

Identity Code BG

1	Trial Pit Records
2	Infiltration Test Results
3	Laboratory Testing (Geotechnical)
4	Laboratory Testing (Environmental)
5	Site Plan

Appendices

1.0	Introduction
2.0	Fieldwork
3.0	Laboratory Testing (Geotechnical)
4.0	Laboratory Testing (Environmental)
5.0	Discussion

Contents

Report on a Site Investigation
 For
 Energy Park Derryclure
 On behalf of
 Project Management

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Report on a Site Investigation
For
Energy Park Derryclure
On behalf of
Project Management

Date March 2010

Report No. 14655

1.0 Introduction

The site for the proposed energy park is located on the eastern side of the N80 between Killleigh and Tullamore, as shown on the enclosed location plan.

An investigation of ground conditions was carried out to ascertain foundation requirements for the proposed structures and pavements. In addition, infiltration tests were performed to assess the suitability of the sub-soils for the dispersion of stormwater.

The fieldwork also included the recovery of a soil sample for environmental testing, and the recovery of water samples from two ditches for similar purposes.

This report describes the fieldworks and, from the information obtained, discusses the implications of the findings.

2.1 Fieldwork

2.1 Trial Pits

Trial pits were excavated in four locations as shown on the site plan enclosed in Appendix 5. The descriptions and depths of the various soils encountered are shown on the trial pit records enclosed in Appendix 1. Also shown on these records are the depths at which samples were recovered and the groundwater conditions observed during the course of excavation operations.

Trial pits TP1, TP2 and TP3 encountered a layer of mottled brown/grey sandy gravely clay directly underlying the topsoil. This material was in a firm condition and was present to depths ranging from 800 mm in TP3 to 1.8 metres at TP1. Underlying this stratum was soft to very soft grey sandy gravely clay with many sub-angular cobbles. The pits were terminated in this material at the scheduled three metre depth.

Towards the southern boundary TP4 showed a marked change in ground conditions, with grey sand to a depth of 2.4 metres where an obstruction was encountered and the pit became unstable.

While a slow ingress of water was noted at 2.5 metres in TP1, the other pits remained dry. However, all of the pits became unstable.

2.2 Infiltration Tests

Infiltration tests were performed in two locations, shown as SA1 and SA2 on the site plan. Tests were performed in accordance with BRE Digest 365 'Soakaway Design'.

To obtain a measure of the infiltration rate of the sub-soils, water is poured into the test pit, and records taken of the fall in water level against time. This procedure is repeated twice more to ensure saturation of the sub-soils. The infiltration rate is the volume of water dispersed per unit exposed area per unit of time, and is generally expressed as metres/minute or metres/second. Designs are based on the slowest infiltration rate, which is generally calculated from the final cycle.

In both tests, very low infiltration rates were recorded, with no movement from depths of 0.87 metres and 1.02 metres at SA1 and SA2 respectively.

3.0 Laboratory Testing (geotechnical)

Samples were recovered from a depth of 500mm in a total of six locations and CBR tests were performed in accordance with test No.7 of BS 1377: Part 4: 1990.

The specification describes six methods of specimen preparation, for this project, specimens were prepared to densities equal to those achieved in the 2.5 kg compaction test, at the 'as sampled' water content values.

To minimise disturbance, specimens were prepared in accordance with clause 7.2.3.3 Method 2. This entails compressing the soil into the test mould in three equal layers using a hydraulic ram.

Specimens of the mottled clay recorded CBR values ranging from 2.2% to 8.1%. Black fibrous peat was encountered at location CBR3 and the specimen of this material recorded a CBR value of 0.1%. An additional test, CBR6 was performed in this area to obtain information on the sub-soil underlying the peat.

4.0 Laboratory Testing (Environmental)

4.1 Soil

A sample of sub-soil was recovered for environmental testing purposes. The sample location is shown as MSET on the site plan.

Landfill acceptability testing was carried out to determine whether or not the material on site would be accepted as inert material by an Irish landfill.

The samples underwent a series of analyses in accordance with the Murphy Suite, which is a programme of analyses adopted when specifying the waste acceptance criteria for inert landfills in Ireland. The limits are based on the European Directive 2002/33/EC.

Included in these test suites are Diesel Range Organics (DRO), Mineral Oil, BTEX, PCB and Total Organic Carbon (TOC) carried out on dry soil samples. Also included are leachate analyses, whereby leachate is generated in accordance with CEN 10:1 specification and this is tested for the presence of recognised contaminants including heavy metals, Dissolved Organic Carbon (DOC) and Total Dissolved Solids (TDS).

4.2 Groundwater

Samples of water were recovered from two ditches, as shown on the site plan. As specified, these samples were tested for Arsenic, Cadmium, Chromium, Lead, Mercury, Chloride, Ammonium, Sulphates, PAH (16), BTEX, PCBs, and TPH CWG.

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5.0 Discussion

5.1 Geotechnical

The trial pits revealed a mantle of mottled sandy gravelly clay, which is in a firm condition. This is the weathered horizon of the main body of the glacial drift deposits, which appeared to be in a soft or very soft condition. However, due to the sensitivity of these deposits it is difficult, without in-situ testing, to establish accurately the true in-situ condition. The pits also revealed a transition to sand in one location, possibly a post-glacial melt-water channel. There is also evidence of surface peat in places, although it appears to be of limited thickness. From the aspect of structural foundations, it would be advisable to attain the bearing capacity of the sub-soils using boreholes or dynamic probing techniques.

Over much of the site the CBR values from the upper mottled clay were above 2.5%, and sub-base requirements can be obtained from the Design Guidance for Pavement Foundations (Draft HD25), Revision 1, 2009. Towards the south-western corner it will be necessary to strip the peat and some of the organic soil at the interface between the peat and the mottled clay.

5.2 Stormwater

The results of the field tests indicate very slow infiltration rates. In addition, infiltration ceased at shallow depths, indicative of a high water table. Since soakaways will not operate in these conditions, it will be necessary to discharge run-off water to an existing surface water system, using attenuation techniques to regulate the flow.

5.3 Environmental

5.3.1 Soil Analysis

A sub-soil sample underwent a series of analyses in accordance with the "Murphy Suite", which is a programme of analyses adopted by Murphy Landfills when specifying the waste acceptance criteria of their inert landfills. The limits are based on the European Directive 2002/33/EC.

Apart from a high TOC (total organic carbon) content and a slightly elevated Molybdenum value, the results are lower than the Murphy Environmental Landfill limits (MELL). The high TOC is probably related to the vegetation content of the test specimen. While the Molybdenum value was slightly high in the test specimen, the MELL is estimated from average values over the site area. Further testing would, therefore, be advantageous in determining the average value.

