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An assessment and evaluation of dissolved methane concentrations at a natural gas extraction site in the Free State Province, South Africa

Patel, Khalid

2018

https://hdl.handle.net/10539/26960

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APPENDIX 1A: APRIL 2015 LABORATORY RESULTS

UIS ORGANIC LABORATORY

UIS Organic Laboratory (Pty) Ltd • Reg. No. 2007/001896/07
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CLIENT INFORMATION

Environment Impact Managemet services (EIM
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Avenue
Randburg

TEST REPORT

Lab No : 09503 E

TEST INFORMATION **Dissolved Gasses**

ANALYTICAL METHOD: HS GC-FID

DATE RECEIVED	2015-04-02
DATE COMPLETED	2015-04-09
DATE ISSUED	2015-04-10

Matrix: **Water**

SAMPLE INFORMATION

SAMPLE No **1074 BH1**

Project Name

Project number Quote1362

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissoleved Methane	0.09 mg/liter	
Dissolved Ethane	<0.38 mg/liter	

Authorised Signatory :

Reinardt Cronhout

DISCLAIMER: The results only relate to the test items provided. This report may not be reproduced, except in full, without the prior written approval of the laboratory.

Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

Environment Impact Managemet services (EIM
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Avenue
Randburg

TEST REPORT

Lab No : 09503E

TEST INFORMATION **Dissolved Gasses**

ANALYTICAL METHOD: HS GC-FID

Matrix: **Water**

DATE RECEIVED	2015-04-02
DATE COMPLETED	2015-04-09
DATE ISSUED	2015-04-10

SAMPLE INFORMATION

SAMPLE No **1074 BH2**

Project Name

Project number Quote1362

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissoleved Methane	<0.07 mg/liter	
Dissolved Ethane	<0.38 mg/liter	

Authorised Signatory :

Reinardt Cromhout

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CLIENT INFORMATION

Environment Impact Managemet services (EIM
Attention: Liam Whitlow
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Randburg

TEST REPORT

Lab No : 09503 E

TEST INFORMATION **Dissolved Gasses**

ANALYTICAL METHOD: HS GC-FID

Matrix: **Water**

DATE RECEIVED	2015-04-02
DATE COMPLETED	2015-04-09
DATE ISSUED	2015-04-10

SAMPLE INFORMATION

SAMPLE No **1074 BH4**

Project Name

Project number Quote1362

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.34 mg/liter	
Dissolved Ethane	<0.38 mg/liter	

Authorised Signatory :

Reinardt Cromhout

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2015-04-10

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CLIENT INFORMATION

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TEST REPORT

Lab No : 09503 E

TEST INFORMATION **Dissolved Gasses**

ANALYTICAL METHOD: HS GC-FID

Matrix: **Water**

DATE RECEIVED	2015-04-02
DATE COMPLETED	2015-04-09
DATE ISSUED	2015-04-10

SAMPLE INFORMATION

SAMPLE No **1074 BH5**

Project Name

Project number Quote1362

Sample dilution Factor 2

Parameter	Results	Remark
Dissoleved Methane	3.16 mg/liter	
Dissolved Ethane	<0.76 mg/liter	

Authorised Signatory :

Reinardt Cromhout

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CLIENT INFORMATION

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TEST REPORT

Lab No : 09503 E

TEST INFORMATION **Dissolved Gasses**

ANALYTICAL METHOD: HS GC-FID

Matrix: **Water**

DATE RECEIVED 2015-04-02
DATE COMPLETED 2015-04-09
DATE ISSUED 2015-04-10

SAMPLE INFORMATION

SAMPLE No **1074 BH7**

Project Name

Project number Quote1362

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissoleved Methane	0.13 mg/liter	
Dissolved Ethane	<0.38 mg/liter	

Authorised Signatory :

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CLIENT INFORMATION

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TEST REPORT

Lab No : 09503E

TEST INFORMATION **Dissolved Gasses**

ANALYTICAL METHOD: HS GC-FID

Matrix: **Water**

DATE RECEIVED 2015-04-02
DATE COMPLETED 2015-04-09
DATE ISSUED 2015-04-10

SAMPLE INFORMATION

SAMPLE No **1074 BH8**

Project Name

Project number Quote1362

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissoleved Methane	<0.07 mg/liter	
Dissolved Ethane	<0.38 mg/liter	

Authorised Signatory :

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CLIENT INFORMATION

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TEST REPORT

Lab No : 09503E

TEST INFORMATION **Dissolved Gasses**

ANALYTICAL METHOD: HS GC-FID

Matrix: **Water**

DATE RECEIVED 2015-04-02
DATE COMPLETED 2015-04-09
DATE ISSUED 2015-04-10

SAMPLE INFORMATION

SAMPLE No **1074 BH9**

Project Name

Project number Quote1362

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissoleved Methane	0.087 mg/liter	
Dissolved Ethane	<0.38 mg/liter	

Authorised Signatory :

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TEST REPORT

Lab No : 09503 E

TEST INFORMATION **Dissolved Gasses**

ANALYTICAL METHOD: HS GC-FID

Matrix: **Water**

DATE RECEIVED	2015-04-02
DATE COMPLETED	2015-04-09
DATE ISSUED	2015-04-10

SAMPLE INFORMATION

SAMPLE No **1074 SW01**

Project Name

Project number Quote1362

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissoleved Methane	<0.07 mg/liter	
Dissolved Ethane	<0.38 mg/liter	

Authorised Signatory :

Reinardt Cronhout

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2015-04-10

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TEST REPORT

Lab No : 09503 E

TEST INFORMATION **Dissolved Gasses**

ANALYTICAL METHOD: HS GC-FID

Matrix: **Water**

DATE RECEIVED	2015-04-02
DATE COMPLETED	2015-04-09
DATE ISSUED	2015-04-10

SAMPLE INFORMATION

SAMPLE No **1074 SW02**

Project Name

Project number Quote1362

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissoleved Methane	<0.07 mg/liter	
Dissolved Ethane	<0.38 mg/liter	

Authorised Signatory :

Reinardt Cronhout

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2015-04-10

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TEST REPORT

Lab No : 09503A

TEST INFORMATION TPH GRO C6-C10

ANALYTICAL METHOD: SPME Extraction and GC-MS
METHOD Number: UISOL-T-012

DATE RECEIVED	2015-04-02
DATE COMPLETED	2015-04-07
DATE ISSUED	2015-04-09

SAMPLE INFORMATION

Storage conditions in the laboratory is an a Fridge @ < 6 deg C

Matrix: Water

CONTAINER TYPE Glass **Project number** Quote1362

Sample dilution Factor No Dilution

Sample ID	Results
1074 BH01	<10 µg/liter
1074 BH02	<10 µg/liter
1074 BH04	<10 µg/liter
1074 BH05	<10 µg/liter
1074 BH07	<10 µg/liter
1074 BH08	<10 µg/liter
1074 BH09	<10 µg/liter
1074 SW01	<10 µg/liter
1074 SW02	<10 µg/liter

Authorised Signatory : *2015-04-09*

Reinardt Cromhout

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sanas Testing Laboratory T0419

UIS ORGANIC LABORATORY
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Client Information

Company :	Environment Impact Management
Attention:	Liam Whitlow
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Fax:	
Address	Block 5 Fernridge Office Park, 5 Hunter Randburg
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Analysis Report

Lab No: 9503

TEST INFORMATION	Total Dissolved Solids
DATE RECEIVED	2/4/2015
DATE COMPLETED	15/4/2015
DATE ISSUED	15/4/2015

SAMPLE INFORMATION

SAMPLE MATRIX: Water

Sample ID | **Parameters**

	TSS	DOC	DIC	Dissolved Oxygen as O_2	
BH1	73	<0.1	48	7.6	mg/liter
BH2	30	<0.1	34	7.6	mg/liter
BH4	190	1.1	69	7.4	mg/liter
BH5	160	<0.1	27	5.6	mg/liter
BH7	157	<0.1	55	7.2	mg/liter
BH9	207	<0.1	29	7.4	mg/liter
SW2	130	5.8	21	7.7	mg/liter
SW1	113	3.7	22	7.8	mg/liter
BH8	227	<0.1	44	7.8	mg/liter

Authorized Signatory

F. HAVENGA

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U.T.D. - Unable To Determine

UIS ORGANIC LABORATORY

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CLIENT INFORMATION

Environment Impact Managemet servi
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Randburg

Analysis Report

Lab No : 09503 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS	METHOD Number: UISOL-T-012
DATE RECEIVED 2015-04-02	DATE COMPLETED 2015-04-07 DATE ISSUED 2015-04-10
SAMPLE INFORMATION	Matrix: Water
SAMPLE No **1074 BH01**	Project number Quote1362
CONTAINER TYPE Glass	Sample dilution Factor No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	<0.1	µg/liter
Acenaphthene	<0.1	µg/liter
Acenaphthylene	<0.1	µg/liter
Flourene	<0.1	µg/liter
Phenanthrene	<0.1	µg/liter
Anthracene	<0.1	µg/liter
Fluoranthene	<0.1	µg/liter
Pyrene	<0.1	µg/liter
Benzo[a]anthracene	<0.1	µg/liter
Crysene	<0.1	µg/liter
Benzo[k+b]fluoranthene*	<0.1	µg/liter
Benzo[a]pyrene*	<0.1	µg/liter
Benzo[g,h,i]perylene *	<6	µg/liter
Dibenz[a,h]anthracene *	<6	µg/liter
Indeno[123-cd]pyrene *	<6	µg/liter

Authorised Signatory that approved this report

Reinardt Cronhout

sanas Testing Laboratory T0419

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Results marked "A" - Concentration outside calibration range, estimate only

2015-04-10

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CLIENT INFORMATION

Environment Impact Managemet servi
Liam Whitlow
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Randburg

Analysis Report

Lab No : 09503 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		METHOD Number: UISOL-T-012	
DATE RECEIVED 2015-04-02	DATE COMPLETED 2015-04-07	**DATE ISSUED**	2015-04-10
SAMPLE INFORMATION		**Matrix:**	Water
SAMPLE No	**1074 BH02**	**Project number**	Quote1362
CONTAINER TYPE Glass		**Sample dilution Factor**	No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<6**	**µg/liter**
Dibenz[a,h]anthracene *	**<6**	**µg/liter**
Indeno[123-cd]pyrene *	**<6**	**µg/liter**

Authorised Signatory that approved this report

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2015-04-10

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CLIENT INFORMATION

Environment Impact Managemet servi
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Randburg

Analysis Report

Lab No : 09503 A

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2015-04-02 DATE COMPLETED 2015-04-07 DATE ISSUED 2015-04-10

SAMPLE INFORMATION
SAMPLE No **1074 BH04**
CONTAINER TYPE Glass

Matrix: Water
Project number Quote1362
Sample dilution Factor No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	<0.1	µg/liter
Acenaphthene	<0.1	µg/liter
Acenaphthylene	<0.1	µg/liter
Flourene	<0.1	µg/liter
Phenanthrene	<0.1	µg/liter
Anthracene	<0.1	µg/liter
Fluoranthene	<0.1	µg/liter
Pyrene	<0.1	µg/liter
Benzo[a]anthracene	<0.1	µg/liter
Crysene	<0.1	µg/liter
Benzo[k+b]fluoranthene*	<0.1	µg/liter
Benzo[a]pyrene*	<0.1	µg/liter
Benzo[g,h,i]perylene *	<6	µg/liter
Dibenz[a,h]anthracene *	<6	µg/liter
Indeno[123-cd]pyrene *	<6	µg/liter

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2015-04-10

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CLIENT INFORMATION

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Randburg

Analysis Report

Lab No : 09503 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		METHOD Number: UISOL-T-012	
DATE RECEIVED	2015-04-02	DATE COMPLETED 2015-04-07	DATE ISSUED 2015-04-10
SAMPLE INFORMATION		Matrix:	Water
SAMPLE No	1074 BH05	Project number	Quote1362
CONTAINER TYPE	Glass	Sample dilution Factor	No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	<0.1	µg/liter
Acenaphthene	<0.1	µg/liter
Acenaphthylene	<0.1	µg/liter
Flourene	<0.1	µg/liter
Phenanthrene	<0.1	µg/liter
Anthracene	<0.1	µg/liter
Fluoranthene	<0.1	µg/liter
Pyrene	<0.1	µg/liter
Benzo[a]anthracene	<0.1	µg/liter
Crysene	<0.1	µg/liter
Benzo[k+b]fluoranthene*	<0.1	µg/liter
Benzo[a]pyrene*	<0.1	µg/liter
Benzo[g,h,i]perylene *	<6	µg/liter
Dibenz[a,h]anthracene *	<6	µg/liter
Indeno[123-cd]pyrene *	<6	µg/liter

Authorised Signatory that approved this report

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Liam Whitlow
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Randburg

Analysis Report

Lab No : 09503 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		METHOD Number: UISOL-T-012	
DATE RECEIVED 2015-04-02	DATE COMPLETED 2015-04-07	**DATE ISSUED**	2015-04-10
SAMPLE INFORMATION		**Matrix:**	Water
SAMPLE No **1074 BH07**		**Project number**	Quote1362
CONTAINER TYPE Glass		**Sample dilution Factor**	No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<6**	**µg/liter**
Dibenz[a,h]anthracene *	**<6**	**µg/liter**
Indeno[123-cd]pyrene *	**<6**	**µg/liter**

Authorised Signatory that approved this report

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2015-04-10

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CLIENT INFORMATION

Environment Impact Managemet servi
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Randburg

