissolved / filtered sample.				111024-1	111024-1	111024-1	111024-1	111024-1	111024-1
tot.unfilt	Total / unfiltered sample.				4562247	4562219	4562221	4562225	4562227	4562229
*	Subcontracted test.									
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery									
(F)	Trigger breach confirmed									
Component	LOD/Units	Method								
GRO Surrogate % recovery**	%	TM089			74	56	56	56	69	68
GRO >C5-C12	<44 µg/kg	TM089			150	119	<44	<44	78.1	<44
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089			<5	<5	<5	<5	<5	<5
Benzene	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Toluene	<2 µg/kg	TM089			<2	<2	<2	<2	<2	<2
Ethylbenzene	<3 µg/kg	TM089			<3	<3	<3	<3	<3	<3
m,p-Xylene	<6 µg/kg	TM089			<6	<6	<6	<6	<6	<6
o-Xylene	<3 µg/kg	TM089			<3	<3	<3	<3	<3	<3
sum of detected mpo xylene by GC	<9 µg/kg	TM089			<9	<9	<9	<9	<9	<9
sum of detected BTEX by GC	<24 µg/kg	TM089			<24	<24	<24	<24	<24	<24
Aliphatics >C5-C6	<10 µg/kg	TM089			<10	10.8	<10	<10	27.5	<10
Aliphatics >C6-C8	<10 µg/kg	TM089			14.6	<10	<10	<10	17.6	<10
Aliphatics >C8-C10	<10 µg/kg	TM089			20.7	46.6	<10	<10	<10	<10
Aliphatics >C10-C12	<10 µg/kg	TM089			54.9	11.9	<10	<10	<10	<10
Aliphatics >C12-C16	<100 µg/kg	TM173			35600	677	5200	3970	3710	4510
Aliphatics >C16-C21	<100 µg/kg	TM173			19300	1640	3660	2640	3620	4780
Aliphatics >C21-C35	<100 µg/kg	TM173			31800	9990	13600	9220	13500	24100
Aliphatics >C35-C44	<100 µg/kg	TM173			3690	5980	10200	4840	8560	14900
Total Aliphatics >C12-C44	<100 µg/kg	TM173			90400	18300	32700	20700	29400	48300
Aromatics >EC5-EC7	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aromatics >EC7-EC8	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10	<10 µg/kg	TM089			17.1	32.5	<10	<10	<10	<10
Aromatics >EC10-EC12	<10 µg/kg	TM089			36.6	<10	<10	<10	<10	<10
Aromatics >EC12-EC16	<100 µg/kg	TM173			3570	2800	6120	5990	4000	6040
Aromatics >EC16-EC21	<100 µg/kg	TM173			4880	5460	17300	26400	9340	19400
Aromatics >EC21-EC35	<100 µg/kg	TM173			23600	22500	64000	75900	37800	83800
Aromatics >EC35-EC44	<100 µg/kg	TM173			7650	15500	32800	32000	23800	46000
Aromatics >EC40-EC44	<100 µg/kg	TM173			2540	6810	13900	13200	10200	19400
Total Aromatics >EC12-EC44	<100 µg/kg	TM173			39700	46300	120000	140000	74900	155000
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173			130000	64800	153000	161000	104000	203000
Total Aliphatics >C5-35	<100 µg/kg	TM173			86800	12400	22500	15900	20900	33400
Total Aromatics >C5-35	<100 µg/kg	TM173			32100	30800	87400	108000	51100	109000
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173			119000	43200	110000	124000	72000	143000



CERTIFICATE OF ANALYSIS

SDG: 111024-1
Job: H_ATKINS_LDC-132
Client Reference: P1A and Stockpile.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0179
Report Number: 157436
Superseded Report:

TPH CWG (S)

Results Legend			Customer Sample R	SP38005	SP38007	SP38009	SP38011	SP38013	SP38015
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference							
M	mCERTS accredited.								
\$	Deviating sample.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted test.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
Component	LOD/Units	Method							
GRO Surrogate % recovery**	%	TM089	61	56	62	63	76	51	
GRO >C5-C12	<44 µg/kg	TM089	152	1200	179	2180	222	188	
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089	<5	<5	<5	<5	<5	<5	
Benzene	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	
Toluene	<2 µg/kg	TM089	<2	<2	<2	<2	<2	<2	
Ethylbenzene	<3 µg/kg	TM089	<3	<3	<3	<3	<3	<3	
m,p-Xylene	<6 µg/kg	TM089	<6	<6	<6	<6	<6	<6	
o-Xylene	<3 µg/kg	TM089	<3	<3	<3	<3	<3	<3	
sum of detected mpo xylene by GC	<9 µg/kg	TM089	<9	<9	<9	<9	<9	<9	
sum of detected BTEX by GC	<24 µg/kg	TM089	<24	<24	<24	<24	<24	<24	
Aliphatics >C5-C6	<10 µg/kg	TM089	10.6	12.9	<10	<10	<10	<10	
Aliphatics >C6-C8	<10 µg/kg	TM089	11.8	24.6	18.2	16.2	12.9	<10	
Aliphatics >C8-C10	<10 µg/kg	TM089	18.9	97.1	29.6	109	29.3	18.2	
Aliphatics >C10-C12	<10 µg/kg	TM089	55.5	600	57	1180	90.1	83.5	
Aliphatics >C12-C16	<100 µg/kg	TM173	20900	31900	32000	40900	20200	44600	
Aliphatics >C16-C21	<100 µg/kg	TM173	31100	38300	35800	52600	32400	78500	
Aliphatics >C21-C35	<100 µg/kg	TM173	166000	170000	185000	213000	148000	329000	
Aliphatics >C35-C44	<100 µg/kg	TM173	22800	27900	55900	53900	26400	36200	
Total Aliphatics >C12-C44	<100 µg/kg	TM173	241000	269000	309000	360000	227000	489000	
Aromatics >EC5-EC7	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	
Aromatics >EC7-EC8	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	
Aromatics >EC8-EC10	<10 µg/kg	TM089	16.5	67.9	23.9	75.4	23.4	14.5	
Aromatics >EC10-EC12	<10 µg/kg	TM089	36.6	400	38.8	789	59.7	55.7	
Aromatics >EC12-EC16	<100 µg/kg	TM173	5650	6320	7050	6020	5450	7390	
Aromatics >EC16-EC21	<100 µg/kg	TM173	12100	11500	13400	16200	12100	14400	
Aromatics >EC21-EC35	<100 µg/kg	TM173	90900	62100	105000	140000	90500	91400	
Aromatics >EC35-EC44	<100 µg/kg	TM173	35200	24900	55900	71300	38600	23900	
Aromatics >EC40-EC44	<100 µg/kg	TM173	12300	9470	22100	28600	14900	8030	
Total Aromatics >EC12-EC44	<100 µg/kg	TM173	144000	105000	181000	233000	147000	137000	
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173	385000	375000	490000	595000	374000	626000	
Total Aliphatics >C5-35	<100 µg/kg	TM173	218000	241000	253000	307000	201000	453000	
Total Aromatics >C5-35	<100 µg/kg	TM173	109000	80400	125000	163000	108000	113000	
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173	327000	322000	378000	470000	309000	566000	



CERTIFICATE OF ANALYSIS

SDG: 111024-1
Job: H_ATKINS_LDC-132
Client Reference: P1A and Stockpile.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0179
Report Number: 157436
Superseded Report:

TPH CWG (S)

Results Legend			Customer Sample R		SP38017	SP38019	SP38021			
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference							
M	mCERTS accredited.									
\$	Deviating sample.									
aq	Aqueous / settled sample.									
diss.filt	Dissolved / filtered sample.									
tot.unfilt	Total / unfiltered sample.									
*	Subcontracted test.									
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery									
(F)	Trigger breach confirmed									
Component	LOD/Units	Method								
GRO Surrogate % recovery**	%	TM089			66	71	59			
GRO >C5-C12	<44 µg/kg	TM089			356	465	81.2	\$		
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089			<5	<5	<5	\$ #		
Benzene	<10 µg/kg	TM089			<10	<10	<10	\$ M		
Toluene	<2 µg/kg	TM089			2.22	2.28	2.32	\$ M		
Ethylbenzene	<3 µg/kg	TM089			<3	<3	<3	\$ M		
m,p-Xylene	<6 µg/kg	TM089			<6	<6	<6	\$ M		
o-Xylene	<3 µg/kg	TM089			<3	<3	<3	\$ M		
sum of detected mpo xylene by GC	<9 µg/kg	TM089			<9	<9	<9	\$		
sum of detected BTEX by GC	<24 µg/kg	TM089			<24	<24	<24	\$		
Aliphatics >C5-C6	<10 µg/kg	TM089			<10	<10	<10	\$		
Aliphatics >C6-C8	<10 µg/kg	TM089			33.3	16	10.4	\$		
Aliphatics >C8-C10	<10 µg/kg	TM089			38.9	30.8	13.9	\$		
Aliphatics >C10-C12	<10 µg/kg	TM089			148	231	23.2	\$		
Aliphatics >C12-C16	<100 µg/kg	TM173			12500	34700	24500			
Aliphatics >C16-C21	<100 µg/kg	TM173			18600	34400	34300			
Aliphatics >C21-C35	<100 µg/kg	TM173			89500	129000	175000			
Aliphatics >C35-C44	<100 µg/kg	TM173			23300	37000	31500			
Total Aliphatics >C12-C44	<100 µg/kg	TM173			144000	235000	266000			
Aromatics >EC5-EC7	<10 µg/kg	TM089			<10	<10	<10	\$		
Aromatics >EC7-EC8	<10 µg/kg	TM089			<10	<10	<10	\$		
Aromatics >EC8-EC10	<10 µg/kg	TM089			30	23.9	13.9	\$		
Aromatics >EC10-EC12	<10 µg/kg	TM089			98.8	154	15.1	\$		
Aromatics >EC12-EC16	<100 µg/kg	TM173			4380	7700	7830			
Aromatics >EC16-EC21	<100 µg/kg	TM173			8530	14400	9460			
Aromatics >EC21-EC35	<100 µg/kg	TM173			54700	97900	73200			
Aromatics >EC35-EC44	<100 µg/kg	TM173			32200	47400	35900			
Aromatics >EC40-EC44	<100 µg/kg	TM173			13700	20600	14800			
Total Aromatics >EC12-EC44	<100 µg/kg	TM173			99700	167000	126000			
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173			244000	403000	392000			
Total Aliphatics >C5-35	<100 µg/kg	TM173			121000	199000	234000			
Total Aromatics >C5-35	<100 µg/kg	TM173			67700	120000	90500			
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173			189000	319000	325000			



CERTIFICATE OF ANALYSIS

SDG: 111024-1
Job: H_ATKINS_LDC-132
Client Reference: P1A and Stockpile.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0179
Report Number: 157436
Superseded Report:

Notification of Deviating Samples

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
4587822	SP38021		SOLID	GRO by GC-FID (S)	Aliphatics >C10-C12	Container with Headspace provided for volatiles analysis
4587822	SP38021		SOLID	GRO by GC-FID (S)	Aliphatics >C5-C6	Container with Headspace provided for volatiles analysis
4587822	SP38021		SOLID	GRO by GC-FID (S)	Aliphatics >C6-C8	Container with Headspace provided for volatiles analysis
4587822	SP38021		SOLID	GRO by GC-FID (S)	Aliphatics >C8-C10	Container with Headspace provided for volatiles analysis
4587822	SP38021		SOLID	GRO by GC-FID (S)	Aromatics >EC10-EC12	Container with Headspace provided for volatiles analysis
4587822	SP38021		SOLID	GRO by GC-FID (S)	Aromatics >EC5-EC7	Container with Headspace provided for volatiles analysis
4587822	SP38021		SOLID	GRO by GC-FID (S)	Aromatics >EC7-EC8	Container with Headspace provided for volatiles analysis
4587822	SP38021		SOLID	GRO by GC-FID (S)	Aromatics >EC8-EC10	Container with Headspace provided for volatiles analysis
4587822	SP38021		SOLID	GRO by GC-FID (S)	Benzene	Container with Headspace provided for volatiles analysis
4587822	SP38021		SOLID	GRO by GC-FID (S)	Ethylbenzene	Container with Headspace provided for volatiles analysis
4587822	SP38021		SOLID	GRO by GC-FID (S)	GRO >C5-C12	Container with Headspace provided for volatiles analysis
4587822	SP38021		SOLID	GRO by GC-FID (S)	GRO Surrogate % recovery**	Container with Headspace provided for volatiles analysis
4587822	SP38021		SOLID	GRO by GC-FID (S)	m,p-Xylene	Container with Headspace provided for volatiles analysis
4587822	SP38021		SOLID	GRO by GC-FID (S)	Methyl tertiary butyl ether (MTBE)	Container with Headspace provided for volatiles analysis
4587822	SP38021		SOLID	GRO by GC-FID (S)	o-Xylene	Container with Headspace provided for volatiles analysis
4587822	SP38021		SOLID	GRO by GC-FID (S)	sum of detected BTEX by GC	Container with Headspace provided for volatiles analysis
4587822	SP38021		SOLID	GRO by GC-FID (S)	sum of detected mpo xylene by GC	Container with Headspace provided for volatiles analysis
4587822	SP38021		SOLID	GRO by GC-FID (S)	Toluene	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	Aliphatics >C10-C12	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	Aliphatics >C5-C6	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	Aliphatics >C6-C8	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	Aliphatics >C8-C10	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	Aromatics >EC10-EC12	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	Aromatics >EC5-EC7	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	Aromatics >EC7-EC8	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	Aromatics >EC8-EC10	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	Benzene	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	Ethylbenzene	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	GRO >C5-C12	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	GRO Surrogate % recovery**	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	m,p-Xylene	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	Methyl tertiary butyl ether (MTBE)	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	o-Xylene	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	sum of detected BTEX by GC	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	sum of detected mpo xylene by GC	Container with Headspace provided for volatiles analysis
4587862	SP38011		SOLID	GRO by GC-FID (S)	Toluene	Container with Headspace provided for volatiles analysis



CERTIFICATE OF ANALYSIS

SDG: 111024-1
Job: H_ATKINS_LDC-132
Client Reference: P1A and Stockpile.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0179
Report Number: 157436
Superseded Report:

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	Aliphatics >C10-C12	Container with Headspace provided for volatiles analysis
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	Aliphatics >C5-C6	Container with Headspace provided for volatiles analysis
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	Aliphatics >C6-C8	Container with Headspace provided for volatiles analysis
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	Aliphatics >C8-C10	Container with Headspace provided for volatiles analysis
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	Aromatics >EC10-EC12	Container with Headspace provided for volatiles analysis
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	Aromatics >EC5-EC7	Container with Headspace provided for volatiles analysis
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	Aromatics >EC7-EC8	Container with Headspace provided for volatiles analysis
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	Aromatics >EC8-EC10	Container with Headspace provided for volatiles analysis
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	Benzene	Container with Headspace provided for volatiles analysis
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	Ethylbenzene	Container with Headspace provided for volatiles analysis
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	GRO >C5-C12	Container with Headspace provided for volatiles analysis
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	GRO Surrogate % recovery**	Container with Headspace provided for volatiles analysis
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	m,p-Xylene	Container with Headspace provided for volatiles analysis
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	Methyl tertiary butyl ether (MTBE)	Container with Headspace provided for volatiles analysis
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	o-Xylene	Container with Headspace provided for volatiles analysis
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	sum of detected BTEX by GC	Container with Headspace provided for volatiles analysis
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	sum of detected mpo xylene by GC	Container with Headspace provided for volatiles analysis
4587878	PAN004	0.90	SOLID	GRO by GC-FID (S)	Toluene	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	Aliphatics >C10-C12	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	Aliphatics >C5-C6	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	Aliphatics >C6-C8	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	Aliphatics >C8-C10	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	Aromatics >EC10-EC12	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	Aromatics >EC5-EC7	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	Aromatics >EC7-EC8	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	Aromatics >EC8-EC10	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	Benzene	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	Ethylbenzene	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	GRO >C5-C12	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	GRO Surrogate % recovery**	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	m,p-Xylene	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	Methyl tertiary butyl ether (MTBE)	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	o-Xylene	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	sum of detected BTEX by GC	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	sum of detected mpo xylene by GC	Container with Headspace provided for volatiles analysis
4587894	SP35005		SOLID	GRO by GC-FID (S)	Toluene	Container with Headspace provided for volatiles analysis
4587906	SP38015		SOLID	GRO by GC-FID (S)	Aliphatics >C10-C12	Container with Headspace provided for volatiles analysis



CERTIFICATE OF ANALYSIS

SDG: 111024-1
Job: H_ATKINS_LDC-132
Client Reference: P1A and Stockpile.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0179
Report Number: 157436
Superseded Report:

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
4587906	SP38015		SOLID	GRO by GC-FID (S)	Aliphatics >C5-C6	Container with Headspace provided for volatiles analysis
4587906	SP38015		SOLID	GRO by GC-FID (S)	Aliphatics >C6-C8	Container with Headspace provided for volatiles analysis
4587906	SP38015		SOLID	GRO by GC-FID (S)	Aliphatics >C8-C10	Container with Headspace provided for volatiles analysis
4587906	SP38015		SOLID	GRO by GC-FID (S)	Aromatics >EC10-EC12	Container with Headspace provided for volatiles analysis
4587906	SP38015		SOLID	GRO by GC-FID (S)	Aromatics >EC5-EC7	Container with Headspace provided for volatiles analysis
4587906	SP38015		SOLID	GRO by GC-FID (S)	Aromatics >EC7-EC8	Container with Headspace provided for volatiles analysis
4587906	SP38015		SOLID	GRO by GC-FID (S)	Aromatics >EC8-EC10	Container with Headspace provided for volatiles analysis
4587906	SP38015		SOLID	GRO by GC-FID (S)	Benzene	Container with Headspace provided for volatiles analysis
4587906	SP38015		SOLID	GRO by GC-FID (S)	Ethylbenzene	Container with Headspace provided for volatiles analysis
4587906	SP38015		SOLID	GRO by GC-FID (S)	GRO >C5-C12	Container with Headspace provided for volatiles analysis
4587906	SP38015		SOLID	GRO by GC-FID (S)	GRO Surrogate % recovery**	Container with Headspace provided for volatiles analysis
4587906	SP38015		SOLID	GRO by GC-FID (S)	m,p-Xylene	Container with Headspace provided for volatiles analysis
4587906	SP38015		SOLID	GRO by GC-FID (S)	Methyl tertiary butyl ether (MTBE)	Container with Headspace provided for volatiles analysis
4587906	SP38015		SOLID	GRO by GC-FID (S)	o-Xylene	Container with Headspace provided for volatiles analysis
4587906	SP38015		SOLID	GRO by GC-FID (S)	sum of detected BTEX by GC	Container with Headspace provided for volatiles analysis
4587906	SP38015		SOLID	GRO by GC-FID (S)	sum of detected mpo xylene by GC	Container with Headspace provided for volatiles analysis
4587906	SP38015		SOLID	GRO by GC-FID (S)	Toluene	Container with Headspace provided for volatiles analysis

Note : Test results may be compromised



SDG:	111024-1	Location:	Coed Darcy Urban Village	Order Number:	CD0179
Job:	H_ATKINS_LDC-132	Customer:	Atkins Global Ltd	Report Number:	157436
Client Reference:	P1A and Stockpile.	Attention:	Alex Mann	Superseded Report:	

Table of Results - Appendix

REPORT KEY

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10 ⁻⁷							
NDP	No Determination Possible	#	ISO 17025 Accredited	*	Subcontracted Test	M	MCERTS Accredited
NFD	No Fibres Detected	PFD	Possible Fibres Detected	»	Result previously reported (Incremental reports only)	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM001		Preparation of Samples for Metals Analysis		
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
TM218	Microwave extraction – EPA method 3546	Microwave extraction - EPA method 3546		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.



CERTIFICATE OF ANALYSIS

SDG:	111024-1	Location:	Coed Darcy Urban Village	Order Number:	CD0179
Job:	H_ATKINS_LDC-132	Customer:	Atkins Global Ltd	Report Number:	157436
Client Reference:	P1A and Stockpile.	Attention:	Alex Mann	Superseded Report:	

Test Completion Dates

Lab Sample No(s)	4562231	4562234	4562235	4562236	4562237	4562238	4562239	4562240	4562241	4562242
Customer Sample Ref.	PAN001	PAN002	PAN003	PAN003	PAN004	PAN004	PAN005	PAN006	PAN007	PAN009
AGS Ref.										
Depth	0.40	0.50	0.20	0.70	0.30	0.90	0.10	0.30	0.20	0.20
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
EPH CWG (Aliphatic) GC (S)	28-Oct-2011	31-Oct-2011	31-Oct-2011	28-Oct-2011	31-Oct-2011	28-Oct-2011	31-Oct-2011	31-Oct-2011	31-Oct-2011	31-Oct-2011
EPH CWG (Aromatic) GC (S)	28-Oct-2011	31-Oct-2011	31-Oct-2011	28-Oct-2011	31-Oct-2011	28-Oct-2011	31-Oct-2011	31-Oct-2011	31-Oct-2011	31-Oct-2011
GRO by GC-FID (S)	28-Oct-2011	28-Oct-2011	28-Oct-2011	30-Oct-2011	30-Oct-2011	28-Oct-2011	28-Oct-2011	30-Oct-2011	28-Oct-2011	30-Oct-2011
Metals by iCap-OES (Soil)	28-Oct-2011	31-Oct-2011	31-Oct-2011	28-Oct-2011	31-Oct-2011	28-Oct-2011	31-Oct-2011	31-Oct-2011	31-Oct-2011	01-Nov-2011
PAH by GCMS	28-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011
pH	28-Oct-2011	28-Oct-2011	27-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011
Sample description	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011
TPH CWG GC (S)	28-Oct-2011	31-Oct-2011	31-Oct-2011	30-Oct-2011	31-Oct-2011	28-Oct-2011	31-Oct-2011	31-Oct-2011	31-Oct-2011	31-Oct-2011

Lab Sample No(s)	4562243	4562245	4562247	4562219	4562220	4562221	4562224	4562225	4562226	4562227
Customer Sample Ref.	PAN009	PAN010	PAN011	SP35001	SP35002	SP35003	SP35004	SP35005	SP35006	SP35007
AGS Ref.										
Depth	0.70	0.50	0.40							
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
EPH CWG (Aliphatic) GC (S)	31-Oct-2011	31-Oct-2011	31-Oct-2011	31-Oct-2011		31-Oct-2011		31-Oct-2011		31-Oct-2011
EPH CWG (Aromatic) GC (S)	31-Oct-2011	31-Oct-2011	31-Oct-2011	31-Oct-2011		31-Oct-2011		31-Oct-2011		31-Oct-2011
GRO by GC-FID (S)	30-Oct-2011	28-Oct-2011	30-Oct-2011	28-Oct-2011		28-Oct-2011		28-Oct-2011		30-Oct-2011
Metals by iCap-OES (Soil)	31-Oct-2011	01-Nov-2011	31-Oct-2011	28-Oct-2011	31-Oct-2011	28-Oct-2011	28-Oct-2011	01-Nov-2011	01-Nov-2011	28-Oct-2011
PAH by GCMS	28-Oct-2011	28-Oct-2011	28-Oct-2011	01-Nov-2011	01-Nov-2011	01-Nov-2011	28-Oct-2011	29-Oct-2011	29-Oct-2011	01-Nov-2011
pH	27-Oct-2011	27-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011	27-Oct-2011	28-Oct-2011	27-Oct-2011
Sample description	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011
Total Organic Carbon	31-Oct-2011		31-Oct-2011							
TPH CWG GC (S)	31-Oct-2011	31-Oct-2011	31-Oct-2011	31-Oct-2011		31-Oct-2011		31-Oct-2011		31-Oct-2011

Lab Sample No(s)	4562228	4562229	4562230	4562199	4562200	4562201	4562203	4562204	4562205	4562206
Customer Sample Ref.	SP35008	SP35009	SP35010	SP38005	SP38006	SP38007	SP38008	SP38009	SP38010	SP38011
AGS Ref.										
Depth										
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
EPH CWG (Aliphatic) GC (S)		31-Oct-2011		31-Oct-2011		31-Oct-2011		31-Oct-2011		31-Oct-2011
EPH CWG (Aromatic) GC (S)		31-Oct-2011		31-Oct-2011		31-Oct-2011		31-Oct-2011		31-Oct-2011
GRO by GC-FID (S)		30-Oct-2011		28-Oct-2011		28-Oct-2011		28-Oct-2011		28-Oct-2011
Metals by iCap-OES (Soil)	28-Oct-2011	01-Nov-2011	31-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011	31-Oct-2011	01-Nov-2011	28-Oct-2011	01-Nov-2011
PAH by GCMS	01-Nov-2011	29-Oct-2011	01-Nov-2011	01-Nov-2011	01-Nov-2011	01-Nov-2011	01-Nov-2011	29-Oct-2011	01-Nov-2011	29-Oct-2011
pH	28-Oct-2011	27-Oct-2011	27-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011	27-Oct-2011	27-Oct-2011
Sample description	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011
TPH CWG GC (S)		31-Oct-2011		31-Oct-2011		31-Oct-2011		31-Oct-2011		31-Oct-2011

Lab Sample No(s)	4562207	4562208	4562209	4562210	4562211	4562212	4562214	4562215	4562216	4562217
Customer Sample Ref.	SP38012	SP38013	SP38014	SP38015	SP38016	SP38017	SP38018	SP38019	SP38020	SP38021
AGS Ref.										
Depth										
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
EPH CWG (Aliphatic) GC (S)		31-Oct-2011		31-Oct-2011		31-Oct-2011		31-Oct-2011		28-Oct-2011
EPH CWG (Aromatic) GC (S)		31-Oct-2011		31-Oct-2011		31-Oct-2011		31-Oct-2011		28-Oct-2011
GRO by GC-FID (S)		28-Oct-2011		28-Oct-2011		30-Oct-2011		28-Oct-2011		28-Oct-2011
Metals by iCap-OES (Soil)	01-Nov-2011	28-Oct-2011	31-Oct-2011	01-Nov-2011	01-Nov-2011	01-Nov-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011
PAH by GCMS	29-Oct-2011	31-Oct-2011	01-Nov-2011	29-Oct-2011	29-Oct-2011	29-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011	28-Oct-2011
pH	28-Oct-2011	28-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	28-Oct-2011	27-Oct-2011
Sample description	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011	27-Oct-2011
TPH CWG GC (S)		31-Oct-2011		31-Oct-2011		31-Oct-2011		31-Oct-2011		28-Oct-2011

Lab Sample No(s)	4562218
Customer Sample Ref.	SP38022
AGS Ref.	
Depth	
Type	SOLID
Metals by iCap-OES (Soil)	28-Oct-2011
PAH by GCMS	01-Nov-2011
pH	27-Oct-2011
Sample description	27-Oct-2011



CERTIFICATE OF ANALYSIS

SDG:	111024-1	Location:	Coed Darcy Urban Village	Order Number:	CD0179
Job:	H_ATKINS_LDC-132	Customer:	Atkins Global Ltd	Report Number:	157436
Client Reference:	P1A and Stockpile.	Attention:	Alex Mann	Superseded Report:	

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA Leach tests, flash point, ammonium as NH4 by the BRE method, VOC TICS, SVOC TICS, TOF-MS SCAN/SEARCH and TOF-MS TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for both soil jars, tubs and volatile jars. All waters and vials will be discarded 10 days after the analysis is completed (e-mailed). All material removed during an asbestos containing material screen and analysed for the presence of asbestos will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be screened in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. Is an asbestos fibre type is found it will be reported as detected (for each fibre type found). If asbestos is present either as asbestos containing material or loose fibres no further analysis will be undertaken. The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample -similarly, if a headspace or sediment is present in the volatile sample. This will be flagged up as an invalid VOC on the test schedule or recorded on the log sheet.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials -whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C4 -C10 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

SOLID MATRICES EXTRACTION SUMMARY				
ANALYSIS	DC OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
SOLVENTEXTRACTABLE MATTER	D&C	DCM	SOX THERM	GRAVIMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOX THERM	GRAVIMETRIC
ELEMENTAL SULPHUR	D&C	DCM	SOX THERM	HPLC
PHENOLS BY GCMS	WET	DCM	SOX THERM	GCMS
HERBICIDES	D&C	HEXANE/ACETONE	SOX THERM	GCMS
PESTICIDES	D&C	HEXANE/ACETONE	SOX THERM	GCMS
EPH (DRO)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH (MIN OIL)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH (CLEANED UP)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH CWGBY GC	D&C	HEXANE/ACETONE	END OVER END	GC-FID
PCBTOT/PCB CON	D&C	HEXANE/ACETONE	END OVER END	GCMS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANE/ACETONE	MICROWAVE TM218.	GCMS
C8-C40 (C6-C40) EZ FLASH	WET	HEXANE/ACETONE	SHAKER	GC-EZ
POLYAROMATIC HYDROCARBONS RAPID GC	WET	HEXANE/ACETONE	SHAKER	GC-EZ
SEMI VOLATILE ORGANIC COMPOUNDS	WET	DOM/ACETONE	SONICATE	GCMS

LIQUID MATRICES EXTRACTION SUMMARY			
ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAHMS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
EPH CWG	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
PCB 7 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
PCB TOTAL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
SVOC	DCM	LIQUID/LIQUID SHAKE	GCMS
FREESULPHUR	DCM	SOLID PHASE EXTRACTION	HPLC
PEST COC/OPP	DCM	LIQUID/LIQUID SHAKE	GCMS
TRIAZINE HERBS	DCM	LIQUID/LIQUID SHAKE	GCMS
PHENOLS MS	DCM	SOLID PHASE EXTRACTION	GCMS
TRI by INFRARED (IR)	TCE	LIQUID/LIQUID SHAKE	HPLC
MINERAL OIL by IR	TCE	LIQUID/LIQUID SHAKE	HPLC
GLYCOLS	NONE	DIRECT INJECTION	GCMS

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials or those identified as potentially asbestos containing during sample description which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace -Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-



Atkins Global Ltd
Project Jonah site office
Llan Coed House
Suite 24
Coed Darcy
Llandarcy
SA10 6HJ

Attention: Alex Mann

CERTIFICATE OF ANALYSIS

Date: 28 November 2011
Customer: H_ATKINS_LDC
Sample Delivery Group (SDG): 111122-37
Your Reference: Weighbridge Rd Pits and DIME
Location: Coed Darcy
Report No: 161619

We received 12 samples on Tuesday November 22, 2011 and 12 of these samples were scheduled for analysis which was completed on Monday November 28, 2011. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan

Operations Manager





SDG:	111122-37	Location:	Coed Darcy	Order Number:	CD0189
Job:	H_ATKINS_LDC-137	Customer:	Atkins Global Ltd	Report Number:	161619
Client Reference:	Weighbridge Rd Pits and DIME	Attention:	Alex Mann	Superseded Report:	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
4742117	Dire WT IN			21/11/2011
4742118	Dire WT OUT			21/11/2011
4742120	PAN012		0.30	21/11/2011
4742121	PAN013		0.10	21/11/2011
4742123	PAN014		0.30	21/11/2011
4742129	PAN015		0.30	21/11/2011
4742131	PAN016		0.30	21/11/2011
4742132	PAN017		0.50	21/11/2011
4742133	PAN017		0.90	21/11/2011
4742134	PAN018		0.50	21/11/2011
4742135	PAN019		0.30	21/11/2011
4742136	PAN020		0.20	21/11/2011

Only received samples which have had analysis scheduled will be shown on the following pages.