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5.3.2 Groundwater

The results of the scheduled tests on groundwater were compared with the Interim Guideline Values (IGV's) listed in Table 3.1 of the EPA interim report "Towards Setting Guideline Values for the Protection of Groundwater in Ireland".

The measured values are generally lower than the interim guideline values. However, the table does not give an IGV for Ammoniacal Nitrogen as N.

Ammoniacal Nitrogen comprises both Ammonia (NH₃) and Ammonium (NH₄). Depending on the pH of the specimen, the proportion of Ammonia and Ammonium can vary.

Therefore, if the concentration of Ammoniacal Nitrogen falls below the IGV for either Ammonia or Ammonium, the individual constituents must also be below the IGV.

The published EPA IGV of 0.15 mg/kg was exceeded at Ditch 1, where Ammoniacal Nitrogen was detected at a level of 0.78 mg/kg. It is noted that this value compares with the EC Drinking Water Regulations 2007 Parametric Value of 0.30 mg/l for Ammonium. The EC *Quality of Surface Waters intended for Abstraction as Drinking Water Regulations 1989* also permit Ammonium levels of 1.5 and 4.0 mg/l for Water Classes A2 and A3 respectively. Water Classes are assigned in respect of the degree of treatment required to convert surface water to water of drinkable quality.

Depending on the intended use of the ditch water, the level of Ammoniacal Nitrogen may therefore be acceptable in the long term. Consultation with the EPA in this regard would be advisable.

**Disposal of Excavated Material
Murphy Environmental Suite**



Note: MELL = Murphy Environmental Landfill Limit
* Total Pollutant Content

Parameter	MELL mg/kg dry substance
Arsenic (as As)	0.5
Barium (as Ba)	20.0
Cadmium (as Cd)	0.04
Total Chromium (as Cr)	0.5
Copper (as Cu)	2.0
Mercury (as Hg)	0.01
Molybdenum (as Mo)	0.5
Nickel (as Ni)	0.4
Lead (as Pb)	0.5
Antimony (as Sb)	0.06
Selenium (as Se)	0.1
Zinc (as Zn)	4.0
Chloride	800.0
Fluoride	10.0
Sulphate	1000.0
Phenol index	1.0
DOC (dissolved Organic Carbon)	500.0
TDS (Total Dissolved Solids)	4000.0
TOC (Total Organic Carbon)	30000 (3%)*
BTEX	6.0
PCB (7 congeners)	1.0
Mineral Oil (C10-C40)	500.0
PAH17	100.0

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Appendix 1 Trial Pit Records



TRIAL PIT RECORD

REPORT NUMBER
14655

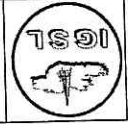
CONTRACT Deryclure Energy Park		LOGGED BY I. Reder		CLIENT ENGINEER PM Group	
TRIAL PIT NO. TP1		CO-ORDINATES () 235,074.00 E 220,205.00 N		GROUND LEVEL (m)	
SHEET Sheet 1 of 1		DATE STARTED 10/03/2010		EXCAVATION METHOD Mini Digger	
DATE COMPLETED 10/03/2010		METHOD			

Hand Penetrometer (KPa)	Vane Test (KPa)	Depth	Type	Sample Ref	Water Strike	Elevation	Depth (m)	Legend	Geotechnical Description	
									Legend	Geotechnical Description
		0.00-0.40					0.40		Firm, brown/grey, very sandy gravelly CLAY with occasional cobbles (possible clayey sand)	0.00
		1.00-1.00	B	AH3849					Soft, grey, very sandy slightly gravelly CLAY with many subangular cobbles	2.00
		2.00-2.00	B	AH3850	(Slow)		2.30		Very soft, grey, very sandy CLAY with some gravel and many subangular cobbles	3.00
		3.00-3.00	B	AH3851			3.00		End of Trial Pit at 3.00m	3.00

Groundwater Conditions Slow water flow at 2.5m	Stability TP unstable from 2.3m (collapsed)
General Remarks	

IGSL TP LOG 14655.GPJ IGSL.GDT 10/3/10

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TRIAL PIT RECORD

14655

REPORT NUMBER

CONTRACT Deryclure Energy Park

TRIAL PIT NO. TP2
SHEET 1 of 1

CO-ORDINATES () 235,216.00 E
220,208.00 N

DATE STARTED 10/03/2010
DATE COMPLETED 10/03/2010

EXCAVATION METHOD Mini Digger

CLIENT PM Group
ENGINEER

LOGGED BY I.Reder

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL		0.30							
Soft, dark brown, clayey PEAT		0.50							
Firm, brownish grey, very sandy gravelly CLAY with some subangular cobbles		1.40			AH3860	B	1.00-1.00		
Very soft, grey, sandy very gravelly CLAY with many subangular cobbles		3.00			AH3861	B	2.00-2.00		
End of Trial Pit at 3.00m		3.00			AH3862	B	3.00-3.00		

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Groundwater Conditions
No water flow observed

Stability
TP very unstable

General Remarks



TRIAL PIT RECORD

REPORT NUMBER
14655

CONTRACT Denvy Energy Park LOGGED BY I. Reider CLIENT PM Group ENGINEER	
CO-ORDINATES () 235,309.00 E 2,202,018.00 N GROUND LEVEL (m)	TRIAL PIT NO. TP3 DATE STARTED 10/03/2010 DATE COMPLETED 10/03/2010 EXCAVATION METHOD Mini Digger SHEET Sheet 1 of 1

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL		0.30							
Firm, grey, very sandy gravelly CLAY with some cobbles		0.80			AH3857	B	1.00-1.00		
Very soft, grey, very sandy slightly gravelly CLAY with many subangular cobbles		3.00			AH3858	B	2.00-2.00		
End of Trial Pit at 3.00m		3.00			AH3859	B	3.00-3.00		

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Groundwater Conditions
No water flow observed

Stability
TP unstable

General Remarks

IGSL TP LOG 14655.GPJ IGSL.GDT 10/3/10



TRIAL PIT RECORD

14655

REPORT NUMBER

TRIAL PIT NO. TP4		SHEET 1 of 1		CONTRACT Dencyclure Energy Park	
DATE STARTED 10/03/2010	DATE COMPLETED 10/03/2010	EXCAVATION METHOD Mini Digger		CLIENT PM Group	
CO-ORDINATES () 235,169.00 E 220,143.00 N		GROUND LEVEL (m)		LOGGED BY I.Reider	