Analysis Report

Lab No : 09503 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		METHOD Number: UISOL-T-012	
DATE RECEIVED 2015-04-02	DATE COMPLETED 2015-04-07	**DATE ISSUED**	2015-04-10
SAMPLE INFORMATION		Matrix: Water	
SAMPLE No **1074 BH08**		Project number Quote1362	
CONTAINER TYPE Glass		Sample dilution Factor No Dilution	

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<6**	**µg/liter**
Dibenz[a,h]anthracene *	**<6**	**µg/liter**
Indeno[123-cd]pyrene *	**<6**	**µg/liter**

Authorised Signatory that approved this report

Reinardt Cronhout

sanas Testing Laboratory T0419

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Results marked "A" - Concentration outside calibration range, estimate only

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Liam Whitlow
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Randburg

Analysis Report

Lab No : 09503 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		METHOD Number:	UISOL-T-012
DATE RECEIVED	2015-04-02	DATE COMPLETED 2015-04-07	**DATE ISSUED** 2015-04-10
SAMPLE INFORMATION		Matrix:	Water
SAMPLE No	1074 BH09	Project number	Quote1362
CONTAINER TYPE	Glass	Sample dilution Factor	No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	<0.1	µg/liter
Acenaphthene	<0.1	µg/liter
Acenaphthylene	<0.1	µg/liter
Flourene	<0.1	µg/liter
Phenanthrene	<0.1	µg/liter
Anthracene	<0.1	µg/liter
Fluoranthene	<0.1	µg/liter
Pyrene	<0.1	µg/liter
Benzo[a]anthracene	<0.1	µg/liter
Crysene	<0.1	µg/liter
Benzo[k+b]fluoranthene*	<0.1	µg/liter
Benzo[a]pyrene*	<0.1	µg/liter
Benzo[g,h,i]perylene *	<6	µg/liter
Dibenz[a,h]anthracene *	<6	µg/liter
Indeno[123-cd]pyrene *	<6	µg/liter

Authorised Signatory that approved this report

Reinardt Cronhout

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2015-04-10

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CLIENT INFORMATION

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Liam Whitlow
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Randburg

Analysis Report

Lab No : 09503 A

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2015-04-02 DATE COMPLETED 2015-04-07 DATE ISSUED 2015-04-10

SAMPLE INFORMATION
SAMPLE No **1074 SW01**
CONTAINER TYPE Glass

Matrix: Water
Project number Quote1362
Sample dilution Factor No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	<0.1	µg/liter
Acenaphthene	<0.1	µg/liter
Acenaphthylene	<0.1	µg/liter
Flourene	<0.1	µg/liter
Phenanthrene	<0.1	µg/liter
Anthracene	<0.1	µg/liter
Fluoranthene	<0.1	µg/liter
Pyrene	<0.1	µg/liter
Benzo[a]anthracene	<0.1	µg/liter
Crysene	<0.1	µg/liter
Benzo[k+b]fluoranthene*	<0.1	µg/liter
Benzo[a]pyrene*	<0.1	µg/liter
Benzo[g,h,i]perylene *	<6	µg/liter
Dibenz[a,h]anthracene *	<6	µg/liter
Indeno[123-cd]pyrene *	<6	µg/liter

Authorised Signatory that approved this report

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Analysis Report

Lab No : 09503 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS	METHOD Number: UISOL-T-012
DATE RECEIVED 2015-04-02	DATE COMPLETED 2015-04-07 DATE ISSUED 2015-04-10
SAMPLE INFORMATION	Matrix: Water
SAMPLE No **1074 SW02**	Project number Quote1362
CONTAINER TYPE Glass	Sample dilution Factor No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<6**	**µg/liter**
Dibenz[a,h]anthracene *	**<6**	**µg/liter**
Indeno[123-cd]pyrene *	**<6**	**µg/liter**

Authorised Signatory that approved this report

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CLIENT INFORMATION

Environment Impact Managemet services (EIM
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Avenue
Randburg

Analysis Report

Lab No : 09503 B

TEST INFORMATION TPH C10 - C40

ANALYTICAL METHOD:For Soil ASE Ext. and GC/MS
ANALYTICAL METHOD:For Water Liquid/Liquid Ext. and GC/MS
METHOD Number: UISOL-T-010

DATE RECEIVED	2015-04-02
DATE COMPLETED	2015-04-07
DATE ISSUED	2015-04-10

SAMPLE INFORMATION

Project Name
Project number Quote1362
CONTAINER TYPE Glass

Storage conditions in the laboratory is in a Fridge @ < 6 deg C

Sample ID	Matrix	C10 - C28	C28 - C40*	Total*
1074 BH01	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH02	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH04	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH05	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH07	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH08	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH09	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 SW01	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter

Authorised Signatory : *2015-04-10*

Reinardt Cromhout

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Randburg

Analysis Report

Lab No : 09503 B

TEST INFORMATION TPH C10 - C40

ANALYTICAL METHOD:For Soil ASE Ext. and GC/MS
ANALYTICAL METHOD:For Water Liquid/Liquid Ext. and GC/MS
METHOD Number: UISOL-T-010

DATE RECEIVED	2015-04-02
DATE COMPLETED	2015-04-07
DATE ISSUED	2015-04-10

SAMPLE INFORMATION

Project Name
Project number Quote1362
CONTAINER TYPE Glass

Storage conditions in the laboratory is in a Fridge @ < 6 deg C

Sample ID	Matrix	C10 - C28	C28 - C40*	Total*
1074 SW02	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter

Authorised Signatory : *2015-04-10*

Reinardt Cromhout

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M&L LABS

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M and L Laboratory Services (Pty) Ltd

Consulting Industrial Chemists, Analysts _Samplers

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Certificate / Report

COMPANY NAME	: ENVIRONMENTAL IMPACT MANAGEMENT SERVICES
ADDRESS	: PO BOX 2083 PINEGOWRIE 2123
SUBJECT	: ANALYSIS OF 9 WATER SAMPLES
PROJECT REFERENCE	: 1074
INSTRUCTED BY	: L. Whitlou
ORDER NUMBER	:
RECEIVED ON	: 2015-04-02
ANALYSIS COMPLETED	: 2015-04-22

BDL - Below Detection Limit

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Certificate / Report

Lab Number			E23127	E23128	E23129
Sampled Date			2015-04-01	2015-04-01	2015-04-01
Sample Marks			1074 BH01	1074 BH02	1074 BH04
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
* pH Value @ 25℃	W044-27-O		7.6	7.1	7.4
* Conductivity @ 25℃ (mS/m)	W044-27-O		90.2	40.9	197.2
* TDS (mg/l)	W044-03-W	1	510	252	1292
* Calcium as Ca (mg/l)	W044-30-C	0.118	40	37	143
* Calcium Hardness as CaCO3 (mg/l)	W044-30-C	1	100	92	357
* Magnesium as Mg (mg/l)	W044-30-C	0.034	13.9	11.7	58
* Magnesium Hardness as CaCO3 (mg/l)	W044-30-C	1	57	48	239
* Sodium as Na (mg/l)	W044-30-C	0.016	140	35	204
* Potassium as K (mg/l)	W044-30-C	0.093	1.1	4.4	2.5
Ammonia as NH4 (mg/l)	W044-50-W	0.10	<0.10	<0.10	1.1
Ammonia as NH3 (mg/l)	W044-50-W	0.10	<0.10	<0.10	1.1
Ammonia as N (mg/l)	W044-50-W	0.10	<0.10	<0.10	0.9
Total Alkalinity as CaCO3 (mg/l)	W044-50-W	1	262	199	355
P Alkalinity as CaCO3 (mg/l)	APHA 2310 B/2320 B	1	-	-	-
Bicarbonate as HCO3 (mg/l)	W044-50-W		319	243	433
Carbonate as CO3 (mg/l)	W044-50-W		0	0	0
Hydroxide as OH- (mg/l)	W044-50-W		0	0	0
Chloride as Cl (mg/l)	W044-50-W	0.10	151	19.5	495
Sulfate as SO4 (mg/l)	W044-50-W	0.2	43	23	42
Nitrate as NO3 (mg/l)	W044-50-W	0.100	0.4	4.1	0.1
Nitrate as N (mg/l)	W044-50-W	0.100	0.1	0.9	<0.1
Nitrite as NO2 (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Nitrite as N (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Fluoride as F (mg/l)	W044-50-W	0.10	0.6	0.1	0.4
Phosphate as PO4 (mg/l)	W044-50-W	0.12	<0.12	0.13	<0.12
Bromide as Br (mg/l)	W044-50-W	0.10	1.02	<0.10	1.99
TSS (mg/l)	A.P.H.A. 2540D	1	16	<1	40
Sum of Anions as meq/l (meq/l)			10.426	5.076	21.949
Sum of Cations as meq/l (meq/l)			9.258	4.475	20.840

BDL - Below Detection Limit

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Certificate / Report

Lab Number			E23127	E23128	E23129
Sampled Date			2015-04-01	2015-04-01	2015-04-01
Sample Marks			1074 BH01	1074 BH02	1074 BH04
Determinand	**Method References**	**Detection Limit**	**Result**	**Result**	**Result**
Chemical Analysis					
% Error			-5.934	-6.293	-2.592
Chemical Balance			In	Out	In

Authorised Signature

Edward Khumalo
Supervisor

BDL - Below Detection Limit

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Certificate / Report

Lab Number			E23127	E23128	E23129
Sampled Date			2015-04-01	2015-04-01	2015-04-01
Sample Marks			1074 BH01	1074 BH02	1074 BH04
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
* Aluminium as Al (mg/l)	W044-30-C	0.003	<0.003	<0.003	<0.003
Arsenic as As (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Boron as B (mg/l)	W044-30-C	0.006	0.46	0.03	0.15
Barium as Ba (mg/l)	W044-30-C	0.001	0.11	0.15	0.56
* Iron as Fe (mg/l)	W044-30-C	0.001	0.05	0.01	0.02
* Manganese as Mn (mg/l)	W044-30-C	0.001	0.09	0.004	1.2
Molybdenum as Mo (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Lead as Pb (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Silicon as Si (mg/l)	W044-30-C	0.007	9.9	16.3	16.2
Strontium as Sr (mg/l)	W044-30-C	0.001	0.56	0.36	4.1
Uranium as U (mg/l)	W044-30-C	0.004	<0.004	<0.004	<0.004
Lithium as Li (mg/l)	W044-30-C	0.003	0.03	0.01	0.08
Rubidium as Rb (mg/l)	W044-33-C	0.001	<0.001	0.003	0.02

Authorised Signature

Ndileka Bangani
Supervisor

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Certificate / Report

Lab Number			E23130	E23131	E23132
Sampled Date			2015-04-01	2015-04-01	2015-04-01
Sample Marks			1074 BH05	1074 BH07	1074 BH08
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
* pH Value @ 25℃	W044-27-O		7.1	7.0	7.2
* Conductivity @ 25℃ (mS/m)	W044-27-O		167.1	154.2	210.4
* TDS (mg/l)	W044-03-W	1	1302	1112	1622
* Calcium as Ca (mg/l)	W044-30-C	0.118	119	173	205
* Calcium Hardness as CaCO3 (mg/l)	W044-30-C	1	297	432	512
* Magnesium as Mg (mg/l)	W044-30-C	0.034	51	83	91
* Magnesium Hardness as CaCO3 (mg/l)	W044-30-C	1	210	342	375
* Sodium as Na (mg/l)	W044-30-C	0.016	137	57	141
* Potassium as K (mg/l)	W044-30-C	0.093	2.8	0.98	5.9
Ammonia as NH4 (mg/l)	W044-50-W	0.10	0.7	0.3	<0.10
Ammonia as NH3 (mg/l)	W044-50-W	0.10	0.6	0.2	<0.10
Ammonia as N (mg/l)	W044-50-W	0.10	0.5	0.2	<0.10
Total Alkalinity as CaCO3 (mg/l)	W044-50-W	1	145	479	332
P Alkalinity as CaCO3 (mg/l)	APHA 2310 B/2320 B	1	-	-	-
Bicarbonate as HCO3 (mg/l)	W044-50-W		177	584	405
Carbonate as CO3 (mg/l)	W044-50-W		0	0	0
Hydroxide as OH- (mg/l)	W044-50-W		0	0	0
Chloride as Cl (mg/l)	W044-50-W	0.10	505	299	479
Sulfate as SO4 (mg/l)	W044-50-W	0.2	16.5	60	214
Nitrate as NO3 (mg/l)	W044-50-W	0.100	0.1	<0.1	36
Nitrate as N (mg/l)	W044-50-W	0.100	<0.1	<0.1	8.1
Nitrite as NO2 (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Nitrite as N (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Fluoride as F (mg/l)	W044-50-W	0.10	0.2	0.5	0.5
Phosphate as PO4 (mg/l)	W044-50-W	0.12	<0.12	<0.12	<0.12
Bromide as Br (mg/l)	W044-50-W	0.10	2.50	0.76	3.55
TSS (mg/l)	A.P.H.A. 2540D	1	38	20	<1
Sum of Anions as meq/l (meq/l)			17.494	19.278	25.204
Sum of Cations as meq/l (meq/l)			16.204	17.964	23.980

BDL - Below Detection Limit

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Certificate / Report

Lab Number			E23130	E23131	E23132
Sampled Date			2015-04-01	2015-04-01	2015-04-01
Sample Marks			1074 BH05	1074 BH07	1074 BH08
Determinand	**Method References**	**Detection Limit**	**Result**	**Result**	**Result**
Chemical Analysis					
% Error			-3.828	-3.528	-2.489
Chemical Balance			In	In	In

