

Appendix 8.3

Site Monitoring Data

RECEIVED: 18/08/2025

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1. On Site Water Supply Well Historic Data

Table 1 Historic Data – On-Site Well

Drinking Water Well	pH	Total Ammonia	Nitrate	Nitrate	Nitrite	EC	Alkalinity	Manganese, Total	Coliforms	E.coli
		mg/l N	mg/l N	mg/l NO3	mg/l NO2	µS/cm	mg/l CaCO3	mg/L	MPN/100ml	MPN/100ml
01/04/2015	7.20	<0.02	7.76	34.30	<0.016	692.00	352.00	<0.001	<1	<1
29/09/2015	7.30	<0.02	6.36	28.10	<0.016	677.00	366.00	0.00	<1	<1
07/03/2016	7.20		7.31	32.30	0.04	655.00	329.00	0.00	<1	<1
07/03/2016	7.15	<0.02	7.26	32.10	<0.016	661.00	325.00	<0.001	<1	<1
06/09/2016	7.40	<0.02	5.84	25.80	<0.016	713.00	362.00	0.01	<1	<1
07/03/2017	7.20		8.17	36.10	<0.016	688.00	314.00	<0.001	<1	<1
04/09/2017	7.30		7.69	34.00	<0.016	693.00	351.00	<0.001	<1	<1
03/04/2018	8.10		9.48	41.90	0.03	731.00	359.00	<0.001	<1	<1
08/10/2018	7.30		7.08	31.30	0.06	700.00	368.00	<0.001	<1	<1



ANALYSIS REPORT

CUSTOMER:	Bennettsbridge Limestone.	SAMPLE TYPE:	DRINKING WATER
ADDRESS:	Bennettsbridge, Co. Kilkenny	CONDITION OF SAMPLE ON RECEIPT:	Satisfactory
REPORT TO:	Eoin O Carroll	DATE SAMPLED:	09 April 2019
SAMPLED BY:	-	DATE RECEIVED:	09 April 2019
SAMPLING PT:	Quarry	DATE ANALYSED:	09-16 April 2019
ORDER NO:	-	DATE REPORTED:	19 April 2019
		WORK NO.:	19-27204 W

TABLE OF RESULTS

Method:	Parameter:	Units	19-27204 W Yard canteen	*** Limit
Chemical Analysis: (F)				
SCP 052	pH	pH Units	7.3	6.5 ≤ pH ≤ 9.5 (Note A)
SCP 027a	Ammonium	mg/L NH ₄	<0.03	0.3 mg/L
SCP 027f	Nitrites	mg/L NO ₂	<0.016	0.5 mg/L (Note B)
SCP 027g	Nitrates	mg/L NO ₃	46	50 mg/L
SCP 027i	Total Hardness	mg/L as CaCO ₃	<5	-
SCP 027h	Alkalinity	mg/L as CaCO ₃	334	-
SCP 038	Manganese	µg/L	2	50 µg/L
SCP 038	Iron	µg/L	<5	200 µg/L
**2510 B	* Dissolved Solids	mg/L	406	-
SCP 052	Conductivity	µS/cm	709	2500 µS/cm (Note A)
	* Langelier Index (70°C)		-0.29	-
Microbiological Analysis: (D)				
SMP 019	Coliforms	MPN/100 mL	<1	0/100 mL
SMP 019	E. coli	MPN/100 mL	<1	0/100 mL

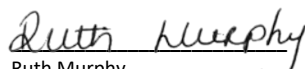
COMMENT:

Chemical Analysis:

The water complies with the Drinking Water Regulations S.I. No. 122 of 2014, based on the tests carried out.

Microbiological Analysis:

The water complies with the Drinking Water Regulations S.I. No. 122 of 2014, based on the tests carried out.


Ruth Murphy
Chemistry Laboratory Manager

Index to symbols used:

*	Analysis is not INAB accredited.
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	S.I. No. 122 of 2014 - European Union (Drinking Water) Regulations 2014
Note A	The water should not be aggressive.
Note B	Compliance must be entered with the conditions that $[NO_3]/50 + [NO_2]/3 \leq 1$
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.

- The results relate only to the items tested.
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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





ANALYSIS REPORT

CUSTOMER:	Bennettsbridge Limestone.	SAMPLE TYPE:	DRINKING WATER
ADDRESS:	Bennettsbridge, Co. Kilkenny	CONDITION OF SAMPLE ON RECEIPT:	Satisfactory
REPORT TO:	Eoin O Carroll	DATE SAMPLED:	09 April 2019
SAMPLED BY:	-	DATE RECEIVED:	09 April 2019
SAMPLING PT:	Quarry	DATE ANALYSED:	09-17 April 2019
ORDER NO:	-	DATE REPORTED:	19 April 2019
		WORK NO.:	19-27205 W

TABLE OF RESULTS

Method:	Parameter:	Units	19-27205 W Office canteen	*** Limit
Chemical Analysis: (F)				
SCP 052	pH	pH Units	7.4	6.5 ≤ pH ≤ 9.5 (Note A)
SCP 027a	Ammonium	mg/L NH ₄	<0.03	0.3 mg/L
SCP 027f	Nitrites	mg/L NO ₂	<0.0016	0.5 mg/L (Note B)
SCP 027g	Nitrates	mg/L NO ₃	43.7	50 mg/L
SCP 027i	Total Hardness	mg/L as CaCO ₃	<5	-
SCP 027h	Alkalinity	mg/L as CaCO ₃	336	-
SCP 038	Manganese	µg/L	2	50 µg/L
SCP 038	Iron	µg/L	<5	200 µg/L
**2510 B	* Dissolved Solids	mg/L	404	-
SCP 052	Conductivity	µS/cm	709	2500 µS/cm (Note A)
	* Langelier Index (70°C)		-0.18	-
Microbiological Analysis: (D)				
SMP 019	Coliforms	MPN/100 mL	<1	0/100 mL
SMP 019	<i>E. coli</i>	MPN/100 mL	<1	0/100 mL

COMMENT:

The Langelier Index indicates that the water may be aggressive (corrosive).

Microbiological Analysis:

The water complies with the Drinking Water Regulations S.I. No. 122 of 2014, based on the tests carried out.

Ruth Murphy
Ruth Murphy
Chemistry Laboratory Manager

Index to symbols used:

*	Analysis is not INAB accredited.
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	S.I. No. 122 of 2014 - European Union (Drinking Water) Regulations 2014
Note A	The water should not be aggressive.
Note B	Compliance must be entered with the conditions that $[NO_3]/50 + [NO_2]/3 \leq 1$
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.

- The results relate only to the items tested.
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Certificate of Analysis

Customer:		Sample Matrix:	Drinking Water
Address:	Bennettsbridge Limestone Quarries Ltd Kilree Sheastown Co. Kilkenny	Date Sampled:	02/06/2020 at 12:15
Customer Sample Ref:	Office Canteen	Date Received:	02/06/2020
Sampled By:	Danny O Leary, SSS Ltd	Condition of Sample on Receipt:	Satisfactory
Report To:	Bennettsbridge Limestone Quarries Ltd	Date Analysed:	02/06/2020 - 05/06/2020
Customer PO:		Issue Date:	05/06/2020
		Our Reference:	19827 (20-06626)
		Quote No:	

Method	Parameter	Units	Result	***Limits	PASS / FAIL
<u>Microbiological Analysis: (D)</u>					
SMP 019	Coliforms	MPN/100mL	< 1	< 1 MPN/100mL	PASS
SMP 019	E. coli	MPN/100mL	< 1	< 1 MPN/100mL	PASS
<u>Chemical Analysis: (F)</u>					
SCP 052	Hydrogen Ion (pH)	pH units	7.2	6.5 - 9.5 pH units	PASS
SCP 027A	Ammonium	mg/L NH ₄	0.08	0.30 mg/L NH ₄	PASS
SCP 027F	Nitrite	mg/L NO ₂	0.020	0.500 mg/L NO ₂	PASS
SCP 027G	Nitrate	mg/L NO ₃	48.00	50.00 mg/L NO ₃	PASS
SCP 027I	Total Hardness	mg/L CaCO ₃	< 5	-	N/A
SCP027H	Alkalinity	mg/L as CaCO ₃	347.3	-	N/A
SCP 038/073	Manganese	µg/L	< 1	50 µg/L	PASS
SCP 038/073	Iron	µg/L	< 5	200 µg/L	PASS
**2510 B	* Total Dissolved Solids (TDS)	mg/L	398	-	N/A
SCP 052	Conductivity	µS/cm @ 20 °C	694	2500 µS/cm @ 20 °C	PASS
	* Langelier Index		-0.77	-	N/A

Sample Comments

Microbiological Analysis (D):

The water complies with the Drinking Water Regulations S.I. No. 122 of 2014, based on the tests carried out.

Chemical Analysis (F):

The water complies with the Drinking Water Regulations S.I. No. 122 of 2014, based on the tests carried out.



Conor Murphy
Operations Manager

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Test Report

RECEIVED: 16/08/2025

Lab Report Number: 14401S001

Customer ID:	BENN.L1	Analysis Type:	CHECK (CHECK)
Contact Name:	EOIN O'CARROLL	Delivery By:	CUSTOMER
Company Name:	BENNETTSBRIDGE LIMESTONE	Sample Card Number:	73487
Address:	KILREE SHEASTOWN KILKENNY R95 EYOR	Condition on Receipt:	Acceptable
Sample Type:	DRINKING WATER	Date Sample Received:	30/11/2022
Sample Reference:	WELL WATER	Date Analysis Commenced:	30/11/2022
Sample Description:	T:10.45 D:30/11 KITCHEN TAP	Date Certificate Issued:	14/12/2022

Parameter	Method	Result	Unit	Drinking Water 2014 Parametric Values Regulations SI122 of
pH	SOP 2004	7.3	pH units	6.5<pH<9.5
Conductivity	SOP 2076	651	µS/cm 20°C	2500
Iron^	Subcontracted	6.63	µg/l	200
Manganese^	Subcontracted	0.52	µg/l	50
Aluminium^	Subcontracted	<6.90	µg/l	200
Total Hardness^	Subcontracted	374	mg/l CaCO ₃	-
Total Coliforms	SOP 2090	0	MPN/100ml	0
E. Coli	SOP 2090	0	MPN/100ml	0
Colour	SOP 2063	<1.0	mg/l Pt-Co	-
Turbidity	SOP 2022	0.64	NTU	-
Ammonium	SOP 2057	0.04	mg/l NH ₄	0.30
Nitrate	SOP 2060	40.70	mg/l NO ₃	50
Nitrite	SOP 2059	<0.03	mg/l NO ₂	0.50
Sulphate	SOP 2062	17.43	mg/l	250
Calcium^	Subcontracted	128	mg/l	-
Magnesium^	Subcontracted	13.2	mg/l	-
Total Oxidised Nitrogen	SOP 2058	9.25	mg/l N	-

Signed: Laura Kavanagh
Laura Kavanagh - Deputy Lab Manager

Date: 14/12/2022

* = not INAB Accredited ^ = Subcontracted

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 Uncertainty of Measurement is not taken into account for any test results reported.





Customer Sample Ref:	1. Quarry Well	Customer Sample Code:	
Project:	Ground Water Analysis	Sampled By:	Water Lab
Our Reference:	120835 (24-39052)	Sample Matrix:	Ground Water
Date Sampled:	20/02/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
- Note 6	Coliforms	cfu/100ml	1	27
- Note 6	* Faecal coliforms	cfu/100ml	1	10
	Microbiological Analysis: (D)			
SMP 068	* Faecal Streptococci	MPN/100mL	<1	< 1
	Chemical Analysis: (F)			
- Note 6	Hydrogen Ion (pH)	pH units	4.0	6.9
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	Conductivity	Note 5 μ S/cm	78.3	761.0
- Note 6	* Nitrate	mg/L N	0.30	7.90
	Chemical Analysis: (F)			
SCP 027B	Chloride	mg/L	0.5	27.1
SCP 053A/053D	Magnesium (Mg)	mg/L	0.2	15.7
SCP 053A/053D	Potassium (K)	mg/L	1.0	2.9
SCP 053A/053D	Sodium	mg/L	1	14
- Note 6	Total Phosphorus	mg/L P	0.09	< 0.09
	Chemical Analysis: (F)			
SCP 053B/053D	Iron	μ g/L	10	< 10
SCP 053B/053D	Manganese	μ g/L	2	< 2

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Customer Sample Ref:	1. Quarry Well	Customer Sample Code:	
Project:	Ground Water Analysis	Sampled By:	Water Lab
Our Reference:	125159 (24-40525)	Sample Matrix:	Ground Water
Date Sampled:	20/03/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
- Note 6	Coliforms	cfu/100ml	1	3
- Note 6	* Faecal coliforms	cfu/100ml	1	1
<u>Microbiological Analysis: (D)</u>				
SMP 068	* Faecal Streptococci	MPN/100mL	<1	1
<u>Chemical Analysis: (F)</u>				
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.4
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	Conductivity	Note 5 μ S/cm	78.3	706.0
- Note 6	* Nitrate	mg/L N	0.30	4.70
<u>Chemical Analysis: (F)</u>				
SCP 027B	Chloride	mg/L	0.5	25.9
SCP 053A/053D	Magnesium (Mg)	mg/L	0.2	14.7
SCP 053A/053D	Potassium (K)	mg/L	1.0	2.7
SCP 053A/053D	Sodium	mg/L	1	14
- Note 6	Total Phosphorus	mg/L P	0.09	< 0.09
<u>Chemical Analysis: (F)</u>				
SCP 053B/053D	Iron	μ g/L	10	< 10
SCP 053B/053D	Manganese	μ g/L	2	< 2

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TEST REPORT

<i>Client Name</i>	<i>HBE</i>	<i>Job No</i>	<i>45790</i>
<i>Client Address</i>	<i>Craigmore House, 19 Millvale Road, Newry BT35 7NH</i>	<i>Date Received</i>	<i>20/09/2024</i>
<i>Customer</i>	<i>Breedon Group</i>	<i>Date Analysed</i>	<i>20/09/2024</i>
<i>Site</i>	<i>Bennetsbridge</i>	<i>Date Reported</i>	<i>23/09/2024</i>
<i>Building</i>	<i>asphalt plant</i>		

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Asset Type	Lab Reference	Date/Time Sampled	Analysis	*Temperature (°C)	Results	Water Matrix	Method
Toilet - whb rhs - toilet - rhs - whb - 682366							
Cold Water Outlets	115786	19/09/2024 10:05:00	Total Coliform	13.00	36 cfu/100ml	Potable Water	SOP 02
Cold Water Outlets	115786	19/09/2024 10:05:00	E.Coli	13.00	0 cfu/100ml	Potable Water	SOP 02
Cold Water Outlets	115786	19/09/2024 10:05:00	TVC @ 37°C	13.00	25 cfu/ml	Potable Water	SOP 03
Cold Water Outlets	115786	19/09/2024 10:05:00	TVC @ 22°C	13.00	39 cfu/ml	Potable Water	SOP 03

CfU= Colony forming unit, TNTC= Too Numerous to Count (>2400cfu), For Legionella Not detected = Not Detected in volume of sample filtered, Not Determined-high level of non-target organisms present, unable to provide a valid result.

Disclaimers :
Results apply to the sample as received, comments are beyond the scope of UKAS accreditation.
Results marked with an (*) are not UKAS accredited. Results marked with a (#) were subcontracted to a laboratory who are UKAS accredited for the analysis.
Legionella Mathematical detection limit = 50 cfu/L.
This issue replaces all previous issues.
Information on uncertainty of measurement is available on request.
This test report should not be reproduced except in full, without written approval of the laboratory.
All information displayed in *italics* has been supplied by the client.
Any TVC result >300 cfu/ml is an Estimate.

Authorised By:


Aoife Whelan
Laboratory Manager
For and on behalf of Bluezone Scientific



21795

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DEVIATIONS
A – Analysis commenced >24 hours after sampling, may not represent the original bacterial content of the sample
B – Analysis commenced >48 hours after sampling, may not represent the original bacterial content of the sample
C – Incorrect bottle type used. Sample results may be affected.
D – Sample not transported between 2-8 degrees C, results may not represent the original bacterial content of the sample.
E – Date/Time of sampling not provided. Unable to determine validity of the results.
P – Presumptive-Unable to confirm

2. Baseline Groundwater Quality -The Quarry Wells & Wider Area.

Wider Area Groundwater Baseline

In order to establish the wider area's groundwater characteristic for the 2024 baseline before Site Investigations commenced for the 2025 proposed greenfield extension area to the west of the quarry, groundwater sampling was completed at six groundwater wells. The wells are shown in Plate 1

The location of each well is explained:

1. Groundwater Quality in Bennettsbridge Limestone's Potable Water Supply Well "Quarry Well", which supplies water to employees at the site. The sample was taken before treatment. Approximate ITM Grid Ref: 654,288; 650,198.
2. The "Artesian Well" in the centre of the working floor of Bennettsbridge Quarry. This well is capped to stop constant flow of groundwater from an elevation of groundwater strike at -26m OD. The quarry floor is 30m OD. It is noted that, historically, this Artesian Well represented pristine deep groundwater unaffected by agriculture or any other anthropogenic activities. As stated, this is located in the centre of the operating quarry. This well is an environmental monitoring point, rather than water supply, and hence is not treated. ITM Grid Ref: 654,123; 650,033. In previous planning applications for the quarry (2018), this well was identified as 'B3D' and the historic record baseline 2018 is presented also here at the end of the note as Table 3.
3. The "Kirwan Well", which a domestic well immediately east of the quarry and south of the offices. This well is not yet treated because it has not yet been brought into production as a source of potable water supply. The site has just received Planning Permission. ITM Grid Ref: 654,560; 650,271.
4. "Hayes' Well", which is a disused agricultural well immediately south of the "Kirwan Well". This is the only other private well available for sampling in direct proximity to the quarry. This well is not used and therefore not treated. ITM Grid Ref: 654,506; 650,171.
5. "Moss Well", which is a private domestic well at 1.5km to the south of the quarry. The owner's state that the water is not treated prior to the sample collection point. ITM Grid Ref: 654,983; 648,736.
6. "Drea's Well", which is a private domestic and farm well at 950m, approximately, due south of Bennettsbridge quarry. This well is not treated prior to the sample collection point. ITM Grid Ref: 654,189; 649,080.

Sampling locations are shown in Plate 1. Laboratory Certificates of Analysis are presented as Appendix A. Hydro-G has Tabulated results for ease of reference. Results for each sampling event are presented in individual Tables, overleaf, as follows:

- (i) Table 1 presents February 2024 Results for each of the six sampling locations.
- (ii) Table 2 presents March 2024 Results for each of the six sampling locations.

In addition, Appendix B presents historical results for groundwater within the Bennettsbridge Limestone Quarry site. Eden Spring is acknowledged in all of the EIAR documentation and all Annual Environmental Reports submitted by Bennettsbridge Limestone demonstrating compliance with the Section 4 Discharge Licence for the site. Eden spring is part of the water balance accounted for in the Licenced Emission Limit Values for Discharge from the site. For example, in the 2018 drought Eden Spring was measured to deliver the base component of groundwater to the site.