Geotechnical Description	Legend	Depth (m)	Elevation	Water Strike	Sample Ref	Type	Depth	Vane Test (KPa)	Hand Penetrometer (KPa)
TOPSOIL		0.30							
Soft, brown/grey, clayey fine to medium SAND		0.50							
Loose to medium dense, grey, fine to medium SAND		1.90			AH3863	B	1.00-1.00		
Loose to medium dense, brown, fine SAND		2.40			AH3864	B	2.00-2.00		

Groundwater Conditions	No water flow observed
Stability	TP very unstable
General Remarks	Obstruction at 2.4m - TP collapsed

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IGSL TP LOG 14655.GPJ IGSL.GDT 10/3/10

Appendix 2 Infiltration Test Results

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Contract No. 14655

Contract: Derryclare, Energy Park

Test No. SA 1

Engineer PM Group

Date: 10/03/2010

Summary of ground conditions

From	To	Description
0.00	0.30	TOPSOIL
0.30	2.00	Soft, grey, very sandy slightly gravelly CLAY with many cobbles
Ground water		

Notes:

Field Data

Depth to Water (m)	Elapsed Time (mins)
0.860	0.00
0.860	2.00
0.862	4.00
0.862	6.00
0.864	8.00
0.864	10.00
0.868	12.00
0.868	14.00
0.870	16.00
0.870	18.00
0.870	20.00
0.870	25.00
0.870	30.00
0.870	45.00
0.870	50.00
0.870	55.00
0.870	60.00
0.870	90.00

Field Test

Depth of Pit (D)	2.00	m
Width of Pit (B)	0.60	m
Length of Pit (L)	1.50	m

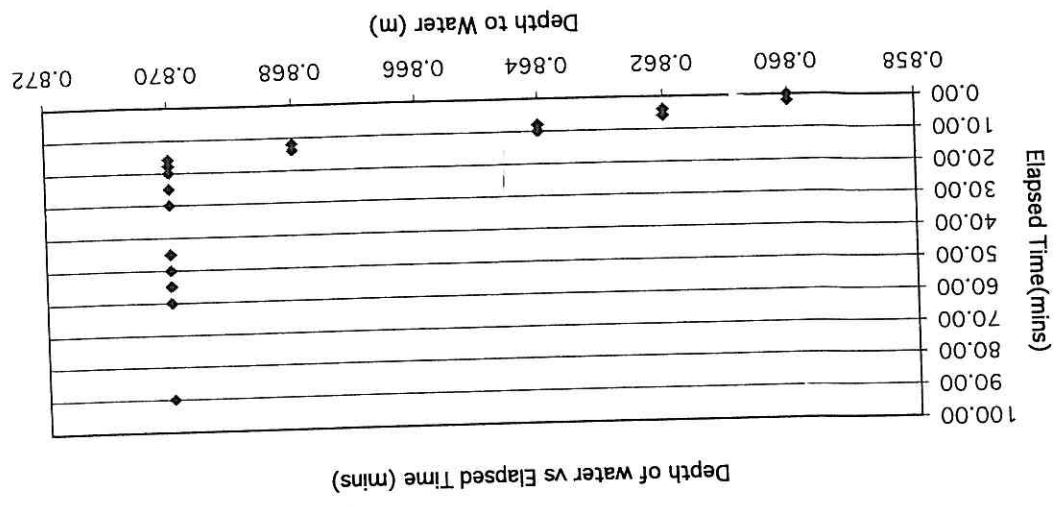
Initial depth to Water =	0.86	m
Final depth to water =	0.87	m
Elapsed time (mins) =	16.00	m



Movement stopped at 0.87 metres

Base area = 0.9 m²
 *Av. side area of permeable stratum over test period = 4.767 m²
 Total exposed area = 5.667 m²

Infiltration rate (f) = Volume of water used/unit exposed area / unit time
 $f = 9.9E-05 \text{ m/min}$ or $1.65431E-06 \text{ m/sec}$



Summary of ground conditions	
from	to
0.00	0.30
0.30	2.00
TOPSOIL	
Soft, grey, very sandy slightly gravelly CLAY with many cobbles	
Ground water	Dry

Notes:

Field Data

Elapsed Time (mins)	Depth to Water (m)
1.000	1.000
2.00	1.000
4.00	1.002
6.00	1.005
8.00	1.005
10.00	1.005
12.00	1.007
14.00	1.010
16.00	1.010
18.00	1.015
20.00	1.020
25.00	1.020
30.00	1.020
45.00	1.020
50.00	1.020
55.00	1.020
60.00	1.020
90.00	1.020

Field Test

Depth of Pit (D)	2.00	m
Width of Pit (B)	0.60	m
Length of Pit (L)	1.30	m

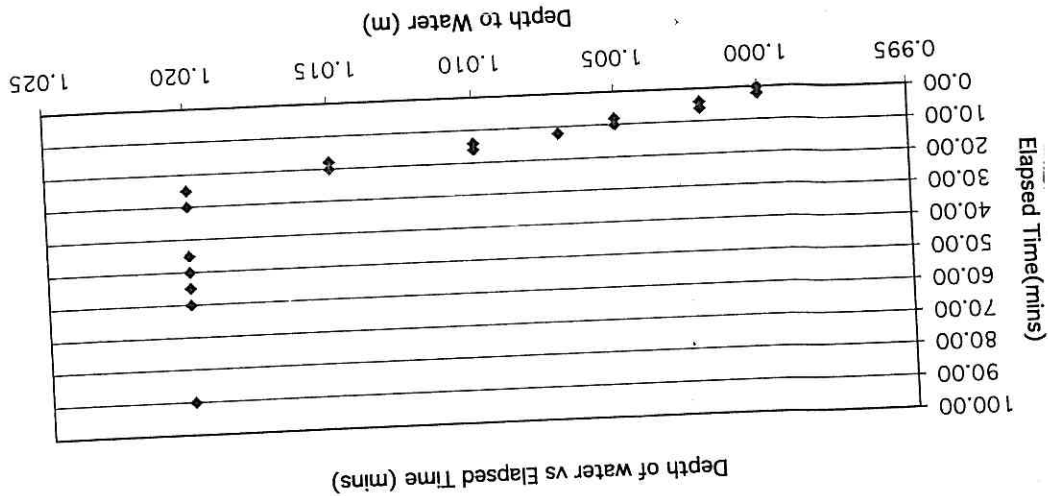
Initial depth to Water =	1.00	m
Final depth to water =	1.02	m
Elapsed time (mins) =	25.00	



Movement stopped at 1.02 metres

Base area =	0.78	m ²
*Av. side area of permeable stratum over test period =	3.762	m ²
Total Exposed area =	4.542	m ²

Infiltration rate (f) = $f = 0.00014 \text{ m/min}$ or $2.28974E-06 \text{ m/sec}$
 Volume of water used/unit exposed area / unit time



Appendix 3 Laboratory Testing (Geotechnical)

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Report No.