SDG: 111122-37
Job: H_ATKINS_LDC-137
Client Reference: Weighbridge Rd Pits and DIME

Location: Coed Darcy
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0189
Report Number: 161619
Superseded Report:

LIQUID**Results Legend**

Test

No Determination
Possible**Lab Sample No(s)**

4742117

4742118

**Customer
Sample Reference**

Dire WT IN

Dire WT OUT

AGS Reference**Depth (m)****Container**

1l green glass bottle

1l plastic (ALE221)

Vial (ALE297)

500ml Plastic (ALE2

1l green glass bottle

Dissolved Metals by ICP-MS

All

NDPs: 0
Tests: 2

X

X

EPH CWG (Aliphatic) Aqueous GC
(W)

All

NDPs: 0
Tests: 2

X

X

EPH CWG (Aromatic) Aqueous GC
(W)

All

NDPs: 0
Tests: 2

X

X

GRO by GC-FID (W)

All

NDPs: 0
Tests: 2

X

X

Mercury Dissolved

All

NDPs: 0
Tests: 2

X

X

pH Value

All

NDPs: 0
Tests: 2

X

X

SVOC MS (W) - Aqueous

All

NDPs: 0
Tests: 2

X

X

TPH CWG (W)

All

NDPs: 0
Tests: 2

X

X

VOC MS (W)

All

NDPs: 0
Tests: 2

X

X



CERTIFICATE OF ANALYSIS

SDG: 111122-37
Job: H_ATKINS_LDC-137
Client Reference: Weighbridge Rd Pits and DIME

Location: Coed Darcy
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0189
Report Number: 161619
Superseded Report:

SOLID Results Legend X Test N No Determination Possible	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container	
	4742120		PAN012				0.30		60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL 60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL	
	4742121		PAN013				0.10		60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL	
	4742123		PAN014				0.30		60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL	
	4742129		PAN015				0.30		60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL	
EPH CWG (Aliphatic) GC (S)	4742131		PAN016				0.30		60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL	
	4742132		PAN017				0.50		60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL	
	4742133		PAN017				0.90		60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL	
	4742134		PAN018				0.50		60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL	
	4742135		PAN019				0.30		60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL	
	4742136		PAN020				0.20		60g VOC (ALE215) 400g Tub (ALE214) 250g Amber Jar (AL	
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 10	X	X	X	X	X	X	X	X
GRO by GC-FID (S)	All	NDPs: 0 Tests: 10	X	X	X	X	X	X	X	X
Metals by iCap-OES (Soil)	Arsenic	NDPs: 0 Tests: 10	X	X	X	X	X	X	X	X
	Cadmium	NDPs: 0 Tests: 10	X	X	X	X	X	X	X	X
	Chromium	NDPs: 0 Tests: 10	X	X	X	X	X	X	X	X
	Copper	NDPs: 0 Tests: 10	X	X	X	X	X	X	X	X
	Lead	NDPs: 0 Tests: 10	X	X	X	X	X	X	X	X
	Mercury	NDPs: 0 Tests: 10	X	X	X	X	X	X	X	X
	Nickel	NDPs: 0 Tests: 10	X	X	X	X	X	X	X	X
	Selenium	NDPs: 0 Tests: 10	X	X	X	X	X	X	X	X
	Vanadium	NDPs: 0 Tests: 10	X	X	X	X	X	X	X	X
	Zinc	NDPs: 0 Tests: 10	X	X	X	X	X	X	X	X
PAH by GCMS	All	NDPs: 0 Tests: 10	X	X	X	X	X	X	X	X
pH	All	NDPs: 0 Tests: 10	X	X	X	X	X	X	X	X



CERTIFICATE OF ANALYSIS

SDG: 111122-37
Job: H_ATKINS_LDC-137
Client Reference: Weighbridge Rd Pits and DIME

Location: Coed Darcy
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0189
Report Number: 161619
Superseded Report:

SOLID			Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container	
Results Legend												
X Test												
N No Determination Possible												
Sample description			All	NDPs: 0 Tests: 10								
Total Organic Carbon			All	NDPs: 0 Tests: 3								
TPH CWG GC (S)			All	NDPs: 0 Tests: 10								



SDG:	111122-37	Location:	Coed Darcy	Order Number:	CD0189
Job:	H_ATKINS_LDC-137	Customer:	Atkins Global Ltd	Report Number:	161619
Client Reference:	Weighbridge Rd Pits and DIME	Attention:	Alex Mann	Superseded Report:	

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
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Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
4742120	PAN012	0.30	Dark Brown	Silty Clay Loam	0.063 - 0.1 mm	Stones	N/A
4742121	PAN013	0.10	Black	Loamy Sand	0.1 - 2 mm	Stones	Ash/Soot
4742123	PAN014	0.30	Dark Brown	Sand	0.1 - 2 mm	Stones	Ash/Soot
4742129	PAN015	0.30	Black	Loamy Sand	0.1 - 2 mm	Stones	Oil/Petroleum
4742131	PAN016	0.30	Dark Brown	Silt Loam	0.063 - 0.1 mm	Stones	N/A
4742132	PAN017	0.50	Dark Brown	Sand	0.1 - 2 mm	Stones	None
4742133	PAN017	0.90	Dark Brown	Silty Clay	0.063 - 0.1 mm	Stones	N/A
4742134	PAN018	0.50	Dark Brown	Silty Clay	0.063 - 0.1 mm	Stones	N/A
4742135	PAN019	0.30	Light Brown	Clay	<0.063 mm	None	None
4742136	PAN020	0.20	Light Brown	Clay	<0.063 mm	Stones	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Order Number: CD0189
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Superseded Report:

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CERTIFICATE OF ANALYSIS

SDG: 111122-37
Job: H_ATKINS_LDC-137
Client Reference: Weighbridge Rd Pits and DIME

Location: Coed Darcy
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0189
Report Number: 161619
Superseded Report:

[illegible]

PAH by GCMS

Order Number: CD0189
Report Number: 161619
Superseded Report:

15:05:14 28/11/2011

Order Number: CD0189
Report Number: 161619
Superseded Report:

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CERTIFICATE OF ANALYSIS

SDG: 111122-37
Job: H_ATKINS_LDC-137
Client Reference: Weighbridge Rd Pits and DIME

Location: Coed Darcy
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0189
Report Number: 161619
Superseded Report:

SVOC MS (W) - Aqueous

Results Legend			Customer Sample R	Dire WT IN	Dire WT OUT			
#	ISO17025 accredited.							
M	mCERTS accredited.		Depth (m)	Water(GW/SW)	Water(GW/SW)			
S	Deviating sample.							
aq	Aqueous / settled sample.		Sample Type	21/11/2011	21/11/2011			
diss.filt	Dissolved / filtered sample.		Date Sampled	22/11/2011	22/11/2011			
tot.unfilt	Total / unfiltered sample.		Date Received	111122-37	111122-37			
*	Subcontracted test.		SDG Ref	4742117	4742118			
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery		Lab Sample No.(s)					
(F)	Trigger breach confirmed		AGS Reference					
Component		LOD/Units	Method					
1,2,4-Trichlorobenzene (aq)		<1 µg/l	TM176	<1	<1			
1,2-Dichlorobenzene (aq)		<1 µg/l	TM176	<1	<1			
1,3-Dichlorobenzene (aq)		<1 µg/l	TM176	<1	<1			
1,4-Dichlorobenzene (aq)		<1 µg/l	TM176	<1	<1			
2,4,5-Trichlorophenol (aq)		<1 µg/l	TM176	<1	<1			
2,4,6-Trichlorophenol (aq)		<1 µg/l	TM176	<1	<1			
2,4-Dichlorophenol (aq)		<1 µg/l	TM176	<1	<1			
2,4-Dimethylphenol (aq)		<1 µg/l	TM176	<1	<1			
2,4-Dinitrotoluene (aq)		<1 µg/l	TM176	<1	<1			
2,6-Dinitrotoluene (aq)		<1 µg/l	TM176	<1	<1			
2-Chloronaphthalene (aq)		<1 µg/l	TM176	<1	<1			
2-Chlorophenol (aq)		<1 µg/l	TM176	<1	<1			
2-Methylnaphthalene (aq)		<1 µg/l	TM176	3.67	1.67			
2-Methylphenol (aq)		<1 µg/l	TM176	<1	<1			
2-Nitroaniline (aq)		<1 µg/l	TM176	<1	<1			
2-Nitrophenol (aq)		<1 µg/l	TM176	<1	<1			
3-Nitroaniline (aq)		<1 µg/l	TM176	<1	<1			
4-Bromophenylphenylether (aq)		<1 µg/l	TM176	<1	<1			
4-Chloro-3-methylphenol (aq)		<1 µg/l	TM176	<1	<1			
4-Chloroaniline (aq)		<1 µg/l	TM176	<1	<1			
4-Chlorophenylphenylether (aq)		<1 µg/l	TM176	<1	<1			
4-Methylphenol (aq)		<1 µg/l	TM176	<1	<1			
4-Nitrophenol (aq)		<1 µg/l	TM176	<1	<1			
4-Nitroaniline (aq)		<1 µg/l	TM176	<1	<1			
Azobenzene (aq)		<1 µg/l	TM176	<1	<1			
Acenaphthylene (aq)		<1 µg/l	TM176	<1	<1			
Acenaphthene (aq)		<1 µg/l	TM176	<1	<1			
Anthracene (aq)		<1 µg/l	TM176	<1	<1			
bis(2-Chloroethyl)ether (aq)		<1 µg/l	TM176	<1	<1			
bis(2-Chloroethoxy)methan e (aq)		<1 µg/l	TM176	<1	<1			
bis(2-Ethylhexyl) phthalate (aq)		<2 µg/l	TM176	<2	<2			
Benzo(a)anthracene (aq)		<1 µg/l	TM176	<1	<1			
Butylbenzyl phthalate (aq)		<1 µg/l	TM176	<1	<1			
Benzo(b)fluoranthene (aq)		<1 µg/l	TM176	<1	<1			
Benzo(k)fluoranthene (aq)		<1 µg/l	TM176	<1	<1			

Order Number: CD0189
Report Number: 161619
Superseded Report:

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CERTIFICATE OF ANALYSIS

SDG: 111122-37
Job: H_ATKINS_LDC-137
Client Reference: Weighbridge Rd Pits and DIME

Location: Coed Darcy
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0189
Report Number: 161619
Superseded Report:

TPH CWG (S)

Results Legend			Customer Sample R		PAN012	PAN013	PAN014	PAN015	PAN016	PAN017
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.30	0.10	0.30	0.30	0.30	0.50
M	mCERTS accredited.				Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
S	Deviating sample.				21/11/2011	21/11/2011	21/11/2011	21/11/2011	21/11/2011	21/11/2011
aq	Aqueous / settled sample.				22/11/2011	22/11/2011	22/11/2011	22/11/2011	22/11/2011	22/11/2011
diss.filt	Dissolved / filtered sample.				111122-37	111122-37	111122-37	111122-37	111122-37	111122-37
tot.unfilt	Total / unfiltered sample.				4742120	4742121	4742123	4742129	4742131	4742132
*	Subcontracted test.									
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery									
(F)	Trigger breach confirmed									
Component	LOD/Units	Method								
GRO Surrogate % recovery**	%	TM089			38	33	29	36	39	54
GRO >C5-C12	<44 µg/kg	TM089			42800	411	9290	20200	30800	18000
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089			<5	<5	<5	<5	<5	<5
Benzene	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Toluene	<2 µg/kg	TM089			3.48	11.7	6.56	4.72	<2	3.33
Ethylbenzene	<3 µg/kg	TM089			65	7.02	3.28	8.26	<3	16.7
m,p-Xylene	<6 µg/kg	TM089			32.5	14	<6	<6	<6	11.1
o-Xylene	<3 µg/kg	TM089			<3	4.68	26.2	61.4	<3	50
sum of detected mpo xylene by GC	<9 µg/kg	TM089			32.5	18.7	26.2	61.4	<9	61.1
sum of detected BTEX by GC	<24 µg/kg	TM089			101	37.4	36	74.4	<24	81.1
Aliphatics >C5-C6	<10 µg/kg	TM089			29	19.9	15.3	22.4	43.4	11.1
Aliphatics >C6-C8	<10 µg/kg	TM089			299	93.6	59	63.7	906	91
Aliphatics >C8-C10	<10 µg/kg	TM089			6770	74.9	820	2110	7130	2230
Aliphatics >C10-C12	<10 µg/kg	TM089			18700	78.4	4680	9900	10700	8460
Aliphatics >C12-C16	<100 µg/kg	TM173			1210000	10600	18300	68100	669000	40000
Aliphatics >C16-C21	<100 µg/kg	TM173			267000	16000	32300	87200	233000	16900
Aliphatics >C21-C35	<100 µg/kg	TM173			275000	138000	156000	802000	797000	115000
Aliphatics >C35-C44	<100 µg/kg	TM173			87000	33300	45100	246000	219000	32000
Total Aliphatics >C12-C44	<100 µg/kg	TM173			1840000	198000	252000	1200000	1920000	204000
Aromatics >EC5-EC7	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aromatics >EC7-EC8	<10 µg/kg	TM089			<10	11.7	<10	<10	<10	<10
Aromatics >EC8-EC10	<10 µg/kg	TM089			4610	74.9	580	1480	4750	1570
Aromatics >EC10-EC12	<10 µg/kg	TM089			12400	52.7	3120	6600	7170	5640
Aromatics >EC12-EC16	<100 µg/kg	TM173			174000	16000	15000	38300	163000	15500
Aromatics >EC16-EC21	<100 µg/kg	TM173			135000	10500	17100	64700	103000	15100
Aromatics >EC21-EC35	<100 µg/kg	TM173			316000	70100	93100	546000	630000	94100
Aromatics >EC35-EC44	<100 µg/kg	TM173			132000	33400	52800	250000	265000	45000
Aromatics >EC40-EC44	<100 µg/kg	TM173			58100	12200	20500	90300	97400	17500
Total Aromatics >EC12-EC44	<100 µg/kg	TM173			757000	130000	178000	898000	1160000	170000
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173			2640000	329000	439000	2120000	3110000	391000
Total Aliphatics >C5-35	<100 µg/kg	TM173			1780000	165000	212000	970000	1720000	182000
Total Aromatics >C5-35	<100 µg/kg	TM173			643000	96700	129000	657000	908000	132000
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173			2420000	262000	341000	1630000	2620000	314000



CERTIFICATE OF ANALYSIS

SDG: 111122-37
Job: H_ATKINS_LDC-137
Client Reference: Weighbridge Rd Pits and DIME

Location: Coed Darcy
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0189
Report Number: 161619
Superseded Report:

TPH CWG (S)

Results Legend		Customer Sample R	PAN017	PAN018	PAN019	PAN020		
#	ISO17025 accredited.		0.90	0.50	0.30	0.20		
M	mCERTS accredited.		Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid		
S	Deviating sample.		21/11/2011	21/11/2011	21/11/2011	21/11/2011		
aq	Aqueous / settled sample.		22/11/2011	22/11/2011	22/11/2011	22/11/2011		
diss.filt	Dissolved / filtered sample.		111122-37	111122-37	111122-37	111122-37		
tot.unfilt	Total / unfiltered sample.		4742133	4742134	4742135	4742136		
*	Subcontracted test.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
Component	LOD/Units	Method						
GRO Surrogate % recovery**	%	TM089	69	103	79	97		
GRO >C5-C12	<44 µg/kg	TM089	218000	345	<44	755		
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089	<25 #	<5 #	<5 #	<5 #		
Benzene	<10 µg/kg	TM089	<50 M	<10 M	<10 M	<10 M		
Toluene	<2 µg/kg	TM089	<10 M	2.3 M	<2 M	<2 M		
Ethylbenzene	<3 µg/kg	TM089	224 M	<3 M	<3 M	<3 M		
m,p-Xylene	<6 µg/kg	TM089	<30 M	<6 M	<6 M	<6 M		
o-Xylene	<3 µg/kg	TM089	668 M	<3 M	<3 M	<3 M		
sum of detected mpo xylene by GC	<9 µg/kg	TM089	668	<9	<9	<9		
sum of detected BTEX by GC	<24 µg/kg	TM089	892	<24	<24	<24		
Aliphatics >C5-C6	<10 µg/kg	TM089	<50	<10	<10	<10		
Aliphatics >C6-C8	<10 µg/kg	TM089	824	16.1	<10	<10		
Aliphatics >C8-C10	<10 µg/kg	TM089	29100	36.8	<10	31.3		
Aliphatics >C10-C12	<10 µg/kg	TM089	101000	150	<10	411		
Aliphatics >C12-C16	<100 µg/kg	TM173	528000	12400	5330	4860		
Aliphatics >C16-C21	<100 µg/kg	TM173	126000	8740	1730	2550		
Aliphatics >C21-C35	<100 µg/kg	TM173	204000	45500	4770	10500		
Aliphatics >C35-C44	<100 µg/kg	TM173	37000	13700	<100	2050		
Total Aliphatics >C12-C44	<100 µg/kg	TM173	896000	80400	11800	20000		
Aromatics >EC5-EC7	<10 µg/kg	TM089	<50	<10	<10	<10		
Aromatics >EC7-EC8	<10 µg/kg	TM089	<50	<10	<10	<10		
Aromatics >EC8-EC10	<10 µg/kg	TM089	20300	29.9	<10	23.2		
Aromatics >EC10-EC12	<10 µg/kg	TM089	67200	100	<10	274		
Aromatics >EC12-EC16	<100 µg/kg	TM173	133000	4740	16500	12600		
Aromatics >EC16-EC21	<100 µg/kg	TM173	92300	7270	2870	3990		
Aromatics >EC21-EC35	<100 µg/kg	TM173	271000	39000	5990	15200		
Aromatics >EC35-EC44	<100 µg/kg	TM173	85900	17700	<100	8040		
Aromatics >EC40-EC44	<100 µg/kg	TM173	33600	7080	<100	3120		
Total Aromatics >EC12-EC44	<100 µg/kg	TM173	583000	68700	25300	39800		
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173	1700000	149000	37200	60500		
Total Aliphatics >C5-35	<100 µg/kg	TM173	989000	66900	11800	18400		
Total Aromatics >C5-35	<100 µg/kg	TM173	584000	51200	25300	32000		
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173	1570000	118000	37200	50400		

Order Number: CD0189
Report Number: 161619
Superseded Report:

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CERTIFICATE OF ANALYSIS

SDG: 111122-37
Job: H_ATKINS_LDC-137
Client Reference: Weighbridge Rd Pits and DIME

Location: Coed Darcy
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0189
Report Number: 161619
Superseded Report:

VOC MS (W)

Results Legend		Customer Sample R	Dire WT IN	Dire WT OUT			
#	ISO17025 accredited.						
M	mCERTS accredited.	Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference	Water(GW/SW) 21/11/2011 22/11/2011 111122-37 4742117	Water(GW/SW) 21/11/2011 22/11/2011 111122-37 4742118			
S	Deviating sample.						
aq	Aqueous / settled sample.						
diss.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.						
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery						
(F)	Trigger breach confirmed						
Component	LOD/Units	Method					
Dibromofluoromethane**	%	TM208	101	92.8			
Toluene-d8**	%	TM208	100	97.2			
4-Bromofluorobenzene**	%	TM208	98.9	93.9			
Dichlorodifluoromethane	<1 µg/l	TM208	<1	<1			
Chloromethane	<1 µg/l	TM208	<1	<1			
Vinyl chloride	<1 µg/l	TM208	129	2.17			
Bromomethane	<1 µg/l	TM208	<1	<1			
Chloroethane	<1 µg/l	TM208	<1	<1			
Trichlorofluoromethane	<1 µg/l	TM208	<1	<1			
1,1-Dichloroethene	<1 µg/l	TM208	14.8	<1			
Carbon disulphide	<1 µg/l	TM208	3.03	<1			
Dichloromethane	<3 µg/l	TM208	15600	550			
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	<1			
trans-1,2-Dichloroethene	<1 µg/l	TM208	2.27	<1			
1,1-Dichloroethane	<1 µg/l	TM208	4.16	<1			
cis-1,2-Dichloroethene	<1 µg/l	TM208	1.69	<1			
2,2-Dichloropropane	<1 µg/l	TM208	<1	<1			
Bromochloromethane	<1 µg/l	TM208	<1	<1			
Chloroform	<1 µg/l	TM208	5.27	<1			
1,1,1-Trichloroethane	<1 µg/l	TM208	3.37	<1			
1,1-Dichloropropene	<1 µg/l	TM208	<1	<1			
Carbontetrachloride	<1 µg/l	TM208	<1	<1			
1,2-Dichloroethane	<1 µg/l	TM208	78800	827			
Benzene	<1 µg/l	TM208	4.87	<1			
Trichloroethene	<1 µg/l	TM208	4.5	<1			
1,2-Dichloropropane	<1 µg/l	TM208	<1	<1			
Dibromomethane	<1 µg/l	TM208	<1	<1			
Bromodichloromethane	<1 µg/l	TM208	<1	<1			
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1			
Toluene	<1 µg/l	TM208	4.24	<1			
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1			
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	<1			
1,3-Dichloropropane	<1 µg/l	TM208	<1	<1			
Tetrachloroethene	<1 µg/l	TM208	<1	<1			
Dibromochloromethane	<1 µg/l	TM208	<1	<1			



CERTIFICATE OF ANALYSIS

SDG: 111122-37
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Location: Coed Darcy
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0189
Report Number: 161619
Superseded Report:

VOC MS (W)

Results Legend			Customer Sample R		Dire WT IN		Dire WT OUT				
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Date Received SDG Ref Lab Sample No.(s) AGS Reference		Water(GW/SW)		Water(GW/SW)				
M	mCERTS accredited.				21/11/2011		21/11/2011				
S	Deviating sample.										
aq	Aqueous / settled sample.										
diss.filt	Dissolved / filtered sample.										
tot.unfilt	Total / unfiltered sample.										
*	Subcontracted test.										
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery										
(F)	Trigger breach confirmed										
Component	LOD/Units	Method									
1,2-Dibromoethane	<1 µg/l	TM208			<1		<1				
					#		#				
Chlorobenzene	<1 µg/l	TM208			<1		<1				
					#		#				
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208			<1		<1				
					#		#				
Ethylbenzene	<1 µg/l	TM208			3.34		<1				
					#		#				
m,p-Xylene	<1 µg/l	TM208			10.6		1.25				
					#		#				
o-Xylene	<1 µg/l	TM208			5.61		<1				
					#		#				
Styrene	<1 µg/l	TM208			<1		<1				
					#		#				
Bromoform	<1 µg/l	TM208			<1		<1				
					#		#				
Isopropylbenzene	<1 µg/l	TM208			<1		<1				
					#		#				
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208			<1		<1				
					#		#				
1,2,3-Trichloropropane	<1 µg/l	TM208			<1		<1				
					#		#				
Bromobenzene	<1 µg/l	TM208			<1		<1				
					#		#				
Propylbenzene	<1 µg/l	TM208			<1		<1				
					#		#				
2-Chlorotoluene	<1 µg/l	TM208			<1		<1				
					#		#				
1,3,5-Trimethylbenzene	<1 µg/l	TM208			4.6		1.6				
					#		#				
4-Chlorotoluene	<1 µg/l	TM208			<1		<1				
					#		#				
tert-Butylbenzene	<1 µg/l	TM208			<1		<1				
					#		#				
1,2,4-Trimethylbenzene	<1 µg/l	TM208			10.4		2.99				
					#		#				
sec-Butylbenzene	<1 µg/l	TM208			<1		<1				
					#		#				
4-iso-Propyltoluene	<1 µg/l	TM208			<1		<1				
					#		#				
1,3-Dichlorobenzene	<1 µg/l	TM208			<1		<1				
					#		#				
1,4-Dichlorobenzene	<1 µg/l	TM208			<1		<1				
					#		#				
n-Butylbenzene	<1 µg/l	TM208			<1		<1				
					#		#				
1,2-Dichlorobenzene	<1 µg/l	TM208			<1		<1				
					#		#				
1,2-Dibromo-3-chloropropene	<1 µg/l	TM208			<1		<1				
					#		#				
1,2,4-Trichlorobenzene	<1 µg/l	TM208			<1		<1				
					#		#				
Hexachlorobutadiene	<1 µg/l	TM208			<1		<1				
					#		#				
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208			<1		<1				
					#		#				
Naphthalene	<1 µg/l	TM208			3.21		<1				
					#		#				
1,2,3-Trichlorobenzene	<1 µg/l	TM208			<1		<1				
					#		#				
1,3,5-Trichlorobenzene	<1 µg/l	TM208			<1		<1				
					#		#				



CERTIFICATE OF ANALYSIS

SDG:	111122-37	Location:	Coed Darcy	Order Number:	CD0189
Job:	H_ATKINS_LDC-137	Customer:	Atkins Global Ltd	Report Number:	161619
Client Reference:	Weighbridge Rd Pits and DIME	Attention:	Alex Mann	Superseded Report:	

Notification of Deviating Samples

Sample Number	Customer Sample Ref.	Depth (m)	Matrix	Test Name	Component Name	Comment
4749311	Dire WT IN		LIQUID	VOC MS (W)	Dichloromethane	Container with Headspace provided for volatiles analysis
4749311	Dire WT IN		LIQUID	VOC MS (W)	1,2-Dichloroethane	Different weight /Aliquot taken

Note : Test results may be compromised



SDG: 111122-37
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Superseded Report:

Table of Results - Appendix

REPORT KEY

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷

NDP	No Determination Possible	#	ISO 17025 Accredited	*	Subcontracted Test	M	MCERTS Accredited
NFD	No Fibres Detected	PFD	Possible Fibres Detected	»	Result previously reported (Incremental reports only)	EC	Equivalent Carbon (Aromatics C8-C35)

Note: Method detection limits are not always achievable due to various circumstances beyond our control

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM001		Preparation of Samples for Metals Analysis		
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM061	Method for the Determination of EPH, Massachusetts Dept. of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM132	In - house Method	ELTRA CS800 Operators Guide		
TM133	BS 1377: Part 3 1990; BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID		
TM174	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID		
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters		
TM218	Microwave extraction – EPA method 3546	Microwave extraction - EPA method 3546		
TM245	By GC-FID	Determination of GRO by Headspace in waters		
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.