Plate 1 Groundwater Sampling Locations to establish Wider Area Baseline Quality 2024

Table 1

Establishing Baseline Groundwater Monitoring Data February 2024

Parameter:	Units	Laboratory LOQ	Drinking Water Regulations (2023) UNTREATED WQ Specification	Drinking Water Regulations (2023) PWS WQ TREATED Specification	1. Quarry Well 20/2/24	2. Artesian Well Quarry Well 20/2/24	3. Kirwan Well 20/2/24	4. Hayes Well 20/2/24	5. Moss Well 20/2/24	6. Drea Well 20/2/24
Hydrogen Ion (pH)	pH units	4.0	n/a	≥ 6.5 and ≤9.5	6.9	7.0	7.1	7.1	7.2	7.1
Lab Result Nitrate	mg/L N	0.30	n/a	n/a	7.90	< 0.30	6.90	8.30	4.10	4.30
Calculated Nitrate as NO3	mg/l NO3	0.7 as NO3 Calc Equiv.	n/a	50 mg/l NO3	35.0	0.7	30.5	36.7	18.1	19.0
Total Ammonia	mg/L N	0.08	n/a	0.5 mg/l Ammonium	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
Sodium	mg/L	1	n/a	200 mg/l	14	13	13	14	11	14
Potassium (K)	mg/L	1.0	n/a	no Parametric Value	2.9	1.1	2.6	5.7	3.7	2.2
Magnesium (Mg)	mg/L	0.2	n/a	no Parametric Value	15.7	29.8	14.3	15.9	23.8	14.6
Total Phosphorus	mg/L P	0.09	n/a	no Parametric Value	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Chloride	mg/L	0.5	n/a	250 mg/l	27.1	29.5	28.2	28.8	21.5	25.5
Coliforms	cfu/100ml	1	n/a	no abnormal change	27	< 1	> 80	60	< 1	< 1
Faecal coliforms	cfu/100ml	1	n/a	Neither parameter mentioned Specifically. However, No Faecal Coliforms in the form of Intestinal Enterococci or Escherichia coli (E.coli) are permitted in Water Intended for Human Consumption via PWS.	10	< 1	78	< 1	< 1	< 1
Faecal Streptococci	MPN/100mL	<1	n/a		< 1	< 1	12	12	< 1	< 1
Conductivity	µS/cm	78.3	n/a	2500 µS/cm	761.0	717.0	776.0	767.0	810.0	814.0
Iron	µg/L	10	n/a	200 mg/l	< 10	107	< 10	37	< 10	20
Manganese	µg/L	2	n/a	50 mg/l	< 2	5	3	6	< 2	< 2
Hydro-G Calculation K:Na Ratio	GSI Indicator Parameter K:Na > 0.3 suggests local source of Organic Contamination				0.2	0.1	0.2	0.4	0.3	0.2

Table 2

Establishing Baseline Groundwater Monitoring Data March 2024

Parameter:	Units	Laboratory LOQ	Drinking Water Regulations (2023) UNTREATED WQ Specification	Drinking Water Regulations (2023) PWS WQ TREATED Specification	1. Quarry Well 20/03/2024	2. Artesian Well Quarry Well 20/03/2024	3. Kirwan Well 20/03/2024	4. Hayes Well 20/03/2024	5. Moss Well 20/03/2024	6. Drea Well 20/03/2024
Hydrogen Ion (pH)	pH units	4.0	n/a	≥ 6.5 and ≤9.5	7.4	7.4	7.2	7.3	7.4	7.1
Lab Result Nitrate	mg/L N	0.30	n/a	n/a	4.70	< 0.30	4.40	4.80	1.10	3.10
Calculated Nitrate as NO3	mg/l NO3	0.7 as NO3 Calc Equiv.	n/a	50 mg/l NO3	20.8	0.7	19.5	21.2	4.9	13.7
Total Ammonia	mg/L N	0.08	n/a	0.5 mg/l Ammonium	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
Sodium	mg/L	1	n/a	200 mg/l	14	13	14	13	11	13
Potassium (K)	mg/L	1.0	n/a	no Parametric Value	2.7	1.1	3.2	31.5	3.3	1.9
Magnesium (Mg)	mg/L	0.2	n/a	no Parametric Value	14.7	28.4	14.9	14.8	22.1	13.8
Total Phosphorus	mg/L P	0.09	n/a	no Parametric Value	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Chloride	mg/L	0.5	n/a	250 mg/l	25.9	28.5	25.0	26.9	17.1	22.7
Coliforms	cfu/100ml	1	n/a	no abnormal change	3	< 1	> 80	> 80	< 1	< 1
Faecal coliforms	cfu/100ml	1	n/a	Neither parameter mentioned Specifically. However, No Faecal Coliforms in the form of Intestinal Enterococci or Escherichia coli (E.coli) are permitted in Water Intended for Human Consumption via PWS.	1	4	17	> 80	< 1	24
Faecal Streptococci	MPN/100mL	<1	n/a		1	< 1	2	46	< 1	< 1
Conductivity	µS/cm	78.3	n/a	2500 uS/cm	706.0	804.0	742.0	625.0	802.0	759.0
Iron	µg/L	10	n/a	200 mg/l	< 10	579	< 10	< 10	< 10	< 10
Manganese	µg/L	2	n/a	50 mg/l	< 2	31	< 2	< 2	< 2	< 2
Hydro-G Calculation K:Na Ratio	GSI Indicator Parameter K:Na > 0.3 suggests local source of Organic Contamination				0.2	0.1	0.2	2.4	0.3	0.1

Evaluation of Quarry & Local Area Baseline Groundwater Monitoring Results

- With respect to Groundwater pH: At all locations pH levels are in the neutral range as specified by the Drinking Water Regulations (2023), which is typical for groundwater in limestone. Values are generally similar.
- With respect to Groundwater NO₃:
 - Nitrate concentrations vary between <1 and 37 mg/l NO₃ in the February samples but are much lower in the March samples. This is the usual groundwater nitrate response in Ireland: slurry spreading season opens in February.
 - All wells surveyed have compliant Nitrate concentrations. The Quarry Artesian and Moss Well sampling points suggest confined groundwater conditions with reduced Nitrate concentrations. This has neither pollution potential nor impact significance. The characteristic is purely geological.
 - The artesian well central in the quarry has had < LOD Nitrate since monitoring records began in the quarry (refer also to Appendix B for historical data).
 - The 2018 EIAR for the quarry discusses the artesian baseline nitrates (Appendix B extracts).
 - All local wells conform to the Drinking Water Regulations (2023) Parametric Value of 50mg/l.
 - Historical data for the quarry (Appendix B) demonstrates that the Eden spring has always had an early winter recharge peak. However, those same sample locations return to much lower values later in summer when recharge from land is less.
 - As previously stated, the published 3rd Cycle WFD Risk classification for the underlying Kilkenny GWB is 'At Risk' with Agriculture as a Pressure and Nutrients as the Issue (EPA, 2024). Of all industries, mines and quarries are cited as the lowest cause of 'At Risk Waterbodies'.
- With respect to Groundwater Nitrite:
 - This parameter is often used by hydrogeologists as a proxy for organic contamination. On a historical basis (Appendix B), Nitrite concentrations in the quarry's waters have varied between 0 - 0.05 mg/l NO₂-N.
 - In this baseline evaluation 2024, the highest nitrite concentrations were found at the deep artesian groundwater sampling location.
 - The limit for NO₂ in the Groundwater Regulations is 0.375 mg/l NO₂ for good groundwater status (S.I. No. 9 of 2010). Hence, concentrations recorded at the site do not suggest poor groundwater quality.
- With respect to Groundwater Ammonia:
 - All of the local and wider area sample locations (6 no.) on both sampling events returned concentrations <0.08 mg/l Ammonia, which is the Limit of Detection (LOD) of the Laboratory

- The Drinking Water Regulations (2023) specify 0.5 mg/l Ammonium, which is a subset of the Total Ammonia value. All local wells return Total Ammonia results for an order of magnitude lower than the Drinking Water Regulation's subset component Ammonium value of 0.5 mg/l, it can confidently be asserted that groundwater is not impacted.
- Ammonia and Ammonium are very useful parameters. The source of ammonia and ammonium is predominantly urine, either from grazing animals or domestic wastewater systems. Ammonia is a transient parameter of the nitrogen cycle. If elevated ammonia is detected, there is a local source of contamination. There is no ammonia in any of the six wells sampled on two occasions in this evaluation of the baseline.
- Local Authorities have a perception that quarry explosives COULD be a source of ammonium. This is not a fact. The explosives industry and its agents in the field are well versed in preserving resources and detonating all explosive nitrogen components. The historical record, Appendix B, for Ammonium concentrations in the quarry's waters suggests that they are an order of magnitude lower than permitted in the Drinking Water Regulations (2023).
- With respect to the groundwater's Total Phosphorus concentrations:
 - Results returned from the accredited laboratory are < LOD: there is no Total P detected.
 - Neither Total P nor Ortho-P are specified in the Drinking Water Regulations (2023).
 - With respect to the historical baseline within the quarry, for the form of Phosphorus that has environmental significance is ortho-Phosphorus and concentrations in the quarry range from <LOD to 0.06 mg/l MRP as P.
 - With respect to the site's discharge, the site's Discharge Licence ELV for ortho-P is always complied with.
- With respect to Groundwater Potassium (K) and Sodium (Na) concentrations:
 - Potassium is not specified in either the Drinking Water Regulations (2023) or the Groundwater Regulations (2010, as amended). There are no health implications and it is not a nuisance parameter. However, potassium is often a component of artificial fertilisers and for that reason it is considered a good indicator parameter in groundwater for the purposes of evaluating agricultural pressure or evidence of organic wastes.
 - With respect to the baseline surveys completed, only one of local wells has elevated K but that well is no longer in use. There are no other wells in the area with that scale of potassium. Historically, the quarry results show potassium concentrations between 1 and 6 mg/l (Appendix B).
 - With respect to Sodium concentrations (Na), groundwater at the quarry and in the local area has low Sodium concentrations compared to the Parametric Value of 200mg/l Na. Sodium concentrations in the local groundwater are normal and do not indicate impact.
- The GSI use the K:Na Ratio to evaluate the potential for local sources of organic contamination. A K:Na Ratio of > 0.3 is considered to present as a potential indicator for nearby organic contamination. Of the six wells

sampled, only one well returns a >0.3 K:Na ratio and that is the well that discontinued its use as a source of water. The K:Na ratio of groundwater at all other locations suggests good hydrochemical quality.

- With respect to local groundwater Magnesium concentrations, all results are broadly similar with the usual trend of the artesian well, and likely artesian Moss well, reflecting slightly higher Magnesium concentrations because of longer contact time with bedrock. Magnesium is not a specified parameter of the Drinking Water Regulations (2023). Hydrogeologists like to use this parameter to evaluate bedrock signals.
- With respect to groundwater Chloride results, the quarry wells and all local wells comply with the Drinking Water Regulations (2023) Parametric Value of 250 mg/l Chloride.
- With respect to Coliforms results, this is normal mould and life in water. There are $<LOD$ Coliforms in the artesian wells because the groundwater in artesian wells are confined and isolated from the anthropogenic influences. There are relatively high numbers of Coliforms in some wells outside the quarry. The Drinking Water Regulations (2023) do not prescribe a Parametric Value, only that there should be 'No Abnormal Change' of this Indicator Parameter.
- With respect to Faecal Coliforms and the Streptococci results, like almost all groundwater and surface water in Ireland there are detections of Faecal matter in some wells. The detection of Faecal Coliforms in the quarry's artesian well sample can only be attributed to sampling or laboratory error because of the other results for this well: namely $< LOD$ Ammonia and reduced Nitrate concentrations. Ensuring compliance with the requirements of the Drinking Water Regulations (2023) means that all Public Water is Chlorinated in order to ensure clean water at the Point of Supply. In addition, many Water Treatment Plants filter and UV Sterilise waters before distribution. All well users must ensure that their waters are appropriately sterilised. Even if there were ZERO detections of any faecal matter in any well, disinfection is always advised because one never knows what might occur randomly in the environment.
- Electrical Conductivity (EC) as a parameter for groundwater evaluation in limestone aquifers. The results are typical EC results for limestone bedrock. All wells sampled are compliant with the Drinking Water Regulations (2023) limit of 2,500 $\mu S/cm$. The quarry's artesian well, and the likely confined conditions Moss Well, have slightly higher EC results than the unconfined groundwater flow condition at the other wells. This is of no significance with respect to impacts.
- Evaluation of Iron and manganese concentrations was completed for the purposes of compliance with the Drinking Water Regulations (2023) and domestic treatment system. Iron and Manganese concentrations are both within the Parametric Values specified by the Drinking Water Regulations (2023).

Overall, the quality of groundwater sampled complies with all Hydrochemical and Physiochemical Parametric Values of the Drinking Water Regulations (2023) but will require treatment to ensure compliance with Microbial Parametric Values. The Drinking Water Regulations (2023) apply to treated water.

Plate 2 Historic Water Quality Sampling Location IDs within the operational permitted Quarry (PL 18/858).

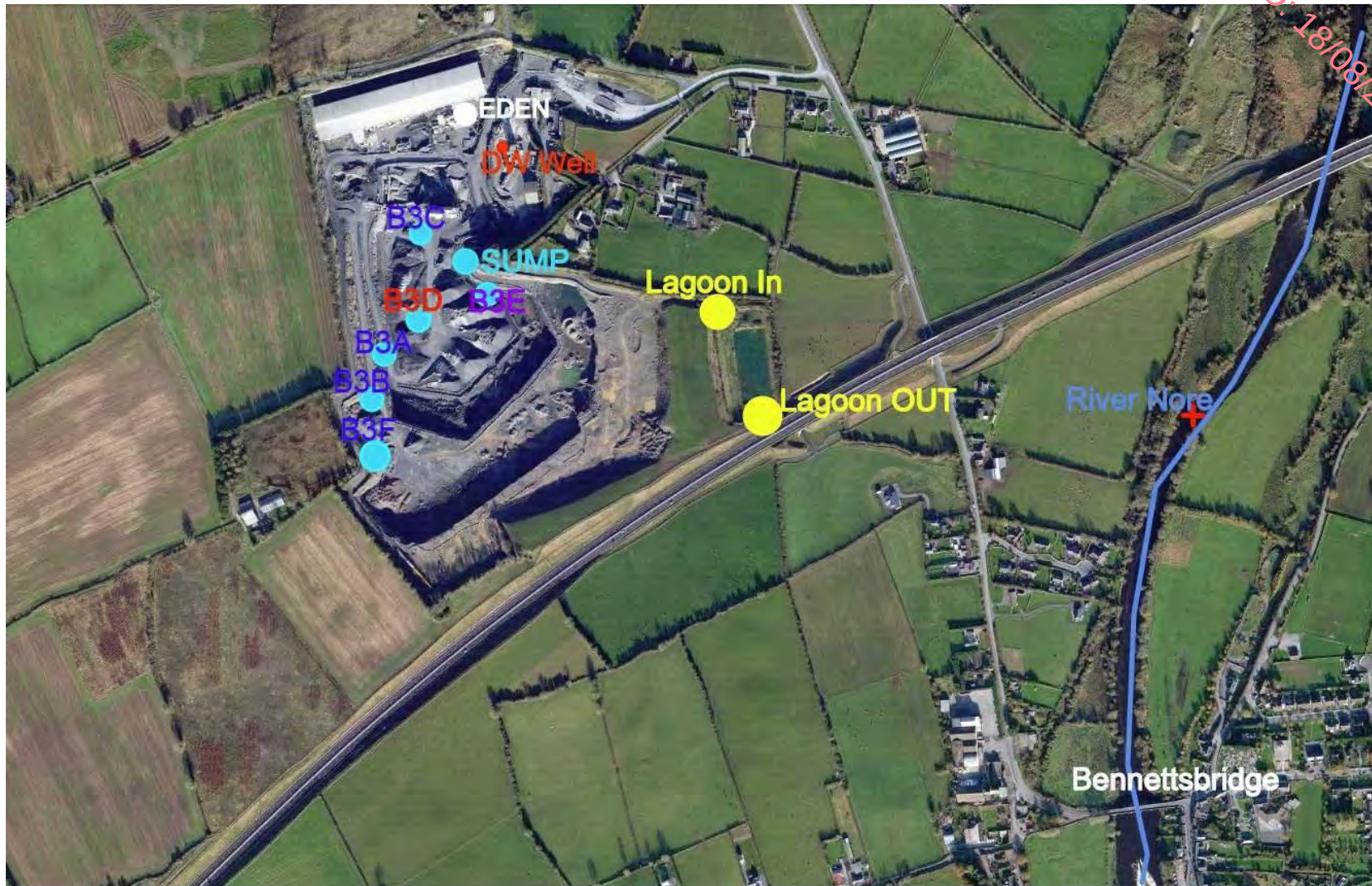


Table 3 Historical Record for 'Artesian Well' B3D in the floor of the quarry (Water strike zone -26m OD)

Groundwater Quality: Artesian BH central floor (RC of Apex): DEEP DEEP GW from elevation range 0m OD to -56m OD												B3D 2018 Monthly Monitoring			Groundwater Regulations (2010) Threshold Value
Parameter	Unit	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sept-18	Oct-18	MAX	MIN	AVERAGE	
pH	pH Unit	7.4	7.1	7.1	7.2	7.1	7.2	7.2	7.2	7.10	7.1	7.4	7.1	7.17	not specified
Sulphate	mg/L	40.7	32.6	36.8	38.1	37.7	38.9	40.2	41.7	39.90	47.50	47.5	32.6	39.41	187.5
Conductivity	µS/cm @ 20°C	680	667	662	655	656	666	664	663	662.00	667	680	655	664	800 - 1875
Ammonia	mg/L	0.06	0.04	0.05	0.05	0.04	0.03	0.08	0.04	0.05	0.04	0.08	0.03	0.048	0.065 to 0.175
Nitrate	mg/L as N	<0.25	<0.25	<0.25	<0.25	<0.25	0.33	0.41	<0.25	<0.25	<0.25	0	0	0	not specified
Nitrate	mg/l NO3	<1	<1	<1	<1	<1	1	2	<1	<1	<1	2	<1	<1	37.5
Nitrite	mg/L as N	0.05	<0.005	0.008	<0.005	<0.005	<0.005	0.04	<0.005	<0.016	<0.005	0.05	<0.005	0.006	0.375
Calcium	mg/L	113	113	108	111	108	106	110	111	113.00	103	113	103	110	not specified
Total Hardness	mg/L as CaCO ₃	405	430	367	410	399	396	402				430	367	401	not specified
Total Phosphorus	mg/L P	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	not specified
Orthophosphate	mg/L P	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.035
Potassium	mg/L	1.27	1.22	0.92	1.26	1.26	0.95	1.28	1.05	1.25	1.22	1.28	0.92	1.168	not specified
Sodium	mg/L	11.5	10.8	10.9	10.8	10.9	10.7	11.1	11.3	11.10	11.0	11.5	10.7	11.01	150
Chloride	mg/L	27	29.1	30.2	30.1	28.9	29.2	30.1	30.8	30.10	29.1	30.8	27	29.46	24 — 187.5
Manganese, Total	mg/L	0.009	0.023	0.01	0.014	0.013	0.012	0.004	0.007	0.01	11	10	0.004	0.013	not specified
Manganese, Dissolved	mg/L	0.009	0.018	0.008	0.01	0.009	0.012	0.004	0.005	0.01	10	11	0.01	0.005	not specified
BOD	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	not specified
COD	mg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	not specified
Iron, Total	mg/L	0.07	2.87	0.903	1	0.85	0.004	0.05	0.6	1.01	1066	1066	0.004		not specified
Iron, Dissolved	mg/L	0.068	<0.005	0.4	0.716		<0.001	<0.005	0.33	0.57	896	896	<0.001		not specified
Magnesium	mg/L		30.7	28.1	29.3	10.9	27	27	26.1	27.30	26	30.7	10.9	25.8	not specified
TOC	mg/L		1.74	1.23	1.19	1.65	1.5	1.29	1.41	3.91	2.06	3.9	1.2	1.8	not specified
Dissolved Organic Carbon	mg/L		1.26	0.66	0.84	1.44	0.9	1	1.31	3.21	1.52	3.2	0.7	1.3	not specified
Suspended Solids	mg/L		5	<2	<2	<2	<2	<2	<2	<2	<2	5.0	<2	<2	not specified
Total Hydrocarbons	mg/L		<10				<0.01	<0.01	<0.01	<0.01	<10	<10	<0.01	<0.01	not specified
PAH (Total)	µg/L	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	not specified
K:Na calculation	Hydro-G ratio	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	