CALIFORNIA BEARING RATIO

I.G.S.L.

Contract: DERRYCLURE ENERGY CENTRE

DATE 23/03/2010

CONTRACT No 14655

C.B.R.

Location	Sample No.	Depth of Sample	Sample Description	Water Content %	Test Code	Water Content		Bulk Density Mg/M3	% Passing 20mm	C.B.R.		
						Top %	Bottom %			Top %	Base %	Average %
CBR 1	AH38652	0.50	Mottled grey brown gravelly very sandy SILT/CLAY with root hairs	16.1	L/St	16.1	16.0	2.17	93.8	3.8	3.3	3.6
CBR 2	AH38653	0.50	Mottled grey gravelly very sandy SILT/CLAY with root hairs	10.7	L/St	10.2	11.2	2.15	90.5	8.4	6.4	7.4
CBR 3	AH38654	0.50	Black fibrous PEAT	470	L/St	488	451	1.21	100.0	0.1	0.1	0.1
CBR 4	AH38655	0.50	Mottled grey gravelly very sandy SILT/CLAY with root hairs	10.0	L/St	10.7	9.2	2.16	96.2	8.7	7.4	8.1
CBR 5	AH38656	0.50	Mottled grey gravelly very sandy SILT/CLAY with root hairs	12.7	L/St	12.6	12.8	2.16	95.2	7.1	7.6	7.3
CBR 6	AH38655	0.50	Mottled grey gravelly very sandy SILT/CLAY with root hairs & pockets of organic material	15.4	L/St	15.9	14.9	2.10	90.3	2.6	1.7	2.2

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Test Code U.-Undisturbed Sample L.-2.5Kg. Rammer A/5.-5% Air Voids Ratio V.- Vibrating Hammer
 D.-Dynamic Compaction H.-4.5Kg. Rammer A10.-10% Air Voids Ratio M.- Method Number
 St.-Static compaction RN29.- Road Note 29 (St. 95% H.)

Appendix 4 Laboratory Testing (Environmental)

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Alcontrol Laboratories



Unit 18A
Rosemount Business Park
Ballycoolin
Dublin 11
Tel : (0035) 3188 29893

IGSL
Unit F
M7 Business Park
Naas
Co Kildare

Attention: John Clancy

CERTIFICATE OF ANALYSIS

Date: 31 March 2010
Customer: D_IGSL_NAS-59
Sample Delivery Group (SDG): 100318-84
Your Reference: 14655
Location: Derryclure Energy Centre

We received 3 samples on Thursday March 18, 2010 and 3 of these samples were scheduled for analysis which was completed on Wednesday March 31, 2010. 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.

Asbestos testing - we are not accredited for screening soil samples for asbestos fibres. We are only accredited to identify asbestos fibres in bulk material (ACM).

Approved By:

Iain Swinton

Operations Director - Land UK & Ireland



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

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Sampled Date
1243069	Ditch 1		
1243079	Ditch 2		
1243008	MSET 1	0.50	

Received Sample Overview

SDG:	100318-84	Customer:	IGSL
Job:	D_IGSL_NAS-59	Attention:	John Clancy
Client Reference:	14655	Order No.:	12665
Location:	Derrydure Energy Centre	Report No.:	78642

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Validated

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Results Legend		Customer Sample Ref.		Depth (m)	Container	Total	
Test	No Determination Possible	Ditch 1	Ditch 2			1243079	1243069
<input checked="" type="checkbox"/>	<input type="checkbox"/>						
Ammonium							
Anions by Kone (M)							
Dissolved Metals by ICP-MS							
EPH CWG (Aliphatic) Aqueous GC (M)							
EPH CWG (Aromatic) Aqueous GC (M)							
GRO BTEX MTBE GC (M)							
Mercury Dissolved							
PAH Spec MS - Aqueous (M)							
PCB Congeners - Aqueous (M)							
TPH CWG (M)							

SDG: 100318-84	Customer: IGSL
Job: D_IGSL_NAS-59	Attention: John Clancy
Client Reference: 14655	Order No.: 12665
Location: Derryclure Energy Centre	Report No.: 78642

Alcontrol Laboratories Analytical Services

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ALcontrol Laboratories Analytical Services
 Validated
 SDG: 100318-84
 Job: D_IGSL_NAS-59
 Client Reference: 14655
 Location: Derryclure Energy Centre
 Customer: IGSL
 Attention: John Clancy
 Order No.: 12665
 Report No.: 78642

SOLID

Results Legend		Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Container	Amions by Koru (w)	CEN Readings	Dissolved Metals by ICP-MS	Dissolved Organic and Inorganic Car	Fluorde (w)	GRO BTEX MTBE GC (S)	Mercury Dissolved	Mineral Oil	PAH micro by GCMS	PAH Value of soil	PCBs by GCMS	Phenols by HPLC (M)	Sample description	Total Dissolved Solids on Leachates	Total Organic Carbon
<input checked="" type="checkbox"/> Test	<input type="checkbox"/> No Determination	1243008	MSET 1	0.50	09 YOC/Quar 10g TUB	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
Total																				

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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.

Lab Sample No(s)	1243008	Customer Sample Ref.	MSET 1	Depth (m)	0.50	Colour	Dark Brown	Description	Silt	Grain size	0.063 - 0.1 mm	Inclusions	Vegetation
------------------	---------	----------------------	--------	-----------	------	--------	------------	-------------	------	------------	----------------	------------	------------

Grain Sizes:
 <0.063mm very fine,
 0.063mm - 0.1mm fine,
 0.1mm - 2mm medium,
 2mm - 10mm coarse,
 >10mm very coarse

Sample Descriptions

SDG:	100318-84	Customer:	IGSL
Job:	D_IGSL_NAS-59	Attention:	John Clancy
Client Reference:	14655	Order No.:	12665
Location:	Derrycure Energy Centre	Report No.:	78642

Alcontrol Laboratories Analytical Services

Validated

SDG: 100318-84
 Job: D_IGSL_NAS-59
 Client Reference: 14655
 Location: Derrylure Energy Centre
 Customer: IGSL
 Attention: John Clancy
 Order No.: 12665
 Report No.: 78642