Authorised Signature

Edward Khumalo
Supervisor

BDL - Below Detection Limit

*** Denotes test method accredited to ISO17025**

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sanas T0040

Printed Date : 2015-04-22

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Ormonde, 2091
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Fax: (011) 496 2238
Golden No.
0861 467 765

M&L LABS
Registration Number 1974/001476/07 VATNumber 4780103505

M and L Laboratory Services (Pty) Ltd

Consulting Industrial Chemists, Analysts _Samplers

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Certificate / Report

Lab Number			E23130	E23131	E23132
Sampled Date			2015-04-01	2015-04-01	2015-04-01
Sample Marks			1074 BH05	1074 BH07	1074 BH08
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
* Aluminium as Al (mg/l)	W044-30-C	0.003	<0.003	<0.003	<0.003
Arsenic as As (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Boron as B (mg/l)	W044-30-C	0.006	0.04	0.03	0.09
Barium as Ba (mg/l)	W044-30-C	0.001	3.5	0.09	0.10
* Iron as Fe (mg/l)	W044-30-C	0.001	0.02	0.02	0.02
* Manganese as Mn (mg/l)	W044-30-C	0.001	1.3	0.17	0.002
Molybdenum as Mo (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Lead as Pb (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Silicon as Si (mg/l)	W044-30-C	0.007	5.0	24	15.0
Strontium as Sr (mg/l)	W044-30-C	0.001	1.4	1.7	2.6
Uranium as U (mg/l)	W044-30-C	0.004	<0.004	<0.004	<0.004
Lithium as Li (mg/l)	W044-30-C	0.003	0.006	0.03	0.07
Rubidium as Rb (mg/l)	W044-33-C	0.001	<0.001	<0.001	0.01

Authorised Signature

Ndileka Bangani
Supervisor

BDL - Below Detection Limit

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Certificate / Report

Lab Number			E23133	E23134	E23135
Sampled Date			2015-04-01	2015-04-01	2015-04-01
Sample Marks			1074 BH09	1074 SW01	1074 SW02
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
* pH Value @ 25°C	W044-27-O		7.5	8.1	8.6
* Conductivity @ 25°C (mS/m)	W044-27-O		213.4	132.4	124.9
* TDS (mg/l)	W044-03-W	1	1458	938	884
* Calcium as Ca (mg/l)	W044-30-C	0.118	178	89	90
* Calcium Hardness as CaCO3 (mg/l)	W044-30-C	1	445	222	225
* Magnesium as Mg (mg/l)	W044-30-C	0.034	57	39	35
* Magnesium Hardness as CaCO3 (mg/l)	W044-30-C	1	235	161	144
* Sodium as Na (mg/l)	W044-30-C	0.016	217	115	126
* Potassium as K (mg/l)	W044-30-C	0.093	3.9	9.5	12.5
Ammonia as NH4 (mg/l)	W044-50-W	0.10	0.2	<0.10	<0.10
Ammonia as NH3 (mg/l)	W044-50-W	0.10	0.2	<0.10	<0.10
Ammonia as N (mg/l)	W044-50-W	0.10	0.2	<0.10	<0.10
Total Alkalinity as CaCO3 (mg/l)	W044-50-W	1	368	146	148
P Alkalinity as CaCO3 (mg/l)	APHA 2310 B/2320 B	1	-	-	5.0
Bicarbonate as HCO3 (mg/l)	W044-50-W		449	178	168
Carbonate as CO3 (mg/l)	W044-50-W		0	0	6
Hydroxide as OH- (mg/l)	W044-50-W		0	0	0
Chloride as Cl (mg/l)	W044-50-W	0.10	538	331	234
Sulfate as SO4 (mg/l)	W044-50-W	0.2	99	95	226
Nitrate as NO3 (mg/l)	W044-50-W	0.100	<0.1	<0.1	<0.1
Nitrate as N (mg/l)	W044-50-W	0.100	<0.1	<0.1	<0.1
Nitrite as NO2 (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Nitrite as N (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Fluoride as F (mg/l)	W044-50-W	0.10	0.9	0.4	0.3
Phosphate as PO4 (mg/l)	W044-50-W	0.12	<0.12	<0.12	0.66
Bromide as Br (mg/l)	W044-50-W	0.10	3.24	0.86	0.15
TSS (mg/l)	A.P.H.A. 2540D	1	48	4	4
Sum of Anions as meq/l (meq/l)			24.633	14.250	14.277
Sum of Cations as meq/l (meq/l)			23.115	12.918	13.172

BDL - Below Detection Limit

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Certificate / Report

Lab Number			E23133	E23134	E23135
Sampled Date			2015-04-01	2015-04-01	2015-04-01
Sample Marks			1074 BH09	1074 SW01	1074 SW02
Determinand	**Method References**	**Detection Limit**	**Result**	**Result**	**Result**
Chemical Analysis					
% Error			-3.179	-4.903	-4.026
Chemical Balance			In	In	In

Authorised Signature

Edward Khumalo
Supervisor

BDL - Below Detection Limit

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Certificate / Report

Lab Number			E23133	E23134	E23135
Sampled Date			2015-04-01	2015-04-01	2015-04-01
Sample Marks			1074 BH09	1074 SW01	1074 SW02
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
* Aluminium as Al (mg/l)	W044-30-C	0.003	<0.003	<0.003	0.008
Arsenic as As (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Boron as B (mg/l)	W044-30-C	0.006	0.36	0.14	0.10
Barium as Ba (mg/l)	W044-30-C	0.001	0.25	0.20	0.11
* Iron as Fe (mg/l)	W044-30-C	0.001	0.01	0.06	0.03
* Manganese as Mn (mg/l)	W044-30-C	0.001	0.35	<0.001	0.002
Molybdenum as Mo (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Lead as Pb (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Silicon as Si (mg/l)	W044-30-C	0.007	7.7	1.6	1.4
Strontium as Sr (mg/l)	W044-30-C	0.001	3.7	0.89	0.81
Uranium as U (mg/l)	W044-30-C	0.004	<0.004	<0.004	<0.004
Lithium as Li (mg/l)	W044-30-C	0.003	0.11	0.03	0.03
Rubidium as Rb (mg/l)	W044-33-C	0.001	0.003	0.002	0.005

Authorised Signature

Ndileka Bangani
Supervisor

BDL - Below Detection Limit

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Printed Date : 2015-04-22

APPENDIX 1B: MAY (1) 2015 LABORATORY RESULTS

UIS ORGANIC LABORATORY

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williehl@uisol.co.za ◦ http://www.uisol.co.za

CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 09791 E

TEST INFORMATION Dissolved gas

ANALYTICAL METHOD: DI GC-FID

Matrix: Water

DATE RECEIVED 2015-06-01
DATE COMPLETED 2015-06-02
DATE ISSUED 2015-06-15

SAMPLE INFORMATION

Project number 1074

SAMPLE No BH1
CONTAINER TYPE Glass
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.07 µg/liter	
Dissolved Ethane	<0.38 µg/liter	

Authorised Signatory that approved this report

Reinardt Cromhout

DISCLAIMER: The results only relate to the test items provided. This report may not be reproduced, except in full, without the prior written approval of the laboratory.

Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 09791 E

TEST INFORMATION Dissolved gas

ANALYTICAL METHOD: DI GC-FID

Matrix: Water

DATE RECEIVED 2015-06-01
DATE COMPLETED 2015-06-02
DATE ISSUED 2015-06-15

SAMPLE INFORMATION Project number 1074

SAMPLE No BH2
CONTAINER TYPE Glass
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.07 µg/liter	
Dissolved Ethane	<0.38 µg/liter	

Authorised Signatory that approved this report

Reinardt Cronhout

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2015-06-15

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 09791 E

TEST INFORMATION Dissolved gas

ANALYTICAL METHOD: DI GC-FID

Matrix: Water

DATE RECEIVED 2015-06-01
DATE COMPLETED 2015-06-02
DATE ISSUED 2015-06-15

SAMPLE INFORMATION **Project number** 1074

SAMPLE No BH3
CONTAINER TYPE Glass
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.14 µg/liter	
Dissolved Ethane	<0.38 µg/liter	

Authorised Signatory that approved this report

Reinardt Cronhout

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2015-06-15

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CLIENT INFORMATION

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Ferndale

TEST REPORT

Lab No : 09791 E

TEST INFORMATION Dissolved gas

ANALYTICAL METHOD: DI GC-FID

DATE RECEIVED	2015-06-01
DATE COMPLETED	2015-06-02
DATE ISSUED	2015-06-15

Matrix: Water

SAMPLE INFORMATION **Project number** 1074

SAMPLE No BH4
CONTAINER TYPE Glass
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.07 µg/liter	
Dissolved Ethane	<0.38 µg/liter	

Authorised Signatory that approved this report

Reinardt Cronhout

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2015-06-15

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CLIENT INFORMATION

Environmental Impact Management Services (P
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Ferndale

TEST REPORT

Lab No : 09791 E

TEST INFORMATION Dissolved gas

ANALYTICAL METHOD: DI GC-FID

DATE RECEIVED	2015-06-01
DATE COMPLETED	2015-06-02
DATE ISSUED	2015-06-15

Matrix: Water

SAMPLE INFORMATION **Project number** 1074

SAMPLE No BH5
CONTAINER TYPE Glass
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.07 µg/liter	
Dissolved Ethane	<0.38 µg/liter	

Authorised Signatory that approved this report

Reinardt Cromhout

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 09791 E

TEST INFORMATION Dissolved gas

ANALYTICAL METHOD: DI GC-FID

Matrix: Water

DATE RECEIVED 2015-06-01
DATE COMPLETED 2015-06-02
DATE ISSUED 2015-06-15

SAMPLE INFORMATION

Project number 1074

SAMPLE No BH7
CONTAINER TYPE Glass
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.28 µg/liter	
Dissolved Ethane	<0.38 µg/liter	

Authorised Signatory that approved this report

Reinardt Cronhout

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CLIENT INFORMATION

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Attention: Liam Whitlow
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Ferndale

TEST REPORT

Lab No : 09791 E

TEST INFORMATION Dissolved gas

ANALYTICAL METHOD: DI GC-FID

DATE RECEIVED	2015-06-01
DATE COMPLETED	2015-06-02
DATE ISSUED	2015-06-15

Matrix: Water

SAMPLE INFORMATION **Project number** 1074

SAMPLE No BH8

CONTAINER TYPE Glass

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.07 µg/liter	
Dissolved Ethane	<0.38 µg/liter	

Authorised Signatory that approved this report

Reinardt Cronhout

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2015-06-15

Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
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Ferndale

TEST REPORT

Lab No : 09791 E

TEST INFORMATION Dissolved gas

ANALYTICAL METHOD: DI GC-FID

DATE RECEIVED	2015-06-01
DATE COMPLETED	2015-06-02
DATE ISSUED	2015-06-15

Matrix: Water

SAMPLE INFORMATION Project number 1074

SAMPLE No BH9

CONTAINER TYPE Glass

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.23 µg/liter	
Dissolved Ethane	<0.38 µg/liter	

Authorised Signatory that approved this report

Reinardt Cromhout

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2015-06-15

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CLIENT INFORMATION

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Attention: Liam Whitlow
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Ferndale

TEST REPORT

Lab No : 09791 E

TEST INFORMATION Dissolved gas

ANALYTICAL METHOD: DI GC-FID

Matrix: Water

DATE RECEIVED 2015-06-01
DATE COMPLETED 2015-06-02
DATE ISSUED 2015-06-15

SAMPLE INFORMATION

Project number 1074

SAMPLE No **SW1**
CONTAINER TYPE Glass
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.07 µg/liter	
Dissolved Ethane	<0.38 µg/liter	

Authorised Signatory that approved this report

Reinardt Cronhout

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2015-06-15

Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

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Attention: Liam Whitlow
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Ferndale

TEST REPORT

Lab No : 09791 E

TEST INFORMATION Dissolved gas

ANALYTICAL METHOD: DI GC-FID

Matrix: Water

DATE RECEIVED 2015-06-01
DATE COMPLETED 2015-06-02
DATE ISSUED 2015-06-15

SAMPLE INFORMATION Project number 1074

SAMPLE No **SW2**
CONTAINER TYPE Glass
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.07 µg/liter	
Dissolved Ethane	<0.38 µg/liter	

Authorised Signatory that approved this report

Reinardt Cronhout

DISCLAIMER: The results only relate to the test items provided. This report may not be reproduced, except in full, without the prior written approval of the laboratory.

