

Customer Contact: David Broderick
Customer: Hydro Environmental Services Ltd
Customer Address: 22 Main Street
Dungarvan
Co Waterford



Report Reference: 14-02263-
Report Version: 1

Report Date: 12/05/2014

Customer PO No.: P1227-2

Chain of Custody No.:

Page 1 of 4

Certificate Of Analysis

Analysis of 3 sample(s) submitted on 06/05/2014 is now complete.
We have the pleasure of enclosing your certificate of analysis.

Should you have any queries regarding the report or require any further services, we would be happy to discuss your requirements. For additional information about the company please log-on to our web site at the above address.

Thank you for choosing City Analysts Limited. We look forward to assisting you again.



Authorised By: Laura Walsh

Date: 12/05/2014

Note: Information on methods of analysis and performance characteristics is available on request.

Note: Results relate only to the items tested.

Test report shall not be reproduced except in full or with written approval of City Analysts Ltd .

Template 1146
Revision 017

Certificate of Analysis

Customer Contact: David Broderick
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Customer Address: 22 Main Street
Dungarvan
Co Waterford

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Page 2 of 4

Sample Description: SW 1 Buffy W.F
Sample Type: Surface Water
Date Sampled: 05/05/2014
Lab Reference Number: 176286

Site/Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value	Accreditation Status
D/1003	07/05/2014	CBOD5	<2	mg/l	-	INAB
D/3000	06/05/2014	Ammonia as N	0.02	mg/l	-	INAB
D/3000	06/05/2014	Nitrite as N	0.01	mg/l	-	INAB
D/3000	06/05/2014	Nitrate as N	<2	mg/l	-	INAB
D/3000	06/05/2014	Ortho-phosphate as P	<0.025	mg/l	-	INAB
D/3001	06/05/2014	Phosphorus, total as P	<0.05	mg/l	-	INAB
D/3000	06/05/2014	Chloride	20.22	mg/l	-	INAB
D/1049	10/05/2014	TSS	2	mg/l	-	INAB

Note:

NAC & ATC - No abnormal change and acceptable to customers.

TVC - Total Viable Count

PV Value is the parametric value, taken from European Communities, (Drinking Water) (No. 2) Regulations, 2007. S.I. No. 278 of 2007, and relates only to drinking water samples.

Site D = Analysed at City Analysts Dublin. Site L = Analysed at City Analysts Limerick. Site SUBC= Analysed at a subcontracted lab

Certificate of Analysis

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Page 3 of 4

Sample Description: SW 2 Buffy W.F
Sample Type: Surface Water
Date Sampled: 05/05/2014
Lab Reference Number: 176287

Site/Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value	Accreditation Status
D/1049	10/05/2014	TSS	4	mg/l	-	INAB
D/3000	06/05/2014	Chloride	12.64	mg/l	-	INAB
D/3000	06/05/2014	Nitrite as N	0.01	mg/l	-	INAB
D/3001	06/05/2014	Phosphorus, total as P	<0.05	mg/l	-	INAB
D/3000	06/05/2014	Nitrate as N	<2	mg/l	-	INAB
D/3000	06/05/2014	Ortho-phosphate as P	<0.025	mg/l	-	INAB
D/3000	06/05/2014	Ammonia as N	<0.01	mg/l	-	INAB
D/1003	07/05/2014	CBOD5	<2	mg/l	-	INAB

Note:

NAC & ATC - No abnormal change and acceptable to customers.

TVC - Total Viable Count

PV Value is the parametric value, taken from European Communities, (Drinking Water) (No. 2) Regulations, 2007. S.I. No. 278 of 2007, and relates only to drinking water samples.

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Certificate of Analysis

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Page 4 of 4

Sample Description: SW 3 Buffy W.F
Sample Type: Surface Water
Date Sampled: 05/05/2014
Lab Reference Number: 176288

Site/Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value	Accreditation Status
D/1003	07/05/2014	CBOD5	<2	mg/l	-	INAB
D/3000	06/05/2014	Chloride	15.37	mg/l	-	INAB
D/3000	06/05/2014	Ammonia as N	0.02	mg/l	-	INAB
D/3000	06/05/2014	Nitrite as N	0.01	mg/l	-	INAB
D/3000	06/05/2014	Nitrate as N	<2	mg/l	-	INAB
D/3000	06/05/2014	Ortho-phosphate as P	<0.025	mg/l	-	INAB
D/3001	06/05/2014	Phosphorus, total as P	<0.05	mg/l	-	INAB
D/1049	10/05/2014	TSS	5	mg/l	-	INAB

Note:

NAC & ATC - No abnormal change and acceptable to customers.