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Table 3 (continued) Organics History for Artesian Well B3D

PAH'S	Unit	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sept-18	Oct-18
		B3D	B3D	B3D	B3D	B3D	B3D	B3D	B3D	B3D	B3D
PAH (Total)	µg/L	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16
Acenaphthene	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)anthracene	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(b)fluoranthene	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(k)fluoranthene	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sum B/K	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(ghi)perylene	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chrysene	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dibenzo(ah)anthracene	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Flouroanthene	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Flourene	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(1,2,3-cd)pyrene	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pyrene	µg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Appendix A

Certs of Analysis – Groundwater Baseline Assessment – 6 Wells

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Customer Sample Ref:	1. Quarry Well	Customer Sample Code:	
Project:	Ground Water Analysis	Sampled By:	Water Lab
Our Reference:	120835 (24-39052)	Sample Matrix:	Ground Water
Date Sampled:	20/02/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
- Note 6	Coliforms	cfu/100ml	1	27
- Note 6	* Faecal coliforms	cfu/100ml	1	10
	Microbiological Analysis: (D)			
SMP 068	* Faecal Streptococci	MPN/100mL	<1	< 1
	Chemical Analysis: (F)			
- Note 6	Hydrogen Ion (pH)	pH units	4.0	6.9
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	Conductivity	Note 5 μ S/cm	78.3	761.0
- Note 6	* Nitrate	mg/L N	0.30	7.90
	Chemical Analysis: (F)			
SCP 027B	Chloride	mg/L	0.5	27.1
SCP 053A/053D	Magnesium (Mg)	mg/L	0.2	15.7
SCP 053A/053D	Potassium (K)	mg/L	1.0	2.9
SCP 053A/053D	Sodium	mg/L	1	14
- Note 6	Total Phosphorus	mg/L P	0.09	< 0.09
	Chemical Analysis: (F)			
SCP 053B/053D	Iron	μ g/L	10	< 10
SCP 053B/053D	Manganese	μ g/L	2	< 2

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Customer Sample Ref:	2. Artesian Well Quarry Well	Customer Sample Code:	
Project:	Ground Water Analysis	Sampled By:	Water Lab
Our Reference:	120836 (24-39052)	Sample Matrix:	Ground Water
Date Sampled:	20/02/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
- Note 6	Coliforms	cfu/100ml	1	< 1
- Note 6	* Faecal coliforms	cfu/100ml	1	< 1
<u>Microbiological Analysis: (D)</u>				
SMP 068	* Faecal Streptococci	MPN/100mL	<1	< 1
<u>Chemical Analysis: (F)</u>				
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.2
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	Conductivity	Note 5 μ S/cm	78.3	717.0
- Note 6	* Nitrate	mg/L N	0.30	< 0.30
<u>Chemical Analysis: (F)</u>				
SCP 027B	Chloride	mg/L	0.5	29.5
SCP 053A/053D	Magnesium (Mg)	mg/L	0.2	29.8
SCP 053A/053D	Potassium (K)	mg/L	1.0	1.1
SCP 053A/053D	Sodium	mg/L	1	13
- Note 6	Total Phosphorus	mg/L P	0.09	< 0.09
<u>Chemical Analysis: (F)</u>				
SCP 053B/053D	Iron	μ g/L	10	107
SCP 053B/053D	Manganese	μ g/L	2	5

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Customer Sample Ref:	3. Kirwan Well	Customer Sample Code:	
Project:	Ground Water Analysis	Sampled By:	Water Lab
Our Reference:	120837 (24-39052)	Sample Matrix:	Ground Water
Date Sampled:	20/02/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
- Note 6	Coliforms	cfu/100ml	1	> 80
- Note 6	* Faecal coliforms	cfu/100ml	1	78
<u>Microbiological Analysis: (D)</u>				
SMP 068	* Faecal Streptococci	MPN/100mL	<1	12
<u>Chemical Analysis: (F)</u>				
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.1
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	Conductivity	Note 5 μ S/cm	78.3	776.0
- Note 6	* Nitrate	mg/L N	0.30	6.90
<u>Chemical Analysis: (F)</u>				
SCP 027B	Chloride	mg/L	0.5	28.2
SCP 053A/053D	Magnesium (Mg)	mg/L	0.2	14.3
SCP 053A/053D	Potassium (K)	mg/L	1.0	2.6
SCP 053A/053D	Sodium	mg/L	1	13
- Note 6	Total Phosphorus	mg/L P	0.09	< 0.09
<u>Chemical Analysis: (F)</u>				
SCP 053B/053D	Iron	μ g/L	10	< 10
SCP 053B/053D	Manganese	μ g/L	2	3

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Customer Sample Ref:	4. Hayes Well	Customer Sample Code:	
Project:	Ground Water Analysis	Sampled By:	Water Lab
Our Reference:	120838 (24-39052)	Sample Matrix:	Ground Water
Date Sampled:	20/02/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
- Note 6	Coliforms	cfu/100ml	1	60
- Note 6	* Faecal coliforms	cfu/100ml	1	< 1
<u>Microbiological Analysis: (D)</u>				
SMP 068	* Faecal Streptococci	MPN/100mL	<1	12
<u>Chemical Analysis: (F)</u>				
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.1
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	Conductivity	Note 5 μ S/cm	78.3	767.0
- Note 6	* Nitrate	mg/L N	0.30	8.30
<u>Chemical Analysis: (F)</u>				
SCP 027B	Chloride	mg/L	0.5	28.8
SCP 053A/053D	Magnesium (Mg)	mg/L	0.2	15.9
SCP 053A/053D	Potassium (K)	mg/L	1.0	5.7
SCP 053A/053D	Sodium	mg/L	1	14
- Note 6	Total Phosphorus	mg/L P	0.09	< 0.09
<u>Chemical Analysis: (F)</u>				
SCP 053B/053D	Iron	μ g/L	10	37
SCP 053B/053D	Manganese	μ g/L	2	6

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Customer Sample Ref:	5. Moss Well	Customer Sample Code:	
Project:	Ground Water Analysis	Sampled By:	Water Lab
Our Reference:	120839 (24-39052)	Sample Matrix:	Ground Water
Date Sampled:	20/02/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
- Note 6	Coliforms	cfu/100ml	1	< 1
- Note 6	* Faecal coliforms	cfu/100ml	1	< 1
<u>Microbiological Analysis: (D)</u>				
SMP 068	* Faecal Streptococci	MPN/100mL	<1	< 1
<u>Chemical Analysis: (F)</u>				
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.2
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	Conductivity	Note 5 μ S/cm	78.3	810.0
- Note 6	* Nitrate	mg/L N	0.30	4.10
<u>Chemical Analysis: (F)</u>				
SCP 027B	Chloride	mg/L	0.5	21.5
SCP 053A/053D	Magnesium (Mg)	mg/L	0.2	23.8
SCP 053A/053D	Potassium (K)	mg/L	1.0	3.7
SCP 053A/053D	Sodium	mg/L	1	11
- Note 6	Total Phosphorus	mg/L P	0.09	< 0.09
<u>Chemical Analysis: (F)</u>				
SCP 053B/053D	Iron	μ g/L	10	< 10
SCP 053B/053D	Manganese	μ g/L	2	< 2

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Customer Sample Ref:	6. Drea Well	Customer Sample Code:	
Project:	Ground Water Analysis	Sampled By:	Water Lab
Our Reference:	120840 (24-39052)	Sample Matrix:	Ground Water
Date Sampled:	20/02/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
- Note 6	Coliforms	cfu/100ml	1	< 1
- Note 6	* Faecal coliforms	cfu/100ml	1	< 1
<u>Microbiological Analysis: (D)</u>				
SMP 068	* Faecal Streptococci	MPN/100mL	<1	< 1
<u>Chemical Analysis: (F)</u>				
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.1
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	Conductivity	Note 5 μS/cm	78.3	814.0
- Note 6	* Nitrate		0.30	4.30
<u>Chemical Analysis: (F)</u>				
SCP 027B	Chloride	mg/L	0.5	25.5
SCP 053A/053D	Magnesium (Mg)	mg/L	0.2	14.6
SCP 053A/053D	Potassium (K)	mg/L	1.0	2.2
SCP 053A/053D	Sodium	mg/L	1	14
- Note 6	Total Phosphorus	mg/L P	0.09	< 0.09
<u>Chemical Analysis: (F)</u>				
SCP 053B/053D	Iron	μg/L	10	20
SCP 053B/053D	Manganese	μg/L	2	< 2

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Customer Sample Ref:	2. Artesian Well Quarry Well	Customer Sample Code:	
Project:	Ground Water Analysis	Sampled By:	Water Lab
Our Reference:	125158 (24-40525)	Sample Matrix:	Ground Water
Date Sampled:	20/03/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
- Note 6	Coliforms	cfu/100ml	1	< 1
- Note 6	* Faecal coliforms	cfu/100ml	1	4
	Microbiological Analysis: (D)			
SMP 068	* Faecal Streptococci	MPN/100mL	<1	< 1
	Chemical Analysis: (F)			
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.4
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	Conductivity	Note 5 μ S/cm	78.3	804.0
- Note 6	* Nitrate	mg/L N	0.30	< 0.30
	Chemical Analysis: (F)			
SCP 027B	Chloride	mg/L	0.5	28.5
SCP 053A/053D	Magnesium (Mg)	mg/L	0.2	28.4
SCP 053A/053D	Potassium (K)	mg/L	1.0	1.1
SCP 053A/053D	Sodium	mg/L	1	13
- Note 6	Total Phosphorus	mg/L P	0.09	< 0.09
	Chemical Analysis: (F)			
SCP 053B/053D	Iron	μ g/L	10	579
SCP 053B/053D	Manganese	μ g/L	2	31

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Customer Sample Ref:	1. Quarry Well	Customer Sample Code:	
Project:	Ground Water Analysis	Sampled By:	Water Lab
Our Reference:	125159 (24-40525)	Sample Matrix:	Ground Water
Date Sampled:	20/03/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
- Note 6	Coliforms	cfu/100ml	1	3
- Note 6	* Faecal coliforms	cfu/100ml	1	1
<u>Microbiological Analysis: (D)</u>				
SMP 068	* Faecal Streptococci	MPN/100mL	<1	1
<u>Chemical Analysis: (F)</u>				
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.4
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	Conductivity	Note 5 μ S/cm	78.3	706.0
- Note 6	* Nitrate	mg/L N	0.30	4.70
<u>Chemical Analysis: (F)</u>				
SCP 027B	Chloride	mg/L	0.5	25.9
SCP 053A/053D	Magnesium (Mg)	mg/L	0.2	14.7
SCP 053A/053D	Potassium (K)	mg/L	1.0	2.7
SCP 053A/053D	Sodium	mg/L	1	14
- Note 6	Total Phosphorus	mg/L P	0.09	< 0.09
<u>Chemical Analysis: (F)</u>				
SCP 053B/053D	Iron	μ g/L	10	< 10
SCP 053B/053D	Manganese	μ g/L	2	< 2

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Customer Sample Ref:	3. Kirwan Well	Customer Sample Code:	
Project:	Ground Water Analysis	Sampled By:	Water Lab
Our Reference:	125160 (24-40525)	Sample Matrix:	Ground Water
Date Sampled:	20/03/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
- Note 6	Coliforms	cfu/100ml	1	> 80
- Note 6	* Faecal coliforms	cfu/100ml	1	17
<u>Microbiological Analysis: (D)</u>				
SMP 068	* Faecal Streptococci	MPN/100mL	<1	2
<u>Chemical Analysis: (F)</u>				
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.2
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	Conductivity	Note 5 μ S/cm	78.3	742.0
- Note 6	* Nitrate	mg/L N	0.30	4.40
<u>Chemical Analysis: (F)</u>				
SCP 027B	Chloride	mg/L	0.5	25.0
SCP 053A/053D	Magnesium (Mg)	mg/L	0.2	14.9
SCP 053A/053D	Potassium (K)	mg/L	1.0	3.2
SCP 053A/053D	Sodium	mg/L	1	14
- Note 6	Total Phosphorus	mg/L P	0.09	< 0.09
<u>Chemical Analysis: (F)</u>				
SCP 053B/053D	Iron	μ g/L	10	< 10
SCP 053B/053D	Manganese	μ g/L	2	< 2

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Customer Sample Ref:	4. Hayes Well	Customer Sample Code:	
Project:	Ground Water Analysis	Sampled By:	Water Lab
Our Reference:	125161 (24-40525)	Sample Matrix:	Ground Water
Date Sampled:	20/03/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
- Note 6	Coliforms	cfu/100ml	1	> 80
- Note 6	* Faecal coliforms	cfu/100ml	1	> 80
<u>Microbiological Analysis: (D)</u>				
SMP 068	* Faecal Streptococci	MPN/100mL	<1	46
<u>Chemical Analysis: (F)</u>				
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.3
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	Conductivity	Note 5 μ S/cm	78.3	625.0
- Note 6	* Nitrate	mg/L N	0.30	4.80
<u>Chemical Analysis: (F)</u>				
SCP 027B	Chloride	mg/L	0.5	26.9
SCP 053A/053D	Magnesium (Mg)	mg/L	0.2	14.8
SCP 053A/053D	Potassium (K)	mg/L	1.0	31.5
SCP 053A/053D	Sodium	mg/L	1	13
- Note 6	Total Phosphorus	mg/L P	0.09	< 0.09
<u>Chemical Analysis: (F)</u>				
SCP 053B/053D	Iron	μ g/L	10	< 10
SCP 053B/053D	Manganese	μ g/L	2	< 2

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Customer Sample Ref:	5. Moss Well	Customer Sample Code:	
Project:	Ground Water Analysis	Sampled By:	Water Lab
Our Reference:	125162 (24-40525)	Sample Matrix:	Ground Water
Date Sampled:	20/03/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
- Note 6	Coliforms	cfu/100ml	1	< 1
- Note 6	* Faecal coliforms	cfu/100ml	1	< 1
	<u>Microbiological Analysis: (D)</u>			
SMP 068	* Faecal Streptococci	MPN/100mL	<1	< 1
	<u>Chemical Analysis: (F)</u>			
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.4
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	Conductivity	Note 5 μ S/cm	78.3	802.0
- Note 6	* Nitrate		0.30	1.10
	<u>Chemical Analysis: (F)</u>			
SCP 027B	Chloride	mg/L	0.5	17.1
SCP 053A/053D	Magnesium (Mg)	mg/L	0.2	22.1
SCP 053A/053D	Potassium (K)	mg/L	1.0	3.3
SCP 053A/053D	Sodium	mg/L	1	11
- Note 6	Total Phosphorus	mg/L P	0.09	< 0.09
	<u>Chemical Analysis: (F)</u>			
SCP 053B/053D	Iron	μ g/L	10	< 10
SCP 053B/053D	Manganese	μ g/L	2	< 2

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Customer Sample Ref:	6. Drea Well	Customer Sample Code:	
Project:	Ground Water Analysis	Sampled By:	Water Lab
Our Reference:	125163 (24-40525)	Sample Matrix:	Ground Water
Date Sampled:	20/03/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
- Note 6	Coliforms	cfu/100ml	1	< 1
- Note 6	* Faecal coliforms	cfu/100ml	1	24
Microbiological Analysis: (D)				
SMP 068	* Faecal Streptococci	MPN/100mL	<1	< 1
Chemical Analysis: (F)				
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.1
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	Conductivity	Note 5 μ S/cm	78.3	759.0
- Note 6	* Nitrate	mg/L N	0.30	3.10
Chemical Analysis: (F)				
SCP 027B	Chloride	mg/L	0.5	22.7
SCP 053A/053D	Magnesium (Mg)	mg/L	0.2	13.8
SCP 053A/053D	Potassium (K)	mg/L	1.0	1.9
SCP 053A/053D	Sodium	mg/L	1	13
- Note 6	Total Phosphorus	mg/L P	0.09	< 0.09
Chemical Analysis: (F)				
SCP 053B/053D	Iron	μ g/L	10	< 10
SCP 053B/053D	Manganese	μ g/L	2	< 2

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Appendix B
– Groundwater Baseline Assessment -
Historic Groundwater Monitoring Data Bennettsbridge Limestone
2018 EIAR Data (PL 18/858)

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The map of sampling locations is presented as Plate 8.12. The sampling point's water flow within the quarry starts with 'Eden' and moves as follows:

1. 'Eden' spring flows to the Quarry Sump: both are part of the monitoring network = 2 sampling points [Eden's current discharge elevation is 39m OD, approximately, but this is an elevation that has been excavated by quarrying].
2. Also feeding the quarry sump is water from multiple small 'springs' in the exposed wall of the quarry: but these are just really groundwater discharges along bedding planes in the limestone. All these flow in an excavated channel to the same Quarry Sump. These springs are sampled at the points at which they come out the western wall and are called B3A, B3B & B3F (B3 is the name ID for the Bench 3 application) = 3 distinct sampling points. Those three sampling points feed a channel and at the end of that channel we sample B3E before it hits the quarry sump = a fourth sampling point in this central void part of the site's system [so now we are at 6 sampling points].
3. Within the quarry floor there is another spring that we sample B3C – also leading eventually to the quarry sump. [this is a 7th sampling point].
4. The quarry sump is the sampling point that integrates Eden, B3C & B3E (and B3E integrates B3A, B3B & B3F and some more small inaccessible groundwater seepage points in the south and east walls of the quarry).
5. The sump has three big pumps on pontoons in it and they can pump 70,000 m³/d. There is also another submersible pump that comes into play only in extreme events at a spring discharge in the eastern corner. From the sump, water is pumped up the side walls to the 'Lagoon' from where it is sampled as water Entering the lagoon and Exiting the Lagoon = 2 more sampling points [there is now 9 sampling points within the quarry]. The reason for sampling both the inlet and outlet of the lagoons is to facilitate performance and maintenance requirements of the lagoons.
6. A 10th point is the capped artesian well B3D, which presents a sampling point from a Rotary Core BH that was called RC2 when drilled by Apex in 2006. The BH was 86m deep and water strike was possibly at 0m OD but water strike could just have easily been at minus 56m OD because it is difficult to evaluate this from the borehole log from the geophysics' company geologist who was there to describe rock product and competency. I am not sure if they would have been able to continue drilling through the artesian pressure and that is why I lean towards -56m OD as the zone for the water strike. In any case it is capped now, and that tap is only opened to sample from and therefore it does not flow to the sump and B3D therefore

represents an isolated groundwater picture. In this water quality monitoring dataset, we could consider that this WQ record at B3D is true deep level groundwater and its quality is isolated from all other sampling points and does not form part of the hydrochemistry picture described in the hydrochemical dataset for the discharged waters at the quarry.