2015-06-15

Results marked "A" - Concentration outside calibration range, estimate only

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willieh@uisol.co.za • http://www.uisol.co.za

CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 09791 B

TEST INFORMATION TPH GRO C6-C10

ANALYTICAL METHOD: SPME Extraction and GC-MS
METHOD Number: UISOL-T-012

DATE RECEIVED	2015-06-01
DATE COMPLETED	2015-06-02
DATE ISSUED	2015-06-15

SAMPLE INFORMATION

Storage conditions in the laboratory is an a Fridge @ < 6 deg C

Matrix: Water

CONTAINER TYPE Glass

Project number

Sample dilution Factor No Dilution

Sample ID	Results
1074 BH01	<10 µg/liter
1074 BH02	<10 µg/liter
1074 BH03	<10 µg/liter
1074 BH04	<10 µg/liter
1074 BH05	<10 µg/liter
1074 BH07	<10 µg/liter
1074 BH08	<10 µg/liter
1074 BH09	<10 µg/liter
1074 SW1	<10 µg/liter
1074 SW2	<10 µg/liter

Authorised Signatory : *2015-06-15*

Reinardt Cromhout

DISCLAIMER: The results only relate to the test items provided. This report may not be reproduced, except in full, without the prior written approval of the laboratory.

sanas Testing Laboratory T0419

UIS ORGANIC LABORATORY

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williah@uisol.co.za ◦ http://www.uisol.co.za

Client Information

Company :	Environment Impact Management se
Attention:	Liam Whitlow
Tel:	(011) 789 7170
Fax:	
Address	Block 5 Fernridge Office Park, 5 Hunter Street Ferndale
	2194

Analysis Report

Lab No: 9791

TEST INFORMATION	Dissolved Oxygen, Dissolved Organic carbon and Inorganic carbon
DATE RECEIVED	01/06/2015
DATE COMPLETED	15/06/2015
DATE ISSUED	16/06/2015

SAMPLE INFORMATION

SAMPLE MATRIX	Water

Sample ID	Parameters			
	DO as O_2	DOC as C	DIC as C	
BH01	6.3	1.9	34	mg/liter
BH02	6.6	1.4	7	mg/liter
BH03	6.0	1	36	mg/liter
BH04	6.7	<1.0	47	mg/liter
BH05	6.2	3	25	mg/liter
BH07	6.2	1.5	74	mg/liter
BH08	7.6	<1.0	35	mg/liter
BH09	6.7	<1.0	32	mg/liter
SW01	8.2	1.3	29	mg/liter
SW02	8.0	1.90	20	mg/liter

Authorized Signatory

F. HAVENGA

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U.T.D. - Unable To Determine

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 09791 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		METHOD Number: UISOL-T-012	
DATE RECEIVED 2015-06-01	DATE COMPLETED 2015-06-02	DATE ISSUED	2015-06-15
SAMPLE INFORMATION		Matrix: Water	
SAMPLE No BH1		Project number 1074	
CONTAINER TYPE Glass		Sample dilution Factor No Dilution	

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	<0.1	µg/liter
Acenaphthene	<0.1	µg/liter
Acenaphthylene	<0.1	µg/liter
Flourene	<0.1	µg/liter
Phenanthrene	<0.1	µg/liter
Anthracene	<0.1	µg/liter
Fluoranthene	<0.1	µg/liter
Pyrene	<0.1	µg/liter
Benzo[a]anthracene	<0.1	µg/liter
Crysene	<0.1	µg/liter
Benzo[k+b]fluoranthene*	<0.1	µg/liter
Benzo[a]pyrene*	<0.1	µg/liter
Benzo[g,h,i]perylene *	<1	µg/liter
Dibenz[a,h]anthracene *	<1	µg/liter
Indeno[123-cd]pyrene *	<1	µg/liter

Authorised Signatory that approved this report

Reinardt Cronhout

sanas Testing Laboratory T0419

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2015-06-15

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Analysis Report

Lab No : 09791 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**				
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS			METHOD Number: UISOL-T-012		
DATE RECEIVED	2015-06-01	**DATE COMPLETED**	2015-06-02	**DATE ISSUED**	2015-06-15
SAMPLE INFORMATION		**Matrix:**	Water		
SAMPLE No	**BH2**	**Project number**	1074		
CONTAINER TYPE	Glass	**Sample dilution Factor**	No Dilution		

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<1**	**µg/liter**
Dibenz[a,h]anthracene *	**<1**	**µg/liter**
Indeno[123-cd]pyrene *	**<1**	**µg/liter**

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Analysis Report

Lab No : 09791 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		METHOD Number:	UISOL-T-012
DATE RECEIVED	2015-06-01	**DATE COMPLETED** 2015-06-02	**DATE ISSUED** 2015-06-15
SAMPLE INFORMATION		**Matrix:**	Water
SAMPLE No	**BH3**	**Project number**	1074
CONTAINER TYPE	Glass	**Sample dilution Factor**	No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<1**	**µg/liter**
Dibenz[a,h]anthracene *	**<1**	**µg/liter**
Indeno[123-cd]pyrene *	**<1**	**µg/liter**

Authorised Signatory that approved this report

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Analysis Report

Lab No : 09791 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		METHOD Number: UISOL-T-012	
DATE RECEIVED 2015-06-01	DATE COMPLETED 2015-06-02	DATE ISSUED	2015-06-15
SAMPLE INFORMATION		Matrix: Water	
SAMPLE No BH4		Project number 1074	
CONTAINER TYPE Glass		Sample dilution Factor No Dilution	

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	<0.1	µg/liter
Acenaphthene	<0.1	µg/liter
Acenaphthylene	<0.1	µg/liter
Flourene	<0.1	µg/liter
Phenanthrene	<0.1	µg/liter
Anthracene	<0.1	µg/liter
Fluoranthene	<0.1	µg/liter
Pyrene	<0.1	µg/liter
Benzo[a]anthracene	<0.1	µg/liter
Crysene	<0.1	µg/liter
Benzo[k+b]fluoranthene*	<0.1	µg/liter
Benzo[a]pyrene*	<0.1	µg/liter
Benzo[g,h,i]perylene *	<1	µg/liter
Dibenz[a,h]anthracene *	<1	µg/liter
Indeno[123-cd]pyrene *	<1	µg/liter

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Analysis Report

Lab No : 09791 A

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2015-06-01 DATE COMPLETED 2015-06-02 DATE ISSUED 2015-06-15

SAMPLE INFORMATION
SAMPLE No BH5
CONTAINER TYPE Glass

Matrix: Water
Project number 1074
Sample dilution Factor No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	<0.1 µg/liter
Acenaphthene	<0.1 µg/liter
Acenaphthylene	<0.1 µg/liter
Flourene	<0.1 µg/liter
Phenanthrene	<0.1 µg/liter
Anthracene	<0.1 µg/liter
Fluoranthene	<0.1 µg/liter
Pyrene	<0.1 µg/liter
Benzo[a]anthracene	<0.1 µg/liter
Crysene	<0.1 µg/liter
Benzo[k+b]fluoranthene*	<0.1 µg/liter
Benzo[a]pyrene*	<0.1 µg/liter
Benzo[g,h,i]perylene *	<1 µg/liter
Dibenz[a,h]anthracene *	<1 µg/liter
Indeno[123-cd]pyrene *	<1 µg/liter

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Analysis Report

Lab No : 09791 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		METHOD Number: UISOL-T-012	
DATE RECEIVED 2015-06-01	DATE COMPLETED 2015-06-02	**DATE ISSUED**	2015-06-15
SAMPLE INFORMATION		Matrix: Water	
SAMPLE No **BH7**		Project number 1074	
CONTAINER TYPE Glass		**Sample dilution Factor** No Dilution	

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<1 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

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Analysis Report

Lab No : 09791 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**				
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS			METHOD Number: UISOL-T-012		
DATE RECEIVED	2015-06-01	DATE COMPLETED	2015-06-02	DATE ISSUED	2015-06-15

SAMPLE INFORMATION		Matrix:	Water
SAMPLE No	BH8	Project number	1074
CONTAINER TYPE	Glass	Sample dilution Factor	No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	<0.1	µg/liter
Acenaphthene	<0.1	µg/liter
Acenaphthylene	<0.1	µg/liter
Flourene	<0.1	µg/liter
Phenanthrene	<0.1	µg/liter
Anthracene	<0.1	µg/liter
Fluoranthene	<0.1	µg/liter
Pyrene	<0.1	µg/liter
Benzo[a]anthracene	<0.1	µg/liter
Crysene	<0.1	µg/liter
Benzo[k+b]fluoranthene*	<0.1	µg/liter
Benzo[a]pyrene*	<0.1	µg/liter
Benzo[g,h,i]perylene *	<1	µg/liter
Dibenz[a,h]anthracene *	<1	µg/liter
Indeno[123-cd]pyrene *	<1	µg/liter

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Analysis Report

Lab No : 09791 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS	METHOD Number: UISOL-T-012
DATE RECEIVED 2015-06-01	DATE COMPLETED 2015-06-02 DATE ISSUED 2015-06-15
SAMPLE INFORMATION	Matrix: Water
SAMPLE No **BH9**	Project number 1074
CONTAINER TYPE Glass	Sample dilution Factor No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<1**	**µg/liter**
Dibenz[a,h]anthracene *	**<1**	**µg/liter**
Indeno[123-cd]pyrene *	**<1**	**µg/liter**

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Analysis Report

Lab No : 09791 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		METHOD Number: UISOL-T-012	
DATE RECEIVED 2015-06-01	DATE COMPLETED 2015-06-02	DATE ISSUED	2015-06-15
SAMPLE INFORMATION		Matrix: Water	
SAMPLE No **SW1**		Project number 1074	
CONTAINER TYPE Glass		Sample dilution Factor No Dilution	

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<1**	**µg/liter**
Dibenz[a,h]anthracene *	**<1**	**µg/liter**
Indeno[123-cd]pyrene *	**<1**	**µg/liter**

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Analysis Report

Lab No : 09791 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		**METHOD Number:** UISOL-T-012	
DATE RECEIVED	2015-06-01	DATE COMPLETED 2015-06-02	**DATE ISSUED** 2015-06-15
SAMPLE INFORMATION		**Matrix:** Water	
SAMPLE No	**SW2**	**Project number** 1074	
CONTAINER TYPE	Glass	**Sample dilution Factor** No Dilution	

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<1**	**µg/liter**
Dibenz[a,h]anthracene *	**<1**	**µg/liter**
Indeno[123-cd]pyrene *	**<1**	**µg/liter**

Authorised Signatory that approved this report

Reinardt Cronhout

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Results marked "A" - Concentration outside calibration range, estimate only

2015-06-15

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Environmental Impact Management Services (P
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Block 5 Fernridge Office Park, 5 Hunter Street
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Analysis Certificate Total Oil and Grease

Lab No : 09791

DATE RECEIVED 2015-06-01
DATE COMPLETED 2015-06-02

Project number

Matrix Water

Sample Number	Total Oil and Grease	
1074 BH01	<1	mg/liter (ppm)
1074 BH02	<1	mg/liter (ppm)
1074 BH03	<1	mg/liter (ppm)
1074 BH04	<1	mg/liter (ppm)
1074 BH05	<1	mg/liter (ppm)
1074 BH07	<1	mg/liter (ppm)
1074 BH08	<1	mg/liter (ppm)
1074 BH09	<1	mg/liter (ppm)
1074 SW1	<1	mg/liter (ppm)

Analytical method: Solvent Extraction and Gravimetric determination

Authorised Signatory :.

WJ Havenga **Technical Manager**

Reporting date: ***15 June 2015***

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CLIENT INFORMATION
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Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Analysis Certificate Total Oil and Grease

Lab No : 09791

DATE RECEIVED 2015-06-01
DATE COMPLETED 2015-06-02

Project number

Matrix Water

Sample Number	Total Oil and Grease	
1074 SW2	<1	mg/liter (ppm)

Analytical method: Solvent Extraction and Gravimetric determination

Authorised Signatory :.

WJ Havenga **Technical Manager**

Reporting date: ***15 June 2015***

UIS ORGANIC LABORATORY

UIS Organic Laboratory (Pty) Ltd • Reg. No. 2007/001896/07
VAT No 4340243221
Unit 3 Carrera House ◦ 17 Sovereign St ◦
Route 21 Office Park ◦ Irene ◦ 0062
Tel. +27 83 3098373
willieh@uisol.co.za ◦ http://www.uisol.co.za

CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Analysis Report

Lab No : 09791 C

TEST INFORMATION TPH C10 - C40

ANALYTICAL METHOD:For Soil ASE Ext. and GC/FID
ANALYTICAL METHOD:For Water Liquid/Liquid Ext. and GC/FID
METHOD Number: UISOL-T-010

DATE RECEIVED	2015-06-01
DATE COMPLETED	2015-06-02
DATE ISSUED	2015-06-15

SAMPLE INFORMATION

Project Name
Project number
CONTAINER TYPE Glass

Storage conditions in the laboratory is in a Fridge @ < 6 deg C

Sample ID	Matrix	C10 - C28	C28 - C40*	Total*
1074 BH01	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH02	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH03	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH04	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH05	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH07	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH08	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter

Authorised Signatory : *2015-06-15*

Reinardt Cromhout

DISCLAIMER: The results only relate to the test items provided. This report may not be reproduced, except in full, without the prior written approval of the laboratory. Results for TPH are not included in the SANAS Accreditation Shedule for our laboratory.