CERTIFICATE OF ANALYSIS

SDG:	111122-37	Location:	Coed Darcy	Order Number:	CD0189
Job:	H_ATKINS_LDC-137	Customer:	Atkins Global Ltd	Report Number:	161619
Client Reference:	Weighbridge Rd Pits and DIME	Attention:	Alex Mann	Superseded Report:	

Test Completion Dates

Lab Sample No(s)	4742117	4742118	4742120	4742121	4742123	4742129	4742131	4742132	4742133	4742134
Customer Sample Ref.	Dire WT IN	Dire WT OUT	PAN012	PAN013	PAN014	PAN015	PAN016	PAN017	PAN017	PAN018
AGS Ref.										
Depth			0.30	0.10	0.30	0.30	0.30	0.50	0.90	0.50
Type	LIQUID	LIQUID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
Dissolved Metals by ICP-MS	24-Nov-2011	24-Nov-2011								
EPH CWG (Aliphatic) Aqueous GC (W)	25-Nov-2011	25-Nov-2011								
EPH CWG (Aliphatic) GC (S)			25-Nov-2011	25-Nov-2011	25-Nov-2011	25-Nov-2011	25-Nov-2011	25-Nov-2011	25-Nov-2011	25-Nov-2011
EPH CWG (Aromatic) Aqueous GC (W)	25-Nov-2011	25-Nov-2011								
EPH CWG (Aromatic) GC (S)			25-Nov-2011	25-Nov-2011	25-Nov-2011	25-Nov-2011	25-Nov-2011	25-Nov-2011	25-Nov-2011	25-Nov-2011
GRO by GC-FID (S)			24-Nov-2011	24-Nov-2011	24-Nov-2011	24-Nov-2011	24-Nov-2011	24-Nov-2011	24-Nov-2011	24-Nov-2011
GRO by GC-FID (W)	23-Nov-2011	23-Nov-2011								
Mercury Dissolved	24-Nov-2011	24-Nov-2011								
Metals by iCap-OES (Soil)			24-Nov-2011	25-Nov-2011	25-Nov-2011	25-Nov-2011	24-Nov-2011	25-Nov-2011	24-Nov-2011	24-Nov-2011
PAH by GCMS			26-Nov-2011	24-Nov-2011	24-Nov-2011	24-Nov-2011	26-Nov-2011	24-Nov-2011	25-Nov-2011	26-Nov-2011
pH			28-Nov-2011	28-Nov-2011	28-Nov-2011	28-Nov-2011	28-Nov-2011	28-Nov-2011	28-Nov-2011	28-Nov-2011
pH Value	23-Nov-2011	23-Nov-2011								
Sample description			23-Nov-2011	23-Nov-2011	23-Nov-2011	23-Nov-2011	23-Nov-2011	23-Nov-2011	23-Nov-2011	23-Nov-2011
SVOC MS (W) - Aqueous	28-Nov-2011	28-Nov-2011								
Total Organic Carbon										28-Nov-2011
TPH CWG (W)	25-Nov-2011	25-Nov-2011								
TPH CWG GC (S)			25-Nov-2011	25-Nov-2011	25-Nov-2011	25-Nov-2011	25-Nov-2011	25-Nov-2011	25-Nov-2011	25-Nov-2011
VOC MS (W)	25-Nov-2011	24-Nov-2011								

Lab Sample No(s)	4742135	4742136
Customer Sample Ref.	PAN019	PAN020
AGS Ref.		
Depth	0.30	0.20
Type	SOLID	SOLID
EPH CWG (Aliphatic) GC (S)	25-Nov-2011	25-Nov-2011
EPH CWG (Aromatic) GC (S)	25-Nov-2011	25-Nov-2011
GRO by GC-FID (S)	24-Nov-2011	24-Nov-2011
Metals by iCap-OES (Soil)	25-Nov-2011	25-Nov-2011
PAH by GCMS	24-Nov-2011	24-Nov-2011
pH	28-Nov-2011	28-Nov-2011
Sample description	23-Nov-2011	23-Nov-2011
Total Organic Carbon	24-Nov-2011	24-Nov-2011
TPH CWG GC (S)	25-Nov-2011	25-Nov-2011



SDG:	111122-37	Location:	Coed Darcy	Order Number:	CD0189
Job:	H_ATKINS_LDC-137	Customer:	Atkins Global Ltd	Report Number:	161619
Client Reference:	Weighbridge Rd Pits and DIME	Attention:	Alex Mann	Superseded Report:	

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA Leach tests, flash point, ammonium as NH4 by the BRE method, VOC TICS, SVOC TICS, TOF-MS SCAN/SEARCH and TOF-MS TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for both soil jars, tubs and volatile jars. All waters and vials will be discarded 10 days after the analysis is completed (e-mailed). All material removed during an asbestos containing material screen and analysed for the presence of asbestos will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be screened in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. Is an asbestos fibre type is found it will be reported as detected (for each fibre type found). If asbestos is present either as asbestos containing material or loose fibres no further analysis will be undertaken. The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, the integrity of the data may be compromised if the laboratory is required to create a sub-sample from the bulk sample -similarly, if a headspace or sediment is present in the volatile sample. This will be flagged up as an invalid VOC on the test schedule or recorded on the log sheet.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials -whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute themajor part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C4 -C10 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

SOLID MATRICES EXTRACTION SUMMARY				
ANALYSIS	DC OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
SOLVENTEXTRACTABLE MATTER	D&C	DCM	SOX THERM	GRAVIMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOX THERM	GRAVIMETRIC
ELEMENTAL SULPHUR	D&C	DCM	SOX THERM	HPLC
PHENOLS BY GCMS	WET	DCM	SOX THERM	GC-MS
HERBICIDES	D&C	HEXANE/ACETONE	SOX THERM	GC-MS
PESTICIDES	D&C	HEXANE/ACETONE	SOX THERM	GC-MS
EPH (DRO)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH (MIN OIL)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH (CLEANED UP)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH CWGBY GC	D&C	HEXANE/ACETONE	END OVER END	GC-FID
PCBTOT/PCB CON	D&C	HEXANE/ACETONE	END OVER END	GC-MS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANE/ACETONE	MICROWAVE TM218.	GC-MS
C8-C40 (C6-C40) EZ FLASH	WET	HEXANE/ACETONE	SHAKER	GC-EZ
POLYAROMATIC HYDROCARBONS RAPID GC	WET	HEXANE/ACETONE	SHAKER	GC-EZ
SEMI VOLATILE ORGANIC COMPOUNDS	WET	DOM/ACETONE	SONICATE	GC-MS

LIQUID MATRICES EXTRACTION SUMMARY			
ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAHMS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
EPH CWG	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC FID
PCB 7 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
PCB TOTAL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GCMS
SVOC	DCM	LIQUID/LIQUID SHAKE	GCMS
FREESULPHUR	DCM	SOLID PHASE EXTRACTION	HPLC
PEST COC/OPP	DCM	LIQUID/LIQUID SHAKE	GCMS
TRIAZINE HERBS	DCM	LIQUID/LIQUID SHAKE	GCMS
PHENOLS MS	DCM	SOLID PHASE EXTRACTION	GCMS
TRI by INFRARED (IR)	TCE	LIQUID/LIQUID SHAKE	HPLC
MINERAL OIL by IR	TCE	LIQUID/LIQUID SHAKE	HPLC
GLYCOLS	NONE	DIRECT INJECTION	GCMS

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials or those identified as potentially asbestos containing during sample description which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace -Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-



Atkins Global Ltd
Project Jonah site office
Llan Coed House
Suite 24
Coed Darcy
Llandarcy
SA10 6HJ

Attention: Alex Mann

CERTIFICATE OF ANALYSIS

Date: 30 May 2012
Customer: H_ATKINS_LDC
Sample Delivery Group (SDG): 120524-30
Your Reference: Not Specified.
Location: Coed Darcy Urban Village
Report No: 182874

We received 13 samples on Thursday May 24, 2012 and 13 of these samples were scheduled for analysis which was completed on Wednesday May 30, 2012. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan

Operations Manager





SDG:	120524-30	Location:	Coed Darcy Urban Village	Order Number:	CD0252
Job:	H_ATKINS_LDC-35	Customer:	Atkins Global Ltd	Report Number:	182874
Client Reference:	Not Specified.	Attention:	Alex Mann	Superseded Report:	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
5631156	CSP001		0.20	23/05/2012
5631157	CSP001		0.50	23/05/2012
5631159	CSP002		0.30	23/05/2012
5631161	CSP003		0.50	23/05/2012
5631162	CSP003		1.00	23/05/2012
5631163	CSP004		0.20	23/05/2012
5631164	CSP005		0.40	23/05/2012
5631165	CSP005		1.00	23/05/2012
5631167	CSP006		0.40	23/05/2012
5631168	CSP007		0.20	23/05/2012
5631169	CSP008		0.40	23/05/2012
5631170	CSP009		0.50	23/05/2012
5631172	CSP009		1.00	23/05/2012

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

SDG: 120524-30
Job: H_ATKINS_LDC-35
Client Reference: Not Specified.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0252
Report Number: 182874
Superseded Report:

SOLID Results Legend X Test N No Determination Possible	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container	
	5631172		CSP009				1.00		60g VOC (ALE215) 400g Tub (ALE214)	
	5631170		CSP009				0.50		250g Amber Jar (AL) 60g VOC (ALE215) 400g Tub (ALE214)	
	5631169		CSP008				0.40		250g Amber Jar (AL) 60g VOC (ALE215) 400g Tub (ALE214)	
	5631168		CSP007				0.20		250g Amber Jar (AL) 60g VOC (ALE215) 400g Tub (ALE214)	
EPH CWG (Aliphatic) GC (S) EPH CWG (Aromatic) GC (S) GRO by GC-FID (S) Metals by iCap-OES (Soil)			CSP006				0.40		250g Amber Jar (AL) 60g VOC (ALE215) 400g Tub (ALE214)	
			CSP005				1.00		250g Amber Jar (AL) 60g VOC (ALE215) 400g Tub (ALE214)	
			CSP005				0.40		250g Amber Jar (AL) 60g VOC (ALE215) 400g Tub (ALE214)	
			CSP004				0.20		250g Amber Jar (AL) 60g VOC (ALE215) 400g Tub (ALE214)	
			CSP003				1.00		250g Amber Jar (AL) 60g VOC (ALE215) 400g Tub (ALE214)	
			CSP003				0.50		250g Amber Jar (AL) 60g VOC (ALE215) 400g Tub (ALE214)	
			CSP002				0.30		250g Amber Jar (AL) 60g VOC (ALE215) 400g Tub (ALE214)	
			CSP001				0.50		250g Amber Jar (AL) 60g VOC (ALE215) 400g Tub (ALE214)	
			CSP001				0.20		250g Amber Jar (AL) 60g VOC (ALE215) 400g Tub (ALE214)	
			CSP001				0.20		250g Amber Jar (AL) 60g VOC (ALE215) 400g Tub (ALE214)	
Arsenic Cadmium Chromium Copper Lead Mercury Nickel Selenium Vanadium Zinc		NDPs: 0 Tests: 13								
PAH by GCMS		NDPs: 0 Tests: 10								
pH		NDPs: 0 Tests: 13								

Order Number: CD0252
Report Number: 182874
Superseded Report:

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SDG:	120524-30	Location:	Coed Darcy Urban Village	Order Number:	CD0252
Job:	H_ATKINS_LDC-35	Customer:	Atkins Global Ltd	Report Number:	182874
Client Reference:	Not Specified.	Attention:	Alex Mann	Superseded Report:	

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
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Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Grain size	Inclusions	Inclusions 2
5631156	CSP001	0.20	Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
5631157	CSP001	0.50	Dark Brown	Sandy Clay	0.1 - 2 mm	Stones	Oil/Petroleum
5631159	CSP002	0.30	Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
5631161	CSP003	0.50	Dark Brown	Sandy Loam	0.1 - 2 mm	Stones	None
5631162	CSP003	1.00	Black	Sand	0.063 - 0.1 mm	Stones	None
5631163	CSP004	0.20	Dark Brown	Sandy Clay Loam	0.063 - 0.1 mm	Stones	None
5631164	CSP005	0.40	Dark Brown	Loamy Sand	0.1 - 2 mm	Stones	None
5631165	CSP005	1.00	Dark Brown	Loamy Sand	0.1 - 2 mm	Stones	None
5631167	CSP006	0.40	Dark Brown	Sandy Clay Loam	0.063 - 0.1 mm	Stones	N/A
5631168	CSP007	0.20	Dark Brown	Loamy Sand	0.063 - 0.1 mm	Stones	None
5631169	CSP008	0.40	Dark Brown	Loamy Sand	0.1 - 2 mm	Stones	None
5631170	CSP009	0.50	Dark Brown	Sand	0.1 - 2 mm	Stones	None
5631172	CSP009	1.00	Dark Brown	Sand	0.063 - 0.1 mm	Stones	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Order Number: CD0252
Report Number: 182874
Superseded Report:

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Order Number: CD0252
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Order Number: CD0252
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Order Number: CD0252
Report Number: 182874
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Order Number: CD0252
Report Number: 182874
Superseded Report:

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CERTIFICATE OF ANALYSIS

SDG: 120524-30
Job: H_ATKINS_LDC-35
Client Reference: Not Specified.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0252
Report Number: 182874
Superseded Report:

Semi Volatile Organic Compounds

Results Legend		Customer Sample R	CSP003	CSP003	CSP007			
#	ISO17025 accredited.							
M	mCERTS accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.50 Soil/Solid 23/05/2012 . 24/05/2012 120524-30 5631161	1.00 Soil/Solid 23/05/2012 . 24/05/2012 120524-30 5631162	0.20 Soil/Solid 23/05/2012 . 24/05/2012 120524-30 5631168			
S	Deviating sample.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
Component	LOD/Units	Method						
Phenol	<100 µg/kg	TM157	<100	<100	<100			
Pentachlorophenol	<100 µg/kg	TM157	<100	<100	<100			
n-Nitroso-n-dipropylamine	<100 µg/kg	TM157	<100	<100	<100			
Nitrobenzene	<100 µg/kg	TM157	<100	<100	<100			
Isophorone	<100 µg/kg	TM157	<100	<100	<100			
Hexachloroethane	<100 µg/kg	TM157	<100	<100	<100			
Hexachlorocyclopentadiene	<100 µg/kg	TM157	<200	<200	<100			
Hexachlorobutadiene	<100 µg/kg	TM157	<100	<100	<100			
Hexachlorobenzene	<100 µg/kg	TM157	<100	<100	<100			
n-Dioctyl phthalate	<100 µg/kg	TM157	<100	<100	<100			
Dimethyl phthalate	<100 µg/kg	TM157	<100	<100	<100			
Diethyl phthalate	<100 µg/kg	TM157	<100	<100	<100			
n-Dibutyl phthalate	<100 µg/kg	TM157	<100	266	<100			
Dibenzofuran	<100 µg/kg	TM157	<100	<100	<100			
Carbazole	<100 µg/kg	TM157	<100	<100	<100			
Butylbenzyl phthalate	<100 µg/kg	TM157	<100	<100	<100			
bis(2-Ethylhexyl) phthalate	<100 µg/kg	TM157	<100	2040	<100			
bis(2-Chloroethoxy)methane	<100 µg/kg	TM157	<100	<100	<100			
bis(2-Chloroethyl)ether	<100 µg/kg	TM157	<100	<100	<100			
Azobenzene	<100 µg/kg	TM157	<100	<100	<100			
4-Nitrophenol	<100 µg/kg	TM157	<100	<100	<100			
4-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100			
4-Methylphenol	<100 µg/kg	TM157	<100	<100	<100			
4-Chlorophenylphenylether	<100 µg/kg	TM157	<100	<100	<100			
4-Chloroaniline	<100 µg/kg	TM157	<100	<100	<100			
4-Chloro-3-methylphenol	<100 µg/kg	TM157	<100	<100	<100			
4-Bromophenylphenylether	<100 µg/kg	TM157	<100	<100	<100			
3-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100			
2-Nitrophenol	<100 µg/kg	TM157	<100	<100	<100			
2-Nitroaniline	<100 µg/kg	TM157	<100	<100	<100			
2-Methylphenol	<100 µg/kg	TM157	<100	<100	<100			
1,2,4-Trichlorobenzene	<100 µg/kg	TM157	<100	<100	<100			
2-Chlorophenol	<100 µg/kg	TM157	<100	<100	<100			
2,6-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100			
2,4-Dinitrotoluene	<100 µg/kg	TM157	<100	<100	<100			

Order Number: CD0252
Report Number: 182874
Superseded Report:

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CERTIFICATE OF ANALYSIS

SDG: 120524-30
Job: H_ATKINS_LDC-35
Client Reference: Not Specified.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0252
Report Number: 182874
Superseded Report:

TPH CWG (S)

Results Legend			Customer Sample R		CSP001	CSP001	CSP002	CSP003	CSP003	CSP004
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.20	0.50	0.30	0.50	1.00	0.20
M	mCERTS accredited.				Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
S	Deviating sample.				23/05/2012	23/05/2012	23/05/2012	23/05/2012	23/05/2012	23/05/2012
aq	Aqueous / settled sample.									
diss.filt	Dissolved / filtered sample.									
tot.unfilt	Total / unfiltered sample.									
*	Subcontracted test.									
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery				24/05/2012	24/05/2012	24/05/2012	24/05/2012	24/05/2012	24/05/2012
(F)	Trigger breach confirmed				120524-30	120524-30	120524-30	120524-30	120524-30	120524-30
					5631156	5631157	5631159	5631161	5631162	5631163
Component	LOD/Units	Method								
GRO Surrogate % recovery**	%	TM089			64	78	57	76	39	72
GRO >C5-C12	<44 µg/kg	TM089			20500	57400	5860	9500	17500	411
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089		#	<5	<5	<5	<5	<5	<5
Benzene	<10 µg/kg	TM089		M	<10	<10	<10	<10	<10	<10
Toluene	<2 µg/kg	TM089		M	<2	<2	3.23	5.6	3.39	<2
Ethylbenzene	<3 µg/kg	TM089		M	<3	<3	<3	<3	<3	<3
m,p-Xylene	<6 µg/kg	TM089		M	<6	<6	<6	<6	<6	<6
o-Xylene	<3 µg/kg	TM089		M	<3	<3	<3	<3	<3	<3
sum of detected mpo xylene by GC	<9 µg/kg	TM089			<9	<9	<9	<9	<9	<9
sum of detected BTEX by GC	<24 µg/kg	TM089			<24	<24	<24	<24	<24	<24
Aliphatics >C5-C6	<10 µg/kg	TM089			<10	<10	<10	12.3	10.2	<10
Aliphatics >C6-C8	<10 µg/kg	TM089			110	565	49.6	84	82.5	20.7
Aliphatics >C8-C10	<10 µg/kg	TM089			2390	9460	565	1640	3370	34.5
Aliphatics >C10-C12	<10 µg/kg	TM089			9850	24700	2910	4000	7090	193
Aliphatics >C12-C16	<100 µg/kg	TM173			84600	262000	22300	22700	141000	8080
Aliphatics >C16-C21	<100 µg/kg	TM173			84400	191000	29900	77700	246000	14300
Aliphatics >C21-C35	<100 µg/kg	TM173			114000	145000	96000	787000	1300000	112000
Aliphatics >C35-C44	<100 µg/kg	TM173			21600	22200	23200	122000	313000	15600
Total Aliphatics >C12-C44	<100 µg/kg	TM173			304000	621000	171000	1010000	2000000	150000
Aromatics >EC5-EC7	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aromatics >EC7-EC8	<10 µg/kg	TM089			<10	<10	<10	<10	<10	<10
Aromatics >EC8-EC10	<10 µg/kg	TM089			1600	6310	382	1090	2250	26.5
Aromatics >EC10-EC12	<10 µg/kg	TM089			6570	16400	1940	2670	4720	129
Aromatics >EC12-EC16	<100 µg/kg	TM173			12900	67900	9270	8830	54200	2250
Aromatics >EC16-EC21	<100 µg/kg	TM173			39500	102000	23300	66100	139000	8720
Aromatics >EC21-EC35	<100 µg/kg	TM173			117000	139000	96700	401000	664000	74200
Aromatics >EC35-EC44	<100 µg/kg	TM173			42600	42800	41000	150000	246000	39500
Aromatics >EC40-EC44	<100 µg/kg	TM173			17300	18300	17600	58300	98200	16700
Total Aromatics >EC12-EC44	<100 µg/kg	TM173			212000	352000	170000	626000	1100000	125000
Total Aliphatics >C5-35	<100 µg/kg	TM173			295000	633000	152000	894000	1690000	134000
Total Aromatics >C5-35	<100 µg/kg	TM173			177000	332000	132000	480000	864000	85300
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173			472000	965000	283000	1370000	2560000	220000
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173			537000	1030000	348000	1650000	3120000	275000



CERTIFICATE OF ANALYSIS

SDG: 120524-30
Job: H_ATKINS_LDC-35
Client Reference: Not Specified.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0252
Report Number: 182874
Superseded Report:

TPH CWG (S)

Results Legend			Customer Sample R	CSP005	CSP005	CSP006	CSP007	CSP008	CSP009
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.40	1.00	0.40	0.20	0.40	0.50
M	mCERTS accredited.			Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid	Soil/Solid
S	Deviating sample.			23/05/2012	23/05/2012	23/05/2012	23/05/2012	23/05/2012	23/05/2012
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted test.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery			24/05/2012	24/05/2012	24/05/2012	24/05/2012	24/05/2012	24/05/2012
(F)	Trigger breach confirmed			120524-30	120524-30	120524-30	120524-30	120524-30	120524-30
			5631164	5631165	5631167	5631168	5631169	5631170	
Component	LOD/Units	Method							
GRO Surrogate % recovery**	%	TM089	28	53	81	41	64	72	
GRO >C5-C12	<44 µg/kg	TM089	6040	15400	113	2490	22900	17000	
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089	<5 #	<5 #	<5 #	<5 #	<5 #	<5 #	
Benzene	<10 µg/kg	TM089	<10 M	<10 M	<10 M	<10 M	<10 M	<10 M	
Toluene	<2 µg/kg	TM089	3.3 M	12.1 M	<2 M	<2 M	<2 M	<2 M	
Ethylbenzene	<3 µg/kg	TM089	3.3 M	15.4 M	<3 M	<3 M	<3 M	<3 M	
m,p-Xylene	<6 µg/kg	TM089	<6 M	8.8 M	<6 M	<6 M	<6 M	<6 M	
o-Xylene	<3 µg/kg	TM089	19.8 M	69.3 M	<3 M	<3 M	<3 M	<3 M	
sum of detected mpo xylene by GC	<9 µg/kg	TM089	19.8	78.1	<9	<9	<9	<9	
sum of detected BTEX by GC	<24 µg/kg	TM089	26.4	106	<24	<24	<24	<24	
Aliphatics >C5-C6	<10 µg/kg	TM089	<10	19.8	<10	<10	<10	17.9	
Aliphatics >C6-C8	<10 µg/kg	TM089	38.5	90.2	10.5	<10	85.9	360	
Aliphatics >C8-C10	<10 µg/kg	TM089	552	1910	16.4	241	2810	2530	
Aliphatics >C10-C12	<10 µg/kg	TM089	3030	7210	41	1250	10900	7460	
Aliphatics >C12-C16	<100 µg/kg	TM173	92400	151000	8040	126000	325000	136000	
Aliphatics >C16-C21	<100 µg/kg	TM173	79100	105000	10900	137000	285000	177000	
Aliphatics >C21-C35	<100 µg/kg	TM173	378000	462000	17500	269000	176000	385000	
Aliphatics >C35-C44	<100 µg/kg	TM173	114000	143000	1520	449000	108000	95300	
Total Aliphatics >C12-C44	<100 µg/kg	TM173	663000	860000	37900	981000	895000	793000	
Aromatics >EC5-EC7	<10 µg/kg	TM089	<10	<10	<10	<10	<10	<10	
Aromatics >EC7-EC8	<10 µg/kg	TM089	<10	12.1	<10	<10	<10	<10	
Aromatics >EC8-EC10	<10 µg/kg	TM089	395	1370	12.9	161	1870	1690	
Aromatics >EC10-EC12	<10 µg/kg	TM089	2020	4810	26.9	830	7260	4980	
Aromatics >EC12-EC16	<100 µg/kg	TM173	17600	24700	<100	41300	31800	63900	
Aromatics >EC16-EC21	<100 µg/kg	TM173	42700	44300	<100	60900	117000	80600	
Aromatics >EC21-EC35	<100 µg/kg	TM173	213000	240000	<100	227000	128000	217000	
Aromatics >EC35-EC44	<100 µg/kg	TM173	105000	115000	<100	511000	126000	88700	
Aromatics >EC40-EC44	<100 µg/kg	TM173	50300	54400	<100	325000	68100	34000	
Total Aromatics >EC12-EC44	<100 µg/kg	TM173	378000	424000	<100	840000	402000	450000	
Total Aliphatics >C5-35	<100 µg/kg	TM173	553000	727000	36500	534000	801000	708000	
Total Aromatics >C5-35	<100 µg/kg	TM173	276000	315000	<100	330000	285000	368000	
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173	828000	1040000	36500	864000	1090000	1080000	
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173	1050000	1300000	38000	1820000	1320000	1260000	



CERTIFICATE OF ANALYSIS

SDG: 120524-30
Job: H_ATKINS_LDC-35
Client Reference: Not Specified.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0252
Report Number: 182874
Superseded Report:

TPH CWG (S)