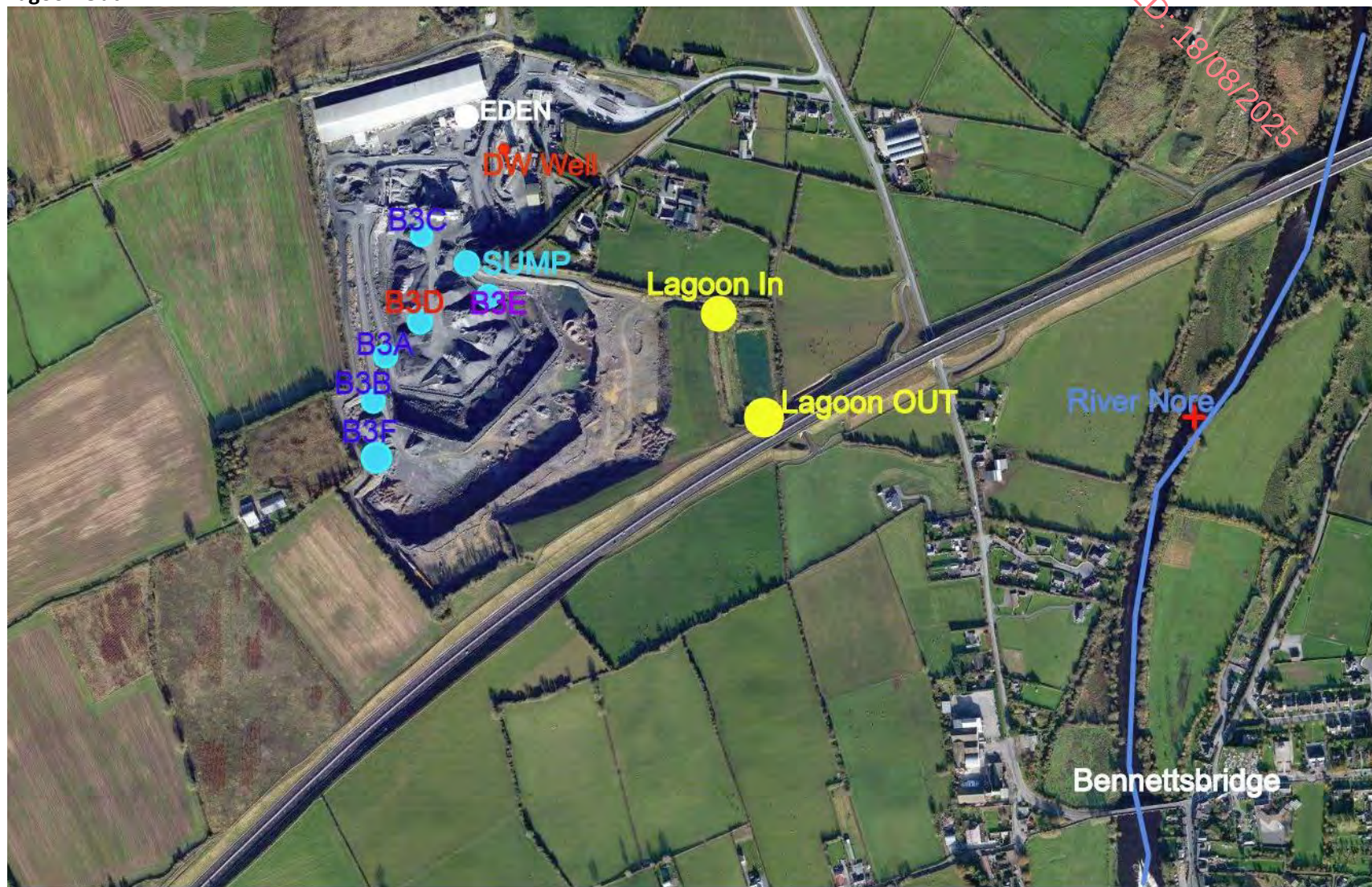
7. And finally, we have a well on site used for drinking water to the canteen, which is dataset point number 11.

The Suite of Parameters is presented in Table 8.12 and the full dataset and associated Certificates of analysis are presented in the 2018 EIAR's Groundwater Quality Appendix C3. As stated, the map of sampling locations is presented as Plate 8.12. The results for each individual groundwater monitoring point are Tabulated in Tables 8.13 to 8.19 and are discussed in the following section.

Table 8.12: Suite of Parameters for the Quarry's 2018 field programme

2018 Water Analysis Schedule.	3 x Routine	6 x B3A - B3F	1 x Quarry Sump	2 x River Nore
Total Organic Carbon	✓	✓	✓	✓
Dissolved Organic Carbon	✓	✓	✓	✓
Calcium	✓	✓	✓	✓
Total phosphorus	✓	✓	✓	✓
total PAH suite	✓	✓	✓	✓
electrical conductivity (EC)	✓	✓	✓	✓
nitrites	✓	✓	✓	✓
Potassium	✓	✓	✓	✓
Sodium	✓	✓	✓	✓
Chloride	✓	✓	✓	✓
Manganese Total	✓	✓	✓	✓
manganese dissolved	✓	✓	✓	✓
Iron total	✓	✓	✓	✓
Iron dissolved	✓	✓	✓	✓
Magnesium	✓	✓	✓	✓
Sulphate	✓	✓	✓	✓
pH	✓	✓	✓	✓
Suspended Solids	✓	✓	✓	✓
BOD	✓	✓	✓	✓
COD	✓	✓	✓	✓
Nitrate	✓	✓	✓	✓
Total Amonia	✓	✓	✓	✓
Molybdate Reactive Phosphate	✓	✓	✓	✓
Total Hydrocarbons	✓	✓	✓	✓

Plate 8-12: Water Quality Sampling Points in the Quarry: Eden, Drinking Water Well, Quarry Sump, B3A, B3B, B3C, B3D, B3E & B3F, Lagoon In, Lagoon Out



Groundwater Quality Results 2018

Groundwater chemistry from all groundwater ingress and collection points within the quarry was assessed with an aim to characterise local groundwater chemistry. As stated, the map of sampling locations was presented as Plate 8.12. The results for each individual groundwater monitoring point are Tabulated in Tables 8.13 to 8.19 and are discussed in this section. Original Certificates of Analysis are presented in Appendix C3. Before the analyses of chemical results, the hypothesis was that sampling points B3A, B3B, B3F, B3C and B3E all collect water from 30 to 35m OD, while sampling point B3D, the drinking water well and EDEN, to some extent, represent groundwater from deeper horizons.

Overall Findings

1. Local shallow groundwater is heavily impacted by agriculture. On a local scale this water is pumped out by the quarry and nutrients are not further introduced within the quarry before water is discharged to the river: ortho-Phosphate and ammonia in the final discharge are most often below the limit of detection of the auto analyser and Nitrates in the final discharge are < the 10 mg/l NO₃-N limit and do not increase above the concentrations that are received by the quarry from the surrounding land's groundwater. In fact the quarry is likely to have a beneficial effect on the river because the deeper groundwater component acts to dilute the shallow groundwater and it is possible that direct natural groundwater discharge via bank infiltration would bring more nutrients to the river than the quarry does.
2. Deep groundwater that is represented by B3D is much cleaner with respect to nutrients. This deep groundwater was struck between 0 and -56m OD. It is a more mineralised groundwater and its low nutrient status. The results for the deeper B3D monitoring point were included in this assessment in order to provide a reference level for groundwater that is different to that experienced in the local shallow hydrogeological system and to ground truth the conceptual hydrogeological model presented by hydrogeologists over the last 20 years, which is that the quarry mostly experiences shallow groundwater. The water quality results do confirm a land surface influenced shallow groundwater component.
3. Of particular note with respect to the monitoring results for the channel on the floor that collects floor runoff, named B3F, the low Suspended Solids content is a good reflection of floor management because it collects floor runoff around spoil heaps and from quarry loader traffic. In fairness, the spoil heaps are of processed product, which has been washed during processing.

Table 8.13 Groundwater Monitoring Point B3A (west face spring, northern spring close to base of access ramp, 31m OD)

Parameter	Unit	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	B3A 2018			Groundwater Regulations (2010) Threshold Value
		B3A	B3A	B3A	B3A	B3A	B3A	B3A	B3A	B3A	B3A	MAX	MIN	AVERAGE	
pH	pH Unit	7.5	7.2	7.2	7.3	7.2	7.3	7.3	7.2	7.20	7.3	7.5	7.2	7.27	not specified
Sulphate	mg/L	13.2	13.6	12.9	13.7	13.1	11.9	11.6	12.7	12.90	15.50	15.5	11.6	13.12	187.5
Conductivity	µS/cm @ 20°C	730	713	712	690	702	697	685	686	692.00	681	730	681	698.8	800 - 1875
Ammonia	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	0.03	0.04	<0.02	0.02	<0.02	0.04	0.02	0.0275	0.065 to 0.175
Nitrate	mg/L NO3 as N	9.2	10	9.24	9.51	9.82	7.91	7.03	7.34	7.11	7.19	10	7	8	not specified
Nitrate	mg/l NO3	41	44	41	42	43	35	31	32	31	32	44	31	37	37.5
Nitrite	mg/L as N	0.005	<0.005	0.007	0.01	<0.005	<0.005	0.007	0.005	<0.016	0.005	0.01	<0.005	0.006	0.375
Calcium	mg/L	14.7	148	138	137	139	126	126	136	128	123	148	15	122	not specified
Total Hardness	mg/L as CaCO ₃	413	422	392	405	419	401	408				422	392	409	not specified
Total Phosphorus	mg/L P	<0.04	0.05	0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.05	<0.04	<0.04	not specified
Orthophosphate	mg/L P	0.01	0.01	0.02	<0.01	0.01	<0.01	<0.01	0.03	<0.01	<0.01	0.03	<0.01	0.013	0.035
Potassium	mg/L	3.18	2.94	3.12	3.3	2.72	1.96	2.56	2.34	2.67	2.57	3.3	1.96	2.736	not specified
Sodium	mg/L	12.3	11.6	16.9	12.8	12	10.1	10.7	11.3	10.70	10.6	16.9	10.1	11.9	150
Chloride	mg/L	31.3	32.2	44.5	34.8	31.3	27.8	27.5	28	27.60	26.7	44.5	26.7	31.17	24 — 187.5
Manganese, Total	mg/L	<0.001	<0.001	<0.001	0.002	<0.001	0.001	<0.001	0.001	<0.001	<1	<1	<0.001	<0.001	not specified
Manganese, Dissolved	mg/L	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<1	<1	<0.001	<0.001	not specified
BOD	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	<1.0	1.4	<1.0	<1.0	not specified
COD	mg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	not specified
Iron, Total	mg/L	0.008	0.009	0.011	0.029	0.009	0.007	0.001	0.002	0.03	<5	0.03	0.001	0.012	not specified
Iron, Dissolved	mg/L	<0.005	0.007	<0.005	0.02		0.004	<0.001	0.001	<0.005	<5	<5	<0.001	<0.005	not specified
Magnesium	mg/L		12.5	12.6	12.1	14	17.2	17.6	18.3	17.80	18	18.3	12.1	15.6	not specified
TOC	mg/L		2.27	1.7	2.16	1.52	2.2	1.18	1.96	2.09	2.48	2.5	1.2	2.0	not specified
Dissolved Organic Carbon	mg/L		1.39	1.48	1.87	1.53	1.6	0.99	1.8	2.04	2.07	2.1	1.0	1.6	not specified
Suspended Solids	mg/L		<2	8	<2	<2	<2	<2	14	4.00	5	14.0	<2	<2	not specified
Total Hydrocarbons	mg/L		<10				<0.01	<0.01	<0.01	<0.01	<10	<10	<0.01	<0.01	not specified
PAH (Total)	µg/L	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16		<0.16	<0.16	<0.16	not specified
K:Na calculation	Hydro-G ratio	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	

Table 8.14 Groundwater Monitoring Point B3B (west face spring, 5m south of B3A, close to base of access ramp, 30.5m OD)

Parameter	Unit	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	B3B 2018			Groundwater Regulations (2010) Threshold Value
		B3B	B3B	B3B	B3B	B3B	B3B	B3B	B3B	B3B	B3B	MAX	MIN	AVERAGE	
pH	pH Unit	7.3	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.10	7.2	7.3	7.1	7.13	not specified
Sulphate	mg/L	12.6	12.9	13.7	14	13.1	12.1	11.9	12.9	13.10	15.40	15.4	11.9	13.17	187.5
Conductivity	µS/cm @ 20°C	746	713	722	720	713	714	698	696	699.00	694	746	694	712	800 - 1875
Ammonia	mg/L	<0.02	0.02	0.03	0.04	<0.02	0.03	0.03	0.2	<0.02	<0.02	0.2	<0.02	0.04	0.065 to 0.175
Nitrate	mg/L as N	8.88	9.4	8.86	8.82	9.48	6.42	7.21	7.28	7.27	7.25	9	6	8	not specified
Nitrate	mg/l NO3	39	42	39	39	42	28	32	32	32	32	42	28	36	37.5
Nitrite	mg/L as N	0.006	0.008	0.01	0.014	<0.005	<0.005	<0.005	<0.005	<0.016	<0.005	0.014	<0.005	0.006	0.375
Calcium	mg/L	157	155	146	144	142	140	139	141	133.00	124	157	124	142	not specified
Total Hardness	mg/L as CaCO ₃	411	448	392	422	422	412	416				448	392	418	not specified
Total Phosphorus	mg/L P	0.04	0.04	0.05	0.08	0.04	<0.04	0.06	<0.04	<0.04	<0.04	0.08	<0.04	<0.04	not specified
Orthophosphate	mg/L P	0.02	0.02	0.03	0.03	0.03	0.01	<0.01	0.06	<0.01	0.01	0.06	0.03	0.013	0.035
Potassium	mg/L	3.3	3.56	4.12	5.11	4.14	2.65	3.08	2.73	3.95	3.16	5.11	2.65	3.58	not specified
Sodium	mg/L	10.6	10.54	13.5	11.7	11.5	10.6	11	11.5	10.80	10.7	13.5	10.54	11.244	150
Chloride	mg/L	32.2	33.1	42.5	37.16	32.9	29.2	28.6	28.8	29.10	27.6	42.5	27.6	32	24 — 187.5
Manganese, Total	mg/L	0.009	0.011	0.011	0.014	0.009	0.004	0.003	0.01	0.01	10	3	0.003	0.009	not specified
Manganese, Dissolved	mg/L	0.002	0.002	0.004	0.01	0.004	0.002	0.002	0.004	0.01	3	10	0.01	0.004	not specified
BOD	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	not specified
COD	mg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	not specified
Iron, Total	mg/L	0.023	0.036	0.061	0.064	0.039	0.016	0.019	0.03	0.05	18	18	0.016	1.834	not specified
Iron, Dissolved	mg/L	0.005	0.005	<0.005	0.019		0.004	0.019	0.002	0.01	<5	<5	0.019	0.01	not specified
Magnesium	mg/L		11.1	11.2	11	11.5	16.7	16.9	17.4	17.20	17	17.4	11.0	14.5	not specified
Suspended Solids	mg/L		4	9	2.8	<2	<2	<2	<2	3.00	<2	9.0	2.8	4.7	not specified
TOC	mg/L		2.21	2.04	2.65	1.88	1.4	1.06	1.83	4.00	2.71	4.0	1.1	2.2	not specified
Dissolved Organic Carbon	mg/L		1.42	1.87	2.43	1.66	1.4	1.07	1.75	3.46	1.97	3.5	1.1	1.1	not specified
Total Hydrocarbons	mg/L		<10				<0.01	<0.01	<0.01	<0.01	<10	<10	<0.01	<0.01	not specified
PAH (Total)	µg/L	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	not specified
K:Na calculation	Hydro-G ratio	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.2	0.4	0.3	0.4	0.2	0.3	

Table 8.15 Groundwater Monitoring Point B3C (Spring on Floor near crushing Plant (north Section of Quarry) 31 m OD)

Parameter	Unit	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	B3C 2018			Groundwater Regulations (2010) Threshold Value
		B3C	B3C	B3C	B3C	B3C	B3C	B3C	B3C	B3C	B3C	MAX	MIN	AVERAGE	
pH	pH Unit	7.4	7.2	7.2	7.2	7.1	7.2	7.1	7.2	7.20	7.2	7.4	7.1	7.2	not specified
Sulphate	mg/L	17.8	16.4	15.7	16.9	15.8	14.1	13.6	14.7	14.20	17.30	17.8	13.6	15.65	187.5
Conductivity	µS/cm @ 20°C	724	707	685	666	701	698	689	690	666.00	656	724	656	688	800 – 1875
Ammonia	mg/L	0.54	<0.02	0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	0.08	0.54	0.02	0.17	0.065 to 0.175
Nitrate	mg/L as N	8.31	8.83	8.63	8.27	9.01	6.26	6.94	7.28	6.99	7.13	9	6	8	not specified
Nitrate	mg/l NO3	37	39	38	37	40	28	31	32	31	32	40	28	34	37.5
Nitrite	mg/L as N	0.005	<0.005	0.007	0.006	<0.005	<0.005	<0.005	<0.005	<0.016	0.006	0.007	<0.005	0.006	0.375
Calcium	mg/L	142	142	132	130	135	126	121	136	133.00	119	142	119	132	not specified
Total Hardness	mg/L as CaCO ₃	417	435	371	408	407	406	411				435	371	408	not specified
Total Phosphorus	mg/L P	<0.04	0.06	<0.04	<0.04	<0.04	<0.04	0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	not specified
Orthophosphate	mg/L P	<0.01	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	0.035
Potassium	mg/L	3.5	3.21	3.16	3.22	3.06	2.15	2.78	2.43	2.79	2.82	3.5	2.15	2.912	not specified
Sodium	mg/L	13	11.9	14.1	12.4	12.1	10.7	11.4	11.7	11.30	11.4	14.1	10.7	12	150
Chloride	mg/L	31.3	32	37.9	32.8	32.4	29.7	29.5	30	29.00	28.8	37.9	28.8	31.34	24 – 187.5
Manganese, Total	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.00	<1	<1	<0.001	<0.001	not specified
Manganese, Dissolved	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<1	<1	<0.001	<0.001	not specified
BOD	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.8	3.8	<1.0	<1.0	not specified
COD	mg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	not specified
Iron, Total	mg/L	0.006	0.014	<0.005	0.008	0.009	0.003	<0.001	0.004	0.02	10	10	0.003	1.258	not specified
Iron, Dissolved	mg/L	<0.005	0.005	<0.005	0.008		0.003	<0.001	<0.001	<0.005	<5	<5	<0.005	<0.005	not specified
Magnesium	mg/L		13.9	13.7	13	12.1	15.2	15.5	16	15.60	16	16.0	12.1	14.5	not specified
TOC	mg/L		2.97	1.48	1.68	1.29	1.5	1.13	1.53	4.50	4.80	4.8	1.1	2.3	not specified
Dissolved Organic Carbon	mg/L		1.05	1.06	1.41	1.37	1.1	1.09	1.53	3.76	3.92	3.9	1.1	1.8	not specified
Suspended Solids	mg/L		<2	<2	<2	<2	<2	<2	<2	10.00	<2	10.0	<2	<2	not specified
Total Hydrocarbons	mg/L		<10				<0.01	<0.01	<0.01	<0.01	<10	<10	<0.01	<0.01	not specified
PAH (Total)	µg/L	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	not specified
K:Na calculation	Hydro-G ratio	0.3	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2	