Parameters marked " * " in this Report are not included in the SANAS Schedule of Accreditation for this laboratory".

sanas Testing Laboratory T0419

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Analysis Report

Lab No : 09791 C

TEST INFORMATION TPH C10 - C40

ANALYTICAL METHOD:For Soil ASE Ext. and GC/FID
ANALYTICAL METHOD:For Water Liquid/Liquid Ext. and GC/FID
METHOD Number: UISOL-T-010

DATE RECEIVED	2015-06-01
DATE COMPLETED	2015-06-02
DATE ISSUED	2015-06-15

SAMPLE INFORMATION

Project Name

Project number

CONTAINER TYPE Glass

Storage conditions in the laboratory is in a Fridge @ < 6 deg C

Sample ID	Matrix	C10 - C28	C28 - C40*	Total*
1074 BH09	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 SW1	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 SW2	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter

Authorised Signatory : *2015-06-15*

Reinardt Cromhout

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M and L Laboratory Services (Pty) Ltd

Consulting Industrial Chemists, Analysts ,Samplers

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Certificate / Report

COMPANY NAME	: ENVIRONMENTAL IMPACT MANAGEMENT SERVICES
ADDRESS	: PO BOX 2083 PINEGOWRIE 2123
SUBJECT	: ANALYSIS OF 10 WATER SAMPLES
PROJECT REFERENCE	:
INSTRUCTED BY	: M MAGALA
ORDER NUMBER	: M&L INSTRUCTION NO 15344
RECEIVED ON	: 2015-06-01
ANALYSIS COMPLETED	: 2015-06-10

BDL - Below Detection Limit

*** Denotes test method accredited to ISO17025**

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Certificate / Report

Lab Number			E24806	E24807	E24808
Sampled Date					
Sample Marks			1074 BH01	1074 BH02	1074 BH03
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
* pH Value @ 25℃	W044-27-O		7.4	7.0	7.9
* Conductivity @ 25℃ (mS/m)	W044-27-O		143.0	43.3	55.5
* TDS (mg/l)	W044-03-W	1	764	196	264
* Calcium as Ca (mg/l)	W044-30-C	0.118	96	40	28
* Calcium Hardness as CaCO3 (mg/l)	W044-30-C	1	240	100	70
* Magnesium as Mg (mg/l)	W044-30-C	0.034	37	13.2	5.8
* Magnesium Hardness as CaCO3 (mg/l)	W044-30-C	1	152	54	24
* Sodium as Na (mg/l)	W044-30-C	0.016	151	37	96
* Potassium as K (mg/l)	W044-30-C	0.093	1.5	5.0	0.95
Ammonia as NH4 (mg/l)	W044-50-W	0.10	<0.10	<0.10	0.2
Ammonia as NH3 (mg/l)	W044-50-W	0.10	<0.10	<0.10	0.2
Ammonia as N (mg/l)	W044-50-W	0.10	<0.10	<0.10	0.2
Total Alkalinity as CaCO3 (mg/l)	W044-50-W	1	295	166	221
Bicarbonate as HCO3 (mg/l)	W044-50-W		360	202	269
Carbonate as CO3 (mg/l)	W044-50-W		0	0	0
Hydroxide as OH- (mg/l)	W044-50-W		0	0	0
Chloride as Cl (mg/l)	W044-50-W	0.10	233	14.0	28
Sulfate as SO4 (mg/l)	W044-50-W	0.2	36	18.4	13.5
Nitrate as NO3 (mg/l)	W044-50-W	0.100	8.0	2.8	<0.1
Nitrate as N (mg/l)	W044-50-W	0.100	1.8	0.6	<0.1
Nitrite as NO2 (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Nitrite as N (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Fluoride as F (mg/l)	W044-50-W	0.10	0.5	0.1	0.4
Phosphate as PO4 (mg/l)	W044-50-W	0.12	<0.12	<0.12	<0.12
Bromide as Br (mg/l)	W044-50-W	0.10	1.87	0.11	<0.10
TSS (mg/l)	A.P.H.A. 2540D	1	<1	<1	2
Sum of Anions as meq/l (meq/l)			13.370	4.145	5.507
Sum of Cations as meq/l (meq/l)			14.488	4.848	6.080
% Error			4.013	7.817	4.945

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Certificate / Report

Lab Number			E24806	E24807	E24808
Sampled Date					
Sample Marks			1074 BH01	1074 BH02	1074 BH03
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
Chemical Balance			In	Out	In

Authorised Signature

Edward Khumalo
Supervisor

BDL - Below Detection Limit

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Certificate / Report

Lab Number			E24806	E24807	E24808
Sampled Date					
Sample Marks			1074 BH01	1074 BH02	1074 BH03
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
* Aluminium as Al (mg/l)	W044-30-C	0.003	<0.003	<0.003	<0.003
Arsenic as As (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Boron as B (mg/l)	W044-30-C	0.006	0.20	<0.006	0.25
Barium as Ba (mg/l)	W044-30-C	0.001	0.29	0.22	0.18
* Iron as Fe (mg/l)	W044-30-C	0.001	0.06	0.01	0.07
* Manganese as Mn (mg/l)	W044-30-C	0.001	0.02	0.001	0.07
Molybdenum as Mo (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Lead as Pb (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Silicon as Si (mg/l)	W044-30-C	0.007	21	20	8.6
Strontium as Sr (mg/l)	W044-30-C	0.001	1.3	0.41	0.61
Uranium as U (mg/l)	W044-30-C	0.004	<0.004	<0.004	<0.004
Lithium as Li (mg/l)	W044-30-C	0.003	0.03	0.01	0.03
Rubidium as Rb (mg/l)	W044-33-C	0.001	0.04	0.01	0.008

Authorised Signature

Ndileka Bangani
Supervisor

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Certificate / Report

Lab Number			E24809	E24810	E24811
Sampled Date					
Sample Marks			1074 BH04	1074 BH05	1074 BH07
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
* pH Value @ 25℃	W044-27-O		7.6	7.2	7.0
* Conductivity @ 25℃ (mS/m)	W044-27-O		216.0	220.0	172.0
* TDS (mg/l)	W044-03-W	1	1204	1360	1052
* Calcium as Ca (mg/l)	W044-30-C	0.118	127	152	132
* Calcium Hardness as CaCO3 (mg/l)	W044-30-C	1	317	380	330
* Magnesium as Mg (mg/l)	W044-30-C	0.034	50	51	104
* Magnesium Hardness as CaCO3 (mg/l)	W044-30-C	1	206	210	428
* Sodium as Na (mg/l)	W044-30-C	0.016	191	161	61
* Potassium as K (mg/l)	W044-30-C	0.093	2.4	1.9	0.80
Ammonia as NH4 (mg/l)	W044-50-W	0.10	0.9	0.7	0.1
Ammonia as NH3 (mg/l)	W044-50-W	0.10	0.9	0.6	0.1
Ammonia as N (mg/l)	W044-50-W	0.10	0.7	0.5	0.1
Total Alkalinity as CaCO3 (mg/l)	W044-50-W	1	295	284	402
Bicarbonate as HCO3 (mg/l)	W044-50-W		360	346	490
Carbonate as CO3 (mg/l)	W044-50-W		0	0	0
Hydroxide as OH- (mg/l)	W044-50-W		0	0	0
Chloride as Cl (mg/l)	W044-50-W	0.10	477	500	280
Sulfate as SO4 (mg/l)	W044-50-W	0.2	34	39	44
Nitrate as NO3 (mg/l)	W044-50-W	0.100	0.1	<0.1	<0.1
Nitrate as N (mg/l)	W044-50-W	0.100	<0.1	<0.1	<0.1
Nitrite as NO2 (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Nitrite as N (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Fluoride as F (mg/l)	W044-50-W	0.10	0.5	0.4	0.5
Phosphate as PO4 (mg/l)	W044-50-W	0.12	0.16	<0.12	<0.12
Bromide as Br (mg/l)	W044-50-W	0.10	2.42	2.55	1.37
TSS (mg/l)	A.P.H.A. 2540D	1	4	24	6
Sum of Anions as meq/l (meq/l)			20.081	20.607	16.870
Sum of Cations as meq/l (meq/l)			18.876	18.816	17.803
% Error			-3.093	-4.543	2.691

BDL - Below Detection Limit

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Certificate / Report

Lab Number			E24809	E24810	E24811
Sampled Date					
Sample Marks			1074 BH04	1074 BH05	1074 BH07
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
Chemical Balance			In	In	In

Authorised Signature

Edward Khumalo
Supervisor

BDL - Below Detection Limit

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Certificate / Report

Lab Number			E24809	E24810	E24811
Sampled Date					
Sample Marks			1074 BH04	1074 BH05	1074 BH07
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
* Aluminium as Al (mg/l)	W044-30-C	0.003	<0.003	<0.003	<0.003
Arsenic as As (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Boron as B (mg/l)	W044-30-C	0.006	0.12	0.07	<0.006
Barium as Ba (mg/l)	W044-30-C	0.001	0.80	0.99	0.11
* Iron as Fe (mg/l)	W044-30-C	0.001	0.13	0.01	0.02
* Manganese as Mn (mg/l)	W044-30-C	0.001	1.6	4.2	0.22
Molybdenum as Mo (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Lead as Pb (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Silicon as Si (mg/l)	W044-30-C	0.007	21	18.7	27
Strontium as Sr (mg/l)	W044-30-C	0.001	4.2	1.3	1.8
Uranium as U (mg/l)	W044-30-C	0.004	0.006	<0.004	<0.004
Lithium as Li (mg/l)	W044-30-C	0.003	0.07	0.008	0.03
Rubidium as Rb (mg/l)	W044-33-C	0.001	0.04	0.03	0.04

Authorised Signature

Ndileka Bangani
Supervisor

BDL - Below Detection Limit

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Certificate / Report

Lab Number			E24812	E24813	E24814
Sampled Date					
Sample Marks			1074 BH08	1074 BH09	1074 SW01
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
* pH Value @ 25℃	W044-27-O		7.2	7.3	8.0
* Conductivity @ 25℃ (mS/m)	W044-27-O		273.0	252.0	232.0
* TDS (mg/l)	W044-03-W	1	1828	1524	1548
* Calcium as Ca (mg/l)	W044-30-C	0.118	183	153	112
* Calcium Hardness as CaCO3 (mg/l)	W044-30-C	1	457	382	280
* Magnesium as Mg (mg/l)	W044-30-C	0.034	129	43	47
* Magnesium Hardness as CaCO3 (mg/l)	W044-30-C	1	531	177	193
* Sodium as Na (mg/l)	W044-30-C	0.016	189	247	216
* Potassium as K (mg/l)	W044-30-C	0.093	5.5	3.5	9.8
Ammonia as NH4 (mg/l)	W044-50-W	0.10	<0.10	0.1	<0.10
Ammonia as NH3 (mg/l)	W044-50-W	0.10	<0.10	0.1	<0.10
Ammonia as N (mg/l)	W044-50-W	0.10	<0.10	0.1	<0.10
Total Alkalinity as CaCO3 (mg/l)	W044-50-W	1	271	320	127
Bicarbonate as HCO3 (mg/l)	W044-50-W		330	390	155
Carbonate as CO3 (mg/l)	W044-50-W		0	0	0
Hydroxide as OH- (mg/l)	W044-50-W		0	0	0
Chloride as Cl (mg/l)	W044-50-W	0.10	589	561	579
Sulfate as SO4 (mg/l)	W044-50-W	0.2	212	94	95
Nitrate as NO3 (mg/l)	W044-50-W	0.100	27	<0.1	<0.1
Nitrate as N (mg/l)	W044-50-W	0.100	6.1	<0.1	<0.1
Nitrite as NO2 (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Nitrite as N (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Fluoride as F (mg/l)	W044-50-W	0.10	0.6	0.9	0.5
Phosphate as PO4 (mg/l)	W044-50-W	0.12	<0.12	<0.12	<0.12
Bromide as Br (mg/l)	W044-50-W	0.10	4.16	3.31	2.79
TSS (mg/l)	A.P.H.A. 2540D	1	8	<1	<1
Sum of Anions as meq/l (meq/l)			26.905	24.218	20.869
Sum of Cations as meq/l (meq/l)			28.125	21.989	19.142
% Error			2.217	-4.824	-4.316

BDL - Below Detection Limit

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Certificate / Report

Lab Number			E24812	E24813	E24814
Sampled Date					
Sample Marks			1074 BH08	1074 BH09	1074 SW01
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
Chemical Balance			In	In	In

Authorised Signature

Edward Khumalo
Supervisor

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Certificate / Report

Lab Number			E24812	E24813	E24814
Sampled Date					
Sample Marks			1074 BH08	1074 BH09	1074 SW01
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
* Aluminium as Al (mg/l)	W044-30-C	0.003	<0.003	<0.003	<0.003
Arsenic as As (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Boron as B (mg/l)	W044-30-C	0.006	0.07	0.32	0.21
Barium as Ba (mg/l)	W044-30-C	0.001	0.13	0.34	0.34
* Iron as Fe (mg/l)	W044-30-C	0.001	0.03	0.39	0.04
* Manganese as Mn (mg/l)	W044-30-C	0.001	0.01	0.56	0.05
Molybdenum as Mo (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Lead as Pb (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Silicon as Si (mg/l)	W044-30-C	0.007	16.4	9.5	1.1
Strontium as Sr (mg/l)	W044-30-C	0.001	3.3	4.0	1.6
Uranium as U (mg/l)	W044-30-C	0.004	<0.004	<0.004	<0.004
Lithium as Li (mg/l)	W044-30-C	0.003	0.08	0.11	0.06
Rubidium as Rb (mg/l)	W044-33-C	0.001	0.03	0.02	<0.001

Authorised Signature

Ndileka Bangani
Supervisor

BDL - Below Detection Limit

*** Denotes test method accredited to ISO17025**

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sanas T0040

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M&L LABS
Registration Number 1974/001476/07 VATNumber 4780103505