Test Completion dates

SDG reference: 100318-84

Lab Sample No(s)	Customer Sample Ref.	Depth	Type
124302	MSEL 1	0.50	SOLID
124309	MSEL 2		LIQUID
2403/2010	2403/2010	2403/2010	2403/2010
Ammonium	Actions by Kona (M)	2303/2010	2303/2010
CEN Readings	Dissolved Metals by ICP-MS	2903/2010	2303/2010
Dissolved Organic Carbon	Dissolved Organic Carbon	2503/2010	2303/2010
EPH CMS (Aliphatic) Aqueous GC (M)	EPH CMS (Aliphatic) Aqueous GC (M)	2303/2010	2303/2010
EPH CMS (Aromatic) Aqueous GC (M)	Fluoride	2403/2010	2303/2010
GRO BTEX MTBE GC (S)	GRO BTEX MTBE GC (S)	2303/2010	2303/2010
GRO BTEX MTBE GC (M)	Mercury Dissolved	2503/2010	2203/2010
Mineral Oil	Mercury Dissolved	2503/2010	2203/2010
Moisture Meter	Moisture Meter	2203/2010	2303/2010
PAH by GC/MS	PAH by GC/MS	2303/2010	2303/2010
PAH Spec MS - Aqueous (M)	PAH Spec MS - Aqueous (M)	2303/2010	2303/2010
PAH Value of soil	PAH Value of soil	2303/2010	2403/2010
PCB Congeners - Aqueous (M)	PCB Congeners - Aqueous (M)	2603/2010	2603/2010
PCBs by GC/MS	PCBs by GC/MS	2503/2010	2503/2010
Phenols by HPLC (M)	Phenols by HPLC (M)	2503/2010	2503/2010
Sample description	Sample description	1903/2010	2503/2010
Total Dissolved Solids on Leachates	Total Dissolved Solids on Leachates	2503/2010	2503/2010
Total Organic Carbon	Total Organic Carbon	2303/2010	2403/2010
TPH CMS (M)	TPH CMS (M)	2303/2010	2403/2010

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Validated

Alcontrol Laboratories Analytical Services

SDG 100318-84
 Job: D_IGSL_NAS-59
 Client Reference: 14655
 Location: Derrycure Energy Centre
 Customer: IGSL
 Attention:
 Order No.: 12665
 Report No.: 78637

Results Legend		Customer Sample Ref.	
#	ISO17025 accredited	Depth (m)	Method
aq	Aqueous / filtered sample	Sample Type	LOD/Units
dis, fil	Dissolved / filtered sample	Date Sampled	
loc, unfil	Total / unfiltered sample	Date Received	
%	Subcontracted test	SDG Ref	
	% recovery of the surrogate	Lab Sample No.(s)	
	runners to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.		

Component	LOD/Units	Method	Water(GW/SW)	Water(GW/SW)
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	0.78	<0.2
Arsenic Dissolved	<0.12 µg/l	TM152	2.36	1.87
Cadmium Dissolved	<0.1 µg/l	TM152	<0.1	#
Chromium Dissolved	<0.22 µg/l	TM152	16.2	20.6
Lead Dissolved	<0.02 µg/l	TM152	0.37	0.389
Mercury Dissolved	<0.01 µg/l	TM183	<0.01	<0.01
Sulphate	3 mg/l	TM184	40.1	29
Sulphate (soluble)	3 mg/l	TM184	39.9	28.9
Chloride	<2 mg/l	TM184	13.2	11.6
PCB congener 28	<0.015 µg/l	TM197	<0.015	#
PCB congener 52	<0.015 µg/l	TM197	<0.015	<0.015
PCB congener 101	<0.015 µg/l	TM197	<0.015	<0.015
PCB congener 118	<0.015 µg/l	TM197	<0.015	<0.015
PCB congener 138	<0.015 µg/l	TM187	<0.015	<0.015
PCB congener 153	<0.015 µg/l	TM197	<0.015	<0.015
PCB congener 180	<0.015 µg/l	TM197	<0.015	<0.015
Total of 7 Congener PCBs (aqueous)	<0.015 µg/l	TM197	<0.015	<0.015

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Customer Sample Ref.	Depth (m)	Sample Type	Date Sampled	Date Received	SDG Ref	Lab Sample No.(s)	Method	Component
Ditch 1		Water(GW/SW)	18/03/2010	18/03/2010	100318-84	1243069	TM178	Naphthalene (Aqueous)
Ditch 2		Water(GW/SW)	18/03/2010	18/03/2010	100318-84	1243079	TM178	Acenaphthene (Aqueous)
							TM178	Acenaphthylene (Aqueous)
							TM178	Fluoranthene (Aqueous)
							TM178	Anthracene (Aqueous)
							TM178	Phenanthrene (Aqueous)
							TM178	Fluorene (Aqueous)
							TM178	Chrysene (Aqueous)
							TM178	Pyrene (Aqueous)
							TM178	Benzo(a)anthracene
							TM178	Benzo(b)fluoranthene (Aqueous)
							TM178	Benzo(k)fluoranthene (Aqueous)
							TM178	Benzo(a)pyrene (Aqueous)
							TM178	Dibenzo(a,h)anthracene
							TM178	Benzo(g,h,i)perylene (Aqueous)
							TM178	Indeno(1,2,3cd)pyrene (Aqueous)
							TM178	PAH 16 Total (Aqueous)

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< 0.1	< 0.1	TM178	< 0.1 µg/l	PAH 16 Total (Aqueous)
< 0.15	< 0.15	TM178	< 0.15 µg/l	Acenaphthene (Aqueous)
< 0.11	< 0.11	TM178	< 0.11 µg/l	Acenaphthylene (Aqueous)
< 0.14	< 0.14	TM178	< 0.14 µg/l	Fluoranthene (Aqueous)
< 0.15	< 0.15	TM178	< 0.15 µg/l	Anthracene (Aqueous)
< 0.22	< 0.22	TM178	< 0.22 µg/l	Phenanthrene (Aqueous)
< 0.14	< 0.14	TM178	< 0.14 µg/l	Fluorene (Aqueous)
< 0.13	< 0.13	TM178	< 0.13 µg/l	Chrysene (Aqueous)
< 0.15	< 0.15	TM178	< 0.15 µg/l	Pyrene (Aqueous)
< 0.17	< 0.17	TM178	< 0.17 µg/l	Benzo(a)anthracene
< 0.23	< 0.23	TM178	< 0.23 µg/l	Benzo(b)fluoranthene (Aqueous)
< 0.27	< 0.27	TM178	< 0.27 µg/l	Benzo(k)fluoranthene (Aqueous)
< 0.09	< 0.09	TM178	< 0.09 µg/l	Benzo(a)pyrene (Aqueous)
< 0.16	< 0.16	TM178	< 0.16 µg/l	Dibenzo(a,h)anthracene
< 0.16	< 0.16	TM178	< 0.16 µg/l	Benzo(g,h,i)perylene (Aqueous)
< 0.14	< 0.14	TM178	< 0.14 µg/l	Indeno(1,2,3cd)pyrene (Aqueous)
< 0.1	< 0.1	TM178	< 0.1 µg/l	PAH 16 Total (Aqueous)