TVC - Total Viable Count

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Attention :	Eoin McCarthy
Date :	10th January, 2017
Your reference :	160814
Our reference :	Test Report 16/18980 Batch 1
Location :	Ardarroo WF
Date samples received :	22nd December, 2016
Status :	Final report
Issue :	1

Four samples were received for analysis on 22nd December, 2016 of which four were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Phil Sommerton BSc
Project Manager

Client Name: McCarthy Keville & O'Sullivan Ltd
 Reference: 160814
 Location: Ardaroo WF
 Contact: Eoin McCarthy
 JE Job No.: 16/18980

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
 H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

J E Sample No.	1-3	4-6	7-9	10-12															
Sample ID	SW1	SW2	SW3	SW4															
Depth																			
COC No / misc																			
Containers	H P BOD	H P BOD	H P BOD	H P BOD															
Sample Date	15/12/2016	15/12/2016	15/12/2016	15/12/2016															
Sample Type	Surface Water	Surface Water	Surface Water	Surface Water															
Batch Number	1	1	1	1															
Date of Receipt	22/12/2016	22/12/2016	22/12/2016	22/12/2016															
														LOD/LOR	Units	Method No.			
Total Phosphorus	47	33	49	61										<5	ug/l	TM30/PM14			
Chloride #	11.4	11.3	14.0	17.3										<0.3	mg/l	TM38/PM0			
Nitrate as NO3 #	<0.2	<0.2	<0.2	<0.2										<0.2	mg/l	TM38/PM0			
Nitrite as NO2 #	<0.02	<0.02	<0.02	<0.02										<0.02	mg/l	TM38/PM0			
Ortho Phosphate as PO4	<0.03	<0.03	<0.03	0.04										<0.03	mg/l	TM38/PM0			
Ammoniacal Nitrogen as NH3 #	<0.03	<0.03	0.06	0.05										<0.03	mg/l	TM38/PM0			
Ammoniacal Nitrogen as NH4 #	0.03	0.03	0.06	0.05										<0.03	mg/l	TM38/PM0			
BOD (Settled) #	2	1	1	1										<1	mg/l	TM58/PM0			
Electrical Conductivity @25C #	91	78	83	104										<2	uS/cm	TM76/PM0			
pH #	6.97	7.58	6.66	6.91										<0.01	pH units	TM73/PM0			
Total Nitrogen	2.2	1.1	1.4	2.0										<0.5	mg/l	TM38/TM125/PM0			
Total Suspended Solids #	<10	<10	<10	<10										<10	mg/l	TM37/PM0			

Please see attached notes for all abbreviations and acronyms

Client Name: McCarthy Keville & O'Sullivan Ltd
Reference: 160814
Location: Ardarroo WF
Contact: Eoin McCarthy

Matrix : Liquid

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Analysis	Reason
16/18980	1	SW1		1-3	BOD	Sample holding time exceeded prior to receipt
16/18980	1	SW2		4-6	BOD	Sample holding time exceeded prior to receipt
16/18980	1	SW3		7-9	BOD	Sample holding time exceeded prior to receipt
16/18980	1	SW4		10-12	BOD	Sample holding time exceeded prior to receipt

**Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
 Only analyses which are accredited are recorded as deviating if set criteria are not met.**

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 16/18980

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
SA	ISO17025 (SANAS) accredited - South Africa.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 16/18980

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7 and 6010B	PM14	Analysis of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for dissolved metals and acidified if required.				
TM37	Modified USEPA 160.2 .Gravimetric determination of Total Suspended Solids. Sample is filtered and the resulting residue is dried and weighed.	PM0	No preparation is required.	Yes			
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.				
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.	Yes			
TM38/TM125	Total Nitrogen/Organic Nitrogen by calculation	PM0	No preparation is required.				
TM58	Modified USEPA methods 405.1 and BS 5667-3. Measurement of Biochemical Oxygen Demand. When cBOD (Carbonaceous BOD) is requested a nitrification inhibitor is added which prevents the oxidation of reduced forms of nitrogen, such as ammonia, nitrite and organic nitrogen which exert a nitrogenous demand.	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM76	Modified US EPA method 120.1. Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			



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Report No: HYDR-536060918

Document No: EF0011

CERTIFICATE OF ANALYSIS

Client Hydro Environmental Services
22 Lower Main Street
Dungarvan
Co. Waterford

Date Received 06/09/2018

Date Reported 17/09/2018

Order Number P1227-8

For the Attention of: Hydro Environmental Services

Sample Reception 4 sample(s) received in good condition.