Results Legend		Customer Sample R	CSP009				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	1.00				
M	mCERTS accredited.		Soil/Solid				
S	Deviating sample.		23/05/2012				
aq	Aqueous / settled sample.		.				
diss.filt	Dissolved / filtered sample.		24/05/2012				
tot.unfilt	Total / unfiltered sample.		120524-30				
*	Subcontracted test.		5631172				
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery						
(F)	Trigger breach confirmed						
Component	LOD/Units	Method					
GRO Surrogate % recovery**	%	TM089	63				
GRO >C5-C12	<44 µg/kg	TM089	12400				
Methyl tertiary butyl ether (MTBE)	<5 µg/kg	TM089	<5	#			
Benzene	<10 µg/kg	TM089	<10	M			
Toluene	<2 µg/kg	TM089	<2	M			
Ethylbenzene	<3 µg/kg	TM089	<3	M			
m,p-Xylene	<6 µg/kg	TM089	<6	M			
o-Xylene	<3 µg/kg	TM089	<3	M			
sum of detected mpo xylene by GC	<9 µg/kg	TM089	<9				
sum of detected BTEX by GC	<24 µg/kg	TM089	<24				
Aliphatics >C5-C6	<10 µg/kg	TM089	19.2				
Aliphatics >C6-C8	<10 µg/kg	TM089	531				
Aliphatics >C8-C10	<10 µg/kg	TM089	2100				
Aliphatics >C10-C12	<10 µg/kg	TM089	5030				
Aliphatics >C12-C16	<100 µg/kg	TM173	88800				
Aliphatics >C16-C21	<100 µg/kg	TM173	123000				
Aliphatics >C21-C35	<100 µg/kg	TM173	294000				
Aliphatics >C35-C44	<100 µg/kg	TM173	75200				
Total Aliphatics >C12-C44	<100 µg/kg	TM173	581000				
Aromatics >EC5-EC7	<10 µg/kg	TM089	<10				
Aromatics >EC7-EC8	<10 µg/kg	TM089	<10				
Aromatics >EC8-EC10	<10 µg/kg	TM089	1400				
Aromatics >EC10-EC12	<10 µg/kg	TM089	3350				
Aromatics >EC12-EC16	<100 µg/kg	TM173	47900				
Aromatics >EC16-EC21	<100 µg/kg	TM173	65900				
Aromatics >EC21-EC35	<100 µg/kg	TM173	173000				
Aromatics >EC35-EC44	<100 µg/kg	TM173	64700				
Aromatics >EC40-EC44	<100 µg/kg	TM173	24600				
Total Aromatics >EC12-EC44	<100 µg/kg	TM173	351000				
Total Aliphatics >C5-35	<100 µg/kg	TM173	514000				
Total Aromatics >C5-35	<100 µg/kg	TM173	291000				
Total Aliphatics & Aromatics >C5-35	<100 µg/kg	TM173	805000				
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173	945000				



CERTIFICATE OF ANALYSIS

SDG: 120524-30
Job: H_ATKINS_LDC-35
Client Reference: Not Specified.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0252
Report Number: 182874
Superseded Report:

VOC MS (S)

Results Legend			Customer Sample R	CSP003	CSP003	CSP007			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference							
M	mCERTS accredited.								
S	Deviating sample.								
aq	Aqueous / settled sample.								
diss.filt	Dissolved / filtered sample.								
tot.unfilt	Total / unfiltered sample.								
*	Subcontracted test.								
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery								
(F)	Trigger breach confirmed								
Component	LOD/Units		Method						
Dibromofluoromethane**	%	TM116	103	102	105				
Toluene-d8**	%	TM116	98	98.9	105				
4-Bromofluorobenzene**	%	TM116	110	114	98.6				
Dichlorodifluoromethane	<4 µg/kg	TM116	<80 M	<80 M	<80 M				
Chloromethane	<7 µg/kg	TM116	<140	<140	<140				
Vinyl Chloride	<10 µg/kg	TM116	<200	<200	<200				
Bromomethane	<13 µg/kg	TM116	<260 M	<260 M	<260 M				
Chloroethane	<14 µg/kg	TM116	<280 M	<280 M	<280 M				
Trichlorofluoromethane	<6 µg/kg	TM116	<120 M	<120 M	<120 M				
1,1-Dichloroethene	<10 µg/kg	TM116	<200 #	<200 #	<200 #				
Carbon Disulphide	<7 µg/kg	TM116	<140 M	<140 M	<140 M				
Dichloromethane	<10 µg/kg	TM116	<200 #	<200 #	<200 #				
Methyl Tertiary Butyl Ether	<11 µg/kg	TM116	<220 M	<220 M	<220 M				
trans-1,2-Dichloroethene	<11 µg/kg	TM116	<220 M	<220 M	<220 M				
1,1-Dichloroethane	<8 µg/kg	TM116	<160 M	<160 M	<160 M				
cis-1,2-Dichloroethene	<5 µg/kg	TM116	<100 M	<100 M	<100 M				
2,2-Dichloropropane	<12 µg/kg	TM116	<240 M	<240 M	<240 M				
Bromochloromethane	<14 µg/kg	TM116	<280 M	<280 M	<280 M				
Chloroform	<8 µg/kg	TM116	<160 M	<160 M	<160 M				
1,1,1-Trichloroethane	<7 µg/kg	TM116	<140 M	<140 M	<140 M				
1,1-Dichloropropene	<11 µg/kg	TM116	<220 M	<220 M	<220 M				
Carbontetrachloride	<14 µg/kg	TM116	<280 M	<280 M	<280 M				
1,2-Dichloroethane	<5 µg/kg	TM116	<100 M	<100 M	<100 M				
Benzene	<9 µg/kg	TM116	<180 M	<180 M	<180 M				
Trichloroethene	<9 µg/kg	TM116	<180 M	<180 M	<180 M				
1,2-Dichloropropane	<12 µg/kg	TM116	<240 M	<240 M	<240 M				
Dibromomethane	<9 µg/kg	TM116	<180 M	<180 M	<180 M				
Bromodichloromethane	<7 µg/kg	TM116	<140 M	<140 M	<140 M				
cis-1,3-Dichloropropene	<14 µg/kg	TM116	<280 M	<280 M	<280 M				
Toluene	<5 µg/kg	TM116	<100 M	<100 M	<100 M				
trans-1,3-Dichloropropene	<14 µg/kg	TM116	<280	<280	<280				
1,1,2-Trichloroethane	<10 µg/kg	TM116	<200 M	<200 M	<200 M				
1,3-Dichloropropane	<7 µg/kg	TM116	<140 #	<140 #	<140 #				
Tetrachloroethene	<5 µg/kg	TM116	<100 M	<100 M	<100 M				
Dibromochloromethane	<13 µg/kg	TM116	<260 M	<260 M	<260 M				



CERTIFICATE OF ANALYSIS

SDG: 120524-30
Job: H_ATKINS_LDC-35
Client Reference: Not Specified.

Location: Coed Darcy Urban Village
Customer: Atkins Global Ltd
Attention: Alex Mann

Order Number: CD0252
Report Number: 182874
Superseded Report:

VOC MS (S)

Results Legend		Customer Sample R	CSP003	CSP003	CSP007			
#	ISO17025 accredited.							
M	mCERTS accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	0.50 Soil/Solid 23/05/2012 . 24/05/2012 120524-30 5631161	1.00 Soil/Solid 23/05/2012 . 24/05/2012 120524-30 5631162	0.20 Soil/Solid 23/05/2012 . 24/05/2012 120524-30 5631168			
S	Deviating sample.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery							
(F)	Trigger breach confirmed							
Component	LOD/Units	Method						
1.2-Dibromoethane	<12 µg/kg	TM116	<240 M	<240 M	<240 M			
Chlorobenzene	<5 µg/kg	TM116	<100 M	<100 M	<100 M			
1.1.1.2-Tetrachloroethane	<10 µg/kg	TM116	<200 M	<200 M	<200 M			
Ethylbenzene	<4 µg/kg	TM116	<80 M	<80 M	<80 M			
p/m-Xylene	<14 µg/kg	TM116	<280 #	<280 #	<280 #			
o-Xylene	<10 µg/kg	TM116	<200 M	<200 M	<200 M			
Styrene	<10 µg/kg	TM116	<200 M	<200 M	<200 M			
Bromoform	<10 µg/kg	TM116	<200 M	<200 M	<200 M			
Isopropylbenzene	<5 µg/kg	TM116	<100 M	<100 M	<100 M			
1.1.2.2-Tetrachloroethane	<10 µg/kg	TM116	<200 #	<200 #	<200 #			
1.2.3-Trichloropropane	<17 µg/kg	TM116	<340 M	<340 M	<340 M			
Bromobenzene	<10 µg/kg	TM116	<200 M	<200 M	<200 M			
Propylbenzene	<11 µg/kg	TM116	<220 M	<220 M	<220 M			
2-Chlorotoluene	<9 µg/kg	TM116	<180 M	<180 M	<180 M			
1.3.5-Trimethylbenzene	<8 µg/kg	TM116	<160 #	<160 #	<160 #			
4-Chlorotoluene	<12 µg/kg	TM116	<240 M	<240 M	<240 M			
tert-Butylbenzene	<12 µg/kg	TM116	<240 #	<240 #	<240 #			
1.2.4-Trimethylbenzene	<9 µg/kg	TM116	<180 #	<180 #	<180 #			
sec-Butylbenzene	<10 µg/kg	TM116	<200 M	<200 M	<200 M			
4-Isopropyltoluene	<11 µg/kg	TM116	<220 M	<220 M	<220 M			
1.3-Dichlorobenzene	<6 µg/kg	TM116	<120 M	<120 M	<120 M			
1.4-Dichlorobenzene	<5 µg/kg	TM116	<100 M	<100 M	<100 M			
n-Butylbenzene	<10 µg/kg	TM116	<200 M	<200 M	<200 M			
1.2-Dichlorobenzene	<12 µg/kg	TM116	<240 M	<240 M	<240 M			
1.2-Dibromo-3-chloropropene	<14 µg/kg	TM116	<280 M	<280 M	<280 M			
Tert-amyl methyl ether	<15 µg/kg	TM116	<300	<300	<300			
1.2.4-Trichlorobenzene	<6 µg/kg	TM116	<120 #	<120 #	<120 #			
Hexachlorobutadiene	<12 µg/kg	TM116	<240	<240	<240			
Naphthalene	<13 µg/kg	TM116	<260 M	<260 M	<260 M			
1.2.3-Trichlorobenzene	<6 µg/kg	TM116	<120 M	<120 M	<120 M			



SDG:	120524-30	Location:	Coed Darcy Urban Village	Order Number:	CD0252
Job:	H_ATKINS_LDC-35	Customer:	Atkins Global Ltd	Report Number:	182874
Client Reference:	Not Specified.	Attention:	Alex Mann	Superseded Report:	

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
PM001		Preparation of Samples for Metals Analysis		
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material		
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)		
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS		
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter		
TM157	HP 6890 Gas Chromatograph (GC) system and HP 5973 Mass Selective Detector (MSD).	Determination of SVOC in Soils by GC-MS extracted by sonication in DCM/Acetone		
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID		
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES		
TM218	Microwave extraction – EPA method 3546	Microwave extraction - EPA method 3546		

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.



SDG:	120524-30	Location:	Coed Darcy Urban Village	Order Number:	CD0252
Job:	H_ATKINS_LDC-35	Customer:	Atkins Global Ltd	Report Number:	182874
Client Reference:	Not Specified.	Attention:	Alex Mann	Superseded Report:	

Test Completion Dates

Lab Sample No(s)	5631156	5631157	5631159	5631161	5631162	5631163	5631164	5631165	5631167	5631168
Customer Sample Ref.	CSP001	CSP001	CSP002	CSP003	CSP003	CSP004	CSP005	CSP005	CSP006	CSP007
AGS Ref.										
Depth	0.20	0.50	0.30	0.50	1.00	0.20	0.40	1.00	0.40	0.20
Type	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID	SOLID
EPH CWG (Aliphatic) GC (S)	30-May-2012	29-May-2012	29-May-2012	30-May-2012	29-May-2012	30-May-2012	29-May-2012	29-May-2012	30-May-2012	29-May-2012
EPH CWG (Aromatic) GC (S)	30-May-2012	29-May-2012	29-May-2012	30-May-2012	29-May-2012	30-May-2012	29-May-2012	29-May-2012	30-May-2012	29-May-2012
GRO by GC-FID (S)	30-May-2012	30-May-2012	30-May-2012	30-May-2012	29-May-2012	30-May-2012	30-May-2012	30-May-2012	29-May-2012	29-May-2012
Metals by iCap-OES (Soil)	29-May-2012	29-May-2012	29-May-2012	29-May-2012	28-May-2012	29-May-2012	29-May-2012	29-May-2012	29-May-2012	28-May-2012
PAH by GCMS	30-May-2012	30-May-2012	30-May-2012			30-May-2012	30-May-2012	30-May-2012	30-May-2012	
pH	28-May-2012	28-May-2012	28-May-2012	28-May-2012	28-May-2012	28-May-2012	28-May-2012	28-May-2012	29-May-2012	28-May-2012
Sample description	24-May-2012	24-May-2012	24-May-2012	24-May-2012	24-May-2012	24-May-2012	24-May-2012	24-May-2012	25-May-2012	24-May-2012
Semi Volatile Organic Compounds				30-May-2012	30-May-2012					30-May-2012
TPH CWG GC (S)	30-May-2012	30-May-2012	30-May-2012	30-May-2012	29-May-2012	30-May-2012	30-May-2012	30-May-2012	30-May-2012	29-May-2012
VOC MS (S)				30-May-2012	29-May-2012					29-May-2012

Lab Sample No(s)	5631169	5631170	5631172
Customer Sample Ref.	CSP008	CSP009	CSP009
AGS Ref.			
Depth	0.40	0.50	1.00
Type	SOLID	SOLID	SOLID
EPH CWG (Aliphatic) GC (S)	30-May-2012	29-May-2012	29-May-2012
EPH CWG (Aromatic) GC (S)	30-May-2012	29-May-2012	29-May-2012
GRO by GC-FID (S)	30-May-2012	29-May-2012	30-May-2012
Metals by iCap-OES (Soil)	29-May-2012	29-May-2012	28-May-2012
PAH by GCMS	30-May-2012	30-May-2012	30-May-2012
pH	28-May-2012	28-May-2012	29-May-2012
Sample description	24-May-2012	24-May-2012	24-May-2012
TPH CWG GC (S)	30-May-2012	29-May-2012	30-May-2012



CERTIFICATE OF ANALYSIS

SDG:	120524-30	Location:	Coed Darcy Urban Village	Order Number:	CD0252
Job:	H_ATKINS_LDC-35	Customer:	Atkins Global Ltd	Report Number:	182874
Client Reference:	Not Specified.	Attention:	Alex Mann	Superseded Report:	

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICS and SVOC TICS.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 2 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible. The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP -No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** -Most of our organic methods include surrogates, the recovery of which is monitored and reported. For EPH, MO, PAH, GRO and VOCs on soils the result is not surrogate corrected, but a percentage recovery is quoted. Acceptable limits for most organic methods are 70 -130 %.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5 -C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

SOLID MATRICES EXTRACTION SUMMARY				
ANALYSIS	D&C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
SOLVENTEXTRACTABLE MATTER	D&C	DCM	SOX THERM	GRAVIMETRIC
CYCLOHEXANE EXT. MATTER	D&C	CYCLOHEXANE	SOX THERM	GRAVIMETRIC
ELEMENTAL SULPHUR	D&C	DCM	SOX THERM	HPLC
PHENOLS BY GCMS	WET	DCM	SOX THERM	GC-MS
HERBICIDES	D&C	HEXANE/ACETONE	SOX THERM	GC-MS
PESTICIDES	D&C	HEXANE/ACETONE	SOX THERM	GC-MS
EPH (DRO)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH (MIN OIL)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH (CLEANED UP)	D&C	HEXANE/ACETONE	END OVER END	GC-FID
EPH CWGBY GC	D&C	HEXANE/ACETONE	END OVER END	GC-FID
PCBAROCLOR 1254/PCB CON	D&C	HEXANE/ACETONE	END OVER END	GC-MS
POLYAROMATIC HYDROCARBONS (MS)	WET	HEXANE/ACETONE	MICROWAVE TM218.	GC-MS
>C6-C40	WET	HEXANE/ACETONE	SHAKER	GC-FID
POLYAROMATIC HYDROCARBONS RAPID GC	WET	HEXANE/ACETONE	SHAKER	GC-FID
SEMI VOLATILE ORGANIC COMPOUNDS	WET	DOM/ACETONE	SONICATE	GC-MS

LIQUID MATRICES EXTRACTION SUMMARY			
ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAHMS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-MS
EPH	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-FID
EPH CWG	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-FID
MINERAL OIL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-FID
PCB7 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-MS
PCBAROCLOR 1254	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC-MS
SVOC	DCM	LIQUID/LIQUID SHAKE	GC-MS
FREESULPHUR	DCM	SOLID PHASE EXTRACTION	HPLC
PESTOCROPP	DCM	LIQUID/LIQUID SHAKE	GC-MS
TRIAZINE HERBS	DCM	LIQUID/LIQUID SHAKE	GC-MS
PHENOLS MS	ACETONE	SOLID PHASE EXTRACTION	GC-MS
TPH by INFRARED (IR)	TCE	STIRRED EXTRACTION (STIR-BAR)	IR
MINERAL OIL by IR	TCE	STIRRED EXTRACTION (STIR-BAR)	IR
GLYCOLS	NONE	DIRECT INJECTION	GC-FID

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials or those identified as potentially asbestos containing during sample description which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace -Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

A E I E

Ongoing monitoring

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	04/05/2012	21/05/2012	28/05/2012	12/06/2012	05/07/2012	23/07/2012	08/08/2012
MSMW143	0.017	0.06	0.05	0.17	0.12	0.005	0.01
MSTP295	0	0					



Stodwen Developments Ltd

**Coedarcy
Commercial Area
Validation Report
May**

Coed Darcy

Commercial Area Validation Report

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This report was produced by Atkins Limited for St. Modwen Developments Limited (SMD) for the specific purpose of assisting the redevelopment of Coed Darcy.

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Atkins Limited

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Appendix A - Photographs
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Glossary of Terms

Term	Meaning / Definition
CSM	Conceptual Site Model
RBSL	Risk Based Screening Level
TPH	Total Petroleum Hydrocarbons
PAH	Polycyclic Aromatic Hydrocarbons
BTEX	Benzene, Toluene, Ethylbenzene and Xylene
FFL	Final Finished Level
ACM	Asbestos Containing Material
VO	Visual/Olfactory Observations
mbgl	Metres Below Ground Level
CWRA	Controlled Waters Risk assessment
NSR	North Site Reservoir

Executive Summary

Atkins has been commissioned by St. Modwen Developments Ltd to provide consultancy advice with regard to the redevelopment of the former Llandarcy Oil Refinery as Coed Darcy.

This report provides confirmation of the scope of remedial and plot preparatory works across the Commercial Area, including a summary of the validation carried out to demonstrate that the land is suitable for the proposed end use.

Prior to the remediation works, a series of ground investigations revealed that the site was overlain by variable thicknesses of Made Ground, which generally comprised gravelly sand with variable amounts of ash, clinker and building materials consistent with demolition rubble. Made Ground in many of the exploratory holes exhibited visual and olfactory hydrocarbon impacts; these ranged from mobile free phase product to hydrocarbon staining and odours.

Following the review of available data, the Commercial Area is considered to represent a '**commercial end use where groundwater is in soil**' scenario, as outlined in the Section 106 Agreement for Coed Darcy. This is because the majority of the area is underlain by Made Ground and natural drift deposits overlying sandstone bedrock, with shallow groundwater often perched at the interface between the Made Ground and underlying cohesive drift deposits.

The scope of reclamation and remediation works carried out included the following:

- General reclamation turnover of the site to a minimum depth of 2m below existing ground level.
- Removal of all oil saturated soils and/or free product and removal of all soils with a visual rating of Class 5.
- Removal of identified 'hotspots' of increased contamination identified through testing and observation.
- Further investigation and removal of all identified asbestos contaminated soils.
- Removal of all remaining significant structural remnants, including concrete, brickwork and other identified 'obstructions'.
- Removal of remaining 'live' services', including drainage where applicable.
- Removal of remaining 'redundant' process pipework.

Validation of the remediation works has been carried out based on the results of chemical analysis on a total of 615 samples across the Commercial Area. This included samples tested as part of hotspot removals, base of excavation testing, trial pitting and from hand dug pits. A total of 472 full test suites were carried out, meeting the required testing frequency given in the S106.

Finished levels over the west of the area are substantially changed compared to the pre-commencement levels due to the construction of a road embankment (Road 3 and Road 13) following remediation of the underlying ground. A geo-environmental and geotechnical validation report for the road embankment is addressed in a separate report by Hydrock.

In accordance with the S106, ground gas protection measures will be required in all buildings, which should include the installation of a proprietary and appropriate ground gas resistant membrane and appropriate venting system. Ground gas monitoring prior to remediation indicated that the site was representative of a Characteristic Situation 2 (CS2) in accordance with CIRIA C665.

Due to the absence of any information relating to proposed development levels across the majority of the Commercial Area it has been assumed that the finished surface following remediation represents the base of clean cover materials (i.e. Final Finished Level less 0.5m), as the S106 requires the top 0.5m below FFL to comprise quality controlled imported fill materials.

Due to the residual concentrations of Total Petroleum Hydrocarbons (TPH) and the absence of any details relating to the specific route of any water supply pipes within the final development, it is recommended that a need for protective barrier water supply pipe is assumed for the purpose of initial assessment.

The Commercial Area has undergone a significant remediation and reclamation exercise. This site is considered suitable for its proposed end use for commercial development and represents a low risk to its future users and the wider environment.

1. Introduction

1.1 Client Brief & Scope of Works

Atkins Limited has been commissioned by St. Modwen Developments Ltd to provide consultancy advice with regard to the redevelopment of the former Llandarcy Oil Refinery as Coed Darcy.

This report relates to the remediation and validation works carried out in an area termed the 'Commercial Area', the boundary of which is indicated on Drawing 5041216-REM-DWG-0001608. This area is defined as Monitor Phase 28 under the phased remediation and sign-off of the overall Coed Darcy site.

Based upon the site Masterplan (ABA Masterplan 1332/400/MP/SK/TERT Rev H) and instruction from St. Modwen, this area is proposed for a commercial end use within the final development. Detailed information on final layouts and development levels are not yet known, however, at this point in time it is anticipated that this area will ultimately consist of a range of commercial units with associated infrastructure and landscaping, approximating to the current site levels. A road embankment (Road 3 and Road 13) has subsequently been constructed by Hydrock on the western part of the validated Commercial Area. A geo-environmental and geotechnical validation report for this embankment is addressed in a separate report by Hydrock (Ref. 14).

The proposed Commercial Area is situated near the former refinery main entrance and is known to have been historically occupied by a range of refinery related processes. A series of historic ground investigations have been carried out across the area (see Section 1.3), which have identified varying degrees of hydrocarbon and heavy metal related contaminants. The locations of key historic contaminative processes are depicted on Drawing 5041216-REM-DWG-0001609.

This report will present the following:

- A summary of background information;
- A summary of the remedial works carried out;
- A summary of the validation requirements, as required by the Section 106 Agreement for Coed Darcy (Ref. 1); and
- Collation and review of applicable validation data.

This document will form a submission under **Planning Condition** of the Outline Planning Permission for the site (P2005/0393), details of which are as below:

Upon completion of each phase of the remediation scheme and prior to the start of construction works to any building in each phase or development area, a report that provides verification that the required works regarding contamination have been carried out in accordance within the approved remediation scheme for that phase of development area, shall be submitted to and approved in writing by the Local Planning Authority. Post remediation sampling and monitoring results shall be included in the report to demonstrate that the required remediation objectives have been fully met. Future monitoring proposals and reporting timescales shall also be included in the submitted report and such monitoring shall be carried out as approved by the Local Planning Authority.

This document supplements previous reports by Atkins relating to the Commercial Area, as highlighted in Section 1.3.

In order to maintain consistency for both historic and recent data, Atkins continues to use the same assessment standards as those used in the S106 Agreement. Details of the visual and olfactory classification system, defined within the S106, are provided as Table 1.1.

Table Scale of Aesthetic Criteria

Class	Visual	Olfactory
	No visible staining of soil, no visible suspect ACM*.	No detectable odour on soil.
	Occasional staining of soil, no visible suspect ACM*.	Faint odour on soil.
	Frequent staining of soil.	Distinct but not strong odour on soil.
	Occasional heavy staining of soil.	Strong odour on soil.
	Heavy staining of soil.	Strong odour discernible in ambient air.
	Visible hydrocarbon present.	Overwhelming odour.

**visible suspect Asbestos containing materials (ACMs). ACM refers to asbestos containing material visible to the naked eye which a reasonable and prudent person used to managing asbestos may suspect to be asbestos containing.*

A discussion of the adopted remediation thresholds has been previously provided as part of the Outline Remediation Strategy for the Commercial Area (Ref. 5).

The adopted contamination thresholds comprise a combination of the Section 106 Risk Based Screening levels (RBSLs) and Remedial Target Concentrations (RTCs) derived by Atkins (Ref. 2).

Both RBSLs and RTCs have been agreed as suitable for use by the Coed Darcy Monitor and the local planning authority. For ease of reference, a table showing a summary of the adopted thresholds relating to this area is provided in Appendix C.

Based on the findings of previous investigations and monitoring, the Commercial Area is considered to represent a **'commercial end use where groundwater is in soil'** scenario, as outlined in the S106. The recent works undertaken as part of the remediation has confirmed this scenario as being correct.

1.2 Remediation Summary

Remediation and reclamation works were carried out, with unacceptable material and defined remnant buried structures removed. The basic works statistics are:

- Total volume of 'turned over' material: approximately 73,000m³
- Volume of concrete and scrap metal removed for recycling: approximately 4,000m³
- Total volume of material removed to the on-site treatment pads: 15,000m³
- Total volume of backfill materials*: 29,730m³

*not including road embankment fill, but including material used in Hawk & Dawnus areas (see Section 2.2) and for 'upfilling works'

1.3 Sources of Information

The following principal sources of information have been used in the preparation of this report:

1. Section 106 Deed of Planning Obligations (Dewey & LeBoeuf report GNP/NJR/13773-2). February 2008;
2. Atkins report 5041216-REM-RPT-000476, Coed Darcy: Derivation of Commercial Remediation Target Criteria. March 2011;

3. Coed D'Arcy Development, BP Llandarcy Refinery Desk Study. July 2007 (Report 44382742 / BRRP0001)
4. Atkins Report 5041216/REM/RPT/375 Commercial Area, Controlled Waters Risk Assessment, March 2012.
5. Atkins Report 5041216/PLOTS/RPT/626 Geo-Environmental Assessment & Outline Remediation Strategy: Proposed Commercial Area, Feb 2012.
6. Churngold Remediation Limited. D'Arcy Business Centre Development, Llandarcy, Contract validation report, December 2007
7. URS Report 44382537/BRRP0001 'D'Arcy Business Centre Closure report. March 2008
8. Various URS investigations data, including:
 - URS: Factual and Interpretative: Environmental Liability Assessment 2048R/2049R September 1997
 - URS: Phase 2 Stage 1 data report R642 August 1998
 - URS: Phase 2 Stage 2 final data report DR785 July 1999
 - URS: Final Data Assessment Report DR786R August 1999
 - URS: Remedial Action Plan (RAP) DR869r3, March 2000
 - URS: Site Investigation Phase I area DR1140 September 2003

1.4 Limitations

The assessment of groundwater and gas conditions outlined within the following document is based on the data available at the time of writing. Groundwater and gas levels may vary due to atmospheric, seasonal or other effects.

In the absence of any information relating to proposed development levels, final levels for the purpose of these works were based upon an approximation to the pre-existing ground levels.

The suitability of the remedial works may need to be reconfirmed once proposed development levels across this area are confirmed.

2. Summary of Available Information

2.1 General

There have been a number of previous investigations across the former refinery, which have included trial pitting and the installation of boreholes. The historical data pertaining to the site is summarised in the following sections.

2.2 The Site

The early historic maps of the site record much of the former refinery to have been undeveloped and is shown as woodland, fields and small holdings, with the Llandarcy Oil Refinery first developed in 1921 to produce motor spirit, lubricating oil and fuel oils from crude oil. The refinery continued to expand until the late 1970s, however, from the mid 1980s a series of rationalisations occurred with notice being given to close the site in 1997.

The commercial area, as defined on Drawing 5041216-REM-DWG-0001632, occupies an area of approximately 66,000m² and comprises of an area of open ground lying to the south and west of Llancoed House and D'Arcy Business Park. The southern part of the site is defined by a slope rising southwards to the main access road to the new development (Road 1) which lies at a level of approximately 40 - 48mAOD, and, at the time of the remediation works, contractors compound areas, Hawk compound and Dawnus compound, at a lower level of around 40mAOD and 37mAOD, respectively. Levels decrease from south to north across the site to around 32mAOD at the northernmost point.