Validated

Alcontrol Laboratories Analytical Services

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Attention:
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Report No.: 78637

TPH CWG (W)

#	15017025 accredited	M	INCERTS accredited	Aqueous / filtered sample	Assayed / filtered sample	Total / unfiltered sample	Subcontracted test	% recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.
	Customer Sample Ref.	Depth (m)	Sample Type	Date Sampled	Date Received	SDG Ref	Lab Sample No.(s)	Method
	Ditch 1	Water(GWSW)	18/03/2010	100318-84	1243069			
	Ditch 2	Water(GWSW)	18/03/2010	100318-84	1243079			

Component	LOD/Units	Method	Result	Result	Result	Result	Result
GRO C5-C12	<42 µg/l	TM245	<42	#	<42	#	<42
MTBE	<3 µg/l	TM245	<3	#	<3	#	<3
Benzene	<7 µg/l	TM245	<7	#	<7	#	<7
Toluene	<4 µg/l	TM245	<4	#	<4	#	<4
Ethyl Benzene	<5 µg/l	TM245	<5	#	<5	#	<5
m & p Xylene	<8 µg/l	TM245	<8	#	<8	#	<8
o Xylene	<3 µg/l	TM245	<3	#	<3	#	<3
Sum m&p and o Xylene	<10 µg/l	TM245	<10	#	<10	#	<10
Sum of BTEX	<10 µg/l	TM245	<10	#	<10	#	<10
Aliphatics C5-C6	<10 µg/l	TM245	<10	#	<10	#	<10
Aliphatics >C6-C8	<10 µg/l	TM245	<10	#	<10	#	<10
Aliphatics >C8-C10	<10 µg/l	TM245	<10	#	<10	#	<10
Aliphatics >C10-C12	<10 µg/l	TM245	<10	#	<10	#	<10
Aliphatics >C12-C16	<10 µg/l	TM174	<10	#	<10	#	<10
(Aqueous) Aliphatics >C16-C21	<10 µg/l	TM174	<10	#	<10	#	<10
(Aqueous) Aliphatics >C21-C35	<10 µg/l	TM174	<10	#	<10	#	<10
Total Aliphatics C5-C12	<10 µg/l	TM245	<10	#	<10	#	<10
Total Aliphatics >C12-C35	<10 µg/l	TM174	<10	#	<10	#	<10
(Aqueous) Aromatics C6-C7	<10 µg/l	TM245	<10	#	<10	#	<10
Aromatics >C7-C8	<10 µg/l	TM245	<10	#	<10	#	<10
Aromatics >EC8-EC10	<10 µg/l	TM245	<10	#	<10	#	<10
Aromatics >EC10-EC12	<10 µg/l	TM245	<10	#	<10	#	<10
Aromatics >EC12-EC16	<10 µg/l	TM174	<10	#	<10	#	<10
(Aqueous) Aromatics >EC16-EC21	<10 µg/l	TM174	<10	#	<10	#	<10
(Aqueous) Aromatics >EC21-EC35	<10 µg/l	TM174	<10	#	<10	#	<10
Total Aromatics C6-C12	<10 µg/l	TM245	<10	#	<10	#	<10
Total Aromatics	<10 µg/l	TM174	<10	#	<10	#	<10
>EC12-EC35 (Aqueous) Surrogate Recovery %	%	TM245	99		99		99
Total Aliphatics & Aromatics >C12-C35 (Aqueous) GRO (>C8-C10A)	<10 µg/l	TM174	<10	#	<10	#	<10
(Aqueous) Total Aliphatics >C5-C35	<10 µg/l	TM174	<10	#	<10	#	<10
(Aqueous) Total Aromatics >C6-C35	<10 µg/l	TM174	<10	#	<10	#	<10
(Aqueous) TPH C5-C35	<10 µg/l	TM174	<10	#	<10	#	<10

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Alcontrol Laboratories Analytical Services

SDG 100318-84
Job: D_IGSL_NAS-59
Client Reference: 14655
Location: Derycure Energy Centre
Customer: IGSL
Order No.: 12665
Report No.: 78637

Results Legend # ISO17025 accredited M MCERTS accredited Aqueous / settled sample Dissolved / filtered sample Total / unfiltered sample 100,000L % recovery of the surrogate standard to check the efficiency of the method. The results of the individual compounds within the samples are not corrected for this recovery.	Customer Sample Ref.	MSET 1 100318-84 1243008
	Method	Soil/Solid

Component	LOD/Units	Method
Moisture	%	PM114
Moisture Content Ratio (%)	%	PM114
Dry Matter Content Ratio (%)	%	PM114
Mineral Oil (%)	<1 mg/kg	TM061
Surrogate Value	-	TM061
% Surrogate Recovery**	%	TM061
Total Organic Carbon on Solid	<0.2 %	TM132
PCB congener 28	<3 µg/kg	TM168
PCB congener 52	<3 µg/kg	TM168
PCB congener 101	<3 µg/kg	TM168
PCB congener 118	<3 µg/kg	TM168
PCB congener 138	<3 µg/kg	TM168
PCB congener 153	<3 µg/kg	TM168
PCB congener 180	<3 µg/kg	TM168
Total of 7 Congener PCBs	<3 µg/kg	TM168
Coronene	2 mg/kg	TM213
PAH Total 17 (inc Coronene)	10 mg/kg	TM213

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Alcontrol Laboratories Analytical Services

SDG 100318-84 **Customer:** IGSL
Job: D_IGSL_NAS-59 **Attention:**
Client Reference: 14655 **Order No.:** 12665
Location: Derrycure Energy Centre **Report No.:** 78637

GRO BTEX MTBE GC (S)

# ISO17025 accredited M ICERTS accredited M Agencours / setted sample Dissolved / filtered sample Total / unfiltered sample loc:unit:		% recovery of the surrogate subcontracted test * of method. The results of the individual compounds within for this recovery.	
# 18/03/2010 Date Sampled Sample Type Depth (m) 0.50 Soil/Solid		Customer Sample Ref. MSET 1 Lab Sample No.(s) 1243008 SDG Ref 100318-84	
Method LOD/Units		Component	