Table 8.16 Groundwater Monitoring Point B3D (Rotary Core BH central floor: DEEP GW from elevation range 0m OD to -56m OD)

Parameter	Unit	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	B3D 2018			Groundwater Regulations (2010) Threshold Value
		B3D	B3D	B3D	B3D	B3D	B3D	B3D	B3D	B3D	B3D	MAX	MIN	AVERAGE	
pH	pH Unit	7.4	7.1	7.1	7.2	7.1	7.2	7.2	7.2	7.10	7.1	7.4	7.1	7.17	not specified
Sulphate	mg/L	40.7	32.6	36.8	38.1	37.7	38.9	40.2	41.7	39.90	47.50	47.5	32.6	39.41	187.5
Conductivity	µS/cm @ 20°C	680	667	662	655	656	666	664	663	662.00	667	680	655	664	800 - 1875
Ammonia	mg/L	0.06	0.04	0.05	0.05	0.04	0.03	0.08	0.04	0.05	0.04	0.08	0.03	0.048	0.065 to 0.175
Nitrate	mg/L as N	<0.25	<0.25	<0.25	<0.25	<0.25	0.33	0.41	<0.25	<0.25	<0.25	0	0	0	not specified
Nitrate	mg/l NO3	<1	<1	<1	<1	<1	1	2	<1	<1	<1	2	<1	<1	37.5
Nitrite	mg/L as N	0.05	<0.005	0.008	<0.005	<0.005	<0.005	0.04	<0.005	<0.016	<0.005	0.05	<0.005	0.006	0.375
Calcium	mg/L	113	113	108	111	108	106	110	111	113.00	103	113	103	110	not specified
Total Hardness	mg/L as CaCO ₃	405	430	367	410	399	396	402				430	367	401	not specified
Total Phosphorus	mg/L P	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	<0.04	0.06	<0.04	<0.04	not specified
Orthophosphate	mg/L P	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.035
Potassium	mg/L	1.27	1.22	0.92	1.26	1.26	0.95	1.28	1.05	1.25	1.22	1.28	0.92	1.168	not specified
Sodium	mg/L	11.5	10.8	10.9	10.8	10.9	10.7	11.1	11.3	11.10	11.0	11.5	10.7	11.01	150
Chloride	mg/L	27	29.1	30.2	30.1	28.9	29.2	30.1	30.8	30.10	29.1	30.8	27	29.46	24 — 187.5
Manganese, Total	mg/L	0.009	0.023	0.01	0.014	0.013	0.012	0.004	0.007	0.01	11	10	0.004	0.013	not specified
Manganese, Dissolved	mg/L	0.009	0.018	0.008	0.01	0.009	0.012	0.004	0.005	0.01	10	11	0.01	0.005	not specified
BOD	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	not specified
COD	mg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	not specified
Iron, Total	mg/L	0.07	2.87	0.903	1	0.85	0.004	0.05	0.6	1.01	1066	1066	0.004		not specified
Iron, Dissolved	mg/L	0.068	<0.005	0.4	0.716		<0.001	<0.005	0.33	0.57	896	896	<0.001		not specified
Magnesium	mg/L		30.7	28.1	29.3	10.9	27	27	26.1	27.30	26	30.7	10.9	25.8	not specified
TOC	mg/L		1.74	1.23	1.19	1.65	1.5	1.29	1.41	3.91	2.06	3.9	1.2	1.8	not specified
Dissolved Organic Carbon	mg/L		1.26	0.66	0.84	1.44	0.9	1	1.31	3.21	1.52	3.2	0.7	1.3	not specified
Suspended Solids	mg/L		5	<2	<2	<2	<2	<2	<2	<2	<2	5.0	<2	<2	not specified
Total Hydrocarbons	mg/L		<10				<0.01	<0.01	<0.01	<0.01	<10	<10	<0.01	<0.01	not specified
PAH (Total)	µg/L	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	not specified
K:Na calculation	Hydro-G ratio	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	

Table 8.17 Groundwater Monitoring Point B3E (End of Open Channel on FLOOR = 30m OD Integrating GW Quality from Wall Springs (B3A, B3B & B3F) & Floor GW & Wet Weather High Wall ingress)

Parameter	Unit	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	B3E 2018			Groundwater Regulations (2010) Threshold Value
		B3E	B3E	B3E	B3E	B3E	B3E	B3E	B3E	B3E	B3E	MAX	MIN	AVERAGE	
pH	pH Unit	7.9	7.8	7.8	7.8	7.6	7.5	7.6	7.5	7.50	7.5	7.9	7.5	7.65	not specified
Sulphate	mg/L	14	14.6	13.7	14.6	16.7	18.4	17.7	21.8	23.90	25.80	25.8	13.7	18.12	187.5
Conductivity	µS/cm @ 20°C	692	674	742	650	662	689	677	692	675.00	672	742	650	682.5	800 - 1875
Ammonia	mg/L	<0.02	<0.02	<0.02	0.02	<0.02	0.02	0.02	<0.02	0.02	<0.02	0.02	0.02	0.02	0.065 to 0.175
Nitrate	mg/L as N	9.06	9.57	8.71	8.81	9.34	3.72	6.29	6.39	6.48	6.65	10	4	8	not specified
Nitrate	mg/l NO3	40	42	39	39	41	16	28	28	29	29	42	16	33	37.5
Nitrite	mg/L as N	0.006	0.005	0.011	0.013	0.02	0.01	0.03	0.02	<0.016	0.010	0.03	0.01	0.006	0.375
Calcium	mg/L	139	135	130	115	122	130	119	136	130.00	119	139	115	128	not specified
Total Hardness	mg/L as CaCO ₃	294	412	348	386	384	405	404				412	294	376	not specified
Total Phosphorus	mg/L P	<0.04	0.04	<0.04	<0.04	<0.04	<0.04	0.07	<0.04	<0.04	<0.04	0.07	<0.04	<0.04	not specified
Orthophosphate	mg/L P	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0.013	0.035
Potassium	mg/L	3.19	2.86	3.23	3.24	2.8	2.05	2.61	2.47	3.02	2.80	3.24	2.05	2.827	not specified
Sodium	mg/L	13.5	12.4	29.6	15.8	13.6	11.4	11.3	12.6	11.80	11.4	29.6	11.3	14.34	150
Chloride	mg/L	32.7	33.9	69.4	40.3	33.7	29.5	28.8	30	29.70	28.2	69.4	28.2	35.62	24 — 187.5
Manganese, Total	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.007	0.003	0.002	0.00	2	1	0.003	<0.001	not specified
Manganese, Dissolved	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.005	0.002	0.002	0.00	1	2	0.00	0.002	not specified
BOD	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	not specified
COD	mg/L	<10	<10	<10	<10	17	<10	<10	<10	<10	<10	<10	<10	<10	not specified
Iron, Total	mg/L	0.01	0.034	0.02	0.023	0.02	0.024	0.005	0.01	0.01	29	29	0.005	2.916	not specified
Iron, Dissolved	mg/L	<0.005	0.026	0.011	0.02		0.011	0.005	<0.001	0.01	29	29	<0.001	4.154	not specified
Magnesium	mg/L		12.4	12.6	12.3	13.6	16.8	16.8	17.6	17.20	18	17.6	12.3	15.2	not specified
TOC	mg/L		2.55	2.13	1.92	1.27	1.4	1.6	1.78	3.72	2.29	3.7	1.3	2.1	not specified
Dissolved Organic Carbon	mg/L		1.32	1.68	1.72	1	1.2	1.07	1.7	3.42	1.85	3.4	1.0	1.7	not specified
Suspended Solids	mg/L		<2	<2	<2	<2	3	<2	<2	<2	<2	3.0	<2	<2	not specified
Total Hydrocarbons	mg/L		<10				<0.01	<0.01	<0.01	<0.01	<10	<10	<0.01	<0.01	not specified
PAH (Total)	µg/L	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	not specified
K:Na calculation	Hydro-G ratio	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.1	0.2	

Of particular note with respect to this monitoring point, the low Suspended Solids content is a good reflection of floor management because it collects floor runoff around spoil heaps. In fairness, the spoil heaps are of processed product, which has been washed during processing.

Table 8.18 Groundwater Monitoring Point B3F (Spring West Face, eternal, B3F, 34m OD approx)

Parameter	Unit	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	B3F 2018			Groundwater Regulations (2010) Threshold Value
		B3F	B3F	B3F	B3F	B3F	B3F	B3F	B3F	B3F	B3F	MAX	MIN	AVERAGE	
pH	pH Unit	7.6	7.4	7.4	7.4	No Sample	7.4	7.6	7.9	7.50	7.9	7.9	7.4	7.6	not specified
Sulphate	mg/L	6.98	7.1	7.78	7.2		7.83	7.34	9.94	15.90	23.70	23.7	6.98	10.4	187.5
Conductivity	µS/cm @ 20°C	803	780	1227	945		772	738	730	741.00	698	1227	698	826	800 – 1975
Ammonia	mg/L	0.04	0.02	0.04	0.22		0.06	0.04	<0.02	0.50	0.96	0.96	<0.02	0.24	0.065 to 0.175
Nitrate	mg/L as N	6.47	5.76	5.52	4.81		9.38	5.26	4.75	9.62	8.64	10	5	6.7	not specified
Nitrate	mg/l NO3	29	25	24	21		42	23	21	43	38	43	21	29.6	37.5
Nitrite	mg/L as N	0.01	0.006	0.008	0.042		0.02	<0.005	<0.005	0.17	0.040	0.17	<0.005	0.006	0.375
Calcium	mg/L	149	149	155	127		140	119	135	96.80	127	155	97	133.1	not specified
Total Hardness	mg/L as CaCO ₃	418	436	418	397		399	379				436	379	407.8	not specified
Total Phosphorus	mg/L P	<0.04	0.06	0.15	<0.04		<0.04	0.05	<0.04	<0.04	<0.04	0.15	<0.04	<0.04	not specified
Orthophosphate	mg/L P	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.035
Potassium	mg/L	3.41	3.26	3.63	4.25		3.07	4.49	5.5	4.55	8.45	8.45	3.07	4.5	not specified
Sodium	mg/L	34.5	33.4	107	78.6		30.9	27.8	27.7	52.20	20.4	107	20.4	45.8	150
Chloride	mg/L	63.6	61.7	243	151.2		56.8	51	54.6	87.10	43.4	243	43.4	90.3	24 — 187.5
Manganese, Total	mg/L	0.013	0.014	0.35	0.08		0.01	0.02	0.02	0.04	<1	<1	0.02	0.0	not specified
Manganese, Dissolved	mg/L	0.012	0.011	0.029	0.072		0.009	0.019	0.02	0.01	<1	<1	0.01	0.0	not specified
BOD	mg/L	<1.0	<1.0	<1.0	<1.0		<1.0	<1.0	<1.0	<1.0	3.6	3.6	<1.0	<1.0	not specified
COD	mg/L	<10	<10	<10	<10		<10	<10	<10	<10	<10	<10	<10	<10	not specified
Iron, Total	mg/L	0.029	0.035	0.045	0.13		0.025	0.021	0.01	0.06	19	19	0.01		not specified
Iron, Dissolved	mg/L	0.007	0.033	0.023	0.08		0.006	0.009	0.003	0.01	21	21	0.01		not specified
Magnesium	mg/L		9.2	9.75	8.11		9.82	8.68	8.6	7.62	8	9.8	7.6	8.7	not specified
TOC	mg/L		2.05	2.48	2.39		1.6	1.39	1.96	4.10	3.87	4.1	1.4	2.5	not specified
Dissolved Organic Carbon	mg/L		1.24	1.86	1.93		1.6	0.93	1.94	3.82	2.68	3.8	0.9	2.0	not specified
Suspended Solids	mg/L		<2	20	3.2		<2	<2	<2	<2	<2	20.0	<2	3.7	not specified
Total Hydrocarbons	mg/L		<10				<0.01	<0.01	<0.01	<0.01	<10	<10	<0.01	<0.01	not specified
PAH (Total)	µg/L	<0.16	<0.16	<0.16	<0.16		<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	<0.16	not specified
K:Na calculation	Hydro-G ratio	0.1	0.1	0.03	0.1		0.1	0.2	0.2	0.1	0.4	0.4	0.03	0.1	

Table 8.19 Groundwater Monitoring Eden Spring

EDEN SPRING	pH	Total Ammonia	Nitrate	Nitrite	Suspended Solids	MRP	TOC	DOC	EC
Date of sampling:		mg/l N	mg/l NO3	mg/l N	mg/l SS	mg/l P	mg/l	mg/l	µS/cm
13/06/2017	7.20	<0.02	28.6	<0.005	<2	<0.01			696
05/07/2017	7.40	<0.02	29.2	<0.005	4.00	<0.01			681
02/08/2017	7.60	0.1200	22.9	<0.005	<2	<0.01			536
04/09/2017	7.20	0.0200	33.6	<0.005	<2	0.02			689
02/10/2017	7.10	0.0200	32.4	<0.005	<2	0.02			704
01/11/2017	7.10	<0.02	40.8	<0.005	<2	0.02			714
05/12/2017	7.10	<0.02	38.8	<0.005	<2	0.01			720
08/01/2018	7.40	0.0300	41.3	0.01	<2	0.02			746
05/02/2018	7.10	<0.02	50.0		<2	0.03	5.09	2.19	
06/03/2018	7.10	<0.02	41.3	0.01	5.00	0.02	1.89	1.79	
03/04/2018	7.10	0.0600	41.3	0.01	<2	0.02	2.30	2.29	
03/05/2018	7.10	<0.02	43.5	<0.005	<2	0.02	1.58	1.75	715
11/06/2018	7.20	0.0300	39.1	<0.005	<2	0.01	1.56	1.51	
09/07/2018	7.20	0.0200	31.3	<0.005	3.60	<0.01	1.16	1.01	
13/08/2018	7.20	<0.02	32.2	<0.005	<2	0.01	1.42	1.31	695
MAX	7.60	0.12	50.00	0.01	5.00	0.03	5.09	2.29	746
MIN	7.10	<0.02	22.92	<0.005	<2	<0.01	1.16	1.01	536
AVERAGE	7.21	0.03	36.44	<0.005	2.44	0.02	2.14	1.69	690
Groundwater Regulations (2010) Threshold Value	not specified	0.065 to 0.175	37.5	0.375	not specified	0.035	not specified	not specified	800 - 1875

Current Bacteriological Sampling = Faecal detections come in from faces with the surrounding landscape and are not sourced from inside the quarry.

4. Groundwater Monitoring Programme Annual Reports: Site & Local Wells

(Condition of Pt 18/858).

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12th October 2019

Mr. Mark Galvin
Bennettsbridge Limestone
Kilree
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County Kilkenny
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R95 EY OR

**Re: Bennettsbridge Limestone REPORTING Condition No. 8: Groundwater Monitoring
Programme
[Planning Register No: P18/858]**

Mark

Condition no. 8 of Permission Grant 18/858, states as follows:

8. Within 4 weeks of the final date of grant of this permission, the developer shall submit for the written agreement of the Planning Authority a detailed groundwater monitoring programme to monitor groundwater levels both on and off site. The programme shall include details of the locations of all wells to be monitored and frequency of monitoring events.

Reason: To provide for the monitoring of groundwater levels.

The groundwater monitoring programme comprises continuous water level monitoring by automated dataloggers in 14 wells: 7 of which are in wells in the surrounding townlands and seven are within the quarry itself.

The water level dataloggers were installed in January 2018 and a continuous groundwater level record has been maintained since then. Information for each of the monitoring locations are presented in the Addendum to this report [Tables 1 & 2]. The locations of the onsite dataloggers are presented in Figure 1 and the local area dataloggers, offsite, are presented in Figure 2. The groundwater levels for the first three seasons of 2019 are reported herein. The time period reported is for January to September 2019.

The datalogger graph for water level responses at all locations is presented in Figure 3 in the format of water levels in each well presented as elevations above ordnance datum and can therefore be directly referenced to the floor elevation at Bennettsbridge Limestone's quarry. Observation and interpretation of the monitoring data for groundwater level response at the site and for the local area are discussed in the text after Figure 3.



Figure 1 On-site Water level datalogger locations.