M and L Laboratory Services (Pty) Ltd

Consulting Industrial Chemists, Analysts ,Samplers

CONFIDENTIAL

Certificate / Report

Lab Number			E24815
Sampled Date			
Sample Marks			1074 SW02
Determinand	**Method References**	**Detection Limit**	**Result**
Chemical Analysis			
* pH Value @ 25℃	W044-27-O		8.2
* Conductivity @ 25℃ (mS/m)	W044-27-O		157.0
* TDS (mg/l)	W044-03-W	1	960
* Calcium as Ca (mg/l)	W044-30-C	0.118	75
* Calcium Hardness as CaCO3 (mg/l)	W044-30-C	1	187
* Magnesium as Mg (mg/l)	W044-30-C	0.034	29
* Magnesium Hardness as CaCO3 (mg/l)	W044-30-C	1	119
* Sodium as Na (mg/l)	W044-30-C	0.016	147
* Potassium as K (mg/l)	W044-30-C	0.093	14.2
Ammonia as NH4 (mg/l)	W044-50-W	0.10	<0.10
Ammonia as NH3 (mg/l)	W044-50-W	0.10	<0.10
Ammonia as N (mg/l)	W044-50-W	0.10	<0.10
Total Alkalinity as CaCO3 (mg/l)	W044-50-W	1	171
Bicarbonate as HCO3 (mg/l)	W044-50-W		208
Carbonate as CO3 (mg/l)	W044-50-W		0
Hydroxide as OH- (mg/l)	W044-50-W		0
Chloride as Cl (mg/l)	W044-50-W	0.10	273
Sulfate as SO4 (mg/l)	W044-50-W	0.2	158
Nitrate as NO3 (mg/l)	W044-50-W	0.100	0.4
Nitrate as N (mg/l)	W044-50-W	0.100	0.1
Nitrite as NO2 (mg/l)	W044-50-W	0.100	<0.10
Nitrite as N (mg/l)	W044-50-W	0.100	<0.10
Fluoride as F (mg/l)	W044-50-W	0.10	0.3
Phosphate as PO4 (mg/l)	W044-50-W	0.12	1.60
Bromide as Br (mg/l)	W044-50-W	0.10	0.45
TSS (mg/l)	A.P.H.A. 2540D	1	6
Sum of Anions as meq/l (meq/l)			14.427
Sum of Cations as meq/l (meq/l)			12.951
% Error			-5.391

BDL - Below Detection Limit

*** Denotes test method accredited to ISO17025**

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M&L LABS

Registration Number 1974/001476/07 VATNumber 4780103505

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Certificate / Report

Lab Number			E24815
Sampled Date			
Sample Marks			1074 SW02
Determinand	**Method References**	**Detection Limit**	**Result**
Chemical Analysis			
Chemical Balance			In

Authorised Signature

Edward Khumalo
Supervisor

BDL - Below Detection Limit

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Consulting Industrial Chemists, Analysts _Samplers

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Certificate / Report

Lab Number			E24815
Sampled Date			
Sample Marks			1074 SW02
Determinand	Method References	Detection Limit	Result
Metals			
* Aluminium as Al (mg/l)	W044-30-C	0.003	<0.003
Arsenic as As (mg/l)	W044-30-C	0.001	<0.001
Boron as B (mg/l)	W044-30-C	0.006	0.12
Barium as Ba (mg/l)	W044-30-C	0.001	0.13
* Iron as Fe (mg/l)	W044-30-C	0.001	0.02
* Manganese as Mn (mg/l)	W044-30-C	0.001	<0.001
Molybdenum as Mo (mg/l)	W044-30-C	0.001	<0.001
Lead as Pb (mg/l)	W044-30-C	0.001	<0.001
Silicon as Si (mg/l)	W044-30-C	0.007	0.88
Strontium as Sr (mg/l)	W044-30-C	0.001	0.97
Uranium as U (mg/l)	W044-30-C	0.004	<0.004
Lithium as Li (mg/l)	W044-30-C	0.003	0.03
Rubidium as Rb (mg/l)	W044-33-C	0.001	<0.001

Authorised Signature

Ndileka Bangani
Supervisor

BDL - Below Detection Limit

*** Denotes test method accredited to ISO17025**

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APPENDIX 1C: MAY (2) 2015 LABORATORY RESULTS

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willieh@uisol.co.za ◦ http://www.uisol.co.za

CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 09710B

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: HS GC-FID

Matrix: Water

DATE RECEIVED 2015-05-15
DATE COMPLETED 2015-05-20
DATE ISSUED 2015-05-27

SAMPLE INFORMATION **Project number**

SAMPLE No **1074 BH01**
CONTAINER TYPE Glass
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.07 mg/liter	
Dissolved Ethane	<0.038 mg/liter	

Authorised Signatory that approved this report

Reinardt Cronhout

DISCLAIMER: The results only relate to the test items provided. This report may not be reproduced, except in full, without the prior written approval of the laboratory.

2015-05-27

Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
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Ferndale

TEST REPORT

Lab No : 09710B

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: HS GC-FID

Matrix: Water

DATE RECEIVED 2015-05-15
DATE COMPLETED 2015-05-20
DATE ISSUED 2015-05-27

SAMPLE INFORMATION **Project number**

SAMPLE No **1074 BH02**
CONTAINER TYPE Glass
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.07 mg/liter	
Dissolved Ethane	<0.038 mg/liter	

Authorised Signatory that approved this report

Reinardt Cronhout

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
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Ferndale

TEST REPORT

Lab No : 09710B

TEST INFORMATION **Dissolved Gasses**

ANALYTICAL METHOD: HS GC-FID

DATE RECEIVED	2015-05-15
DATE COMPLETED	2015-05-20
DATE ISSUED	2015-05-27

Matrix: Water

SAMPLE INFORMATION Project number

SAMPLE No **1074 BH03**

CONTAINER TYPE Glass

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.17 mg/liter	
Dissolved Ethane	<0.038 mg/liter	

Authorised Signatory that approved this report

Reinardt Cronhout

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CLIENT INFORMATION

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Ferndale

TEST REPORT

Lab No : 09710B

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: HS GC-FID

Matrix: Water

DATE RECEIVED 2015-05-15
DATE COMPLETED 2015-05-20
DATE ISSUED 2015-05-27

SAMPLE INFORMATION **Project number**

SAMPLE No **1074 BH04**
CONTAINER TYPE Glass
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.34 mg/liter	
Dissolved Ethane	<0.038 mg/liter	

Authorised Signatory that approved this report

Reinardt Cromhout

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Results marked "A" - Concentration outside calibration range, estimate only

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CLIENT INFORMATION

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Attention: Liam Whitlow
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TEST REPORT

Lab No : 09710B

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: HS GC-FID

DATE RECEIVED	2015-05-15
DATE COMPLETED	2015-05-20
DATE ISSUED	2015-05-27

Matrix: Water

SAMPLE INFORMATION Project number

SAMPLE No 1074 BH05

CONTAINER TYPE Glass

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.07 mg/liter	
Dissolved Ethane	<0.038 mg/liter	

Authorised Signatory that approved this report

Reinardt Cronhout

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 09710B

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: HS GC-FID

DATE RECEIVED	2015-05-15
DATE COMPLETED	2015-05-20
DATE ISSUED	2015-05-27

Matrix: Water

SAMPLE INFORMATION **Project number**

SAMPLE No **1074 BH07**

CONTAINER TYPE Glass

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.22 mg/liter	
Dissolved Ethane	<0.038 mg/liter	

Authorised Signatory that approved this report

Reinardt Cronhout

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CLIENT INFORMATION

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Ferndale

TEST REPORT

Lab No : 09710B

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: HS GC-FID

Matrix: Water

DATE RECEIVED 2015-05-15
DATE COMPLETED 2015-05-20
DATE ISSUED 2015-05-27

SAMPLE INFORMATION **Project number**

SAMPLE No **1074 BH08**
CONTAINER TYPE Glass
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.07 mg/liter	
Dissolved Ethane	<0.038 mg/liter	

Authorised Signatory that approved this report

Reinardt Cronhout

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CLIENT INFORMATION

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TEST REPORT

Lab No : 09710B

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: HS GC-FID

DATE RECEIVED	2015-05-15
DATE COMPLETED	2015-05-20
DATE ISSUED	2015-05-27

Matrix: Water

SAMPLE INFORMATION **Project number**

SAMPLE No **1074 BH09**

CONTAINER TYPE Glass

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	0.14 mg/liter	
Dissolved Ethane	<0.038 mg/liter	

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CLIENT INFORMATION

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TEST REPORT

Lab No : 09710B

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: HS GC-FID

Matrix: Water

DATE RECEIVED 2015-05-15
DATE COMPLETED 2015-05-20
DATE ISSUED 2015-05-27

SAMPLE INFORMATION **Project number**

SAMPLE No **1074 SW01**
CONTAINER TYPE Glass
Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.07 mg/liter	
Dissolved Ethane	<0.038 mg/liter	

Authorised Signatory that approved this report

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CLIENT INFORMATION

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Ferndale

TEST REPORT

Lab No : 09710B

TEST INFORMATION Dissolved Gasses

ANALYTICAL METHOD: HS GC-FID

DATE RECEIVED	2015-05-15
DATE COMPLETED	2015-05-20
DATE ISSUED	2015-05-27

Matrix: Water

SAMPLE INFORMATION **Project number**

SAMPLE No **1074 SW02**

CONTAINER TYPE Glass

Sample dilution Factor No Dilution

Parameter	Results	Remark
Dissolved Methane	<0.07 mg/liter	
Dissolved Ethane	<0.038 mg/liter	

Authorised Signatory that approved this report

Reinardt Cronhout

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2015-05-27

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CLIENT INFORMATION

Environmental Impact Management Services (P
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Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

TEST REPORT

Lab No : 09710A

TEST INFORMATION TPH GRO C6-C10

ANALYTICAL METHOD: SPME Extraction and GC-MS
METHOD Number: UISOL-T-012

DATE RECEIVED	2015-05-15
DATE COMPLETED	2015-05-20
DATE ISSUED	2015-05-27

SAMPLE INFORMATION

Storage conditions in the laboratory is an a Fridge @ < 6 deg C

Matrix: Water

CONTAINER TYPE Glass

Project number

Sample dilution Factor No Dilution

Sample ID	Results
1074 BH 01	<10 µg/liter
1074 BH 02	<10 µg/liter
1074 BH 03	<10 µg/liter
1074 BH 04	<10 µg/liter
1074 BH 05	<10 µg/liter
1074 BH 07	<10 µg/liter
1074 BH 08	<10 µg/liter
1074 BH 09	<10 µg/liter
1074 SW 01	<10 µg/liter
1074 SW 02	<10 µg/liter

Authorised Signatory : *2015-05-27*

Reinardt Cromhout

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sanas Testing Laboratory T0419

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 09710 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		METHOD Number: UISOL-T-012	
DATE RECEIVED	2015-05-15	DATE COMPLETED 2015-05-20	DATE ISSUED 2015-05-27
SAMPLE INFORMATION		Matrix:	Water
SAMPLE No	1074 BH 01	Project number	
CONTAINER TYPE	Glass	Sample dilution Factor	No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<1 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cronhout

sanas Testing Laboratory T0418

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Results marked "A" - Concentration outside calibration range, estimate only

2015-05-27

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 09710 A

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS **METHOD Number:** UISOL-T-012
DATE RECEIVED 2015-05-15 DATE COMPLETED 2015-05-20 **DATE ISSUED** 2015-05-27

SAMPLE INFORMATION **Matrix:** Water
SAMPLE No **1074 BH 02** **Project number**
CONTAINER TYPE Glass **Sample dilution Factor** No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<1**	**µg/liter**
Dibenz[a,h]anthracene *	**<1**	**µg/liter**
Indeno[123-cd]pyrene *	**<1**	**µg/liter**

Authorised Signatory that approved this report

Reinardt Cronhout

sanas Testing Laboratory T0419

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2015-05-27

UIS ORGANIC LABORATORY

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunt
Ferndale

Analysis Report

Lab No : 09710 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		**METHOD Number:** UISOL-T-012	
DATE RECEIVED	2015-05-15	DATE COMPLETED 2015-05-20	**DATE ISSUED** 2015-05-27
SAMPLE INFORMATION		**Matrix:** Water	
SAMPLE No	1074 BH 03	**Project number**	
CONTAINER TYPE	Glass	**Sample dilution Factor** No Dilution	

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<1 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cronhout

sanas Testing Laboratory T0419

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2015-05-27

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CLIENT INFORMATION

Environmental Impact Management S
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Ferndale

Analysis Report

Lab No : 09710 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		**METHOD Number:**	UISOL-T-012
DATE RECEIVED	2015-05-15	DATE COMPLETED 2015-05-20	**DATE ISSUED** 2015-05-27
SAMPLE INFORMATION		**Matrix:**	Water
SAMPLE No	1074 BH 04	Project number	
CONTAINER TYPE	Glass	**Sample dilution Factor**	No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<1**	**µg/liter**
Dibenz[a,h]anthracene *	**<1**	**µg/liter**
Indeno[123-cd]pyrene *	**<1**	**µg/liter**

Authorised Signatory that approved this report

Reinardt Cronhout

sanas Testing Laboratory T0419

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2015-05-27

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CLIENT INFORMATION

Environmental Impact Management S
Liam Whitlow
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Ferndale

Analysis Report

Lab No : 09710 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		METHOD Number: UISOL-T-012	
DATE RECEIVED	2015-05-15	DATE COMPLETED 2015-05-20	**DATE ISSUED** 2015-05-27
SAMPLE INFORMATION		Matrix: Water	
SAMPLE No	1074 BH 05	Project number	
CONTAINER TYPE	Glass	Sample dilution Factor	No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<1 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

Reinardt Cronhout

sanas Testing Laboratory T0419

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2015-05-27

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CLIENT INFORMATION

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Liam Whitlow
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Ferndale

Analysis Report

Lab No : 09710 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**				
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS			METHOD Number: UISOL-T-012		
DATE RECEIVED	2015-05-15	DATE COMPLETED	2015-05-20	**DATE ISSUED**	2015-05-27
SAMPLE INFORMATION			Matrix:	Water	
SAMPLE No	**1074 BH 07**		Project number		
CONTAINER TYPE	Glass		Sample dilution Factor	No Dilution	