MTBE	<5 µg/kg	TM089	<5
Benzene	<10 µg/kg	TM089	<10
Toluene	<2 µg/kg	TM089	<2
Ethyl Benzene	<3 µg/kg	TM089	<3
m & p Xylene	<6 µg/kg	TM089	<6
o Xylene	<3 µg/kg	TM089	<3
Sum m&p and o Xylene	<10 µg/kg	TM089	<10
Sum of BTEX	<10 µg/kg	TM089	<10

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Alcontrol Laboratories Analytical Services

SDG 100318-84
 Job: D IGSL_NAS-59
 Client Reference: 14655
 Location: Derynure Energy Centre
 Customer: IGSL
 Attention:
 Order No.: 12665
 Report No.: 78637

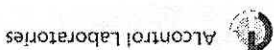
PAH micro by GCMS

#	ISO17025 accredited.	Customer Sample Ref.	MSET 1
M	QCERTS accredited.	Depth (m)	0.50
aq	Aqueous / settled sample.	Sample Type	Soil/Solid
dis.filt	Disolved / filtered sample.	Date Sampled	18/03/2010
total.filt	Total / unfiltered sample.	SDG Ref	100318-84
%	% recovery of the surrogate	Date Received	18/03/2010
subcontracted test.	subcontracted test.	Lab Sample No.(s)	1243008
individual compounds which	individual compounds which	Method	
for this recovery.	for this recovery.	LQD/units	

Component	Method	LQD/units	Result
Naphthalene-d8**	TM218	%	96.5
Acenaphthene-d10**	TM218	%	98.4
Phenanthrene-d10**	TM218	%	96.5
Chrysene-d12**	TM218	%	98.2
Perylene-d12**	TM218	%	100
Naphthalene (S)	TM218	< 9 µg/kg	< 9
Acenaphthylene (S)	TM218	< 12 µg/kg	< 12
Acenaphthene (S)	TM218	< 8 µg/kg	< 8
Fluorene (S)	TM218	< 10 µg/kg	< 10
Phenanthrene (S)	TM218	< 15 µg/kg	< 15
Anthracene (S)	TM218	< 16 µg/kg	< 16
Fluoranthene (S)	TM218	< 17 µg/kg	< 17
Pyrene (S)	TM218	< 15 µg/kg	< 15
Benz(a)anthracene (S)	TM218	< 14 µg/kg	< 14
Chrysene (S)	TM218	< 10 µg/kg	41.1
Benzo(b)fluoranthene (S)	TM218	< 15 µg/kg	< 15
Benzo(k)fluoranthene (S)	TM218	< 14 µg/kg	< 14
Benzo(a)pyrene (S)	TM218	< 15 µg/kg	< 15
Indeno(1,2,3cd)pyrene (S)	TM218	< 18 µg/kg	< 18
Dibenz(a,h)anthracene (S)	TM218	< 23 µg/kg	< 23
Benzo(ghi)perylene (S)	TM218	< 24 µg/kg	< 24
PAH 16 EPA Total	TM218	< 118 µg/kg	< 118

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Alcontrol Laboratories Analytical Services
CEN 10:1 ONE STAGE BATCH TEST



REF-CEN12457-3

Deryclure Energy Centre

Client Location

1455

Client Reference

Mass Sample taken (kg)

Moisture Content Ratio (%)

0.403

Mass of dry sample (kg)

Dry Matter Content Ratio (%)

0.175

349

Particle Size <4mm

>95%

Case

SDG	100318-B4
Lab Sample Number(s)	1243008
Sampled Date	MSET 1
Customer Sample Ref.	0.50
Depth (m)	

Solid Waste Analysis

Total Organic Carbon (%)	34.9
Loss on Ignition (%)	-
Sum of BTEX (mg/kg)	<0.01
Sum of 7 PCBs (mg/kg)	<0.006
Mineral Oil (mg/kg)	58.0
PAH Sum of 17 (mg/kg)	<10.0
pH (pH Units)	-
ANC to pH 6 (mol/kg)	-
ANC to pH 4 (mol/kg)	-

Eluate Analysis

Conc ⁿ in 10:1 eluate	mg/l	mg/kg
As	0.0142	0.0142
Barium	0.0394	0.394
Cadmium	0.000119	0.00119
Chromium	0.000365	0.00365
Copper	0.00195	0.0195
Mercury Dissolved (CVAF)	<0.00001	<0.0001
Molybdenum	0.0868	0.868
Nickel	0.00251	0.0251
Lead	0.000842	0.00842
Antimony	0.00119	0.0119
Selenium	<0.00039	<0.0039
Zinc	0.00455	0.0455
Chloride	3.5	35
Fluoride	<0.5	<5
Sulphate (soluble)	-	-
Total Dissolved Solids	204	2040
Total Monohydric Phenols (W)	<0.15	<0.15
Dissolved Organic Carbon	20	200

Leach Test Information

Date Prepared	22-Mar-2010
pH (pH Units)	7.48
Conductivity (µS/cm)	246.00
Temperature (°C)	20.50
Volume Leachant (Litres)	0.586
Volume of Eluate VE1 (Litres)	-

Soil Results are expressed on a dry weight basis, after correction for moisture content where applicable
 Stated limits are for guidance only and Alcontrol cannot be held responsible for any discrepancies with current legislation
 Meets Certification does not apply to leachates

Alcontrol Laboratories Analytical Services

Table of Results - Appendix

SDG Number : 100318-84

Client : IGSL

Client Ref : 14655

REPORT KEY

NDP	No Determination Possible	#	ISO 17025 Accredited	+	Subcontracted Test	M	M	M	M
NFD	No Fibres Detected	PFD	Possible Fibres Detected	+	Result previously reported (Incremental reports only)	EC	EC	EC	EC

Results expressed as (e.g.) 1.03E-07 is equivalent to 1.03x10⁻⁷
 MCERTS Accredited
 Equivalent Carbon (Aromatics C8-C35)

Method No	Reference	Description	Wet/Dry Sample
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos containing Material	Wet
PM114		Leaching Procedure for CEN Two Stage Batch Test 2:1/8:1 Cumulative	
PM115		Leaching Procedure for CEN One Stage Leach Test 2:1 & 10:1 1 Step	
TM061	Method for the Determination of EPH, Massachusetts Dept. of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)	
TM061	Method for the Determination of EPH, Massachusetts Dept. of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)	Dry
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)	
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water	
TM098	Method 4500E, AWWA/APHA, 20th Ed., 1999	Determination of Sulphate using the Kone Analyser	Dry
TM099	BS 2690: Part 7:1968 / BS 6068: Part 2:1:1984	Determination of Ammonium in Water Samples using the Kone Analyser	
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser	
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water	
TM132	In-house Method	ELTRA CS800 Operators Guide	
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of aqueous Samples by ICP-MS	Dry
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils	Dry
TM174	Analysis of Petroleum Hydrocarbons in Environmental Media - Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID	
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters	
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	
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers	
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers	Dry
TM197	Modified: US EPA Method 8082, EA	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Waters	
TM213	In-house Method	Rapid Determination of PAHs by GC-FID	
TM218	Microwave extraction - EPA method 3546	Microwave extraction - EPA method 3546	Wet
TM245	By GC-FID	Determination of GRO by Headspace in waters	Wet
TM259			