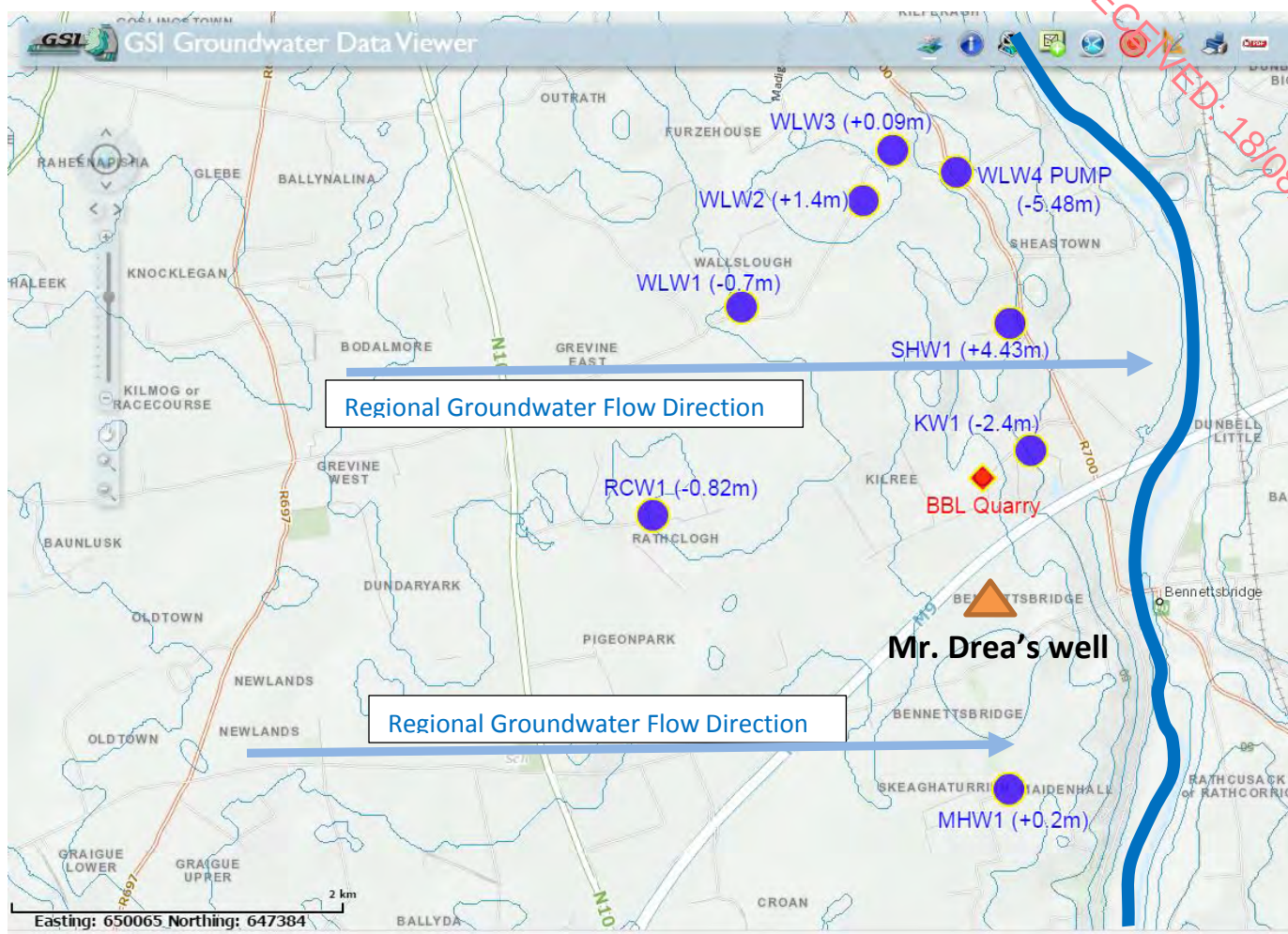


Figure 2

Location of local area monitoring points (2019), groundwater flow direction and groundwater level differences between the 1999 and recent survey [NOTE: RCW1 is now monitored manually each season, there is no datalogger at that location in 2019 but Mr. Drea's well is a new datalogger location monitoring point].

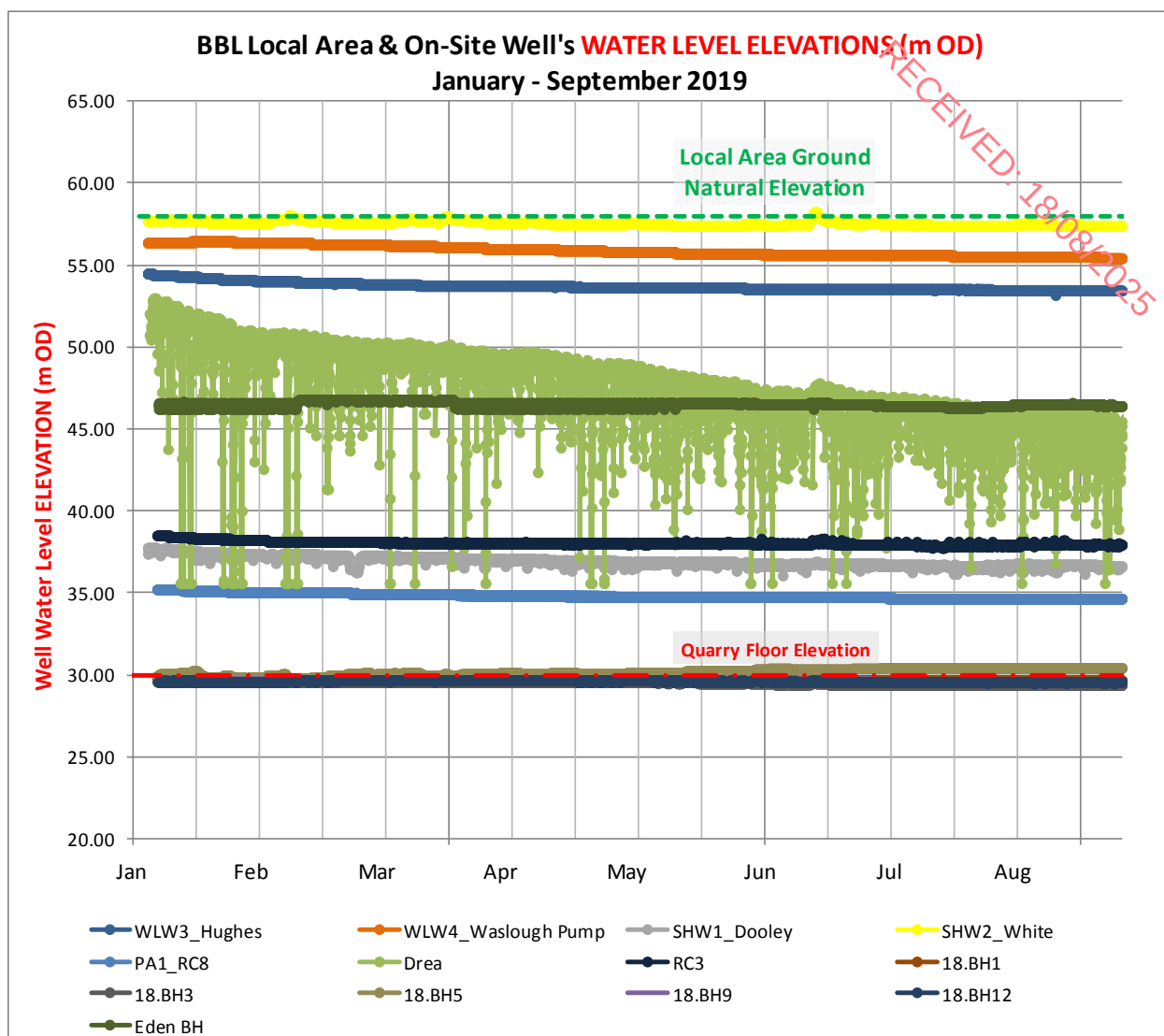


Figure 3 Groundwater levels (m OD): on-site & local area wells January – September 2019.

Considering the information presented in Figure 3, the following observations can be made:

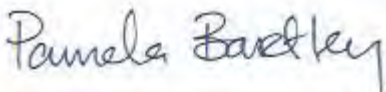
1. The quarry's water management regime, which enables dry working on the floor, keeps groundwater levels at the floor elevation of 30m OD, approximately. The quarry's managed groundwater level on the floor is very localised to the quarry floor itself. This can be confidently concluded for numerous reasons, as follows:
 - a. The 'EDEN BH' is within the quarry, close to the northern boundary, at a distance of 330m, approximately, of the centre of the quarry floor. Ground surface elevation at 'Eden BH' is 49m OD, approximately, and that is 19m above the quarry floor. Groundwater elevation at 'Eden BH' is 49m OD, approximately. There is a 19m elevation difference between the floor and ground level at 'Eden BH'. Since the datalogger record commenced in 2018, the water level in the 'Eden BH' monitoring point has always been about 2.5m below ground level. Groundwater elevation at the 'Eden BH' is 17m higher than groundwater level on the floor. Therefore, it is concluded that it maintains its relationship with the local groundwater regime rather than the

dewatering at the floor at a distance of 330m;

- b. Groundwater levels at the 'SHW2_White' monitoring point retains its usual elevation, which is close to ground level: this well is not pumped, it is a reference point well on a farm 700m to the north of the northern boundary of the quarry;
- c. The domestic well serving Hughes, in the townland of Waslough, at a distance of 1.6km to the north, north west, of the quarry, retains its usual elevation of 54.5 to 53m OD throughout the year. Overall, there is the expected drop in groundwater elevations as the year progresses. This 'annual recession' is expected and is the usual groundwater response to the dropping off of rainfall recharge from rainfall;
- d. The 'SHW1_Dooley' domestic well monitoring point is more or less half way between the quarry and the most northerly monitoring points in the townland of Waslough, namely 'Hughes' and 'Waslough Pump'. Ground elevation at Dooley's is 17m lower than the ground level at Hughes. The difference in groundwater levels at these two domestic monitoring points is similar to the difference in ground levels. It is therefore concluded that the groundwater levels are related to the monitoring points topography rather than water management at the quarry floor;
- e. The expected 'annual recession' in groundwater level is observed in the Waslough Pump monitoring point, 1.5km to the north of the quarry. This monitoring point is a disused water supply well for Kilkenny County Council. It is an old well that was probably hand excavated, given that it was not bored and is large diameter. It most likely taps a shallow groundwater or spring. It presents the most dipping recession in Figure 3, for the northerly zone, but 'Hughes' shows a similar response to the reduction in rainfall through the year;
- f. To the east of the quarry, in the direction of the River Nore (SAC), groundwater levels at monitoring points RC3 and PA1 RC8 present no cause for concern and no indication of groundwater level dropping to the managed floor's groundwater elevation of 30m OD. As observed at all locations, there is the expected small annual recession small drop off in groundwater elevation at RC3 and PA1 RC8;
- g. To the south, across the motorway, the 'Drea' monitoring point presents groundwater level response that is the same as previously observed at that location. This well presents large drawdowns and recovery on a daily basis in response to the switching on and off of the pump. It is a domestic/farm well. It is drilled at a point in the limestone that appears to be relatively low yielding compared to other monitoring wells targeting domestic users to the north of the quarry (e.g. Hughes & Dooley). The trend and response suggest no connectivity to the quarry's water levels.

Overall, the groundwater monitoring results suggest that

- A. The quarry's managed groundwater level on the floor is very localised to the quarry floor itself.
- B. In the wider catchment, there is the expected small drop in groundwater elevations as the year progresses. This 'annual recession' is expected and is the usual groundwater response to the dropping off of rainfall recharge from rainfall.



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Addendum

Tables 1 & 2

Monitoring Point Information

Table 1 On-site Datalogger location information

Dataloggers (On-site)							
Number	Townland	Well I.D.	Grid Ref	Ground Elevation (m OD)	Well Depth (m)	Base of Well Elevation (m OD)	2018 Water level Datalogger Installations Rationale/Reasoning
7	Kilree	Eden BH	254300, 150247	49	25	24	long term on site groundwater monitoring point, in front of sheds near Eden Spring, remote from working excavation area.
8	Kilree	RC3	254673, 149962	47	31	-1	adjacent to the final discharge lagoons, elevated above the floor, similar elevation to the current ground surface of the 2017 Grant of permission zones, which are adjacent to this BH RC3.
9	Kilree	18.BH1	254395, 149841	30	21	9	10" diameter investigatory BH located centrally on the 30m OD quarry floor
10	Kilree	18.BH2	254387, 149909	30	21	9	6" diameter investigatory BH on the 30m OD floor, targetting the collapse infill zone in the western face/wall of the worked pit, which is to the west of this monitoring BH "18.BH1".
11	Kilree	18.BH5	254287, 149766	30	21	9	6" diameter investigatory BH on the 30m OD floor, targetting the eastern zone of the worked part of the quarry.
12	Kilree	18.BH9	254191, 149869	30	18	12	6" diameter investigatory BH on the 30m OD floor, targetting the eastern zone of the worked part of the quarry, near springs & artesian investigation borehole "18.BH8".
13	Kilree	18.BH12	254275, 149937	30	36	-6	6" diameter investigatory BH in the worked floor/stockpile area, relatively close to the 'strong artesian' BH RC2 (Apex 2008).
14	Kilree	mobile Datalogger for on site pump tests					
BARO 1	Kilree	at Eden BH	254300, 150247	49	BARO Elevation applicable to local natural Ground level		
BARO 2	Kilree	at 18.BH1	254395, 149841	30	BARO Elevation applicable to 30m OD quarry floor level		

Table 2 Off-site Datalogger location information

Datalogger Number	Townland	Well I.D.	Well Name	Grid Reference	Ground Elevation (m OD)	Well Depth (m)	Base of Well ELEVATION (m OD)	2018 Water level Datalogger Installations Rationale/Reasoning
1	Walslough	WLW3	Hughes	253750, 151910	75	48.7	26.3	(WLW3) Installed water level datalogger in February 2018 for 30 minute interval recording of water level: Walslough Townland, North of quarry, Upgradient monitoring location, base elevation of the well is below the 30m OD lowest level elevation of excavations at the quarry. There is an established 1999 & 2017 monitoring record, which shows similar water levels with a 9cm difference (being a rise of 9cm when 1999 and 2017 data are compared).
2	Walslough	WLW4	Walslough pump	254050, 151850	68.47	n/a	n/a	(WLW4) Installed water level datalogger in February 2018 for 30 minute interval recording of water level: rationale = non pumping chamber for spring = untapped groundwater resource. With respect to groundwater flow direction and groundwater discharge to the Nore River, this spring chamber is upgradient or crossgradient of quarry, it is a monitoring point to the north of the quarry.
3	Sheastown	SHW1	Dooley	254600, 151210	58	61	-3	(SHW1) Installed water level datalogger in February 2018 for 30minute interval recording of water level. Domestic operational well in Sheastown, north west of quarry, base level of this domestic well is -3m OD and therefore significantly below the 30m OD quarry's proposed finished level of floor of the 2017 Grant of permission that is permitted in the excavation area (and the current 30m OD elevation of much of the floor).
4	Sheastown	SHW2	White	254570, 150850	61.02	48.7	12.32	(SHW2) installed water level datalogger in February 2018 for 30 minute interval water level recording. Rationale = disused well in townland of Sheastown, to the north west of the quarry, between quarry and the Nore. DISUSED Well signifies great potential for local groundwater level impact assessment. Comparison between water level in February 2017 (3.04m bgl) and August 2018 (2.71m bgl) suggests rising groundwater level.
5	Rathclough	RCW1	Kelly	252200, 149650	80	61	19	(RCW1) - Monitoring point east of quarry = upgradient of quarry in terms of regional groundwater discharge to the Nore. If the quarry was acting as a regional 'bath' void / soak area for regional groundwater then this well would show signs but comparison of 1999 data (33.68 m bgl) and 2017 data (34.5 m bgl) suggests similar levels with the small difference rationalised by weather and possible pumping regime changes.
6	Kilree	PA1 (Rotary Core Hole RC8 [yr 2008])		254897, 149991 (Apex 2008 Grid Ref)	41.79	25	17	(PA1/RC8) is a cored hole, unpumped and located between the quarry and the River Nore. (PA1/RC8) is 200m, approximately, west of the area of the quarry granted permission for extraction in 2017, in the direction of the Nore and it is 500m, approximately from the Nore.
7	Bennettsbridge	Drea		254221, 147984	69	115	-47	Installed in 2019 in response to request by Mr Drea, remains in the Monitoring Programme.



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24th March 2020

To:
Mr. Mark Galvin
Bennettsbridge Limestone Ltd.
Kilree
Sheastown
County Kilkenny
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R95 EY OR

Re: Bennettsbridge Limestone Groundwater Level REPORTING

Groundwater Monitoring Condition [Planning Register No: P18/858]

Mark

Ongoing Groundwater Monitoring is a Condition requirement of Planning Permission P18/858. As stipulated in the grant of permission Hydro-G and Bennettsbridge Limestone Ltd. formally notified Kilkenny County Council of the Groundwater Monitoring Plan in 2019 and the first report was submitted for the January to September 2019 period: That report is presented as Addendum A to this report, for ease of reference.

This March 2020 report presents the record for September 2019 to March 2020 for the continuous water level data recorded for the six-borehole water level dataloggers on site at Bennettsbridge Limestone Ltd. together with the six offsite dataloggers that are installed in local wells. Addendum A's 2019 report presented the locations of the all wells instrumented with water level dataloggers (Figure 1 and Figure 2).

Figure A of this report graphically presents the September 2019 to March 2020 record for the elevation of groundwater in each well. The dataloggers record water pressure above the actual datalogger in each well. There are also two barometric loggers at the Bennettsbridge: one is on the floor level and it is used to compensate the floor level BH's water pressure record and the second barometric datalogger is at the Eden BH on the site, which is at an elevation more comparable to the land surface elevations of the local area wells and therefore more applicable for use to compensate those datalogger's pressure record. Hydro-G has compensated each individual well's pressure record and related the determined water levels (m below ground level) to the elevation of the wellheads at each location. That data is presented in Figure A and facilitates comparison of all water levels throughout the community with reference to a common datum (m OD). Commentary on the data is provided in the text following Figure A. This report finishes with conclusions about groundwater level responses at Bennettsbridge Limestone's site and throughout the community.