A summary of the anticipated remedial works relating to this area was reported in the Atkins outline remediation strategy report for the Commercial Area (Ref. 5). This report has been approved by Neath Port Talbot County Borough Council in line with requirements of **Planning Condition** of the Outline Planning Permission for the proposed Coed Darcy site.

2.3 Geology, Hydrogeology & Hydrology

The British Geological Survey Sheet for Swansea (Sheet 247) Drift Edition suggests this part of the refinery to be underlain directly by Carboniferous, Upper Pennant Measures. The solid strata comprise predominantly sandstones and are indicated to dip towards the north. There are no recorded faults shown to cross beneath this area.

The main hydrological catchment is the River Neath, which lies approximately 1km east of the site.

The underlying sandstones are considered to be a Secondary 'A' Aquifer, which are defined by the Environment Agency as;

'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.'

This document is supported by a separate Controlled Waters Risk Assessment prepared by Atkins (Ref. 4).

2.4 Pre Remediation Recorded Ground Conditions

Prior to the remediation works, a series of ground investigations revealed that the site was overlain by variable thicknesses of Made Ground, which generally comprised gravelly sand with variable amounts of ash, clinker and building materials consistent with demolition rubble. Made Ground in many of the exploratory holes exhibited visual and olfactory hydrocarbon impacts; these ranged from mobile free phase product to hydrocarbon staining and odours.

Made Ground in general was underlain by natural drift deposits, consisting of glacial silts, sands and gravels interspersed with bands of silty clays, with occasional bands of organic-rich peaty clays and peat. The bedrock underlying the glacial deposits was confirmed as Pennant Sandstone.

As detailed in Atkins' Remediation Strategy (Ref.5), a series of investigations were undertaken prior to the remediation works, which allowed the identification of six free product contaminated hotspots, localised asbestos and remnant concrete structures. These are highlighted on Drawing 5041216-REM-DWG-948 (Rev D), and were generally located within the Made Ground horizon.

It was not possible to fully assess ground conditions over some areas of the site prior to the remediation works, mainly due to variable thicknesses of concrete slabs and foundations, especially across the western area. This is further discussed in Section 4 of this report.

2.5 Hazardous Ground Gases

Previous assessment of reported ground gas concentrations across this area (Ref 5.), suggests the reported data to be considered representative of Characteristic Situation 2 (low risk classification) in accordance with CIRIA C665 (Ref. 15).

Recommended gas protection measures for proposed buildings are discussed in Section 6.

3. Outline Remediation Strategy

3.1 Section 106 Deed of Planning Obligations Requirements

Following the review of available data, the Commercial Area is considered to represent a **'commercial end use where groundwater is in soil'** scenario, as outlined in the S106. This is because the majority of the area is underlain by Made Ground and natural drift deposits overlying sandstone bedrock, with shallow groundwater often perched at the interface between the Made Ground and underlying cohesive drift deposits.

Based upon this classification, the following remediation requirements are stated in the S106 (Schedule 8, Section 6.0) as being the minimum remediation requirements required in order to release this area for redevelopment for a commercial end use.

- *All oil saturated soils and soil containing free product other than minor sheens shall be removed to a minimum depth of 2.00m below FFL (Final Finished Level) or 0.50m below the likely lowest seasonal groundwater elevation following development of the intended Urban Village, whichever is the deeper. This depth is to be established by consideration of all available groundwater level monitoring data.*
- *All soils must meet the RBSL for TPH to at least 1m below FFL.*
- *All soils must meet in bulk, considering both dispersed fibres and pieces of ACM, the RBSL for ACM to at least 1m below FFL. Any visible ACM encountered during construction in the first 1m below FFL is to be removed.*
- *Where there is a risk of the migration in the ground of hazardous gas or contaminated liquid into remediated areas, the Developer shall take all appropriate measures to prevent this occurring. Such measures could include the installation of interception trenches and management of discharge from those. The Developer shall monitor whatever measures are put in place after their installation to continue to demonstrate their effectiveness.*
- *Where necessary, seeps, sheens and iron rich discharges from the bedrock must be controlled such that there is no visible discharge at surface and little or no odour. Acceptable methodologies for remediation may include, but are not limited to the use of land drainage via interceptors.*

In order to support the remedial strategy (Ref. 5) required under Condition 44 of the outline planning consent for Coed Darcy, and to support subsequent applications for detailed planning permission for the Commercial Area, a Controlled Waters Risk assessment (CWRA) was undertaken, specifically for the Commercial Area.

This assessment was undertaken in September 2011 and provides an assessment of the remedial requirements for those substances considered to pose a risk to Controlled Waters. This is detailed in Atkins' CWRA (Ref. 4).

The results of the assessment suggest that source removal of hydrocarbon impacted ground was required in order to prevent migration of the principal contaminants and impact on the receptor (River Neath).

3.2 Proposed Scope of Works

General

As final development levels are not accurately defined, the following scope of remedial works was proposed in Atkins Remediation Strategy (Ref. 5), following the remediation requirements stated in the S106 (Schedule 8, Section 6.0). The works also involved a land reclamation element which focussed on the preparation of the plot for future development.

Note: Aside from the road embankment area it is assumed for the purposes of this report that the post remediation/reclamation levels across the proposed Commercial Area are to be maintained within the final development. If that is not the case, the suitability of the remedial works may need to be reconfirmed, once proposed development levels are confirmed. This is important if final site levels are to be below existing ground levels.

With the requirement of generally maintaining existing ground levels following reclamation and remediation, the scope of works comprised:

- *General reclamation turnover of the site to a minimum depth of 2m below existing ground level (Phases 2 and 3 only, as described in Section 4).*
- *Removal of all oil saturated soils and/or free product and removal of all soils with a visual rating of Class 5. The S106 requires all oil saturated soils and soil containing free product other than minor sheens to be removed to a minimum depth of 2.00m below FFL or 0.50m below the likely lowest seasonal groundwater elevation following development of the intended Urban Village, whichever is the deeper. The minimum groundwater levels recorded in standpipes are shown on Drawing 5041216-REM-DWG-1112 in Atkins' Remediation Strategy (Ref. 5), which shows the groundwater is typically 2-3m bgl. This represents the shallow groundwater table which is typically perched at the interface of the Made Ground and underlying natural soils. Hence remediation turnover, always extended to at least the base of the Made Ground, with validation pits taken below that level to ensure that all oil saturated soils and free product was removed.*
- *Removal of identified 'hotspots' of increased contamination identified through testing and observation.*
- *Further investigation and removal of all identified asbestos contaminated soils.*
- *Removal of all remaining significant structural remnants, including concrete, brickwork and other identified 'obstructions'.*
- *Removal of remaining 'live' services', including drainage where applicable.*
- *Removal of remaining 'redundant' process pipework.*

Further verification works were deemed to be required across the 'Churngold area' (Phase 1 described in Section 4) in line with the chemical testing requirements and frequencies required in the S106.

4. Remedial Works and Plot Preparation.

4.1 Introduction and Strategy

Due to the large size of the Commercial area a 'phased' approach to the remedial works was undertaken. This can be summarised into three main phases, with the extents of each phase of remediation works indicated on Drawing 5041216-REM-DWG-1611.

Remedial works consisted of the following phases:

- **hase m** this included land currently occupied by the D'Arcy Business Park and the area immediately to the south and east of Llancoed House. Remediation works were undertaken by Churngold Remediation Limited during 2007. (D'Arcy Business Centre Development, Llandarcy, Contract Validation Report, December 2007).

Further localised remedial works and verification sampling were required to comply with the S106 remedial requirements. Works were undertaken by Hawk, in conjunction with Atkins in spring 2013.

- **hase m** Land between the Phase 1 area and the Road 1 embankment to the south. Works were undertaken by Hawk, in conjunction with Atkins, in Winter/Spring 2012.
- **hase m** Land to the west of the D'Arcy Business Park and to the east of the former 'DiMe' area. Works were undertaken by Hawk, in conjunction with Atkins, and commenced in late 2012 and were completed in October 2013.

Parties involved in the reclamation and remediation works are as follows:

Client – St. Modwen Developments Ltd

Principal Contractor – Hawk Ltd

Secondary Contractor – Hydrock

Employers Representative – Prosurv Consult

Employers Technical Representative – Atkins Ltd

Further details on each of the main phases of works are provided in the following sections. All the 2012/13 works were carried out under the full time attendance of an Atkins Site Engineer.

4.2 Reclamation and Remedial Works undertaken

hase

Works across Phase 1, (also called the 'Churngold Area') consisted of an initial program of reclamation works, which were carried out by Churngold in 2007 on behalf of the former owners of the site BP and prior to the purchase of the site by St. Modwen. These works were supervised by URS, and consisted of the removal and treatment of hydrocarbon impacted ground and localised asbestos.

Approximately 50% of Phase 1 was redeveloped post 2007 with commercial units and offices (D'Arcy Business Park) as marked on Drawing 5041216-REM-DWG-1611). The ground conditions over the undeveloped area of Phase 1 currently comprise an approximate 0.5m thick cover layer of grey mudstone gravel, which is waste mined rock from a local underground colliery, Unity Mine. This was placed over the remediated surface in 2008/2009 by St. Modwen post the 2007 remediation works. Underlying the mudstone gravel, Made Ground was encountered, which broadly consisted of gravelly sandy clays consistent with reworked natural ground. Areas of imported fill brought in by Churngold during the remediation (Made Ground) generally comprised gravelly sands with frequent evidence of materials consistent with demolition rubble (concrete and red brick). There was localised evidence of residual hydrocarbon impacts; these ranged from

mobile free phase product (which was removed in focused hotspot removals) to hydrocarbon staining and odours.

The remediation results from the Churngold area were reviewed by Atkins against the requirements of the S106 (Section 3). Data gaps were identified by the review and therefore Atkins undertook a series of validation trial pits at a frequency of 1 per 400m² to obtain the testing frequency required. The locations of these validation pits are marked on Drawing 5041216-REM-DWG-1610, and relate to pits with the prefix CHVTP.

During the validation pitting works, additional concrete foundations and pipe work were identified, which were removed. Where concrete was retained, the edges of the structure were verified, and trial pits were dug through to ensure that the underlying ground was not impacted by hydrocarbons. Localised areas of free product and material that exhibited an olfactory score of 4 or above were identified and removed during the validation. The locations of removed and retained structures and pipework are marked on Drawings 5041216-REM-DWG-1624 and 5041216-REM-DWG-1613, respectively. We understand that a full turnover of soil to 2m depth was not undertaken by Churngold in the Phase 1 area, and therefore the existence of remnant buried structures and pipework cannot be ruled out.

hase

The area marked as Phase 2 on Drawing 5041216-REM-DWG-1611 underwent a ground turnover down to a minimum of 2m below ground level and generally encountered natural, undisturbed ground within that depth. Sandstone bedrock was encountered in the topographically higher area in the south, whilst natural drift deposits were encountered in the lower lying areas further north. The turnover was undertaken in order to identify any historical structures and/or services relating to the former site use. These turnover works were undertaken in parallel with the bulk of the contamination hotspot removal works.

Made Ground was encountered across the area, with the Made Ground often being found to directly overlie the sandstone bedrock in the south of the site. The Made Ground typically consisted of gravelly sandy clays, which exhibited localised hydrocarbon impacts, notably towards the interface between more granular Made Ground and the less permeable underlying natural soils. This free product impacted material generally lay in an approximate 0.5m thick horizon across Phase 2, overlying the impermeable natural ground, and was removed during the remedial works. The Made Ground in lower lying areas in the north of Phase 2 frequently exhibited an olfactory score of 4 to 5, and was indicative of light end range hydrocarbon impacts. This was removed as part of the remediation works.

The total volume of material turned over on Phase 2 was 30,063m³. The volume of hydrocarbon impacted soils removed for treatment elsewhere on the Coed Darcy site was approximately 4,150m³.

hase

The last phase of remediation works commenced in October 2012, with the final hotspot removals and validations undertaken in September 2013.

As with Phase 2, the Phase 3 remediation works largely consisted of the turnover of overlying Made Ground down to natural undisturbed ground. Ground conditions to the south of Phase 3 were similar to those encountered to the south of Phase 2, with Made Ground directly overlying the sandstone bedrock. The topographically lower, northern, area was underlain by natural soils consisting of some organic rich soft clays and thin peats overlying the more persistent and extensive glacial drift.

The lower lying areas had been extensively developed during the operation of the refinery, with many areas covered by variable thicknesses of concrete and relict structures, which were consistent with building foundations and floor slabs. Furthermore, drainage plans and old process plans for the site indicated that the main bank of drainage and process pipework from the Process

Area ran directly through the Commercial Area towards the effluent discharge point to the north of D'Arcy Business Park. Made Ground in the far west of the area was found to consist of localised fused slags which is consistent with findings on the adjacent DiMe plot to the west.

The locations of the concrete and pipework identified, removed and retained during the reclamation works are presented on Drawings 5041216-REM-DWG-1624 and 5041216-REM-DWG-1613.

Made Ground across Phase 3 of the Commercial Area was locally impacted by heavy metals (notably lead) and asbestos, whereas the hydrocarbon impacted material tended to be associated with the interface between granular Made Ground and the underlying natural soils. The hydrocarbon contamination identified across Phase 3 during the remediation confirmed the findings of the previous investigations and consisted generally of oily free product and BTEX compounds. This was often found to lie below concrete slabs and be associated with old process pipe runs. Chlorinated compounds were identified in the low lying central area of Phase 3.

In many cases, pipework and building footings etc. were embedded in the natural underlying clays (circa 2 to 3m below ground level (bgl) locally). Areas that were previously un-investigated (key areas being those beneath concrete slabs / foundations, and / or being on the route of redundant services and pipelines) were validated following the removal of these structures.

Locally trial trenches were dug at the base of remediation excavations and at the interface between the Made Ground and natural ground to ensure that all structures / pipes were removed during the works, as often these were hard to identify when covered with soft clay materials.

The total volume of material turned over on Phase 3 was approximately 27,734m³. The volume of hydrocarbon impacted soils removed for treatment was approximately 10,920m³.

Management of Materials

Materials excavated during the Commercial Area remediation were managed within the Commercial Area boundary or within the wider Coed Darcy site as follows:

- Unacceptable contaminated soils - predominantly hydrocarbon impacted soils, were transported for treatment and storage to the licensed Treatment Area located in the south of the Coed Darcy site. Materials are held here under an existing Waste Management Permit operated by Hawk. All such materials were not used in the re-filling and re-profiling works for the Commercial area. The treatment and re-use of these materials will be subject of a separate report.
- Geotechnically unsuitable materials – small quantities of geotechnically unsuitable materials were excavated from the site. These predominantly comprised soft clays and peat and were removed from the Commercial Area and stored at a recorded location on the wider Coed Darcy site and entered onto the Coed Darcy stockpile management system
- Overburden – a substantial quantity of overburden was removed from the site to facilitate the removal of contamination and structures. These materials were removed, predominantly from Phase 3, and stored temporarily on the adjacent plot. All these materials were subsequently validated and re-used as fill within the Commercial Area (predominantly within the Phase 3).
- Structural remnants and concrete – these elements were removed from site and placed within the Coed Darcy concrete management system, awaiting re-processing and validation ahead of re-use on the site.
- Metal structures and pipes – these elements were removed from site to be recycled at an off-site facility.
- Asbestos contaminated soil – localised areas of soil exhibiting elevated levels of asbestos (predominantly measured as loose fibres) were removed from the Commercial Area and stockpiled and are to undergo further analysis to determine the appropriate management option (which may include off-site disposal).

- Off-site disposals – at the time of this report production there were no off-site disposals to landfill.

4.3 Re-profiling Works and Post Remediation Levels

Re-profiling of Phases 2 and 3 of the Commercial Area was undertaken in conjunction with the remedial works. Drawings 5041216-REM-DWG-1612 and 1634 show isopachyte drawings of Phases 2 and 3 of the Commercial Area turnover, showing the difference between the Base of Excavation (BoE) and post remediation fill levels. This excludes the construction of the road embankment (February 2013) in the western and northern parts of Phase 3 (see Drawing 5041216-REM-DWG-1632). The base of excavation profile was highly variable across the areas, consistent with the removal of building footings, tank bases and contaminated hotspots.

Areas that were not surveyed, were not turned over, but were both visually and chemically assessed via trial pitting at the s106 frequency. These areas were in general related to existing site roads where full turnover was neither practical nor required, due to the absence of structures.

Backfilling of excavations and creation of the post reclamation profile was undertaken using a variety of materials, including:

- Validated site won material, including overburden removed to allow access to deeper contaminated materials and relict structures.
- Site won crushed concrete aggregate (contractor compound areas).
- Validated stockpiled materials from the wider Coed Darcy site.
- Hydrock remediated materials (used principally for the construction of the road embankment).

The following drawings provide the landform information for the works:

- Drawing 5041216-REM-DWG-1633 – pre-commencement profile (As-built 2009).
- Drawing 5041216-REM-DWG-1614 – February 2013 profile. The as built survey was conducted on 21/02/13.
- Drawing 5041216-REM-DWG-1632 Commercial Area As-built September 2013.
- Drawing 5041216-REM-DWG-1634 – approximate base of excavation to finished level isopachyte in Phase 3.
- Drawing 5041216-REM-dwg 1612 – base of excavation to finished level isopachyte in Phase 2.

Within Phase 2, levels were increased, over and above the original ground profile to allow the construction of two temporary contractor compounds (Hawk compound and Dawnus compound) as shown on Drawing 5041216-REM-DWG-1611.

Within Phase 3 the first stage of backfilling and re-profiling was completed in February 2013. The second stage, which commenced on top of the February 2013 surface, was completed in September 2013.

Finished levels over the west of Phase 3 are substantially changed compared to the pre-commencement levels due to the construction of the Road Embankment (Road 3 and Road 13). These works have used the stabilised North Site Reservoir sludge at the base (>2-3mbgl), which was tested by Hydrock, with validation results provided to Atkins for assessment. Retained validated site won material was used for the top 2-3m of the road embankment, and the material was tested at the S106 frequency both prior to (whilst in stockpiles) and after placement (surface samples). Additional upfilling works were undertaken in the low lying area to the east of Road 3 and south of Road 13 in order to provide a graded profile to aid site drainage.

The geotechnical and geo-environmental verification for the Road 3/Road 13 embankment is subject to a separate report by Hydrock (Ref. 14), which also includes data pertaining to the upfilling of the remaining Phase 3 area.(validated to the standard required by the S106).

For the purpose of validation in accordance with the requirements of the S106, it has been assumed that this final profile detailed on Drawing 5041216-REM-DWG-1632 represents the base of the clean cover required by the S106 (i.e. FFL-0.5m).

5. Validation/Verification

5.1 Requirements of the S106

The S106 (Schedule 8, Part 3, Paragraph 8) sets out the requirements for validation testing as part of the ongoing redevelopment of the refinery. It was therefore proposed that the validation of the Commercial Area be undertaken in accordance with the relevant frequencies outlined in Table 10.1, based upon a proposed commercial end use.

Table 10.1 Minimum Validation Testing Frequencies for Commercial Area

Testing for the Validation Suite at the following frequency	Soils Commercial at all depths
Imported quarried material	1 per 1000m ³ ex situ, composite of 5 regular sub-samples.
Imported soil from verified Greenfield site	1 per 500m ³ ex situ, composite of 5 regular sub-samples.
Imported soil from characterised brownfield site ¹ .	1 per 100m ³ ex situ, composite of 5 regular sub-samples.
0.5m-1m below FFL in-situ	Regular grid of 1 per 400m ² , sample over 0.5m depth.
>1m below FFL in-situ.	Regular grid of 1 per 400m ² , sample over 0.5m depth.
Stockpiled excavated site materials for re-use.	1 per 400m ³ ex situ, composite of 5 sub-samples.
Face of remedial excavations <1m deep.	1 per 15m ² , minimum of 1 per face, worst case VO sample.
Face of remedial excavations >1m deep.	1 per 15m ² , minimum of 1 per face, worst case VO sample.
Along redundant service excavations.	1 per 20m of trench, worst case VO sample.
Soil treated ex situ and homogenised.	1 per 500m ³ ex situ, composite of 5 regular sub-samples.

¹ Validation suite to reflect prior use of the originating brownfield site and the design and purpose of the relevant area of Coed Darcy.

VO = visual/olfactory (i.e. aesthetic) observation

The remedial standard required for the S106 visual scoring is 4 or below (as detailed in Table 1.1) i.e. all oil saturated soils and soils containing free product other than minor sheens to be removed to a minimum depth of 2m below FFL or 0.5m below the likely lowest seasonal groundwater elevation following development, whichever is the deeper. The minimum groundwater levels recorded in standpipes are shown on Drawing 5041216-REM-DWG-1112 in Atkins' Remediation Strategy (Ref. 5), which shows the groundwater is typically 2-3m bgl. This represents the shallow groundwater table which is typically perched at the interface of the Made Ground and underlying natural soils. Hence remediation turnover, always extended to at least the base of the Made Ground,

with validation pits taken below that level to ensure that all oil saturated soils and free product was removed. There is no olfactory requirement for a commercial end use given in the S106; however in general, Atkins closely inspected any ground with an olfactory score of 3 or above, due to the strong association of volatile organic compounds (e.g. benzene) with a high olfactory score.

In response to the widespread presence of structures and services across the entire Commercial Area, a complete turnover was undertaken across the areas that were historically densely occupied by process plant. Base of excavation validation samples were taken along with samples of backfill material.

Selected photographs taken during the remedial works are presented as a photographic record in Appendix A.

5.2 Validation Sampling: Soils

As described in Section 4.1, validation of the Commercial Area was carried out in a 'phased' approach as works were completed;

- Phase 1, initially remediated and validated by Churngold, was further validated by Atkins via a series of validation trial pits, with localised contamination and structure removal carried out in line with S106 requirements.
- Phase 2 was accomplished primarily via a series of validation trial pits carried out post reclamation, with base of excavation samples taken beneath the Dawnus and Hawk compounds only (Hawk C1 & C2, and DAWN C1 – C6.).
- Phase 3 was validated via base of excavation samples and sampling of backfilled material, alongside validation trial pits in areas that did not undergo a full turnover.

The locations of all validation trial pits taken prior to the road embankment construction by Hydrock are shown on Drawing 5041216-REM-DWG-1610. The exploratory hole logs relating to these pits are presented in Appendix B.

The assumption that the site could be classified as a '**commercial end use where groundwater is in soil**' scenario, as outlined in the S106 was confirmed by the remediation and validation works. The excavations proved that the majority of the area is underlain by Made Ground and natural drift deposits overlying sandstone bedrock, with shallow groundwater often perched at the interface between the Made Ground and underlying cohesive drift deposits.

The results of chemical analysis on a total of 628 samples were obtained as part of the overall validation across the Commercial Area. This includes samples tested as part of the additional hotspot removals (where not all samples were tested for a full suite of contaminants and were only tested for specific determinands e.g. asbestos and lead), base of excavation testing, trial pitting and from hand dug pits.

For ease of correlation between the samples and the validation plan, an explanation of the various samples taken as part of the overall validation are summarised below, and all screened results are presented in Appendix D.

- CAEMV001 TO 101 (excl CAEMV079-081, 087-092, 094): Commercial Area Base of excavation validation samples (Phase 3 only)
- CAEMTP 001 to 019: Commercial Area contamination delineation Trial pits (Phase 3 road embankment only)
- CAEMVTP 020 to 033 (excl 021): Commercial Area post remediation Trial pit validation (Phase 3 road embankment only)
- CHVTP 001 to 022: Phase 1 (Churngold) Trial pit validation

- CAV001 to 047: Commercial Area Trial pit validation (Phases 2 and 3) (N.B the results for samples CAV09 – CAV017 have been erroneously labelled as CAU09 – CAU017 in Appendix E, but elsewhere are pre-fixed CAV)
- CAV100-130: Commercial area hand dug pits (0.3mbgl) Phase 3
- CAV131-147: Commercial Area Trial pit validation Phases 2 and 3
- CA-A1 to 6: Commercial area hand dug pits (0.3mbgl) Phase 2 & 3
- HSP and DSP: Hawk and Dawnus compound excavation validation samples (Phase 2 only). Refers to both validation samples and hand dug pits for surface samples
- HAWK C1-C2, DAWN C1-C6: B of E samples taken prior to filling in Hawk and Dawnus compound areas
- PBV01-05: Commercial area hand dug pits (0.3mbgl) Phase 3
- CAV500-530: Hotspot validations
- CA-A 001 to 014: Asbestos hotspot BofE sample (Phase 3 only)
- P28TP001 to 003: Commercial Area Trial pit validation (Phase 1)
- CAUFV001 to 009: Commercial Area hand dug pits upfilling works (Phase 3)
- HCV1 to 13: North Site Reservoir (NSR) stabilised sludge
- HAW001 to 101 and DAW001: Hawk and Dawnus compound areas, additional pits 2015

Base of E cavation B of E validation

A total of **base of e cavation validation samples** were taken across Phase 2 and 3. In all cases, the B of E samples were taken from the natural superficial materials underlying the Made Ground. The natural materials sampled as part of the validation consisted of either peaty clays, peats, gravelly sandy clays and clays. In general, the VO scores for the BofE samples varied between 0,0 and 2-3,3 across Phases 2 and 3.

All chemical results indicate compliance with the commercial end use S106 RTCs/RBSLs for the relevant depths below ground level (see Appendix C). A summary of the screened results is provided in Appendix D. Three exceedances of the RTCs were recorded at B of E samples CAEMV 037 (benzene and TPH Aromatic C_{8-C10}), CAEMV 077 (benzene) and CAEMV 050 (vinyl chloride), but these were subsequently removed during the excavations for Hotspots I and J (see Appendix F: AF 1.3 and AF 1.4). A further B of E exceedance was noted at HAWK C1 where a benzo(a)pyrene concentration of 28,600ug/kg was recorded. This location was subsequently upfilled and the sample lies at >1m depth and therefore does not exceed any RTC/RBSL value. An exceedance of the asbestos RTC was noted at B of E sample CAEMV 061, however, this location is >1m below FFL and therefore no asbestos RTC applies.

Validation Trial pits

A total of trial pits were e cavated across hases and with chemical results obtained as part of the validation pitting and chemical results obtained as part of the subsequent hotspot removals Logs are consistent with ground conditions that were recorded in the previous Atkins ground investigations, and previous investigations by others carried out prior to the remedial works.

Areas that were previously un-investigated (key areas being those beneath concrete slabs / foundations, and / or being in the route of redundant services and pipelines) were validated via both trial pits during the remedial works, and B of E samples following the removal of structures. Contamination encountered was generally related to free phase hydrocarbons and benzene, which was removed as part of the remedial works.

Evidence of hydrocarbon impact (visual or olfactory or both) was noted up to a maximum class of VO 5,4-5 prior to remediation, and VO 3,3 after remediation.

Some exceedances of the commercial end use S106 RTCs/RBSLs were recorded (notably asbestos), as indicated in the screening tables in Appendix D. However, these were generally associated subsequent hotspot removals, as detailed in Appendix F, or are from below 1m depth and are therefore too deep to apply to the RTC initially used to screen the results (<1m RTC). A summary of the exceedances from validation trial pit samples, as indicated in Appendix D, is shown in Table 5.2.