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<1 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

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2015-05-27

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CLIENT INFORMATION

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Analysis Report

Lab No : 09710 A

TEST INFORMATION **DETERMINATION OF PAHs USING SPME GC-MS-MS**

ANALYTICAL METHOD: SPME Extraction and GC-MS-MS METHOD Number: UISOL-T-012
DATE RECEIVED 2015-05-15 DATE COMPLETED 2015-05-20 DATE ISSUED 2015-05-27

SAMPLE INFORMATION Matrix: Water
SAMPLE No **1074 BH 08** Project number
CONTAINER TYPE Glass Sample dilution Factor No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	<0.1 µg/liter
Acenaphthene	<0.1 µg/liter
Acenaphthylene	<0.1 µg/liter
Flourene	<0.1 µg/liter
Phenanthrene	<0.1 µg/liter
Anthracene	<0.1 µg/liter
Fluoranthene	<0.1 µg/liter
Pyrene	<0.1 µg/liter
Benzo[a]anthracene	<0.1 µg/liter
Crysene	<0.1 µg/liter
Benzo[k+b]fluoranthene*	<0.1 µg/liter
Benzo[a]pyrene*	<0.1 µg/liter
Benzo[g,h,i]perylene *	<1 µg/liter
Dibenz[a,h]anthracene *	<1 µg/liter
Indeno[123-cd]pyrene *	<1 µg/liter

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sanas Testing Laboratory T0419

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2015-05-27

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CLIENT INFORMATION

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Ferndale

Analysis Report

Lab No : 09710 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		METHOD Number: UISOL-T-012	
DATE RECEIVED	2015-05-15	DATE COMPLETED 2015-05-20	DATE ISSUED 2015-05-27
SAMPLE INFORMATION		Matrix:	Water
SAMPLE No	1074 BH 09	Project number	
CONTAINER TYPE	Glass	Sample dilution Factor	No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1 µg/liter**
Acenaphthene	**<0.1 µg/liter**
Acenaphthylene	**<0.1 µg/liter**
Flourene	**<0.1 µg/liter**
Phenanthrene	**<0.1 µg/liter**
Anthracene	**<0.1 µg/liter**
Fluoranthene	**<0.1 µg/liter**
Pyrene	**<0.1 µg/liter**
Benzo[a]anthracene	**<0.1 µg/liter**
Crysene	**<0.1 µg/liter**
Benzo[k+b]fluoranthene*	**<0.1 µg/liter**
Benzo[a]pyrene*	**<0.1 µg/liter**
Benzo[g,h,i]perylene *	**<1 µg/liter**
Dibenz[a,h]anthracene *	**<1 µg/liter**
Indeno[123-cd]pyrene *	**<1 µg/liter**

Authorised Signatory that approved this report

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2015-05-27

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CLIENT INFORMATION

Environmental Impact Management S
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Ferndale

Analysis Report

Lab No : 09710 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		**METHOD Number:** UISOL-T-012	
DATE RECEIVED	2015-05-15	**DATE COMPLETED** 2015-05-20	**DATE ISSUED** 2015-05-27
SAMPLE INFORMATION		**Matrix:**	Water
SAMPLE No	**1074 SW 01**	**Project number**	
CONTAINER TYPE	Glass	**Sample dilution Factor**	No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	**<0.1**	**µg/liter**
Acenaphthene	**<0.1**	**µg/liter**
Acenaphthylene	**<0.1**	**µg/liter**
Flourene	**<0.1**	**µg/liter**
Phenanthrene	**<0.1**	**µg/liter**
Anthracene	**<0.1**	**µg/liter**
Fluoranthene	**<0.1**	**µg/liter**
Pyrene	**<0.1**	**µg/liter**
Benzo[a]anthracene	**<0.1**	**µg/liter**
Crysene	**<0.1**	**µg/liter**
Benzo[k+b]fluoranthene*	**<0.1**	**µg/liter**
Benzo[a]pyrene*	**<0.1**	**µg/liter**
Benzo[g,h,i]perylene *	**<1**	**µg/liter**
Dibenz[a,h]anthracene *	**<1**	**µg/liter**
Indeno[123-cd]pyrene *	**<1**	**µg/liter**

Authorised Signatory that approved this report

Reinardt Cronhout

sanas Testing Laboratory T0419

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2015-05-27

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CLIENT INFORMATION

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Liam Whitlow
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Ferndale

Analysis Report

Lab No : 09710 A

TEST INFORMATION	**DETERMINATION OF PAHs USING SPME GC-MS-MS**		
ANALYTICAL METHOD: SPME Extraction and GC-MS-MS		**METHOD Number:** UISOL-T-012	
DATE RECEIVED	2015-05-15	DATE COMPLETED 2015-05-20	**DATE ISSUED** 2015-05-27
SAMPLE INFORMATION		Matrix:	Water
SAMPLE No	1074 SW 02	Project number	
CONTAINER TYPE	Glass	Sample dilution Factor	No Dilution

POLYCYCLIC AROMATIC COMPOUND

Naphthalene	<0.1 µg/liter
Acenaphthene	<0.1 µg/liter
Acenaphthylene	<0.1 µg/liter
Flourene	<0.1 µg/liter
Phenanthrene	<0.1 µg/liter
Anthracene	<0.1 µg/liter
Fluoranthene	<0.1 µg/liter
Pyrene	<0.1 µg/liter
Benzo[a]anthracene	<0.1 µg/liter
Crysene	<0.1 µg/liter
Benzo[k+b]fluoranthene*	<0.1 µg/liter
Benzo[a]pyrene*	<0.1 µg/liter
Benzo[g,h,i]perylene *	<1 µg/liter
Dibenz[a,h]anthracene *	<1 µg/liter
Indeno[123-cd]pyrene *	<1 µg/liter

Authorised Signatory that approved this report

Reinardt Cronhout

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2015-05-27

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CLIENT INFORMATION
Environmental Impact Management Services (P
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Analysis Certificate Total Oil and Grease

Lab No : 09710

DATE RECEIVED 2015-05-15
DATE COMPLETED 2015-05-20

Project number

Matrix Water

Sample Number	Total Oil and Grease	
1074 BH 01	<1	mg/liter (ppm)
1074 BH 02	<1	mg/liter (ppm)
1074 BH 03	<1	mg/liter (ppm)
1074 BH 04	<1	mg/liter (ppm)
1074 BH 05	<1	mg/liter (ppm)
1074 BH 07	<1	mg/liter (ppm)
1074 BH 08	<1	mg/liter (ppm)
1074 BH 09	1	mg/liter (ppm)
1074 SW 01	<1	mg/liter (ppm)

Analytical method: Solvent Extraction and Gravimetric determination

Authorised Signatory :.

WJ Havenga **Technical Manager**

Reporting date: ***27 May 2015***

UIS ORGANIC LABORATORY

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CLIENT INFORMATION
Environmental Impact Management Services (P
Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Analysis Certificate Total Oil and Grease

Lab No : 09710

DATE RECEIVED 2015-05-15
DATE COMPLETED 2015-05-20

Project number

Matrix Water

Sample Number	Total Oil and Grease	
1074 SW 02	<1	mg/liter (ppm)

Analytical method: Solvent Extraction and Gravimetric determination

Authorised Signatory :.

WJ Havenga **Technical Manager**

Reporting date: ***27 May 2015***

UIS ORGANIC LABORATORY

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Analysis Report

Lab No : 09710 C

TEST INFORMATION TPH C10 - C40

ANALYTICAL METHOD:For Soil ASE Ext. and GC/FID
ANALYTICAL METHOD:For Water Liquid/Liquid Ext. and GC/FID
METHOD Number: UISOL-T-010

DATE RECEIVED 2015-05-15
DATE COMPLETED 2015-05-20
DATE ISSUED 2015-05-27

SAMPLE INFORMATION

Project Name
Project number
CONTAINER TYPE Glass
Storage conditions in the laboratory is in a Fridge @ < 6 deg C

Sample ID	Matrix	C10 - C28	C28 - C40*	Total*
1074 BH 01	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH 02	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH 03	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH 04	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH 05	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH 07	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 BH 08	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter

Authorised Signatory : *2015-05-27*

Reinardt Cronhout

sanas Testing Laboratory T0419

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CLIENT INFORMATION

Environmental Impact Management Services (P
Attention: Liam Whitlow
Block 5 Fernridge Office Park, 5 Hunter Street
Ferndale

Analysis Report

Lab No : 09710 C

TEST INFORMATION TPH C10 - C40

ANALYTICAL METHOD:For Soil ASE Ext. and GC/FID
ANALYTICAL METHOD:For Water Liquid/Liquid Ext. and GC/FID
METHOD Number: UISOL-T-010

DATE RECEIVED 2015-05-15
DATE COMPLETED 2015-05-20
DATE ISSUED 2015-05-27

SAMPLE INFORMATION

Project Name
Project number
CONTAINER TYPE Glass

Storage conditions in the laboratory is in a Fridge @ < 6 deg C

Sample ID	Matrix	C10 - C28	C28 - C40*	Total*
1074 BH 09	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 SW 01	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter
1074 SW 02	Water	<382 µg/liter	<382 µg/liter	<382 µg/liter

Authorised Signatory : *2015-05-27*

Reinardt Cromhout

sanas Testing Laboratory T0419

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M&L LABS

Registration Number 1974/001476/07 VATNumber 4780103505

M and L Laboratory Services (Pty) Ltd

Consulting Industrial Chemists, Analysts _Samplers

CONFIDENTIAL

Certificate / Report

COMPANY NAME	: ENVIRONMENTAL IMPACT MANAGEMENT SERVICES
ADDRESS	: PO BOX 2083 PINEGOWRIE 2123
SUBJECT	: ANALYSIS OF 8 WATER SAMPLES
PROJECT REFERENCE	:
INSTRUCTED BY	: M MAGALA
ORDER NUMBER	:
RECEIVED ON	: 2015-05-14
ANALYSIS COMPLETED	: 2015-06-04

BDL - Below Detection Limit

*** Denotes test method accredited to ISO17025**

- Refer to terms and conditions www.inspml.co.za
- This report relates to only test items listed herein and analysis on an as received basis. These tests do not apply to any other samples of a similar nature.
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sanas T0040

Printed Date : 2015-06-04

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M&L LABS
Registration Number 1974/001476/07 VATNumber 4780103505

M and L Laboratory Services (Pty) Ltd

Consulting Industrial Chemists, Analysts _Samplers

CONFIDENTIAL

Certificate / Report

Lab Number			E24424	E24425	E24426
Sampled Date					
Sample Marks			1074 BH01	1074 BH02	1074 BH03
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
* pH Value @ 25℃	W044-27-O		7.3	7.0	7.6
* Conductivity @ 25℃ (mS/m)	W044-27-O		139.0	45.7	56.7
* TDS (mg/l)	W044-03-W	1	784	264	318
* Calcium as Ca (mg/l)	W044-30-C	0.118	83	36	25
* Calcium Hardness as CaCO3 (mg/l)	W044-30-C	1	207	90	62
* Magnesium as Mg (mg/l)	W044-30-C	0.034	32	12.5	5.2
* Magnesium Hardness as CaCO3 (mg/l)	W044-30-C	1	132	51	21
* Sodium as Na (mg/l)	W044-30-C	0.016	154	41	92
* Potassium as K (mg/l)	W044-30-C	0.093	1.4	4.5	0.87
Ammonia as NH4 (mg/l)	W044-50-W	0.10	<0.10	<0.10	0.1
Ammonia as NH3 (mg/l)	W044-50-W	0.10	<0.10	<0.10	0.1
Ammonia as N (mg/l)	W044-50-W	0.10	<0.10	<0.10	0.1
Total Alkalinity as CaCO3 (mg/l)	W044-50-W	1	291	181	227
Bicarbonate as HCO3 (mg/l)	W044-50-W		355	221	277
Carbonate as CO3 (mg/l)	W044-50-W		0	0	0
Hydroxide as OH- (mg/l)	W044-50-W		0	0	0
Chloride as Cl (mg/l)	W044-50-W	0.10	253	18.5	33
Sulfate as SO4 (mg/l)	W044-50-W	0.2	65	29	32
Nitrate as NO3 (mg/l)	W044-50-W	0.100	4.4	1.2	<0.1
Nitrate as N (mg/l)	W044-50-W	0.100	1.0	0.3	<0.1
Nitrite as NO2 (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Nitrite as N (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Fluoride as F (mg/l)	W044-50-W	0.10	0.4	<0.10	0.3
Phosphate as PO4 (mg/l)	W044-50-W	0.12	<0.12	<0.12	<0.12
Bromide as Br (mg/l)	W044-50-W	0.10	2.24	<0.100	<0.10
Sum of Anions as meq/l (meq/l)			14.394	4.761	6.148
Sum of Cations as meq/l (meq/l)			13.487	4.699	5.724
% Error			-3.253	-0.655	-3.571

BDL - Below Detection Limit

*** Denotes test method accredited to ISO17025**

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Consulting Industrial Chemists, Analysts ,Samplers

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Certificate / Report

Lab Number			E24424	E24425	E24426
Sampled Date					
Sample Marks			1074 BH01	1074 BH02	1074 BH03
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
Chemical Balance			In	In	In

Authorised Signature

Edward Khumalo
Supervisor

BDL - Below Detection Limit

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Consulting Industrial Chemists, Analysts _Samplers