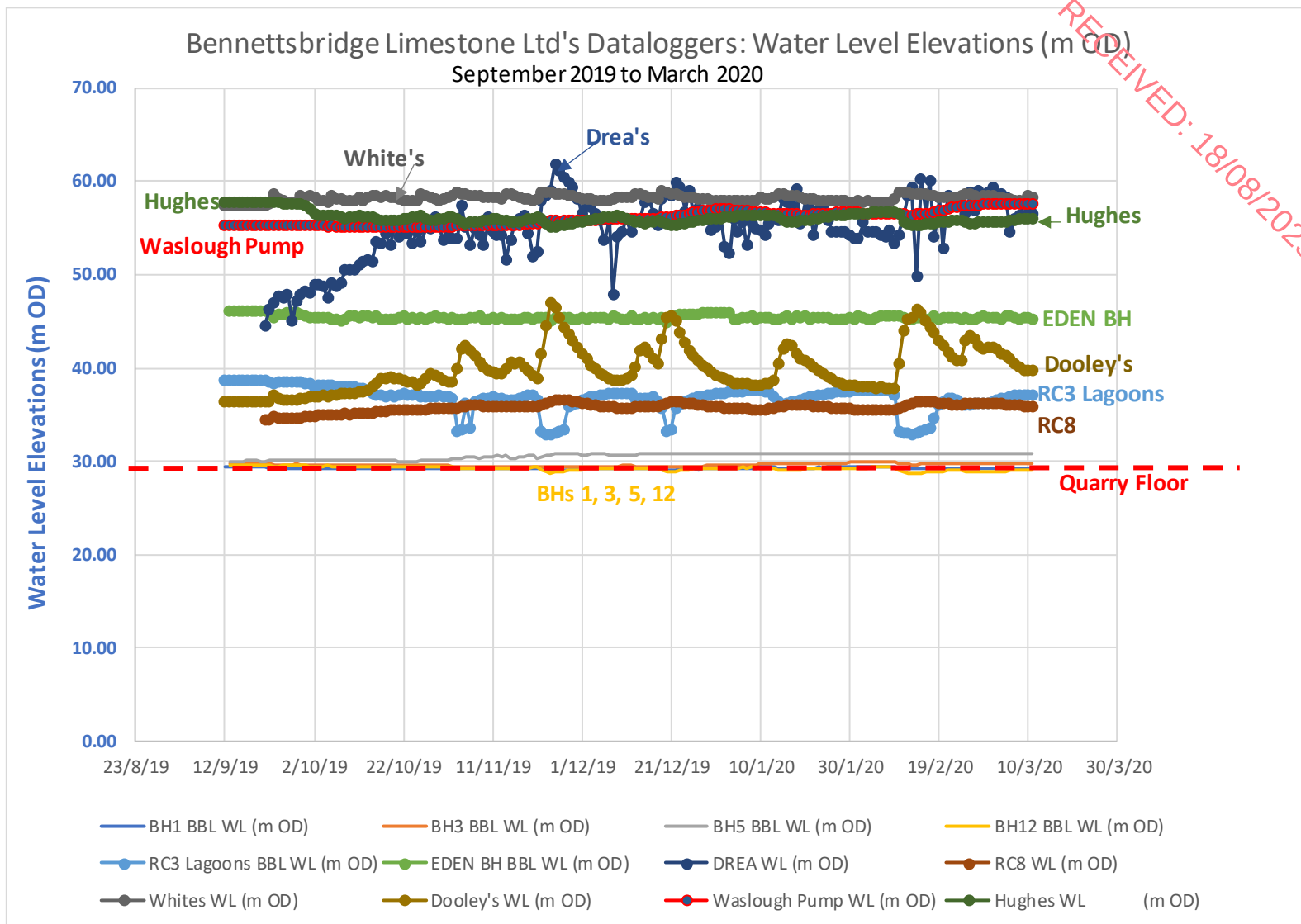


Figure A Groundwater levels (m OD): on-site & local area wells September 2019 to March 2020.

Considering the data shown graphically in Figure A, the following observations can be made:

1. The quarry floor's BHs: namely BH1, BH3, BH5, BH12, each of which have water levels at floor level, approximately. The quarry's water management regime, which enables dry working on the floor, keeps groundwater levels at the floor elevation of 30m OD, approximately. As part of the information collected for the Planning Application resulting in Permission P18/858 each of those BHs were previously pump tested and it was demonstrated that they could readily be emptied with a small 3" diameter pump and therefore their water levels represent the fact that they act more so as collection devices for floor water. The take home point is that the floor BHs present local groundwater elevation on the floor. Other BHs instrumented within the site boundary are RC3 (located on the edge of the settlement lagoons at more elevated ground relative to the floor) and Eden BH (also more elevated than the floor): The ground elevation at RC3 is 47m OD and Eden BH has an elevation of 49m OD. At the locations of the six dataloggers installed around the community, local land area has an elevation ranging from 42m OD to 75m OD. Land Elevations at each datalogger installation BH and the associated base elevation of each monitoring point are presented in Table 1;

Table 1 Land Elevations at Borehole Water Level Datalogger Locations & Base of hole Elevations at those locations

	No.	Borehole ID	Land Elevation (m OD)	BH Bottom Elevation (m OD)
On Site Dataloggers	1	BH1 BBL Ground Level (floor)	30 mOD	9
	2	BH3 BBL Ground Level (floor)	30 mOD	9
	3	BH5 BBL Ground Level (floor)	30 mOD	9
	4	BH12 BBL Ground Level (floor)	30 mOD	-6
	5	RC3 Lagoons BBL Ground Level	47 mOD	-1
	6	EDEN BH BBL Ground Level	49 mOD	24
Community Dataloggers	7	DREA Ground Level	69 mOD	-47
	8	RC8 Ground Level	42 mOD	17
	9	Whites Ground Level	61 mOD	12
	10	Dooley's Ground Level	58 mOD	-3
	11	Waslough Pump Ground Level	68.5 mOD	50
	12	Hughes Ground Level	75 mOD	26

The elevations of monitoring points and the elevation of their bases is relevant to the comparison of water level elevations that are presented in Figure A.

The location of each BH can be found in Figures 1 and 2 of Addendum A's 2019 report.

2. The quarry's managed groundwater level on the floor remains localised to the quarry floor itself, as it was for the January 2019 to September 2019 period of observation previously reported. This is concluded for numerous reasons, as follows:
 - a. The 'EDEN BH' is within the quarry, close to the northern boundary, at a distance of 330m, approximately, of the centre of the quarry floor. Ground surface elevation at 'Eden BH' is 49m OD, approximately, and that is 19m above the quarry floor. Groundwater elevation at 'Eden

BH' in this monitoring period ranged from 45 to 46m OD, approximately. There is a 19m elevation difference between the floor and ground level at 'Eden BH'. Since the datalogger record commenced in 2018, the water level in the 'Eden BH' monitoring point has always been about 2 to 3m below ground level. Groundwater elevation at the 'Eden BH' is therefore ~15m higher than groundwater level on the floor. Therefore, it is concluded that it maintains its relationship with the local groundwater regime rather than having a relationship with dewatering at the floor, which is 330m from the on-site 'Eden BH' monitoring point;

- b. Groundwater levels at the 'SHW2_White' monitoring point retain their usual elevation, averaging 58.2m OD for September 2019 to March 2020, which is close to ground level: this well is not pumped, it is a reference point well on a farm 700m to the north of the northern boundary of the quarry. For the January to September 2019 previously reported monitoring period water level elevations at this location averaged 57.6 m OD. The data demonstrates that water level at the 'White BH' monitoring location has increased in elevation. While this is expected because the monitoring period reported here is for the relatively higher recharge season and the winter and spring record, it is still evidence that dewatering at the quarry has not manifested any dewatering effects in the wider aquifer at a distance of 700m to the north;
- c. The domestic well serving Hughes, in the townland of Waslough, at a distance of 1.6km to the north, north west, of the quarry, had a water level elevation range of 53m OD to 54.5m OD in the first 9 months of 2019. In the months since then it has presented a water level elevation range of 55.17m OD to 57.84m OD. Again, similar to the 'White BH' monitoring point, the observed rise in water level is expected because the monitoring period reported here is a higher recharge winter & spring record. However, the data demonstrate that winter dewatering at the quarry site has not manifested any dewatering effects in the wider aquifer at a distance of 1.6km to the north, north west, of the quarry;
- d. The 'SHW1_Dooley' domestic well monitoring point is more or less halfway between the quarry and the most northerly monitoring points in the townland of Waslough, namely 'Hughes' and 'Waslough Pump'. Dooley's has always had a more pump responsive water level elevation trend than other locations. The elevation of groundwater at this location does not demonstrate any reduction in this monitoring period reported. Previously, in the first 9 months of 2019, the water level elevation here averaged at 36.95 m OD and had a minimum and maximum of 36.05m OD and 37.74 m OD. In this September 2019 to December 2020 reporting period it has a 39.89m OD average and a range of 36.37 to 46.94m OD. The conclusion here is the same as for Hughes and Whites monitoring points: groundwater levels are not negatively affected by activities at the quarry;
- e. The Waslough Pump monitoring point, 1.5km to the north of the quarry retains a relatively level water level elevation throughout. This monitoring point is a disused water supply well for Kilkenny County Council. It is an old well that was probably hand excavated, given that it was not bored and is large diameter. It most likely taps a shallow groundwater or spring. It presents the similar response as its most proximate wells: Hughes and Whites. Most interesting is that Waslough pump is 1.5 km **north** of the quarry and the 'Drea BH' is 420m, approximately, to the **south** of the quarry and both monitoring points present similar water level elevations (Figure A). This is further evidence that activities at the quarry are not spreading any effect outside the site in any compass direction;
- f. To the south, at a distance of 420m from the quarry's most southerly boundary and across the motorway, the 'Drea' monitoring point presents groundwater level response that is the same as previously observed at that location. This well presents large drawdowns and recovery on a daily basis in response to the switching on and off of the pump. It is a domestic/farm well. It is drilled at a point in the limestone that appears to be relatively low yielding compared to other monitoring wells of domestic users to the north of the quarry (e.g. Hughes). The trend shows

water levels increasing throughout the winter and the response suggests no connectivity to the quarry's water levels;

- g. To the east of the quarry, in the direction of the River Nore (SAC), groundwater levels at monitoring points RC3 and RC8 are similar and present no cause for concern and no indication of groundwater levels dropping to the managed floor's groundwater elevation of 30m OD. RC's fluctuations reflect the pumped influent to the settlement ponds: it is a rotary cored investigation borehole adjacent to the channel that conveys received pumped waters from the sump on the floor as it is transferred to the final settlement lagoons on the site;

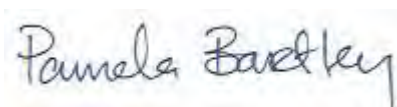
The summary statistics for all monitoring points water level elevations are presented in Table 2.

Table 2 Summary statistics for all monitoring points water level elevations (Sept 2019 to March 2020)

	BH1 WL (m OD)	BH3 WL (m OD)	BH5 WL (m OD)	BH12 WL (m OD)	RC3 Lagoons WL (m OD)	EDEN BH WL (m OD)	RC8 WL (m OD)	DREA WL (m OD)	Whites WL (m OD)	Dooley's WL (m OD)	Waslough Pump WL (m OD)	Hughes WL (m OD)	
Water Level	29.37	29.88	30.77	29.59	38.75	46.10	36.56	61.94	58.98	46.94	57.59	57.84	MAX
Elevation	29.10	29.34	29.98	28.62	32.86	44.88	34.50	44.53	57.44	36.37	55.19	55.17	MIN
Summary	29.23	29.61	30.52	29.22	36.76	45.45	35.74	54.88	58.23	39.89	56.09	56.14	AVERAGE
Ground Level (m OD)	30 mOD	30 mOD	30 mOD	30 mOD	47 mOD	49 mOD	42 mOD	69 mOD	61 mOD	58 mOD	68.5 mOD	75 mOD	

Overall, the groundwater monitoring results suggest that:

- 1) In the wider aquifer, there is evidence that each domestic borehole and RC8 (a rotary core hole close to the motorway) retain their own water level integrity and groundwater levels are not negatively affected by activities at the quarry. Water level elevations in all compass directions have risen since the last reporting in September 2019.
- 2) The quarry's managed groundwater level on the floor is very localised to the quarry floor itself. This is a conclusion supported by the EDEN BH and RC3 BH on the site: both of these BHs are datalogger instrumented monitoring points within the quarry boundary but at locations that are much more elevated than the floor. Water level elevations at Eden and RC3 are much more elevated than water level elevations on the floor, which is 300m, approximately, from each point. Water level elevations at and both EDEN BH and RC3 BH are similar to water level elevations at their closest off-site monitoring points.
- 3) No impact is groundwater level impact is observed in the local aquifer.



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Addendum A

Report 2019

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23rd October 2020

To:
Mr. Mark Galvin
Bennettsbridge Limestone Ltd.
Kilree
Sheastown
County Kilkenny
Ireland
R95 EY OR

**Re: Bennettsbridge Limestone Groundwater Level REPORTING
Groundwater Monitoring Condition
[Planning Register No: P18/858]**

Mark

Ongoing Groundwater Monitoring is a Condition requirement of Planning Permission P18/858. As stipulated in the grant of permission, Hydro-G and Bennettsbridge Limestone Ltd. formally notified Kilkenny County Council of the Groundwater Monitoring Plan in 2019. Since then, two reports have been submitted as follows:

1. January to September 2019,
2. September 2019 to March 2020.

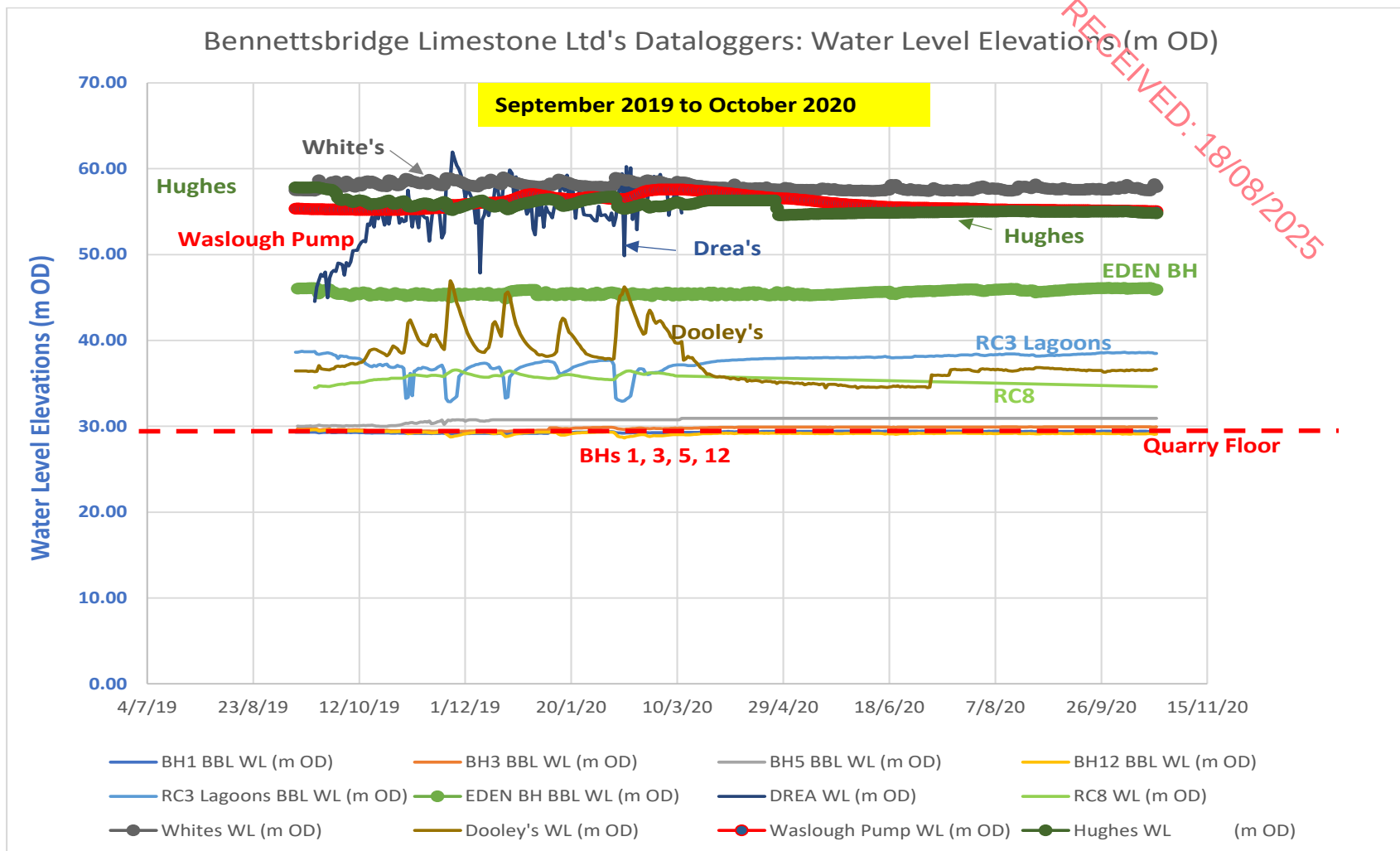
Each of those reports are presented as Appendix A to this report, for ease of reference.

This is the third report and presents the record for March 2020 to end of October 2020.

All of these reports present the continuous water level data recorded for the onsite boreholes within the quarry itself and for the offsite dataloggers installed in local wells. The first report (Jan-Sept 2019) presented Figures that showed the locations of the wells instrumented with dataloggers (Figure 1 and Figure 2, Appendix A).

Graph 1 of this report presents the record for the this March – October 2020 period as well as the preceding reporting period and therefore 1 full year of data is presented for the elevation of groundwater at each monitoring point. The dataloggers record water pressure above the datalogger position in each well. There are also two barometric loggers at the quarry at different elevations appropriate to the floor and the local area's topography. Hydro-G has compensated each individual well's pressure record and related the determined water levels (m below ground level) to the elevation of the wellheads at each location. That data is presented in Graph 1 and facilitates comparison of water levels throughout a full annual cycle.

Hydro-G has interrogated the data while processing and concludes that there is no deterioration in levels.



Graph 1 Groundwater levels (m OD): on-site & local area wells September 2019 to 22nd October 2020.

NOTE: While there was wide variation in elevations at some monitoring points in the September to March early graph period, we weighted the dataloggers when downloading in March 2020 and the data is smoothed now. This was to stop the dataloggers moving in response to pump activity.

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Table 1 Winter Data Comparison and Comment

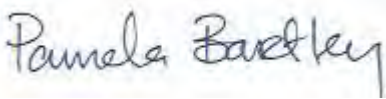
WINTER Spot Data for commentary	Oct-18	Oct-19	Oct-20	Winter Difference 2020 vs 2019	Winter Difference 2020 vs 2018	Hydro-G Observations
BH1 BBL WL (m OD)	29.3	29.2	29.4	0.2	0.1	Water levels not dropping: higher WL now but very similar 100-200mm
BH3 BBL WL (m OD)	29.8	29.5	29.9	0.4	0.2	Water levels not dropping: higher WL but very similar 200-400mm
BH5 BBL WL (m OD)	29.4	30.0	30.9	0.9	1.6	Water levels not dropping: higher WL now
BH12 BBL WL (m OD)	29.7	29.4	29.1	-0.3	-0.7	lower WL on the floor
RC3 Lagoons BBL WL (m OD)	38.3	37.2	38.5	1.3	0.2	Water levels not dropping: this monitoring point is highly affected by the discharge channel beside it.
EDEN BH BBL WL (m OD)	45.8	45.6	45.9	0.4	0.1	Water levels not dropping: WL is higher now than last year and 2 years ago
DREA WL (m OD)		55.8				Monitoring point not active in 2018 and temporarily inaccessible in 2020
RC8 WL (m OD)	33.6	35.5	34.6	-0.9	1.0	This year the WL is 1m higher than in 2018 and 1m lower than 2019 = natural variations
Whites WL (m OD)	57.0	58.0	57.9	-0.2	0.8	Water levels not dropping: 200mm lower now than last year but 800mm higher than 2 years ago.
Dooley's WL (m OD)	27.3	38.7	36.7	-2.0	9.3	Water levels not dropping: 2m lower than last year but 9m higher than 2018.
Waslough Pump WL (m OD)	58.28	55.2	55.1	-0.1	-3.2	drop in water level elevation but the bottom of this monitoring point is 25m ABOVE THE FLOOR so it is perched and the quarry is unlikely to be the cause of changes here.
Hughes WL (m OD)	52.02	56.0	54.8	-1.2	2.8	Water levels not dropping: 2020's winter water level is 1.2 m lower than last year but 2.8m higher than in 2018.