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

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APPENDIX

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. All control 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 large asbestos containing material fragments/pieces. If no asbestos containing material is found this will be reported as 'no asbestos containing material detected'. If asbestos containing material is detected it will be removed and analysed by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If asbestos containing material is present no further analysis will be undertaken. At no point is the fibre content of the soil sample determined.
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/unusable sample.
10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals – total metals must be requested separately.
11. A table containing the date of analysis for each parameter is not routinely included with the report, but is available upon request.
12. **Surrogate recoveries** – Most of our organic methods include surrogates, the recovery of which is monitored and reported.
13. For EPH, MO, PAH, GRO and VOCs on soils the result is of surrogate corrected, but a percentage recovery is quoted.
13. **Product analyses** – Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.
14. 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).
15. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-isopropylphenol, Cresols and Xylenols (as detailed in 14).
16. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.
17. Our MCERTS accreditation for PAHs by GCMS applies to all product types apart from Kerosene, where naphthalene only is not accredited.
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.
21. GC/FID/GCMS and all subcontracted analysis.
22. 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 GC/FID 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.

LIQUID MATRICES EXTRACTION SUMMARY

ANALYSIS	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
PAH MS	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
PCB 7 CONGENERS	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GC MS
PCB TOTAL	HEXANE	STIRRED EXTRACTION (STIR-BAR)	GS MS
SVOC	DCM	LIQUID/LIQUID SHAKEN SVOC	GC MS
FREE SULPHUR	DCM	SOLID PHASE EXTRACTION	HPLC
PEST OCP/OPP	DCM/EA	SOLID PHASE EXTRACTION	GC MS
TRIAZINE HERBS	DCM/EA	SOLID PHASE EXTRACTION	GC MS
PHENOLS MS	DCM	SOLID PHASE EXTRACTION	GC MS
TPH by INFRA RED (IR)	TCE	LIQUID/LIQUID EXTRACTION	HPLC
MINERAL OIL by IR	TCE	LIQUID/LIQUID EXTRACTION	HPLC
SAPONIFIABLE	TCE	LIQUID/LIQUID EXTRACTION	HPLC
UNSAPOINIFIABLE	TCE	LIQUID/LIQUID EXTRACTION	HPLC
GLYCOLS	DCM	LIQUID/LIQUID EXTRACTION	EZ FLASH

ANALYSIS	D/C OR WET	EXTRACTION SOLVENT	EXTRACTION METHOD	ANALYSIS
Solvent Extractable Matter	D&C	DCM	SOXTHERM	GRAVIMETRIC
Cylohexane Ext. Matter	D&C	CYCLOHEXANE	SOXTHERM	GRAVIMETRIC
Thin Layer Chromatography	D&C	DCM	SOXTHERM	IATROSCAN
Elemental Sulphur	D&C	DCM	SOXTHERM	HPLC
Phenols by GCMS	WET	DCM	SOXTHERM	HPLC
Herbicides	D&C	HEXANE:ACETONE	SOXTHERM	GC-MS
Pesticides	D&C	HEXANE:ACETONE	SOXTHERM	GC-MS
EPH (DRO)	D&C	HEXANE:ACETONE	END OVER	GC-FID
EPH (Min oil)	D&C	HEXANE:ACETONE	END OVER	GC-FID
EPH (Cleaned up)	D&C	HEXANE:ACETONE	END OVER	GC-FID
EPH CWG by GC	D&C	HEXANE:ACETONE	END OVER	GC-FID
PCB tot / PCB con	D&C	HEXANE:ACETONE	END OVER	GC-MS
Polyaromatic Hydrocarbons (MS)	WET	HEXANE:ACETONE	Microwave	GC-MS
C8-C40 (C6-C40)EZ Flash	WET	HEXANE:ACETONE	TM218	GC-MS
Polyaromatic Hydrocarbons Rapid GC	WET	HEXANE:ACETONE	SHAKER	GC-EZ
Semi Volatile Organic Compounds	WET	DCM:ACETONE	SONICATE	GC-MS

Identification of Asbestos in Bulk Materials

The results for asbestos identification for soil samples are obtained from possible Asbestos Containing Material, removed during the 'Screening of soils for Asbestos Containing Materials', which have been examined to determine the presence of asbestos fibres using Alcohol 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 MDHS 100.

The identification of asbestos containing materials 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	-
Amosite	-
Crocidolite	-
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-
White Asbestos	-
Brown Asbestos	-
Blue Asbestos	-

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Appendix 5 Site Plan

SITE PLAN
28
30
32

X
Water Sample
Ditch 1

TP1
TM

LOCATION TYPICAL
FOR EXISTING
CONCRETE PAVEMENT

SA2
Op

CBR X
CBRS

Water Sample
Ditch 2
TP2
TM

CBR X
CBR 1

TP4
TM

CBR X
CBR 4

CBR X
CBR 2

CBR X
CBR 3

X
CBR 6

SA1
Op

TP3
TM

SEE SHEET
FOR THE
LOCATION OF
THE
EXISTING
CONCRETE
PAVEMENT

SEE SHEET
FOR THE
LOCATION OF
THE
EXISTING
CONCRETE
PAVEMENT

SEE SHEET
FOR THE
LOCATION OF
THE
EXISTING
CONCRETE
PAVEMENT

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NOTES:
1. ALL DIMENSIONS ARE IN FEET AND INCHES.
2. ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE NOTED.
3. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE NOTED.
4. ALL DIMENSIONS ARE TO CENTERLINE UNLESS OTHERWISE NOTED.

N
 P
 X
 N

No.	Description	Date	By

SKETCH

Preparer: SAMPSON LIMITED
 Designer: SAMPSON LIMITED
 Checker: SAMPSON LIMITED
 Date: 2011

SITE LAYOUT PLAN

No.	Date	By
01	2011	SAMPSON LIMITED
02	2011	SAMPSON LIMITED
03	2011	SAMPSON LIMITED
04	2011	SAMPSON LIMITED
05	2011	SAMPSON LIMITED

AXIS
architecture