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Certificate / Report

Lab Number			E24424	E24425	E24426
Sampled Date					
Sample Marks			1074 BH01	1074 BH02	1074 BH03
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
* Aluminium as Al (mg/l)	W044-30-C	0.003	0.03	0.009	0.006
Arsenic as As (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Boron as B (mg/l)	W044-30-C	0.006	0.20	<0.006	0.23
Barium as Ba (mg/l)	W044-30-C	0.001	0.24	0.17	0.15
* Iron as Fe (mg/l)	W044-30-C	0.001	0.002	<0.001	0.03
* Manganese as Mn (mg/l)	W044-30-C	0.001	0.03	0.002	0.07
Molybdenum as Mo (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Lead as Pb (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Silicon as Si (mg/l)	W044-30-C	0.007	16.7	16.3	6.7
Strontium as Sr (mg/l)	W044-30-C	0.001	1.1	0.36	0.53
Uranium as U (mg/l)	W044-30-C	0.004	<0.004	<0.004	<0.004
Lithium as Li (mg/l)	W044-30-C	0.003	0.02	0.01	0.02
Rubidium as Rb (mg/l)	W044-33-C	0.001	0.01	<0.001	<0.001

Authorised Signature

Ndileka Bangani
Supervisor

BDL - Below Detection Limit

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Consulting Industrial Chemists, Analysts _Samplers

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Certificate / Report

Lab Number			E24427	E24428	E24429
Sampled Date					
Sample Marks			1074 BH04	1074 BH05	1074 BH07
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
* pH Value @ 25℃	W044-27-O		7.2	7.1	7.0
* Conductivity @ 25℃ (mS/m)	W044-27-O		213.0	222.0	171.0
* TDS (mg/l)	W044-03-W	1	1256	1444	1000
* Calcium as Ca (mg/l)	W044-30-C	0.118	140	186	163
* Calcium Hardness as CaCO3 (mg/l)	W044-30-C	1	350	465	407
* Magnesium as Mg (mg/l)	W044-30-C	0.034	58	68	79
* Magnesium Hardness as CaCO3 (mg/l)	W044-30-C	1	239	280	325
* Sodium as Na (mg/l)	W044-30-C	0.016	202	152	65
* Potassium as K (mg/l)	W044-30-C	0.093	2.5	2.3	1.1
Ammonia as NH4 (mg/l)	W044-50-W	0.10	0.9	0.6	0.2
Ammonia as NH3 (mg/l)	W044-50-W	0.10	0.9	0.6	0.2
Ammonia as N (mg/l)	W044-50-W	0.10	0.7	0.5	0.2
Total Alkalinity as CaCO3 (mg/l)	W044-50-W	1	300	291	411
Bicarbonate as HCO3 (mg/l)	W044-50-W		366	355	501
Carbonate as CO3 (mg/l)	W044-50-W		0	0	0
Hydroxide as OH- (mg/l)	W044-50-W		0	0	0
Chloride as Cl (mg/l)	W044-50-W	0.10	394	501	290
Sulfate as SO4 (mg/l)	W044-50-W	0.2	91	84	73
Nitrate as NO3 (mg/l)	W044-50-W	0.100	<0.1	<0.1	<0.1
Nitrate as N (mg/l)	W044-50-W	0.100	<0.1	<0.1	<0.1
Nitrite as NO2 (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Nitrite as N (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Fluoride as F (mg/l)	W044-50-W	0.10	0.1	0.2	0.1
Phosphate as PO4 (mg/l)	W044-50-W	0.12	<0.12	<0.12	<0.12
Bromide as Br (mg/l)	W044-50-W	0.10	1.92	<0.100	<0.100
Sum of Anions as meq/l (meq/l)			19.005	21.702	10.522
Sum of Cations as meq/l (meq/l)			20.643	21.525	17.542
% Error			4.131	-0.409	-1.052

BDL - Below Detection Limit

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M and L Laboratory Services (Pty) Ltd

Consulting Industrial Chemists, Analysts _Samplers

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Certificate / Report

Lab Number			E24427	E24428	E24429
Sampled Date					
Sample Marks			1074 BH04	1074 BH05	1074 BH07
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
Chemical Balance			In	In	In

Authorised Signature

Edward Khumalo
Supervisor

BDL - Below Detection Limit

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Consulting Industrial Chemists, Analysts _Samplers

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Certificate / Report

Lab Number			E24427	E24428	E24429
Sampled Date					
Sample Marks			1074 BH04	1074 BH05	1074 BH07
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
* Aluminium as Al (mg/l)	W044-30-C	0.003	0.04	0.06	0.04
Arsenic as As (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Boron as B (mg/l)	W044-30-C	0.006	0.10	0.03	<0.006
Barium as Ba (mg/l)	W044-30-C	0.001	0.61	0.84	0.09
* Iron as Fe (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
* Manganese as Mn (mg/l)	W044-30-C	0.001	1.3	3.5	0.19
Molybdenum as Mo (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Lead as Pb (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Silicon as Si (mg/l)	W044-30-C	0.007	16.9	15.2	22
Strontium as Sr (mg/l)	W044-30-C	0.001	3.5	1.0	1.5
Uranium as U (mg/l)	W044-30-C	0.004	<0.004	<0.004	<0.004
Lithium as Li (mg/l)	W044-30-C	0.003	0.06	0.007	0.02
Rubidium as Rb (mg/l)	W044-33-C	0.001	0.03	0.02	0.02

Authorised Signature

Ndileka Bangani
Supervisor

BDL - Below Detection Limit

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Certificate / Report

Lab Number			E24430	E24431	E24432
Sampled Date					
Sample Marks			1074 BH08	1074 BH09	SW01
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
* pH Value @ 25℃	W044-27-O		7.4	7.3	7.7
* Conductivity @ 25℃ (mS/m)	W044-27-O		243.0	251.0	187.0
* TDS (mg/l)	W044-03-W	1	1672	1544	1240
* Calcium as Ca (mg/l)	W044-30-C	0.118	198	181	123
* Calcium Hardness as CaCO3 (mg/l)	W044-30-C	1	495	452	307
* Magnesium as Mg (mg/l)	W044-30-C	0.034	87	60	56
* Magnesium Hardness as CaCO3 (mg/l)	W044-30-C	1	358	247	230
* Sodium as Na (mg/l)	W044-30-C	0.016	151	254	149
* Potassium as K (mg/l)	W044-30-C	0.093	5.5	3.8	9.6
Ammonia as NH4 (mg/l)	W044-50-W	0.10	<0.10	<0.10	<0.10
Ammonia as NH3 (mg/l)	W044-50-W	0.10	<0.10	<0.10	<0.10
Ammonia as N (mg/l)	W044-50-W	0.10	<0.10	<0.10	<0.10
Total Alkalinity as CaCO3 (mg/l)	W044-50-W	1	279	321	111
Bicarbonate as HCO3 (mg/l)	W044-50-W		340	391	135
Carbonate as CO3 (mg/l)	W044-50-W		0	0	0
Hydroxide as OH- (mg/l)	W044-50-W		0	0	0
Chloride as Cl (mg/l)	W044-50-W	0.10	443	594	507
Sulfate as SO4 (mg/l)	W044-50-W	0.2	200	107	106
Nitrate as NO3 (mg/l)	W044-50-W	0.100	23	<0.1	<0.1
Nitrate as N (mg/l)	W044-50-W	0.100	5.2	<0.1	<0.1
Nitrite as NO2 (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Nitrite as N (mg/l)	W044-50-W	0.100	<0.10	<0.10	<0.10
Fluoride as F (mg/l)	W044-50-W	0.10	0.4	0.5	0.2
Phosphate as PO4 (mg/l)	W044-50-W	0.12	<0.12	<0.12	<0.12
Bromide as Br (mg/l)	W044-50-W	0.10	2.82	<0.100	<0.100
Sum of Anions as meq/l (meq/l)			22.623	25.418	18.733
Sum of Cations as meq/l (meq/l)			23.723	25.130	17.424
% Error			2.373	-0.570	-3.620

BDL - Below Detection Limit

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Consulting Industrial Chemists, Analysts _Samplers

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Certificate / Report

Lab Number			E24430	E24431	E24432
Sampled Date					
Sample Marks			1074 BH08	1074 BH09	SW01
Determinand	Method References	Detection Limit	Result	Result	Result
Chemical Analysis					
Chemical Balance			In	In	In

Authorised Signature

Edward Khumalo
Supervisor

BDL - Below Detection Limit

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Certificate / Report

Lab Number			E24430	E24431	E24432
Sampled Date					
Sample Marks			1074 BH08	1074 BH09	SW01
Determinand	Method References	Detection Limit	Result	Result	Result
Metals					
* Aluminium as Al (mg/l)	W044-30-C	0.003	0.04	0.04	0.03
Arsenic as As (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Boron as B (mg/l)	W044-30-C	0.006	0.02	0.30	0.10
Barium as Ba (mg/l)	W044-30-C	0.001	0.10	0.26	0.28
* Iron as Fe (mg/l)	W044-30-C	0.001	0.004	<0.001	0.009
* Manganese as Mn (mg/l)	W044-30-C	0.001	0.01	0.43	0.03
Molybdenum as Mo (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Lead as Pb (mg/l)	W044-30-C	0.001	<0.001	<0.001	<0.001
Silicon as Si (mg/l)	W044-30-C	0.007	14.0	8.3	1.9
Strontium as Sr (mg/l)	W044-30-C	0.001	2.5	3.3	1.1
Uranium as U (mg/l)	W044-30-C	0.004	<0.004	<0.004	<0.004
Lithium as Li (mg/l)	W044-30-C	0.003	0.06	0.09	0.04
Rubidium as Rb (mg/l)	W044-33-C	0.001	0.01	0.008	<0.001

Authorised Signatura

Ndileka Bangani
Supervisor

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Certificate / Report

Lab Number			E24433
Sampled Date			
Sample Marks			SW02
Determinand	Method References	Detection Limit	Result
Chemical Analysis			
* pH Value @ 25℃	W044-27-O		7.6
* Conductivity @ 25℃ (mS/m)	W044-27-O		132.0
* TDS (mg/l)	W044-03-W	1	784
* Calcium as Ca (mg/l)	W044-30-C	0.118	86
* Calcium Hardness as CaCO3 (mg/l)	W044-30-C	1	215
* Magnesium as Mg (mg/l)	W044-30-C	0.034	35
* Magnesium Hardness as CaCO3 (mg/l)	W044-30-C	1	144
* Sodium as Na (mg/l)	W044-30-C	0.016	127
* Potassium as K (mg/l)	W044-30-C	0.093	12.4
Ammonia as NH4 (mg/l)	W044-50-W	0.10	<0.10
Ammonia as NH3 (mg/l)	W044-50-W	0.10	<0.10
Ammonia as N (mg/l)	W044-50-W	0.10	<0.10
Total Alkalinity as CaCO3 (mg/l)	W044-50-W	1	138
Bicarbonate as HCO3 (mg/l)	W044-50-W		168
Carbonate as CO3 (mg/l)	W044-50-W		0
Hydroxide as OH- (mg/l)	W044-50-W		0
Chloride as Cl (mg/l)	W044-50-W	0.10	191
Sulfate as SO4 (mg/l)	W044-50-W	0.2	176
Nitrate as NO3 (mg/l)	W044-50-W	0.100	<0.1
Nitrate as N (mg/l)	W044-50-W	0.100	<0.1
Nitrite as NO2 (mg/l)	W044-50-W	0.100	<0.10
Nitrite as N (mg/l)	W044-50-W	0.100	<0.10
Fluoride as F (mg/l)	W044-50-W	0.10	0.1
Phosphate as PO4 (mg/l)	W044-50-W	0.12	1.02
Bromide as Br (mg/l)	W044-50-W	0.10	0.57
Sum of Anions as meq/l (meq/l)			11.813
Sum of Cations as meq/l (meq/l)			13.013
% Error			4.834

BDL - Below Detection Limit

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Certificate / Report

Lab Number			E24433
Sampled Date			
Sample Marks			SW02
Determinand	**Method References**	**Detection Limit**	**Result**
Chemical Analysis			
Chemical Balance			In

Authorised Signature

Edward Khumalo
Supervisor

BDL - Below Detection Limit

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M&L LABS

Registration Number 1974/001476/07 VATNumber 4780103505

M and L Laboratory Services (Pty) Ltd

Consulting Industrial Chemists, Analysts _Samplers

CONFIDENTIAL

Certificate / Report

Lab Number			E24433
Sampled Date			
Sample Marks			SW02
Determinand	Method References	Detection Limit	Result
Metals			
* Aluminium as Al (mg/l)	W044-30-C	0.003	0.03
Arsenic as As (mg/l)	W044-30-C	0.001	<0.001
Boron as B (mg/l)	W044-30-C	0.006	0.05
Barium as Ba (mg/l)	W044-30-C	0.001	0.11
* Iron as Fe (mg/l)	W044-30-C	0.001	0.01
* Manganese as Mn (mg/l)	W044-30-C	0.001	0.003
Molybdenum as Mo (mg/l)	W044-30-C	0.001	<0.001
Lead as Pb (mg/l)	W044-30-C	0.001	<0.001
Silicon as Si (mg/l)	W044-30-C	0.007	0.73
Strontium as Sr (mg/l)	W044-30-C	0.001	0.69
Uranium as U (mg/l)	W044-30-C	0.004	<0.004
Lithium as Li (mg/l)	W044-30-C	0.003	0.02
Rubidium as Rb (mg/l)	W044-33-C	0.001	<0.001

Authorised Signature

Ndileka Bangani
Supervisor

BDL - Below Detection Limit

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