Table 5.2 Summary of RTC RBSL exceedances in validation trial pits

Validation Trial Pit	Depth (m)	Determinand	Concentration (ug/g)	Comment
CAEMTP 016	1.4	1,2 Dichloroethane	10,600	This isolated sample is located beneath the road embankment and therefore lies at a depth in excess of 5m below existing ground level. It is therefore not considered to represent a risk to human health.
CAEMTP 027	0.5	Lead	1,730	Located beneath road embankment and therefore lies at a depth greater than 1m.
CAEMTP 028	0.5	Lead	1,870	Located beneath road embankment and therefore lies at a depth greater than 1m.
CAV003	0.4	Chromium	635	At toe of slope and therefore difficult to chase out. Sample will ultimately be at 0.9m depth, when 0.5m of clean cover is placed (as required by the S106), and is therefore not considered a significant risk to human health.
CAV006	1.5	Lead	1,210	Depth >1m
CAV022	1.5	Lead	997	Depth >1m
CAV026	1.0	Lead	1,470	Depth of sample will ultimately be >1m, when 0.5m clean cover is placed.
CAV043	0.3	Lead	1,270	Dug out during Hotspot H removal.
CAV133	2.0	Benzene	6,730	Depth of sample will ultimately be >2m, when 0.5m clean cover is placed. This is an isolated slight exceedance of the RTC. Twelve samples from adjacent pits HAW002, HAW006, HAW007 and CAV014 at depths ranging between 0.2m and 4.5m were all below the RTC, with most results below the MDL. Therefore, due to the isolated nature and the depth of the sample below FFL, it is not considered likely to represent a risk to human health.
CAV143	0.2	Lead	1,900	Dug out during Hotspot H removal.
CAV143 BASE1	0.5	Lead	1,060	Dug out during Hotspot H removal.
CAV143 W	0.3	Lead	773	Dug out during Hotspot H removal.

Validation Trial ID	Depth m	Determinand	Concentration µg/g	Comment
CAV144	0.35	Lead	5,830	Dug out during Hotspot H removal.
CAV144	1.8	Lead	5,830	Depth >1m
CAV144 E	0.3	Lead	6,150	Dug out during Hotspot H removal.
CAV520	0.3	Lead	1,520	Dug out during Hotspot H removal.
SP55-1	-	Lead	3,050	From stockpile. Used beneath road embankment at >1m depth.
SP55-2	-	Lead	9,510	From stockpile. Used beneath road embankment at >1m depth.
SP55-3	-	Lead	7,980	From stockpile. Used beneath road embankment at >1m depth.
SP55-4	-	Lead	8,060	From stockpile. Used beneath road embankment at >1m depth.
HAW002	1.5	Lead	1,520	Depth >1m
HAW002	2.5	Lead	833	Depth >1m
HAW002	3.5	Lead	960	Depth >1m
HAW002	4.3	Lead	1,540	Depth >1m
HAW003	0.5	Lead	1,260	Sample taken beneath 0.5m of crushed concrete surfacing. Depth of sample will ultimately be >1m, when 0.5m clean cover is placed.
HAW005	0.5	Lead	3,900	Sample taken beneath 0.5m of crushed concrete surfacing. Depth of sample will ultimately be >1m, when 0.5m clean cover is placed.
HAW005	2.5	Lead	864	Depth >1m

Backfill Turned Over material

All backfill and turned over material was tested both prior to re-use and *in situ* following placement to confirm suitability. Turned over material was tested *in situ* only via a series of hand dug pits.

The results of all samples taken from the backfill and turned over material were found to be compliant with the S106 requirement that all oil saturated soils are removed to a minimum depth of 2m below FFL or 0.50m below the likely lowest seasonal groundwater elevation. The VO scores of backfill were generally less than 2,2, and the turned over material less than 3,3.

Generally, imported backfill (from other areas of the wider Coed Darcy site) was only used in areas where the *in situ* material was geotechnically poor / unsuitable for end use; to infill hotspot removal excavations; where a capping layer was required; and/or where there was insufficient *in situ* material available to reach required finished ground levels.

In addition to the hotspot removals, there are four key areas across the Commercial Area where backfill was used, these are:

1. Hawk compound area: backfill required to raise site levels. Used site won material from the Commercial Area, together with backfill material from Coed Darcy stockpile SP48 and site won crushed concrete material from stockpile SP Q, which was used as a 'top dressing material' in the top 500mm.

The volume of backfill used in the Hawk compound was approximately 6,960m³.

There were no exceedances for the adopted thresholds for retention within a commercial area for the depth of the samples (or final depth, once that 0.5m of clean cover has been placed – see Table 5.2). Some samples tested in 2013 detected asbestos, but not all were tested for asbestos quantification and therefore the results could not be compared to the asbestos RTC of 0.03%. Consequently additional trial pits were dug at the same locations in 2015 and new samples taken. All of the 2015 samples either detected no asbestos or, where they did, the quantification results showed asbestos concentrations below the RTC. Additionally, in 2015 ten new validation trial pits were dug (HAW001- 010) and 13 additional samples tested for asbestos, including quantification, where asbestos was detected. None of the samples tested exceeded the asbestos RTC.

One of the original samples (CAV134 at 0.7m) detected asbestos in 2013, but was not re-tested in 2015. However, a quantification test on a surface sample from the same pit gave a concentration below the laboratory MDL of 0.001%. The sample at 0.7m will ultimately be at >1m depth, once that 0.5m of clean cover has been placed, as required by the S106.

Three samples were taken from SP48, which comprised a mixture of gravelly clay and sand won from a sub-soil scrape to expose bedrock, and had a total volume of 3000m³. All this material was used in the construction of the Hawk compound. A total of four samples of SPQ (crushed concrete) were taken, which had a total volume of 1000m³ (this was used as a 500mm cover layer split equally between both the Hawk and Dawnus compounds). Additional 'in situ' samples were taken of the constructed area via trial pitting and hand dug pits (HSP1 and 2, CAV017 (erroneously labelled CAU in Appendix E), CAV132-135, HAW 001-010). The remaining material was site won 'turned over' material from the Commercial Area.

Based on a required S testing frequency of test per m the required minimum number of validation samples is In total samples have been tested from trial pits CA CA CA and samples tested from additional trial pits dug within the bac fill material in A This equates to a total of samples which gives a testing frequency of appro imately m and which satisfies the requirement of the S Samples ta en from S and S S A A and A were not tested for the full suite of determinands and therefore have not been counted in the overall testing frequency A significantly higher number of samples o were tested but not for the full suite of analyses

2. Dawnus compound: backfill required to raise site levels. Used site won material from the Commercial Area and crushed concrete material from SP Q which was used as a 'top dressing material'.

Existing natural ground (a cobbly gravelly firm silt) was used to build up site levels over the compound, with a 500mm 'running surface' placed over the surface from Coed Darcy Stockpile SP Q. Sampling of the turned over material was carried out at the time of construction (DAWN C7 – C12: 6 samples spread evenly throughout the turned over material), and via trial pits and surface samples taken post construction; CAV136 to 138 (3 samples), DSP1, 4 and 5 (3 samples, including additional samples taken in 2015 to complete a full suite of determinands) and DAW 001 (3 samples taken in 2015, including 1 asbestos analysis).

The volume of the backfill placed in the Dawnus compound was approximately 5,075m³.

There were no exceedances for the adopted thresholds for retention within a commercial area at less than or greater than 1m depth. Some asbestos was detected in post remediation trial pits CAV136-138 in deeper samples >1m below FFL, however quantification testing was not carried out

on these samples as they will ultimately be at least 1.5m below FFL, once that 0.5m of clean cover has been placed, as required by the S106.

The S requires a testing frequency of test per m For most determinands analysis was carried out on samples of the bac fill material including two samples from S si samples from A C C si samples from CA four samples from S and three samples from A which equates to an approximate testing frequency of m which is in excess of the required S frequency Some of the bac fill samples taken were however not tested for a full suite of determinands and asbestos samples were tested giving a testing frequency of m which still meets the required S frequency albeit that a lesser number of asbestos samples could be considered acceptable as a proportion of the bac fill placed is m below FFL for which there is no asbestos RTC

3. Road embankment footprint (see Drawing No. 5041216-REM-DWG-1610): Backfill required to raise site levels. Stockpiles SP27, SP 55, and a 'slag backfill', used as a free draining material, geotechnically more competent than the existing ground, on which to construct the embankment.

Eight samples were taken from the granular backfill used beneath the embankment during the remedial works (samples SP47, 1-2; SP55, 1-4, CAEM Slag backfill 1-2). Representative samples were taken from the stockpiles prior to placement of the backfill. The total volume of backfill used was 2,500m³. There were no reported exceedances for the adopted thresholds for retention within a commercial area at greater than 1m depth. Samples SP55 1-4 recorded lead RTC exceedances for shallow soil. However, this soil was placed below the road embankment at >1m below FFL and therefore no asbestos RTC applies.

Based on a required testing frequency of test per m samples equated to an approximate testing frequency of m This is in excess of the S required frequency Asbestos was not tested for in samples S however as the bac fill as placed at m below FFL no asbestos RTC is applicable

4. Low lying area at apex of Road 3/Road 13 junction: Used to increase the relative heights between the lower lying areas and the Road 3 embankment. Used Hydrock North Site Reservoir (NSR) stabilised material, and site won material from Coed Darcy stockpiles CA-SP and SP77.

Thirteen samples were taken from the NSR stabilised material, which was all used below 1m depth, (samples HCV1CT to HCV13CT). There were no reported exceedances for the adopted thresholds for retention within a commercial area at greater than 1m depth.

The total volume of NSR backfill used was 6,500m³.

Thirteen samples of the SR stabilised material equated to a testing frequency of m This is less than the S required frequency m however due to the homogenous nature of the material and the consistent achievement of the required quality At ins considers that the testing frequency is sufficient to give confidence that the material is fit for purpose Additionally the SR material was used in the core of the road embankment crossing the Commercial Area for which ydroc prepared a verification plan This included a testing frequency of m as set out in two technical notes T and T which according to ydroc s report were sent to all stakeholders and an agreement reached

Additional material was used as a capping at least 1m thick over the NSR stabilised material, which consisted of material from stockpiles CA-SP and SP77. CA-SP was stockpiled overburden from the Commercial Area site.

Approximately 6,000m³ of CA-SP, and 1,500m³ of SP77 was used.

Testing frequency has been calculated from a total of 20 samples of the CA-SP stockpile (CASP 01-CASP 20) used in the Commercial Area, 4 samples from SP 77 (SP77-901, 902, 904 & 905) and nine additional surface samples which were taken of the combined CA-SP and CA77 material after it had been placed (samples CAUFV01 to 09).

There was one reported exceedance of asbestos in stockpile SP77 (SP77 - 903) for the adopted thresholds for retention within a commercial area at less than 1m depth. This material was segregated in the stockpile prior to use and that section of the stockpile removed from the Commercial Area to another stockpile on the wider Coed Darcy site. As not all the stockpile materials where asbestos was detected, were tested for asbestos quantification, an additional 9 samples (CAUFV01 to 09) were taken in situ to give confidence of the asbestos content in both the CA-SP and SP77 material as placed. This further testing reported that, in all the CAUFV samples, asbestos concentrations were less than the 300ppm threshold given in the S106.

Thirty three samples of the bac fill capping material equates to an appropriate testing frequency of 1 in 100. This is in excess of the required S106 testing frequency. However not all of the samples were tested for a full suite of contaminants for example only three of the nine CA F samples included a full suite. Taking only full suites of contamination CAS 01 to S 09 and CA F 01 to 09 gives a total of 33 samples i.e. a testing frequency of 1 in 100 which still meets the required S106 frequency

Hotspot removals

Ten 'hotspots' were identified as part of the validation process. These primarily related to localised benzene, lead, and asbestos, however one highly localised vinyl chloride hotspot was also identified. All hotspots were excavated, with base and side validation samples taken to demonstrate that remaining soil met the relevant RTCs, before being filled in with validated backfill material. A list of the hotspot removals are shown below, with full details of the hotspot removals provided in Appendix F, and presented on a series of Drawings 5041216-REM-DWG-1615 A-F:

- Hotspots A-G: Asbestos
- Hotspot H: Lead
- Hotspot I: Benzene
- Hotspot J: Vinyl Chloride

Summary

Excluding samples taken as part of the hotspot removals, **a total of 100 samples** have been taken from the Made Ground, the backfill material (stockpiled material) and underlying natural ground (BofE samples) across the Commercial Area. Where detections of asbestos (and exceedances of certain organic and inorganic contaminants) are below 0.5m depth, this soil will be greater than 1m below the FFL (due to the S106 requirement for imported quality controlled fill material to be placed in the top 0.5m), and hence validation is not required.

Based on a total volume of turned over and retained material of 57,797m³, and imported backfill material of 29,728m³ (see section 5.5 for volumes summary), **this equates to a total volume of validated material of 87,525m³ and a testing frequency of approximately 1 in 100 which is well in excess of the required S106 testing frequency**

Copies of laboratory certificates are presented in Appendix E.

Due to the absence of information relating to proposed development levels across this area, it is recommended that suitability of the remedial works should be re-assessed once information on final site levels becomes available.

5.3 Validation Sampling: Groundwater

As part of the remediation works, a key criteria was the removal of oil saturated ground that was impacting, or could impact, upon groundwater.

A series of boreholes were identified on the Commercial Area to monitor groundwater both during and after the remediation works. Due to data gaps, three sumps were also installed across the Phase 1 and 2 areas (Sumps 1 to 3) to monitor for free product in the shallow groundwater. The locations of these boreholes are presented on 5041216-REM-DWG-949(c).

The Atkins Remediation Strategy (Ref. 5) indicated that there were no exceedances of the groundwater chemical RTCs (see Appendix C for criteria) prior to remediation, but identified key boreholes that contained free product. These boreholes were predominantly located in the western half of the Commercial Area as indicated on Drawing 5041216-REM-DWG-00949(c). Free product was only recorded in one location in the eastern half of the Commercial Area, where CA SUMP 2 detected a. a thin layer of product (2mm) on a single occasion only in February 2012. Subsequent groundwater monitoring on three occasions in 2013 did not detect any product in CA SUMP 2 and therefore no remediation was considered necessary in this area of the site (Phase 1 was previously remediated by Churngold). The following boreholes/sumps within, or close to, the Commercial Area detected free product on at least one occasion: MSMW065D, MSMW070 S2, WSMW077, MSMW143, P1BH010, P1BH021, P1BH024D, CA SUMP 2, DM4, DM6, DM7, DM8 and DM19.

All areas containing free phase hydrocarbons were targeted during the remediation. Wholesale excavation of the affected areas was preferred over recovery from wells, as experience shows that where present, free phase hydrocarbons were limited to discrete horizons, often at the base of the Made Ground, and associated with remnant structures. It should also be noted that across the most heavily impacted areas (Phase 3) remediation excavations were taken to natural ground and below what was considered the shallow groundwater level. Consequently, any free product within the shallow groundwater was removed during the remediation works and groundwater was pumped into a tanker for subsequent treatment within the wider Coed Darcy site.

Remaining boreholes continue to be monitored; with no evidence of free product, and no exceedance of the commercial area groundwater RTCs. Results (2011 to August 2013) are screened and summarised in Appendix D. It is noted that between 190mm and 275mm of product was measured in borehole MSMW065D, located in Phase 3. The monitoring well screen at this borehole is sealed within the sandstone bedrock between 5.5m and 11.0m depth, and rockhead is at 3.6m depth. The remediation in this part of the Commercial Area involved the wholesale removal and turnover of the Made Ground and any underlying impacted natural soils. Consequently, any shallow groundwater impacted with free product will have been removed in conjunction with associated oil-impacted soils. The free product recorded within borehole MSMW065D lies within the deeper groundwater within the sandstone bedrock and below the shallow groundwater and was therefore not targeted as part of the remediation works.

The Atkins Remediation Strategy indicated that groundwater flows were generally inferred to be in a north / northeast direction. Remediation has been carried out in the areas of the wider Coed Darcy site to the south and west of the Commercial Area and the relevant validation reports have either been agreed by the Monitor, or are being prepared for Monitor sign off. There is a risk of residual contamination in the deeper groundwater within the sandstone bedrock underlying the wider site. However this is impractical to remediate and it is considered that, following source removal during the wider site remediation, the groundwater quality will improve. Hence the risk of the Commercial Area being re-contaminated by free product or impacted groundwater migrating from the south / southwest is considered to have been sufficiently mitigated.

5.4 Final Levels

Current final ground levels are presented on drawing 5041216-REM-DWG-1632.

Due to the absence of any information relating to proposed development levels across the majority of the Commercial Area it has been assumed that the finished surface shown on drawing 5041216-REM-DWG-1632 represents the base of clean cover materials (i.e. FFL less 0.5m), as the S106 requires the top 0.5m below FFL to comprise quality controlled imported fill material.

Where additional fill materials are required as part of the proposed development of this area, proposed fill materials should be tested at the frequency required by the S106, prior to placement, in order to confirm their suitability for use.

5.5 Remediation summary

Remediation volumes

Note Phase 1 works consisted of localised hotspot removals that were not surveyed due to the small volumes encountered. Pipework and structures removed and retained are indicated on Drawings 5041216-REM-DWG-1624 and 5041216-REM-DWG-1613.

	hase m	hase m
Contaminated material	4,150*	10,920
Structures removed	900	3020
Turned over material (retained)	30,063	27,734
Total	35,113	41,674

p fill volumes

	hase m	hase m
Dawnus Compound	5,076	
Hawk Compound	6,962	
Haul Road	1,050	
Embankment Footprint		2,640
Road 3/13 junction ('low area')		14,000

* Note, volume calculated from an excavation area of 8326m²

6. Post Remediation Constraints and Development Requirements

6.1 Gas Protection Measures

The S106 requires the installation of a gas membrane beneath structures, as indicated below;

'As a minimum...the preventative measures shall include'

The installation of a proprietary and appropriate ground gas resistant membrane and appropriate venting system in all structures that will be entered by people and any structure where there is a potential for gas accumulation if ground gas is present. The Developer shall develop and adopt a Quality Assurance programme to which Coed Darcy Limited does not object to validate the integrity of the membrane and the adequacy of the venting system installed in each such structure.

Assessment of ground gas monitoring data from across the Commercial Area (Atkins Remediation Strategy Ref.5) suggested that, pre remediation, the site was representative of a Characteristic Situation 2 (CS2) in accordance with CIRIA C665 (Ref. 15). Post remediation monitoring indicated that the ground gas conditions remain as CS2.

The following gas protective measures are recommended by CIRIA 665 for office/commercial/industrial development based upon a CS2 classification;

a) Reinforced concrete cast in situ floor slab (suspended, non suspended or raft) with at least 1200g DPM.

b) Beam and block or pre-cast concrete slab and minimum 2000g DPM/reinforced gas membrane.

c) Possibly underfloor venting or pressurisation in combination with a) and b) depending on use.

All joints and penetrations to be sealed.

It is recommended that the exact details of the proposed gas protection system to be installed beneath plots is agreed with the relevant regulatory authorities prior to installation.

6.2 Service Installation

The adopted remediation thresholds (refer to Appendix C) are in excess of the 500mg/kg threshold for TPH C₁₆-C₄₀, which precludes the use of conventional polyethylene water supply pipes (UKWIR Report ref 10/WM/03/21 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites', 2010).

Due to the absence of any details relating to the specific route of any water supply pipes within the final development, it is recommended that a need for protective barrier water supply pipe is assumed for the purpose of initial assessment.

6.3 Ground and Construction Workers

This report and assessment of contamination risks does not specifically address occupational risks to workers involved in activities which include exposure to sub-surface material. A separate assessment should be undertaken, which will need to take account of the levels of residual contamination and the type of activity being undertaken. The adoption of good hygiene procedures and suitable Personal Protective Equipment (PPE) should be sufficient to minimise the risks posed by exposure to such soils.

Given the works undertaken and the observations on the site it is considered that the likelihood of encountering significant contamination during the redevelopment of this area is low.

6.4 Clean cover

In addition to the requirements outlined above, the S106 (Schedule 10, Section 8) also requires the placement of a cover of clean materials within proposed public and commercial areas of the final development as detailed below:

To provide them with a minimum thickness of suitable garden soils in residential areas, soils for landscaping in public and commercial areas and sub-base for hard surfaced areas, the Developer shall build up the final elevation after completion of the RAP and Redevelopment Remediation Works with a minimum of 0.5m of quality controlled imported fill materials suitable for the use to which they are to be put and of better quality than all RBSLs for the relevant end use and meeting aesthetic type 0 for a residential end use and type 1 or better for a commercial end use.

It is recommended that the suitability of materials proposed for use as clean cover is confirmed and agreed with the Monitor and relevant regulatory authorities prior to placement.

7. Validation Summary

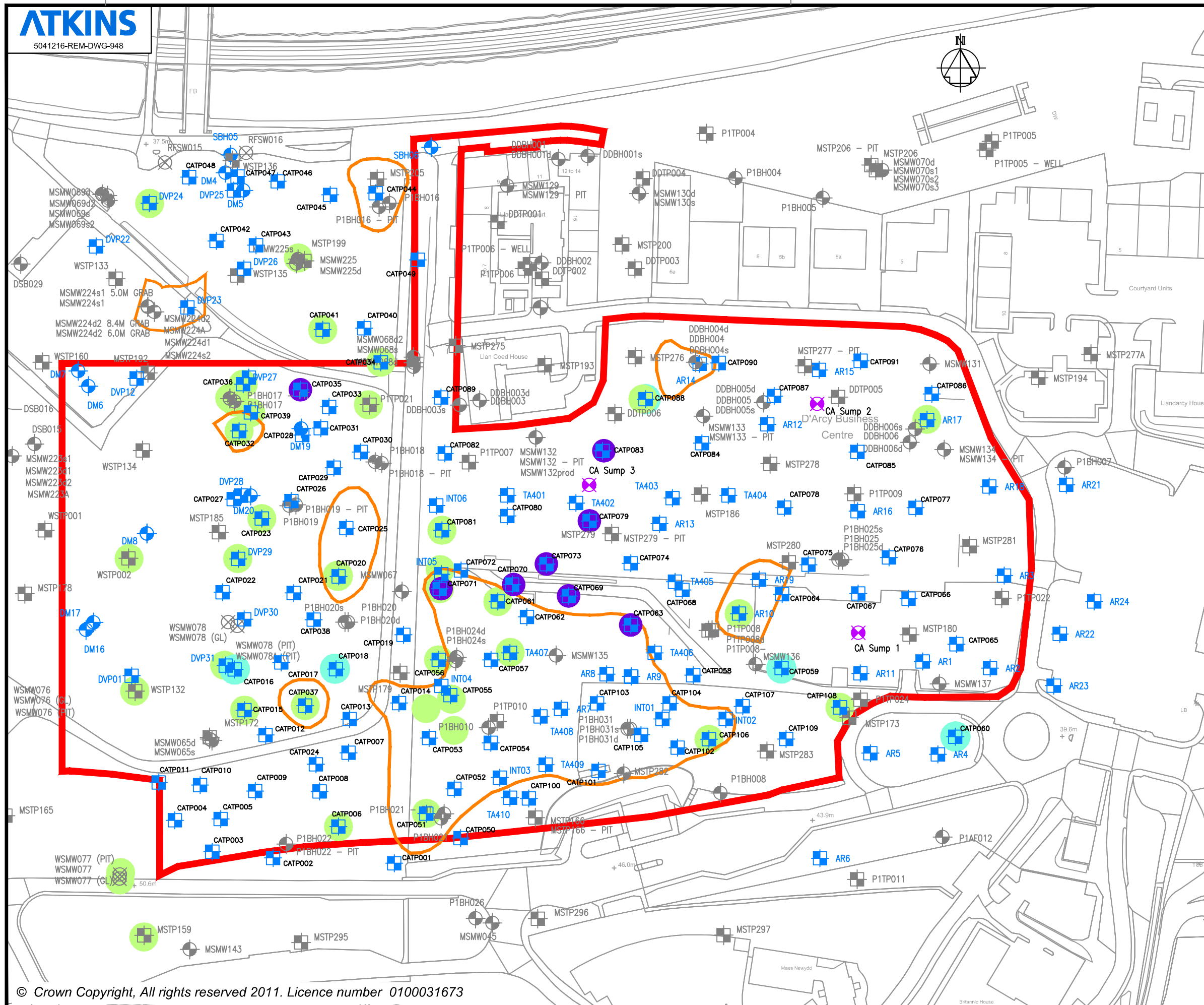
Table Certification Summary for Validation of Commercial Area

CERTIFICATION SUMMARY		
Requirement	Status	Comments
Chemical quality of soil in-situ.	COMPLETE	
Visual/olfactory quality of the soil in-situ.	COMPLETE	See logs
Observations of groundwater for the presence of free phase product	COMPLETE	
Chemical and Visual/Olfactory quality of imported material	COMPLETE	
The RBSLs/RTCs set out in Appendix C and the aesthetic criteria, remediation quality and scope (including the depth below Final Finished Level to which quality standards are achieved) shall be achieved for each part of the Property at the minimum validation frequencies set out in Clause 8 of Part 3 (as applicable depending upon whether such part of the Property is intended for use as residential, commercial or recreational land) as a minimum base level standard	COMPLETE	
All oil saturated soil should be removed	COMPLETE	
All soils must be remediated so as to meet the RBSLs/RTCs for TPH, BTEX and PAHs at the relevant depth relative to FFL and the aesthetic criteria Class 2 or better at greater than 1m below FFL.	COMPLETE	
Where it is not practicable to address groundwater contamination within bedrock this must be controlled, e.g. where seeps, sheens and iron staining discharge from the bedrock. Acceptable methodologies for remediation may include, but are not limited to, the use of land drainage via interceptors. Control measures should result in no visible discharge at surface and little or no odour observable.	COMPLETE	
All soil potentially containing dispersed asbestos fibres or visible ACM must be removed or remediated to meet in bulk, considering both dispersed fibres and pieces of ACM, the appropriate ACM RBSL, or to meet the requirements of relevant Environmental Authorities, whichever is the more conservative.	COMPLETE	

8. References

1. Section 106 Deed of Planning Obligations (Dewey & LeBoeuf report GNP/NJR/13773-2). February 2008.
2. Atkins report 5041216-REM-RPT-000476, Coed Darcy: Derivation of Commercial Remediation Target Criteria. March 2011.
3. Coed D'Arcy Development, BP Llandarcy Refinery Desk Study. July 2007 (Report 44382742 / BRRP0001)
4. Atkins Report 5041216/REM/RPT/375 Commercial Area, Controlled Waters Risk Assessment, March 2012.
5. Atkins Report 5041216/PLOTS/RPT/626 Geo-Environmental Assessment & Outline Remediation Strategy: Proposed Commercial Area, Feb 2012.
6. Churngold Remediation Limited. D'Arcy Business Centre Development, Llandarcy, Contract validation report, December 2007.
7. URS Report 44382537/BRRP0001 'D'Arcy Business Centre Closure report. March 2008.
8. URS: Factual and Interpretative: Environmental Liability Assessment 2048R/2049R September 1997.
9. URS: Phase 2 Stage 1 data report R642, August 1998.
10. URS: Phase 2 Stage 2 final data report DR785, July 1999.
11. URS: Final Data Assessment Report DR786R, August 1999.
12. URS: Remedial Action Plan (RAP) DR869r3, March 2000.
13. URS: Site Investigation Phase I area DR1140, September 2003.
14. Hydrock, Validation Report for North Site Reservoir Sludge Treatment and Embankment Construction, March 2014, R/11007/004, Issue 2 08/05/2014.
15. CIRIA, Report C665: Assessing the risks posed by Hazardous Ground Gases to Buildings, 2007

Drawings



Key

- Commercial Area Boundary
- CATP090 Trial pit location (Atkins March 2011)
- AR21 ■ INT01 } Trial pit location (Atkins 2008/09)
- DVP31 Trial pit location (Atkins 2011)
- DM4, SBH05 Borehole location (Atkins 2009)
- MSMW137 Historical boreholes
- P1TP009 Historical trial pits
- Buried concrete slab obstruction (all located between 0 & 2m bgl)
- Asbestos detected
- Free product impacted ground
- Trial pits with overwhelming odour (olfactory score : 5)

D	TITLE CHANGED	MJ	MW	14/05/14
C	COMMERCIAL AREA	JSD	SB	21/11/13
B	BOUNDARY REVISED	JSD	SB	20/10/11
A	TRIAL PIT ODOUR ADDED	JSD	SB	24/08/11
	CONCRETE AREA ADDED			