Comments N/A

Report Authorised by:

Rosemary Thomas
Environmental Chemistry Manager

Conditions:

1. Results in this report relate only to the items tested
2. Reports may not be reproduced except in full without the approval of ALS Life Sciences Ltd
3. All queries regarding this report should be addressed to the Technical Manager at the above address
4. A * next to a method reference signifies that ALS Life Sciences Ltd is NOT INAB accredited for this method
5. Results reported as CFU/cm² are calculated based on information supplied by customer regarding area swabbed
6. CFU indicates Colony Forming Units, MPN indicates Most Probable Number
7. SUBCON* indicates analysis subcontracted to approved subcontractors who do not hold accreditation for this test
8. SUBCON^ indicates analysis subcontracted to approved subcontractors who hold accreditation for this test
9. Where sampling is undertaken by ALS personnel, sampling activities are outside the scope of INAB accreditation



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Report No: HYDR-536060918

Document No: EF0011

CERTIFICATE OF ANALYSIS

Date Received 06/09/2018
Date Reported 17/09/2018
Order Number P1227-8

Sample Type Water
Client ID SW1
Date Tested 07/09/2018
ALS ID 3220470

<u>Test</u>	<u>Result</u>	<u>Unit</u>	<u>Method</u>
Suspended Solids	10	mg / l	P202
Phosphorus	<0.10	mg/l P	P207
BOD 5 day Total with ATU	2	mg/l O2	P280
Orthophosphate	<0.02	mg/l P	P281
Chloride	14.5	mg/l CL	P281
Nitrate	<5.0	mg/l NO3	P281
Nitrite	<0.05	mg/l NO2	P281
Ammonia	0.02	mg/l NH3-N	P281
Nitrogen (Total)	1.2	mg/L N	P285

Sample Type Water
Client ID SW2
Date Tested 07/09/2018
ALS ID 3220471

<u>Test</u>	<u>Result</u>	<u>Unit</u>	<u>Method</u>
Suspended Solids	10	mg / l	P202
Phosphorus	<0.10	mg/l P	P207
BOD 5 day Total with ATU	1	mg/l O2	P280
Orthophosphate	0.20	mg/l P	P281
Chloride	13.8	mg/l CL	P281
Nitrate	<5.0	mg/l NO3	P281
Nitrite	<0.05	mg/l NO2	P281
Ammonia	0.04	mg/l NH3-N	P281
Nitrogen (Total)	1.2	mg/L N	P285

Report Authorised by:

Rosemary Thomas



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Report No: HYDR-536060918

Document No: EF0011

CERTIFICATE OF ANALYSIS

Date Received 06/09/2018

Date Reported 17/09/2018

Order Number P1227-8

Sample Type Water
Client ID SW3
Date Tested 07/09/2018
ALS ID 3220472

Test	Result	Unit	Method
Suspended Solids	10	mg / l	P202
Phosphorus	<0.10	mg/l P	P207
BOD 5 day Total with ATU	<2	mg/l O2	P280
Orthophosphate	<0.02	mg/l P	P281
Chloride	14.6	mg/l CL	P281
Nitrate	<5.0	mg/l NO3	P281
Nitrite	<0.05	mg/l NO2	P281
Ammonia	0.02	mg/l NH3-N	P281
Nitrogen (Total)	<1.0	mg/L N	P285

Sample Type Water
Client ID SW4
Date Tested 07/09/2018
ALS ID 3220473

Test	Result	Unit	Method
Suspended Solids	<10	mg / l	P202
Phosphorus	<0.10	mg/l P	P207
BOD 5 day Total with ATU	<2	mg/l O2	P280
Orthophosphate	<0.02	mg/l P	P281
Chloride	12.8	mg/l CL	P281
Nitrate	<5.0	mg/l NO3	P281
Nitrite	<0.05	mg/l NO2	P281
Ammonia	0.02	mg/l NH3-N	P281
Nitrogen (Total)	<1.0	mg/L N	P285

Report Authorised by:

Rosemary Thomas