REVISIONS	Drawn By	Checked By	Date
VALIDATION REPORT FOR INFORMATION	D	MW	14/05/14
FOR INFORMATION	C	SB	21/11/13
FOR INFORMATION	B	SB	21/10/11
FOR INFORMATION	A	SB	26/08/11
			06/07/11

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CLIENT **ST.MODWEN**

PROJECT **Coed Darcy**

DRAWING TITLE **Commercial Area**

Location of Free Product, Asbestos and Buried Concrete

SCALES	DRAWN	CHECKED	CO-ORD CHECK
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1:1500	MJ	SB	
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26.04.11	26.04.11	
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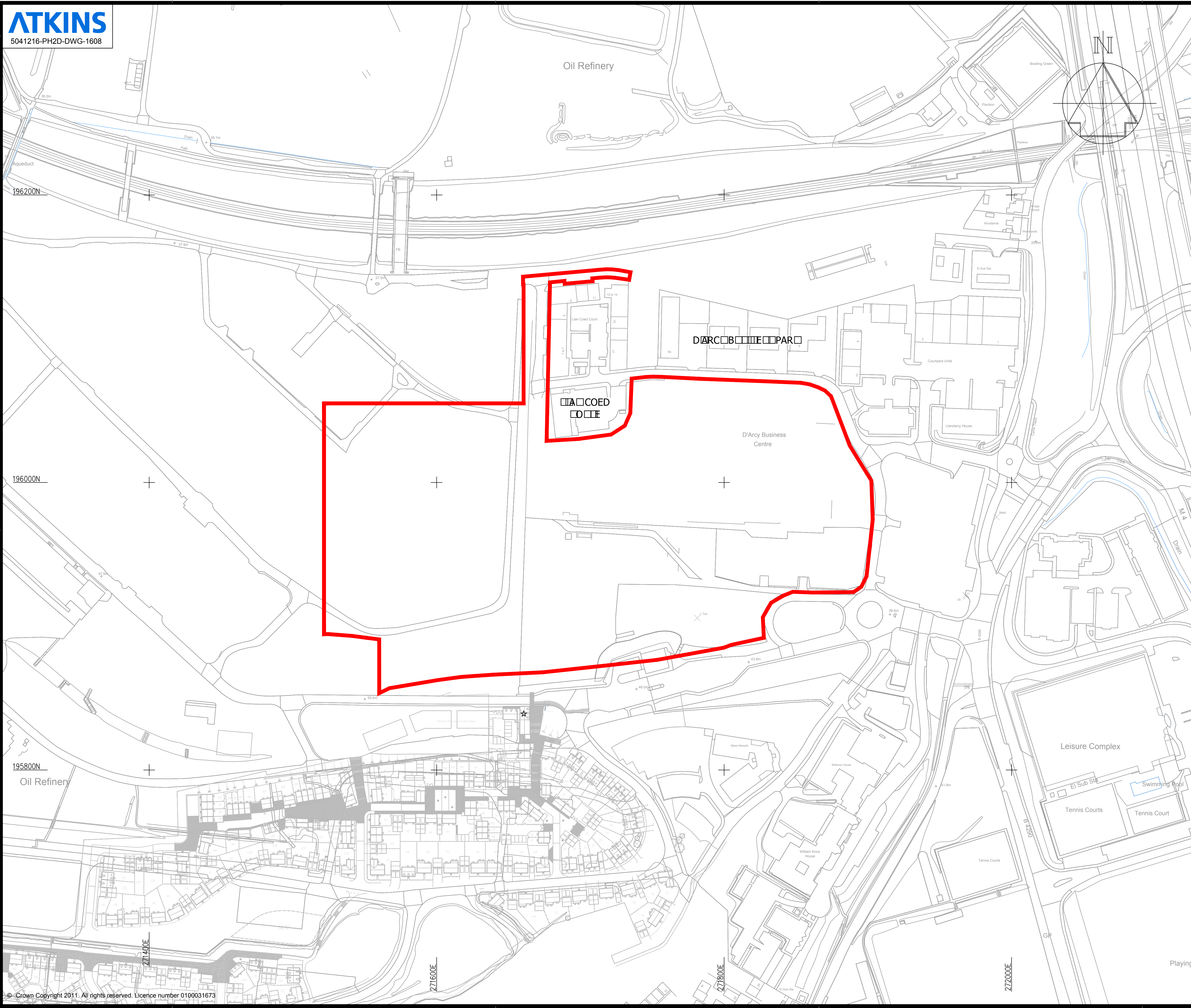
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5041216-REM-DWG-948	A3	10.07.14	D
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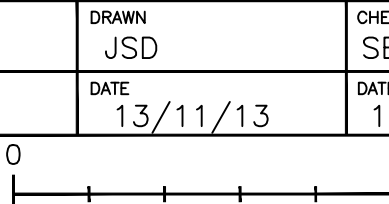


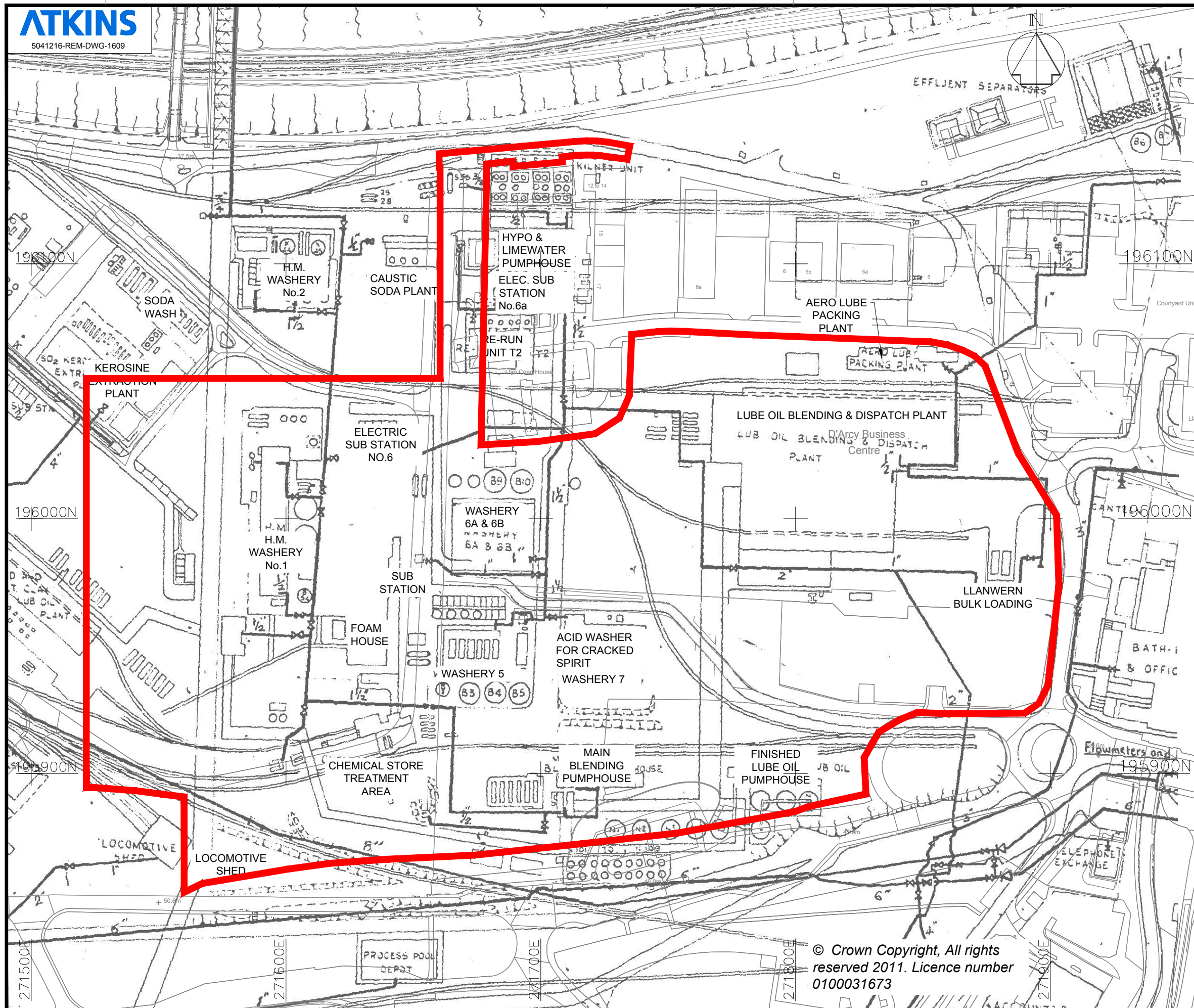
Boreholes/sump historically containing free product. Any free product or oil-saturated ground at these locations within the Commercial Area boundary was removed as part of remediation works.

DRAWING NO	5041216-REM-DWG-949	REV	D
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KEY
COMMERCIAL AREA PHASE BOUNDARY

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PROJECT				
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DRAWING TITLE				
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Scales	DRAWN JSD	CHECKED SB	CO-ORD CHECK	
1:1250	DATE 13/11/13	DATE 13/11/13	DATE	
		SHEET A1	PLOT DATE 05.08.14	
DRAWING NO			REV	
5041216-PH2D-DWG-1608			-	



NOTE

- THIS DRAWING SHOWS THE HISTORICAL SITE LAYOUT WITHIN THE PHASE BOUNDARY TAKEN FROM A SCANNED IMAGE OF NEATH WATER SERVICES DRAWING 30701/274 DATED 25TH OCTOBER 1965.

KEY

— COMMERCIAL AREA BOUNDARY

A	AREA BOUNDARY AMENDED	CK	MJW	06/05/15
REVISIONS		Drawn By	Checked By	Date

VALIDATION REPORT	A	MP	06/05/15
VALIDATION REPORT		MP	21/11/13
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CLIENT **ST.MODWEN**

PROJECT **COED DARCY URBAN VILLAGE**

DRAWING TITLE **COMMERCIAL AREA HISTORICAL SITE USE**

SCALES	DRAWN	CHECKED	CO-ORD CHECK
NTS	JSD	SB	
	DATE	DATE	DATE
	13/11/13	13/11/13	
DRAWING NO	SHEET	PLOT DATE	REV
5041216-REM-DWG-1609	A3	06.05.15	A



NOTE

- THIS DRAWING WAS BASED ON SURVEY INFORMATION PRODUCED AND PROVIDED BY HAWK 2013.

KEY

- COMMERCIAL AREA PHASE BOUNDARY
- ATKINS COMMERCIAL AREA EMBANKMENT TRIAL PITS
- ATKINS BASE OF EXCAVATION VALIDATION SAMPLES
- ATKINS CHURNGOLD AREA VALIDATION TRIAL PITS
- ATKINS COMMERCIAL AREA VALIDATION SAMPLES LOCATIONS
- ATKINS COMMERCIAL AREA VALIDATION TRIAL PITS
- ATKINS VALIDATION SAMPLE LOCATIONS 2015

A	2015 SAMPLE LOCATIONS ADDED	CK	MJW	06/05/15
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VALIDATION REPORT	-	MP	21/11/13
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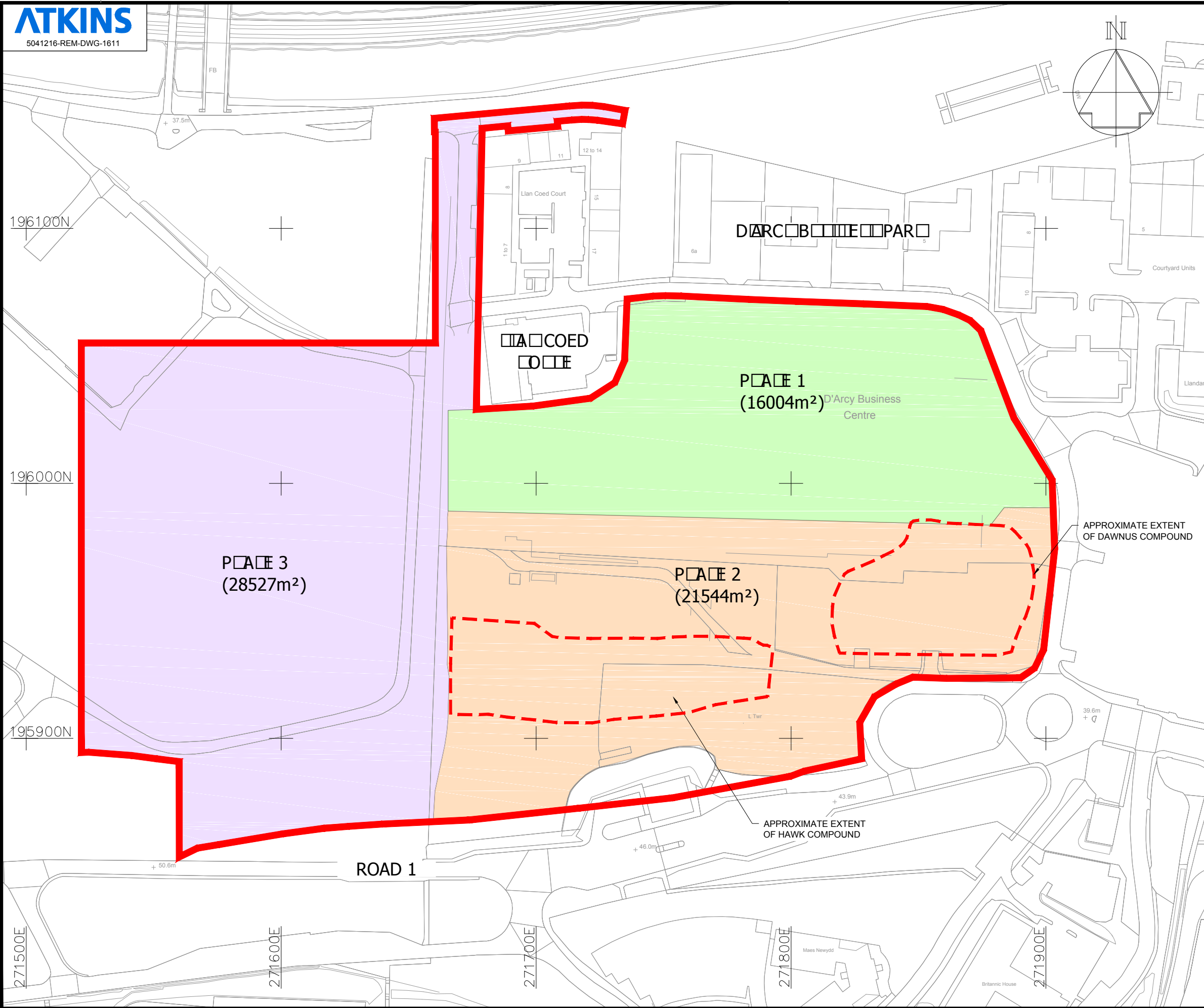
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CLIENT	ST.MODWEN
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PROJECT	COED DARCY
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DRAWING TITLE	COMMERCIAL AREA VALIDATION EXPLORATORY HOLES
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Scales	1:1000	DRAWN	JSD	CHECKED	SB	CO-ORD	CHECK
DATE	13/11/13	DATE	13/11/13	DATE			
0				SHEET	A1	PLOT DATE	14.05.15
DRAWING NO	5041216-REM-DWG-0001610	REV	A				



NOTE

1. THIS DRAWING WAS BASED ON SURVEY INFORMATION PRODUCED AND PROVIDED BY HAWK 2013.

KEY

COMMERCIAL AREA PHASE BOUNDARY

A	BOUNDARY AMENDED	CK	MJW	06/05/15
REVISIONS	Drawn By	Checked By	Date	

VALIDATION REPORT	A	MP	06/05/15
VALIDATION REPORT	-	MP	21/11/13
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PROJECT	COED DARCY
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DRAWING TITLE	COMMERCIAL AREA PHASES OF REMEDIATION
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SCALES	DRAWN	CHECKED	CO-ORD CHECK
NTS	JSD	SB	
	DATE	DATE	DATE
	13/11/13	13/11/13	
DRAWING NO	SHEET	PLOT DATE	REV
5041216-REM-DWG-1611	A3	06.05.15	A

NOTE

- THIS DRAWING WAS BASED ON SURVEY INFORMATION PROVIDED BY HAWK, FEBRUARY 2013.

KEY

COMMERCIAL AREA PHASE BOUNDARY

FILL THICKNESS

No.	ID	Start	End
1		-0.92	0.00
2		0.00	1.00
3		1.00	2.00
4		2.00	3.00
5		3.00	4.00
6		4.00	4.61

PHASE 1

D'Arcy Business Centre

PHASE 2

PHASE 3

REVISIONS

Rev.	Authorised for issue	Date
-	MP	21/11/13

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PROJECT

COED DARCY

DRAWING TITLE

COMMERCIAL AREA - ISOPACHYTE
BASE OF REMEDIATION EXCAVATION
TO FINAL LEVELS - PHASE 2

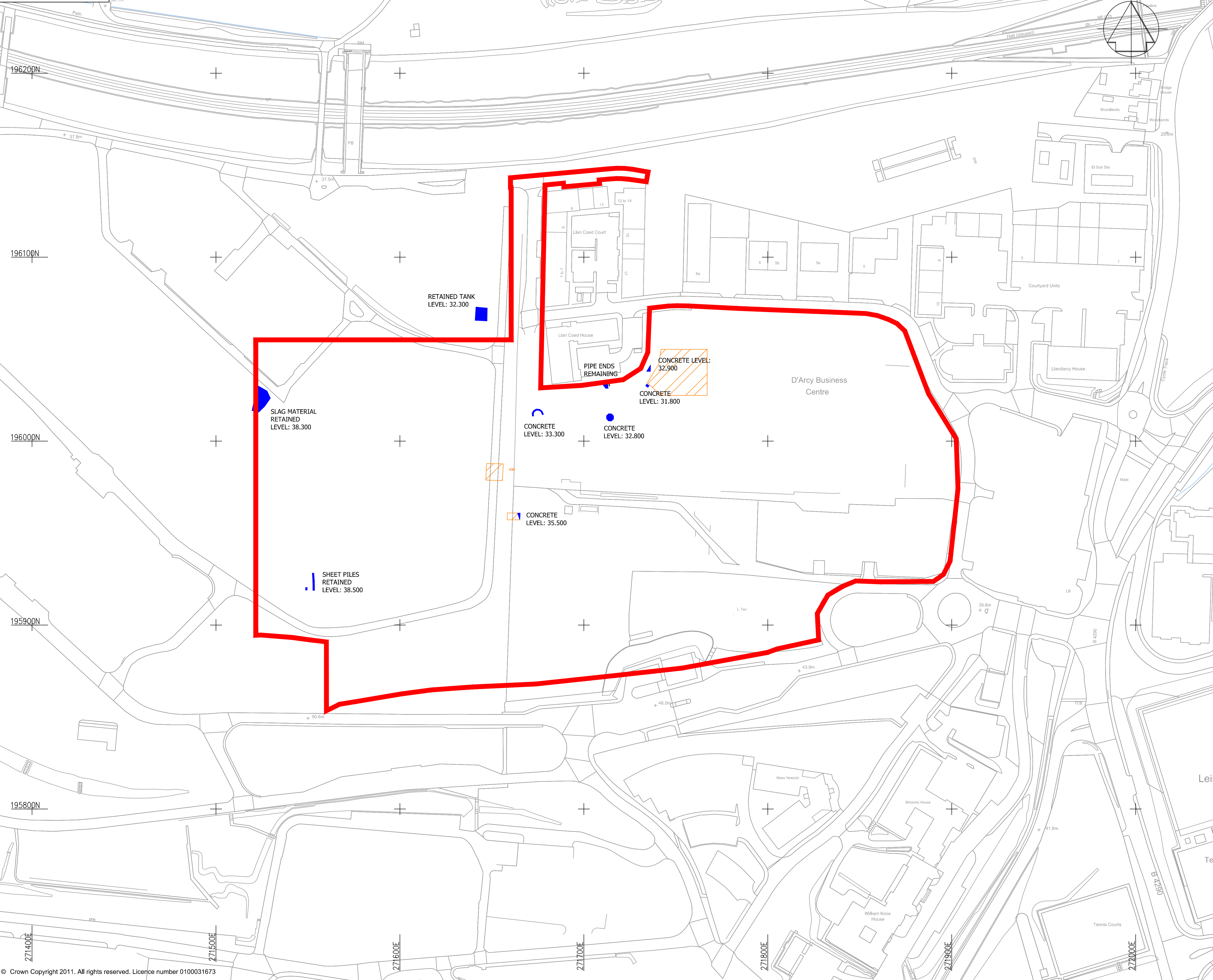
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SHEET A3 PLOT DATE 10.07.14

DRAWING NO 5041216-REM-DWG-1612 REV -



NOTE

1. THIS DRAWING WAS BASED ON SURVEY INFORMATION PRODUCED AND PROVIDED BY HAWK 2013.

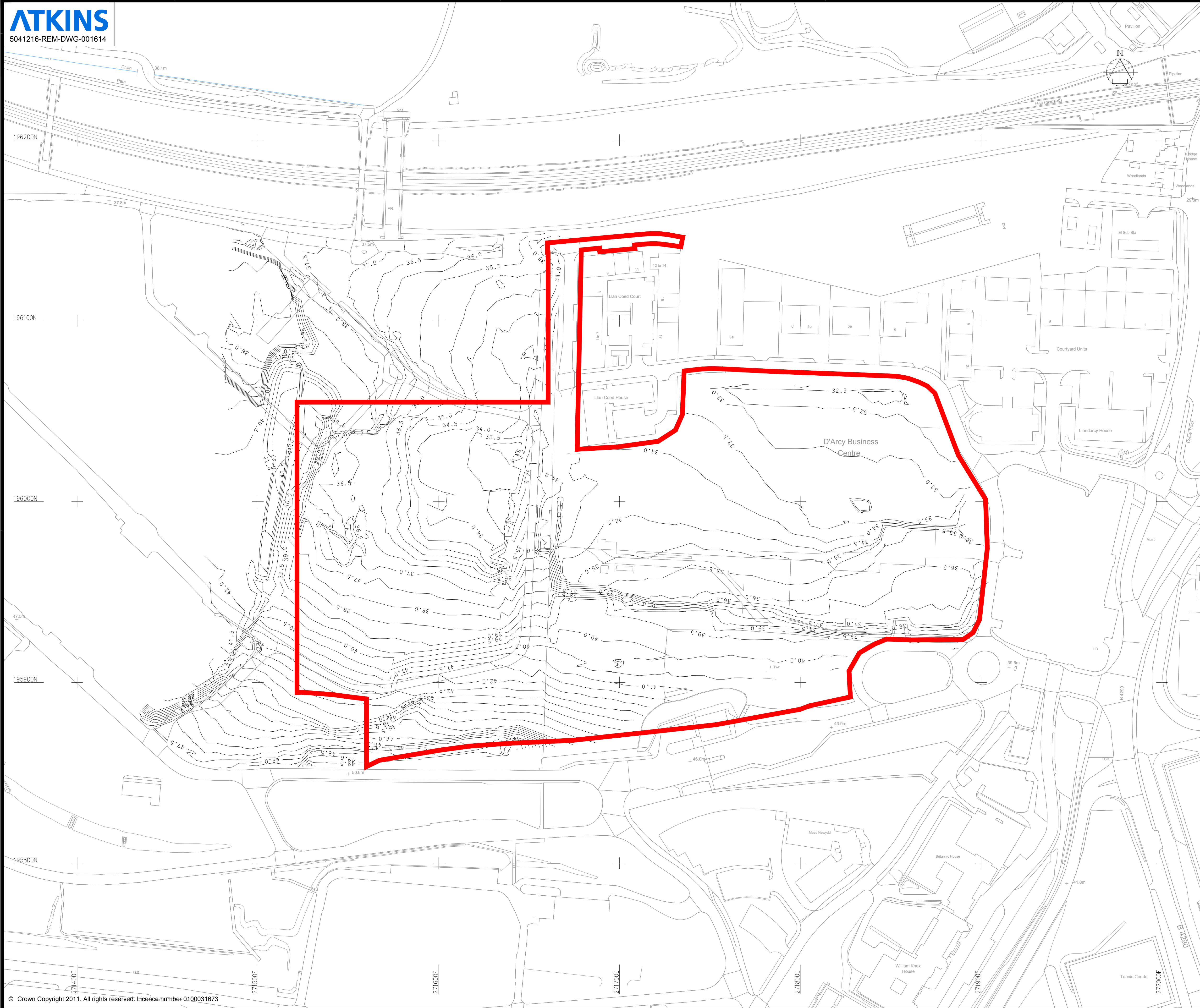
KEY

COMMERCIAL AREA PHASE BOUNDARY

APPROXIMATE EXTENT OF CONCRETE/STRUCTURES REMAINING

SURVEYED EXTENT OF CONCRETE/STRUCTURES REMAINING

REVISIONS	Drawn By	Checked By	Date
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PROJECT COED DARCY			
DRAWING TITLE COMMERCIAL AREA SITE CONSTRAINTS			
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DATE 13/11/13	DATE 13/11/13	DATE	DATE
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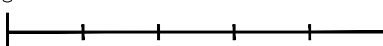


NOTE

1. THIS DRAWING WAS BASED ON SURVEY INFORMATION PRODUCED AND PROVIDED BY HAWK 2013.
2. AS BUILT LEVELS AS OF FEBRUARY 2013. PRIOR TO CONSTRUCTION OF THE EMBANKMENT AND UPFILLING WORKS.

KEY

COMMERCIAL AREA PHASE BOUNDARY

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PROJECT				
COED DARCY				
DRAWING TITLE				
COMMERCIAL AREA AS BUILT (FEBRUARY 2013)				
Scales	DRAWN	CHECKED	CO-ORD CHECK	
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	13/11/13	13/11/13		
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		A1	05.08.14	
DRAWING NO			REV	
5041216-REM-DWG-001614			-	

196100N

196000N

195900N

195800N

FB

+ 37.5m

1615-A

HOTSPOT A

1615-B

HOTSPOT I

HOTSPOT J

1615-D

HOTSPOT H

1615-C

HOTSPOT C

HOTSPOT B

1615-E

HOTSPOT G

1615-E

HOTSPOT F

1615-F

HOTSPOT E

Llan Coed Court

Llan Coed House

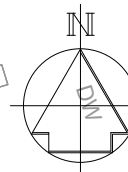
D'Arcy Business
Centre

L Twr

+ 43.9m

+ 46.0m

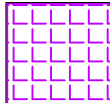
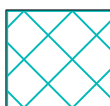
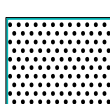
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NOTE

1. THIS DRAWING WAS BASED ON SURVEY INFORMATION PRODUCED AND PROVIDED BY HAWK 2013.

KEY

-  COMMERCIAL AREA PHASE BOUNDARY
-  ASBESTOS HOTSPOT REMOVAL
-  LEAD HOTSPOT REMOVAL
-  BENZENE HOTSPOT REMOVAL
-  VINYL CHLORIDE REMOVAL

A AREA CHANGES CK MJW 06/05/15

REVISIONS Drawn By Checked By Date

VALIDATION REPORT A MP 06/05/15

VALIDATION REPORT - MP 21/11/13

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PROJECT

COED DARCY

DRAWING TITLE

COMMERCIAL AREA VALIDATION HOTSPOT REMOVALS
SUMMARY SHEET

Scales DRAWN JSD CHECKED SB CO-ORD CHECK

DATE 13/11/13 DATE 13/11/13 DATE

0 SHEET A1 PLOT DATE 06.05.15

DRAWING NO 5041216-REM-DWG-001615 REV A



NOTE

1. THIS DRAWING WAS BASED ON SURVEY INFORMATION PRODUCED AND PROVIDED BY HAWK 2013.

KEY

- COMMERCIAL AREA PHASE BOUNDARY
- ASBESTOS HOTSPOT REMOVAL
- HOTSPOT VALIDATION SAMPLE LOCATION
- INITIAL ASBESTOS HOTSPOT

A	LABELS AMENDED	CK	MJW	06/05/15
REVISIONS		Drawn By	Checked By	Date

VALIDATION REPORT	A	MP	06/05/15
VALIDATION REPORT	-	MP	21/11/13
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ST.MODWEN

PROJECT

COED DARCY

DRAWING TITLE

**COMMERCIAL AREA VALIDATION
HOTSPOT A**

Scales	DRAWN JSD	CHECKED SB	CO-ORD CHECK
1:100	DATE 13/11/13	DATE 13/11/13	DATE
0	SHEET A1	PLOT DATE 06.05.15	
DRAWING NO	5041216-REM-DWG-001615A		REV A

196030N

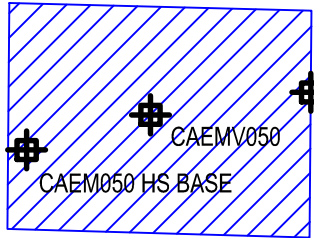
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196010N

196000N

195990N

PO



271570E

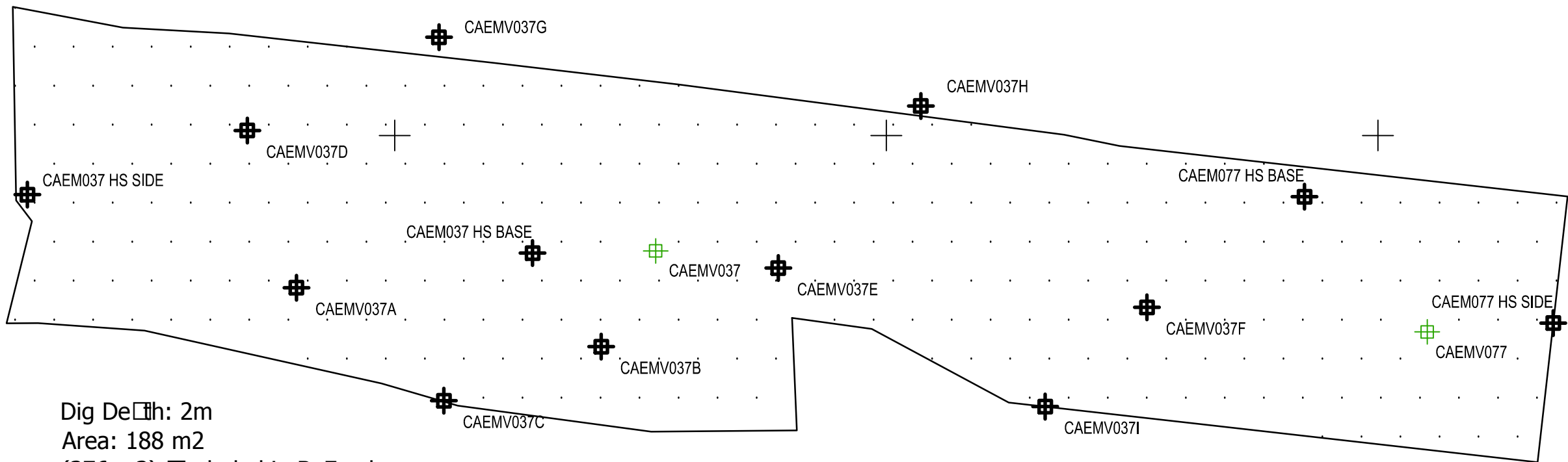
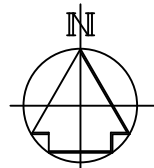
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271600E

271610E

271620E

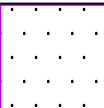


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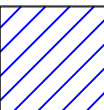
NOTE

1. THIS DRAWING WAS BASED ON SURVEY INFORMATION PRODUCED AND PROVIDED BY HAWK 2013.

KEY



BENZENE HOTSPOT REMOVAL



VINYL CHLORIDE REMOVAL



HOTSPOT VALIDATION SAMPLE LOCATION



INITIAL BENZENE HOTSPOT

A	LABELS AMENDED	CK	MJW	06/05/15
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REVISIONS	Drawn By	Checked By	Date
VALIDATION REPORT VALIDATION REPORT	A	MP MP	05/06/15 21/11/13
PURPOSE OF ISSUE	Rev.	Authorised for issue	Date

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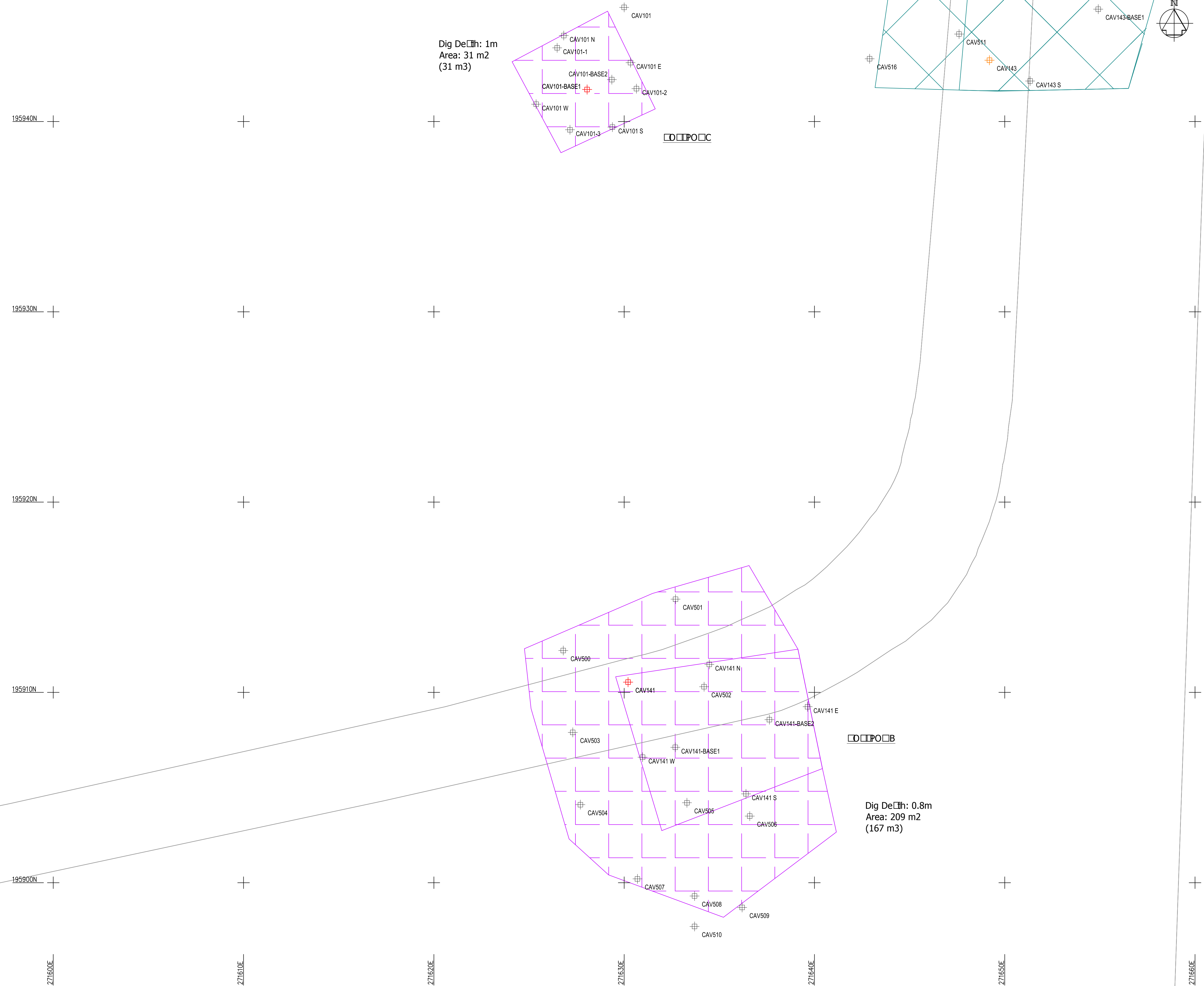
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CLIENT	ST.MODWEN
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PROJECT	COED DARCY
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DRAWING TITLE	COMMERCIAL AREA VALIDATION HOTSPOTS I AND J
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Scales	DRAWN JSD	CHECKED SB	CO-ORD CHECK
	DATE 13/11/13	DATE 13/11/13	DATE
0	SHEET A1	PLOT DATE 06.05.15	
DRAWING NO	5041216-REM-DWG-001615B	REV	A



NOTE

1. THIS DRAWING WAS BASED ON SURVEY INFORMATION PRODUCED AND PROVIDED BY HAWK 2013.

KEY



A	LABELS AMENDED	CK	MJW	06/05/15
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REVISIONS	Drawn By	Checked By	Date
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VALIDATION REPORT VALIDATION REPORT	A -	MP MP	06/05/15 21/11/13
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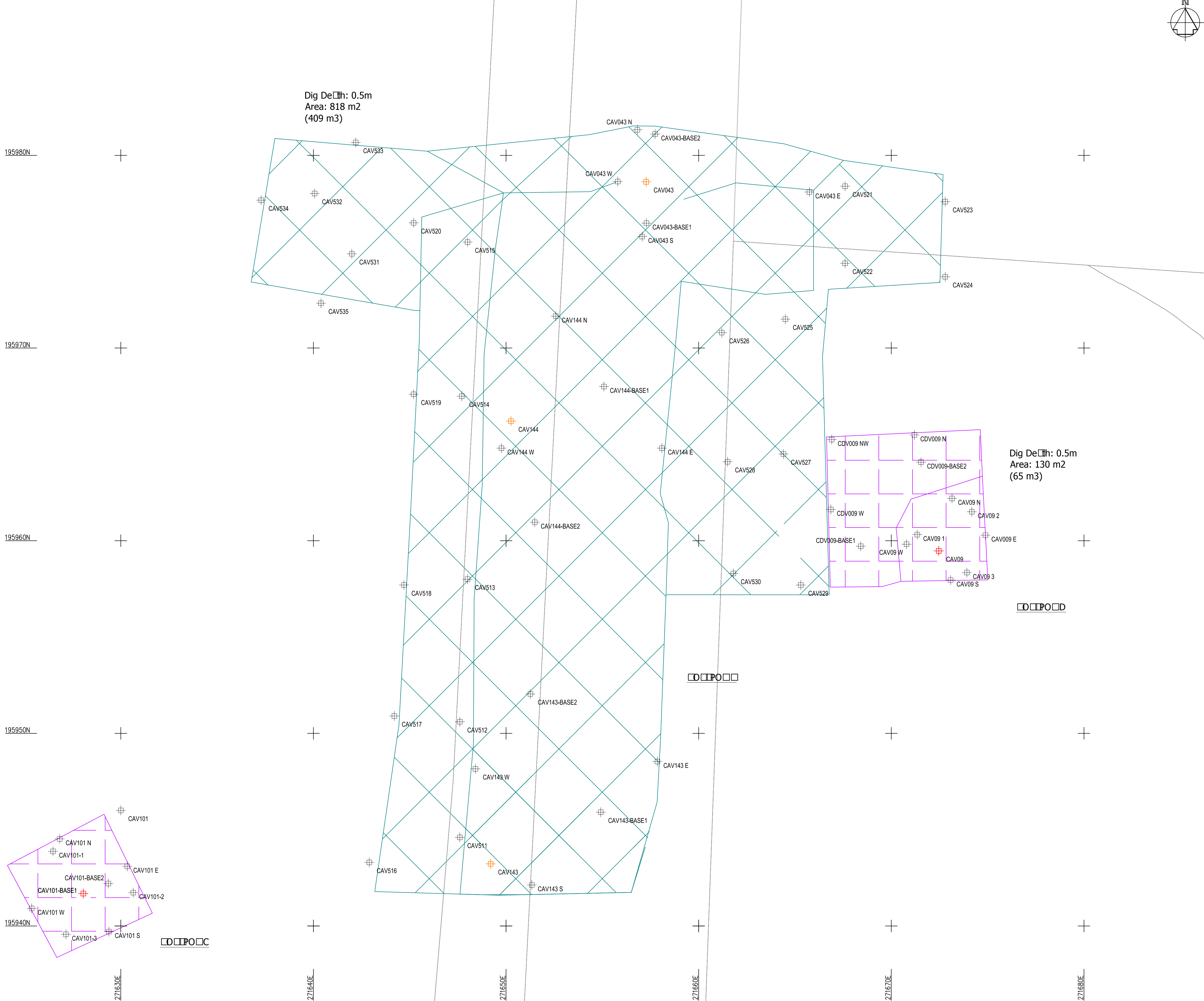
PROJECT	
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COED DARCY

DRAWING TITLE

DRAWING TITLE
COMMERCIAL AREA VALIDATION HOTSPOTS B AND C

Scales 1:100	DRAWN JSD	CHECKED SB	CO-ORD CHECK
	DATE 13/11/13	DATE 13/11/13	DATE
		SHEET A 1	PLOT DATE 06.05.15
DRAWING NO 5041216-REM-DWG-001615C			REV A



NOTE

1. THIS DRAWING WAS BASED ON SURVEY INFORMATION PRODUCED AND PROVIDED BY HAWK 2013.

KEY

- COMMERCIAL AREA PHASE BOUNDARY
- ASBESTOS HOTSPOT REMOVAL
- LEAD HOTSPOT REMOVAL
- HOTSPOT VALIDATION SAMPLE LOCATION
- INITIAL ASBESTOS HOTSPOT
- INITIAL LEAD HOTSPOT

A	LABELS AND AREA AMENDED	CK	MJW	06/05/15
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REVISIONS	Drawn By	Checked By	Date
VALIDATION REPORT	A	MP	06/05/15
VALIDATION REPORT	-	MP	21/11/13
PURPOSE OF ISSUE	Rev.	Authorised for issue	Date

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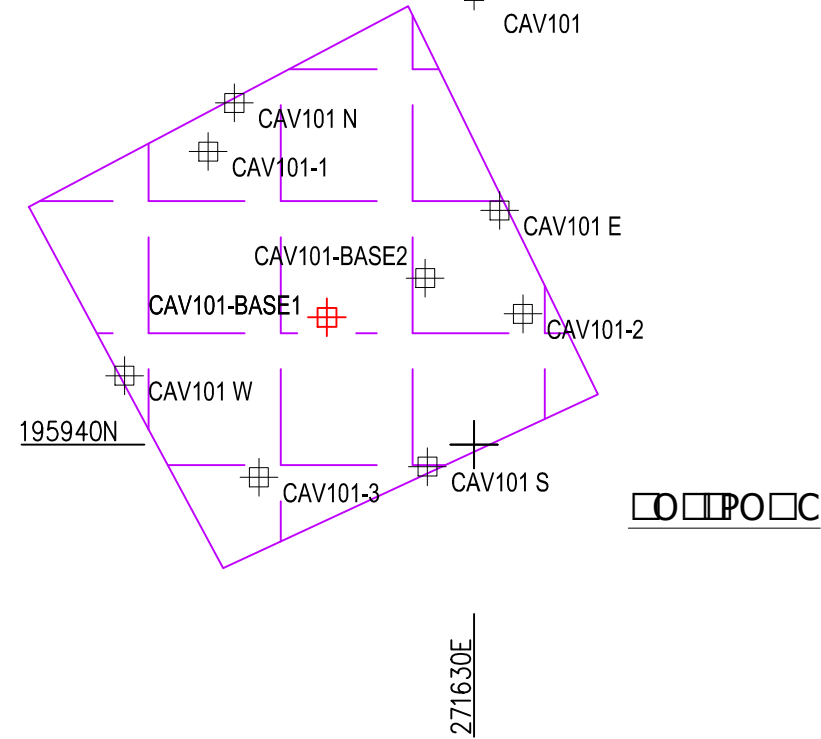
PROJECT

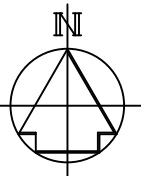
COED DARCY

DRAWING TITLE

COMMERCIAL AREA VALIDATION HOTSPOTS D AND H

Scales	DRAWN JSD	CHECKED SB	CO-ORD CHECK
1:100	DATE 13/11/13	DATE 13/11/13	DATE
0	SHEET A1	PLOT DATE 06.05.15	REV
DRAWING NO	5041216-REM-DWG-001615D		A

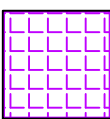




NOTE

1. THIS DRAWING WAS BASED ON SURVEY INFORMATION PRODUCED AND PROVIDED BY HAWK 2013.

KEY



ASBESTOS HOTSPOT REMOVAL



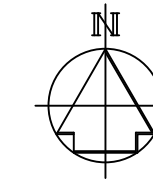
HOTSPOT VALIDATION SAMPLE LOCATION



INITIAL ASBESTOS HOTSPOT



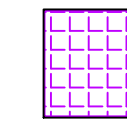
A	SAMPLING LOCATIONS ADDED	CK	MJW	06/05/15
REVISIONS		Drawn By	Checked By	Date
VALIDATION REPORT		A	MP	06/05/15
VALIDATION REPORT		-	MP	21/11/13
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PROJECT COED DARCY				
DRAWING TITLE COMMERCIAL AREA VALIDATION HOTSPOTS F AND G				
Scales	DRAWN	CHECKED	CO-ORD CHECK	
1:100	JSD	SB		
	DATE	DATE	DATE	
	13/11/13	13/11/13		
0			SHEET	PLOT DATE
			A1	06.05.15
DRAWING NO				REV
5041216-REM-DWG-001615E				A



NOTE

1. THIS DRAWING WAS BASED ON SURVEY INFORMATION PRODUCED AND PROVIDED BY HAWK 2013.

KEY



ASBESTOS HOTSPOT REMOVAL



HOTSPOT VALIDATION SAMPLE LOCATION



INITIAL ASBESTOS HOTSPOT

Dig Depth: 0.5m
Area: 206 m²
(103 m³)

COOPE

CAV34 N

CAV34-2

CAV34 W

CAV034

CAV34 E

CAV34-1

CAV34-3

CAV34 :

CAV034 N

CAV034-BASE2

CAV034 E

CAV034 W

CAV034-BASE1

CAV034 S

A	LABELS AMENDED	CK	MJW	06/05/15
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REVISIONS	Drawn By	Checked By	Date
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VALIDATION REPORT	A	MP	06/05/15
VALIDATION REPORT	-	MP	21/11/13

PURPOSE OF ISSUE	Rev.	Authorised for issue	Date
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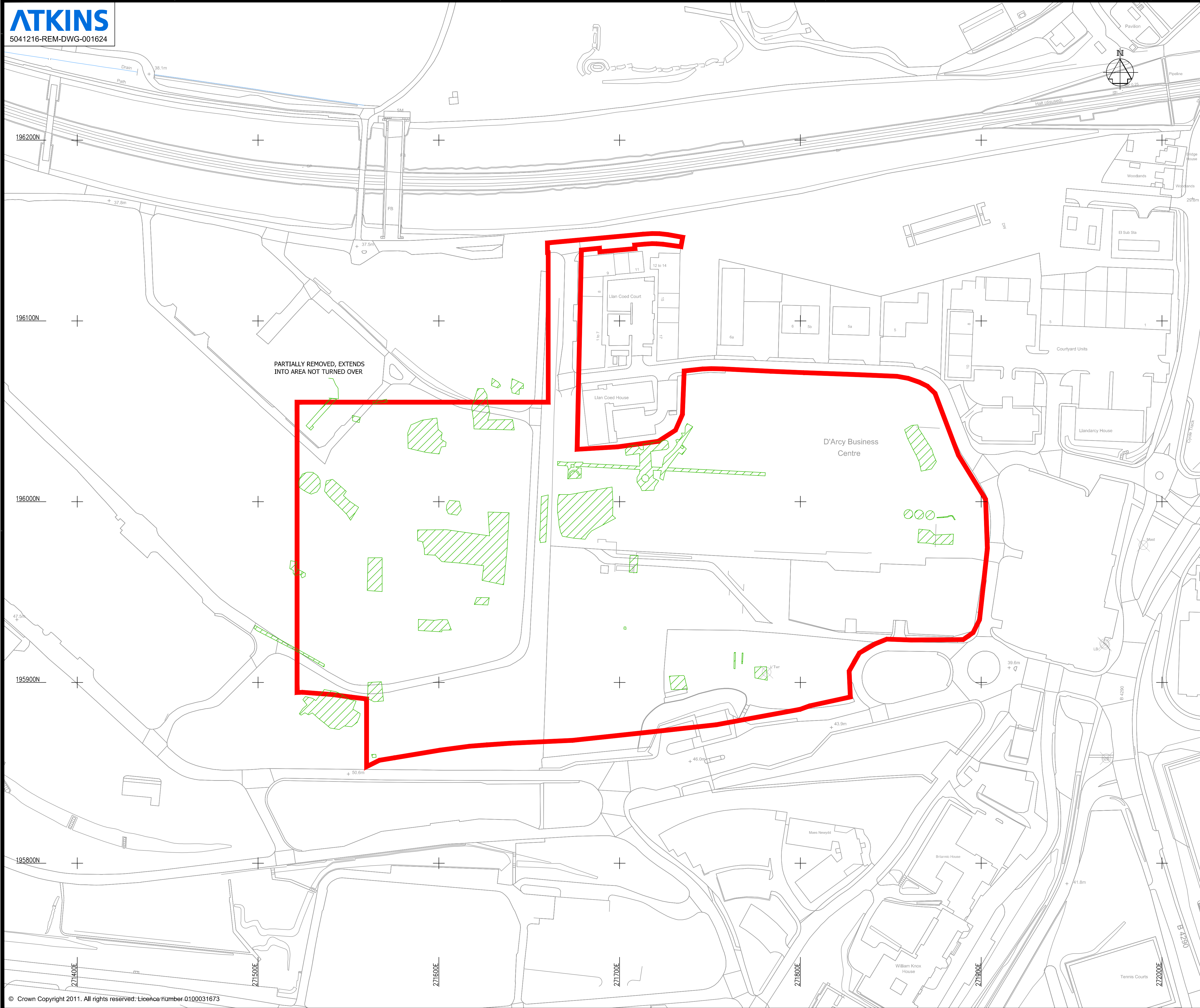
DRAWING TITLE	COMMERCIAL AREA VALIDATION HOTSPOT E
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Scales	DRAWN	CHECKED	CO-ORD CHECK
1:50	JSD	SB	

DATE	DATE	DATE	DATE
13/11/13	13/11/13		

0	SHEET A1	PLOT DATE 06.05.15
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DRAWING NO	REV
5041216-REM-DWG-001615F	A



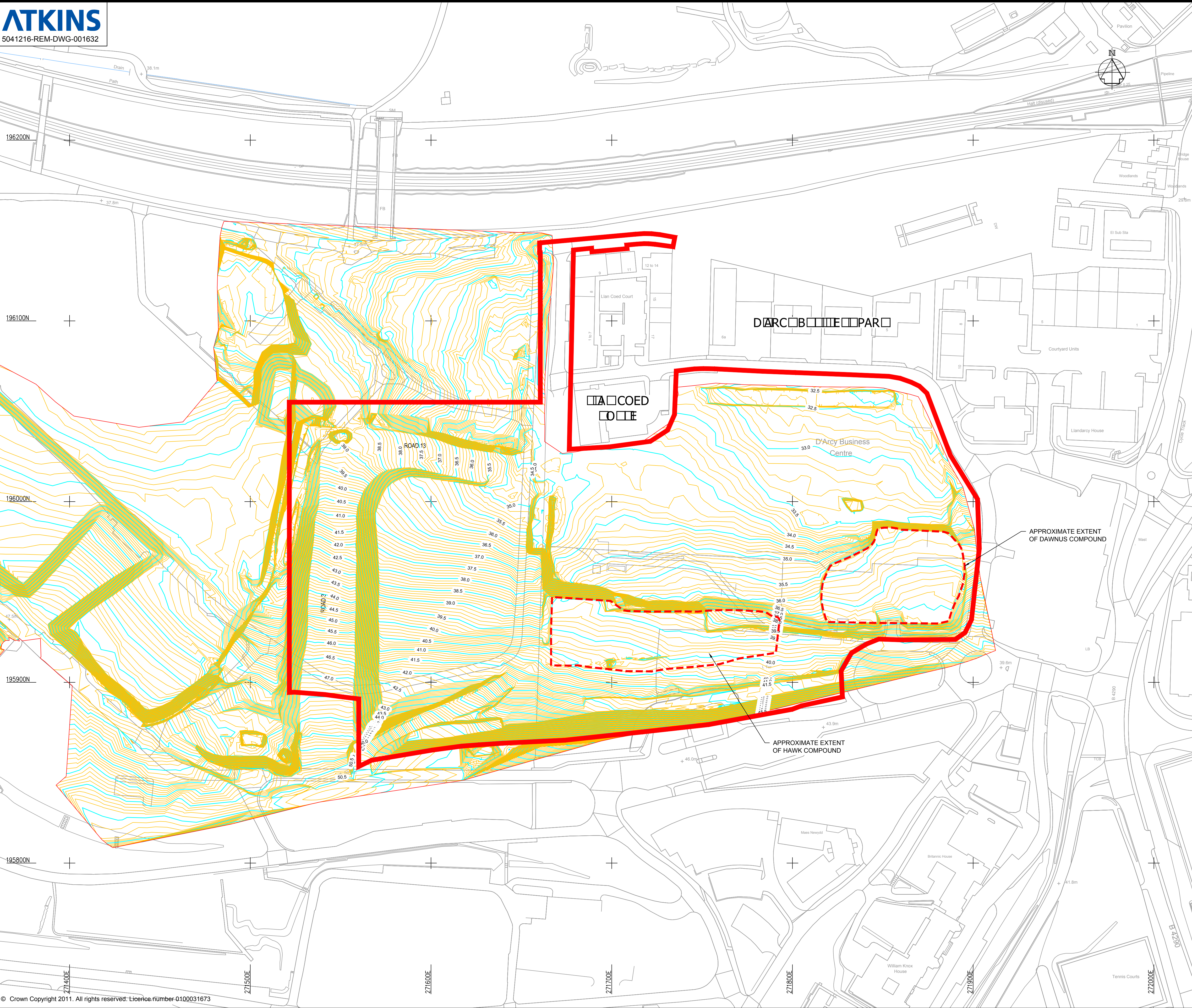
NOTE

1. THIS DRAWING WAS BASED ON SURVEY INFORMATION PRODUCED AND PROVIDED BY HAWK 2013.
2. PLEASE NOTE. CONCRETE AND PIPEWORK REMOVED AS PART OF PHASE 2 WERE ONLY PARTLY SURVEYED IN DURING THE LATTER STAGES OF THE RECLAMATION.

KEY

- COMMERCIAL AREA PHASE BOUNDARY
- AREAS OF STRUCTURES OR PIPEWORK REMOVED.

REVISIONS	Drawn By	Checked By	Date
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PROJECT COED DARCY			
DRAWING TITLE COMMERCIAL AREA STRUCTURES/ PIPEWORK REMOVAL			
Scales	DRAWN	CHECKED	CO-ORD CHECK
1:1000	JSD	SB	
	DATE	DATE	DATE
	13/11/13	13/11/13	
0		SHEET	PLOT DATE
+ + + + +		A1	10.07.14
DRAWING NO			REV
5041216-REM-DWG-001624			-



- NOTE
- THIS DRAWING WAS BASED ON SURVEY INFORMATION PRODUCED AND PROVIDED BY HAWK 2013.
 - AS BUILT LEVELS AS OF SEPTEMBER 2013. PRIOR TO CONSTRUCTION OF THE EMBANKMENT AND UPFILLING WORKS.

KEY

COMMERCIAL AREA PHASE BOUNDARY

A	BOUNDARY AMENDED	CK	MJW	06/05/15
REVISIONS		Drawn By	Checked By	Date
VALIDATION REPORT		A	MP	06/05/15
VALIDATION REPORT		-	MP	21/11/13
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CLIENT				
 ST.MODWEN				
PROJECT				
COED DARCY				
DRAWING TITLE				
COMMERCIAL AREA AS BUILT (SEPTEMBER 2013)				
Scales		DRAWN	CHECKED	CO-ORD CHECK
1:1000		JSD	SB	
DATE		DATE	DATE	
13/11/13		13/11/13		
0			SHEET	PLOT DATE
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DRAWING NO				REV
5041216-REM-DWG-001632				A