Table 2 Summer Data Comparison and Comment

Summer Spot Data for commentary	Jul-18	Jul-19	Jul-20	SUMMER Difference 2020 vs 2019	SUMMER Difference 2020 vs 2018	Hydro-G Observations
BH1 BBL WL (m OD)	29.3	29.3	29.4	0.2	0.2	Water levels not dropping: WL 200mm higher now
BH3 BBL WL (m OD)	27.3	29.2	29.9	0.7	2.6	Water levels not dropping: WL higher now
BH5 BBL WL (m OD)	29.4	30.1	30.9	0.8	1.6	Water levels not dropping: WL higher now
BH12 BBL WL (m OD)	29.8	30.3	29.2	-1.1	-0.6	WL 1m lower now on the floor
RC3 Lagoons BBL WL (m OD)	38.1	45.1	38.1	-6.9	0.0	same now as 2 years ago, significant decrease in WL in the 2020 vs 2019 = the extreme variability at this stn due to the discharge channel adjoining.
EDEN BH BBL WL (m OD)	46.9	46.3	45.7	-0.6	-1.2	natural seasonal variations.
DREA WL (m OD)		57.1				Monitoring point not active in 2018 and temporarily inaccessible in 2020
RC8 WL (m OD)	34.1	35.6				logger now in place.
Whites WL (m OD)	57.0	58.5	57.5	-1.1	0.5	Water Levels not dropping - natural variances - 1m lower this year relative to last and 0.5m higher relative to 2 yrs ago.
Dooley's WL (m OD)	28.0	34.3	34.6	0.4	6.6	Water Levels not dropping: Natural variances with higher this year and relative to 2 summer's ago.
Waslough Pump WL (m OD)	57.26	57.4	55.4	-2.0	-1.8	drop in water level elevation but the bottom of this monitoring point is 25m ABOVE THE FLOOR so it is perched and the quarry is unlikely to be the cause of changes here.
Hughes WL (m OD)	52.89	55.2	54.9	-0.3	2.0	Water Levels not dropping: Natural variances with 0.3m lower water level relative to 2019 but 2 m higher relative to 2018.

Overall, the groundwater monitoring results suggest that

- A. The quarry's managed groundwater level on the floor is very localised to the quarry floor itself.
- B. Groundwater elevations in the local community are not dropping.
- C. The information presented in Tables 1 and 2 facilitate evaluation on a seasonal basis. The differences between years is explained in the text accompanying the information and overall there is no consistent water level drop in the area. Comparing last year to this year or the previous year, water levels rise and fall between observation periods. This is natural groundwater variance.
- D. In the catchment there is the expected drop in groundwater elevations as the year progresses. This 'annual recession' is expected and is the usual groundwater response to the dropping off of rainfall recharge from rainfall. However, one can see from Graph 1 that the water levels are similar at the beginning and end of the hydrological year presented.



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Appendix A

Previous Monitoring Reports



Hydro-G

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20th March 2020

To:
Mr. Mark Galvin
Bennettsbridge Limestone Ltd.
Kilree
Sheastown
County Kilkenny
Ireland
R95 EY OR

Re: Bennettsbridge Limestone Groundwater Level REPORTING

Groundwater Monitoring Condition [Planning Register No: P18/858]

Mark

Ongoing Groundwater Monitoring is a Condition requirement of Planning Permission P18/858. As stipulated in the grant of permission Hydro-G and Bennettsbridge Limestone Ltd. formally notified Kilkenny County Council of the Groundwater Monitoring Plan in 2019 and the first report was submitted for the January to September 2019 period: That report is presented as Addendum A to this report, for ease of reference.

This March 2020 report presents the record for September 2019 to March 2020 for the continuous water level data recorded for the six-borehole water level dataloggers on site at Bennettsbridge Limestone Ltd. together with the six offsite dataloggers that are installed in local wells. Addendum A's 2019 report presented the locations of the all wells instrumented with water level dataloggers (Figure 1 and Figure 2).

Figure A of this report graphically presents the September 2019 to March 2020 record for the elevation of groundwater in each well. The dataloggers record water pressure above the actual datalogger in each well. There are also two barometric loggers at the Bennettsbridge: one is on the floor level and it is used to compensate the floor level BH's water pressure record and the second barometric datalogger is at the Eden BH on the site, which is at an elevation more comparable to the land surface elevations of the local area wells and therefore more applicable for use to compensate those datalogger's pressure record. Hydro-G has compensated each individual well's pressure record and related the determined water levels (m below ground level) to the elevation of the wellheads at each location. That data is presented in Figure A and facilitates comparison of all water levels throughout the community with reference to a common datum (m OD). Commentary on the data is provided in the text following Figure A. This report finishes with conclusions about groundwater level responses at Bennettsbridge Limestone's site and throughout the community.

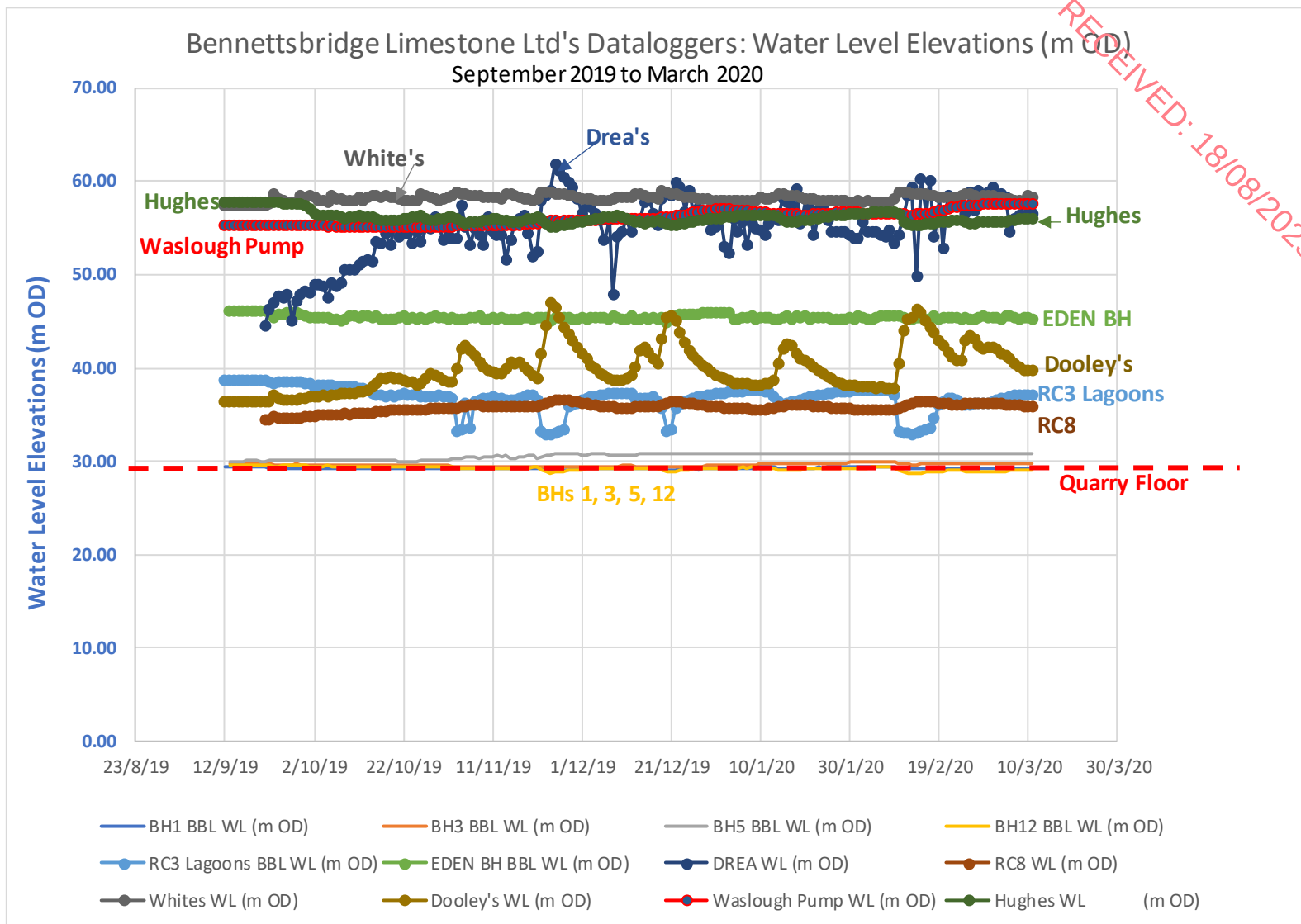


Figure A Groundwater levels (m OD): on-site & local area wells September 2019 to March 2020.

Considering the data shown graphically in Figure A, the following observations can be made:

1. The quarry floor's BHs: namely BH1, BH3, BH5, BH12, each of which have water levels at floor level, approximately. The quarry's water management regime, which enables dry working on the floor, keeps groundwater levels at the floor elevation of 30m OD, approximately. As part of the information collected for the Planning Application resulting in Permission P18/858 each of those BHs were previously pump tested and it was demonstrated that they could readily be emptied with a small 3" diameter pump and therefore their water levels represent the fact that they act more so as collection devices for floor water. The take home point is that the floor BHs present local groundwater elevation on the floor. Other BHs instrumented within the site boundary are RC3 (located on the edge of the settlement lagoons at more elevated ground relative to the floor) and Eden BH (also more elevated than the floor): The ground elevation at RC3 is 47m OD and Eden BH has an elevation of 49m OD. At the locations of the six dataloggers installed around the community, local land area has an elevation ranging from 42m OD to 75m OD. Land Elevations at each datalogger installation BH and the associated base elevation of each monitoring point are presented in Table 1;

Table 1 Land Elevations at Borehole Water Level Datalogger Locations & Base of hole Elevations at those locations

	No.	Borehole ID	Land Elevation (m OD)	BH Bottom Elevation (m OD)
On Site Dataloggers	1	BH1 BBL Ground Level (floor)	30 mOD	9
	2	BH3 BBL Ground Level (floor)	30 mOD	9
	3	BH5 BBL Ground Level (floor)	30 mOD	9
	4	BH12 BBL Ground Level (floor)	30 mOD	-6
	5	RC3 Lagoons BBL Ground Level	47 mOD	-1
	6	EDEN BH BBL Ground Level	49 mOD	24
Community Dataloggers	7	DREA Ground Level	69 mOD	-47
	8	RC8 Ground Level	42 mOD	17
	9	Whites Ground Level	61 mOD	12
	10	Dooley's Ground Level	58 mOD	-3
	11	Waslough Pump Ground Level	68.5 mOD	50
	12	Hughes Ground Level	75 mOD	26

The elevations of monitoring points and the elevation of their bases is relevant to the comparison of water level elevations that are presented in Figure A.

The location of each BH can be found in Figures 1 and 2 of Addendum A's 2019 report.

2. The quarry's managed groundwater level on the floor is remains very localised to the quarry floor itself, as it was for the January 2019 to September 2019 period of observation previously reported. This is concluded for numerous reasons, as follows:
 - a. The 'EDEN BH' is within the quarry, close to the northern boundary, at a distance of 330m, approximately, of the centre of the quarry floor. Ground surface elevation at 'Eden BH' is 49m OD, approximately, and that is 19m above the quarry floor. Groundwater elevation at 'Eden

BH' in this monitoring period ranged from 45 to 46m OD, approximately. There is a 19m elevation difference between the floor and ground level at 'Eden BH'. Since the datalogger record commenced in 2018, the water level in the 'Eden BH' monitoring point has always been about 2 to 3m below ground level. Groundwater elevation at the 'Eden BH' is therefore ~15m higher than groundwater level on the floor. Therefore, it is concluded that it maintains its relationship with the local groundwater regime rather than having a relationship with dewatering at the floor, which is 330m from the on-site 'Eden BH' monitoring point;

- b. Groundwater levels at the 'SHW2_White' monitoring point retain their usual elevation, averaging 58.2m OD for September 2019 to March 2020, which is close to ground level: this well is not pumped, it is a reference point well on a farm 700m to the north of the northern boundary of the quarry. For the January to September 2019 previously reported monitoring period water level elevations at this location averaged 57.6 m OD. The data demonstrates that water level at the 'White BH' monitoring location has increased in elevation. While this is expected because the monitoring period reported here is for the relatively higher recharge season and the winter and spring record, it is still evidence that dewatering at the quarry has not manifested any dewatering effects in the wider aquifer at a distance of 700m to the north;
- c. The domestic well serving Hughes, in the townland of Waslough, at a distance of 1.6km to the north, north west, of the quarry, had a water level elevation range of 53m OD to 54.5m OD in the first 9 months of 2019. In the months since then it has presented a water level elevation range of 55.17m OD to 57.84m OD. Again, similar to the 'White BH' monitoring point, the observed rise in water level is expected because the monitoring period reported here is a higher recharge winter & spring record. However, the data demonstrate that winter dewatering at the quarry site has not manifested any dewatering effects in the wider aquifer at a distance of 1.6km to the north, north west, of the quarry;
- d. The 'SHW1_Dooley' domestic well monitoring point is more or less halfway between the quarry and the most northerly monitoring points in the townland of Waslough, namely 'Hughes' and 'Waslough Pump'. Dooley's has always had a more pump responsive water level elevation trend than other locations. The elevation of groundwater at this location does not demonstrate any reduction in this monitoring period reported. Previously, in the first 9 months of 2019, the water level elevation here averaged at 36.95 m OD and had a minimum and maximum of 36.05m OD and 37.74 m OD. In this September 2019 to December 2020 reporting period it has a 39.89m OD average and a range of 36.37 to 46.94m OD. The conclusion here is the same as for Hughes and Whites monitoring points: groundwater levels are not negatively affected by activities at the quarry;
- e. The Waslough Pump monitoring point, 1.5km to the north of the quarry retains a relatively level water level elevation throughout. This monitoring point is a disused water supply well for Kilkenny County Council. It is an old well that was probably hand excavated, given that it was not bored and is large diameter. It most likely taps a shallow groundwater or spring. It presents the similar response as its most proximate wells: Hughes and Whites. Most interesting is that Waslough pump is 1.5 km **north** of the quarry and the 'Drea BH' is 420m, approximately, to the **south** of the quarry and both monitoring points present similar water level elevations (Figure A). This is further evidence that activities at the quarry are not spreading any effect outside the site in any compass direction;
- f. To the south, at a distance of 420m from the quarry's most southerly boundary and across the motorway, the 'Drea' monitoring point presents groundwater level response that is the same as previously observed at that location. This well presents large drawdowns and recovery on a daily basis in response to the switching on and off of the pump. It is a domestic/farm well. It is drilled at a point in the limestone that appears to be relatively low yielding compared to other monitoring wells of domestic users to the north of the quarry (e.g. Hughes). The trend shows

water levels increasing throughout the winter and the response suggests no connectivity to the quarry's water levels;

- g. To the east of the quarry, in the direction of the River Nore (SAC), groundwater levels at monitoring points RC3 and RC8 are similar and present no cause for concern and no indication of groundwater levels dropping to the managed floor's groundwater elevation of 30m OD. RC's fluctuations reflect the pumped influent to the settlement ponds: it is a rotary cored investigation borehole adjacent to the channel that conveys received pumped waters from the sump on the floor as it is transferred to the final settlement lagoons on the site;

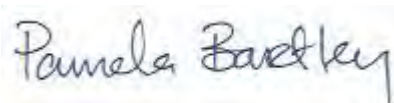
The summary statistics for all monitoring points water level elevations are presented in Table 2.

Table 2 Summary statistics for all monitoring points water level elevations (Sept 2019 to March 2020)

	BH1 WL (m OD)	BH3 WL (m OD)	BH5 WL (m OD)	BH12 WL (m OD)	RC3 Lagoons WL (m OD)	EDEN BH WL (m OD)	RC8 WL (m OD)	DREA WL (m OD)	Whites WL (m OD)	Dooley's WL (m OD)	Waslough Pump WL (m OD)	Hughes WL (m OD)	
Water Level	29.37	29.88	30.77	29.59	38.75	46.10	36.56	61.94	58.98	46.94	57.59	57.84	MAX
Elevation	29.10	29.34	29.98	28.62	32.86	44.88	34.50	44.53	57.44	36.37	55.19	55.17	MIN
Summary	29.23	29.61	30.52	29.22	36.76	45.45	35.74	54.88	58.23	39.89	56.09	56.14	AVERAGE
Ground Level (m OD)	30 mOD	30 mOD	30 mOD	30 mOD	47 mOD	49 mOD	42 mOD	69 mOD	61 mOD	58 mOD	68.5 mOD	75 mOD	

Overall, the groundwater monitoring results suggest that:

- 1) In the wider aquifer, there is evidence that each domestic borehole and RC8 (a rotary core hole close to the motorway) retain their own water level integrity and groundwater levels are not negatively affected by activities at the quarry. Water level elevations in all compass directions have risen since the last reporting in September 2020.
- 2) The quarry's managed groundwater level on the floor is very localised to the quarry floor itself. This is a conclusion supported by the EDEN BH and RC3 BH on the site: both of these BHs are datalogger instrumented monitoring points within the quarry boundary but at locations that are much more elevated than the floor. Water level elevations at Eden and RC3 are much more elevated than water level elevations on the floor, which is 300m, approximately, from each point. Water level elevations at and both EDEN BH and RC3 BH are similar to water level elevations at their closest off-site monitoring points.
- 3) No impact is groundwater level impact is observed in the local aquifer.



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Addendum A

Report 2019

RECEIVED: 18/08/2025



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12th October 2019

Mr. Mark Galvin
Bennettsbridge Limestone
Kilree
Sheastown
County Kilkenny
Ireland
R95 EY OR

**Re: Bennettsbridge Limestone REPORTING Condition No. 8: Groundwater Monitoring
Programme
[Planning Register No: P18/858]**

Mark

Condition no. 8 of Permission Grant 18/858, states as follows:

8. Within 4 weeks of the final date of grant of this permission, the developer shall submit for the written agreement of the Planning Authority a detailed groundwater monitoring programme to monitor groundwater levels both on and off site. The programme shall include details of the locations of all wells to be monitored and frequency of monitoring events.

Reason: To provide for the monitoring of groundwater levels.

The groundwater monitoring programme comprises continuous water level monitoring by automated dataloggers in 14 wells: 7 of which are in wells in the surrounding townlands and seven are within the quarry itself.

The water level dataloggers were installed in January 2018 and a continuous groundwater level record has been maintained since then. Information for each of the monitoring locations are presented in the Addendum to this report [Tables 1 & 2]. The locations of the onsite dataloggers are presented in Figure 1 and the local area dataloggers, offsite, are presented in Figure 2. The groundwater levels for the first three seasons of 2019 are reported herein. The time period reported is for January to September 2019.

The datalogger graph for water level responses at all locations is presented in Figure 3 in the format of water levels in each well presented as elevations above ordnance datum and can therefore be directly referenced to the floor elevation at Bennettsbridge Limestone's quarry. Observation and interpretation of the monitoring data for groundwater level response at the site and for the local area are discussed in the text after Figure 3.



Figure 1 On-site Water level datalogger locations.

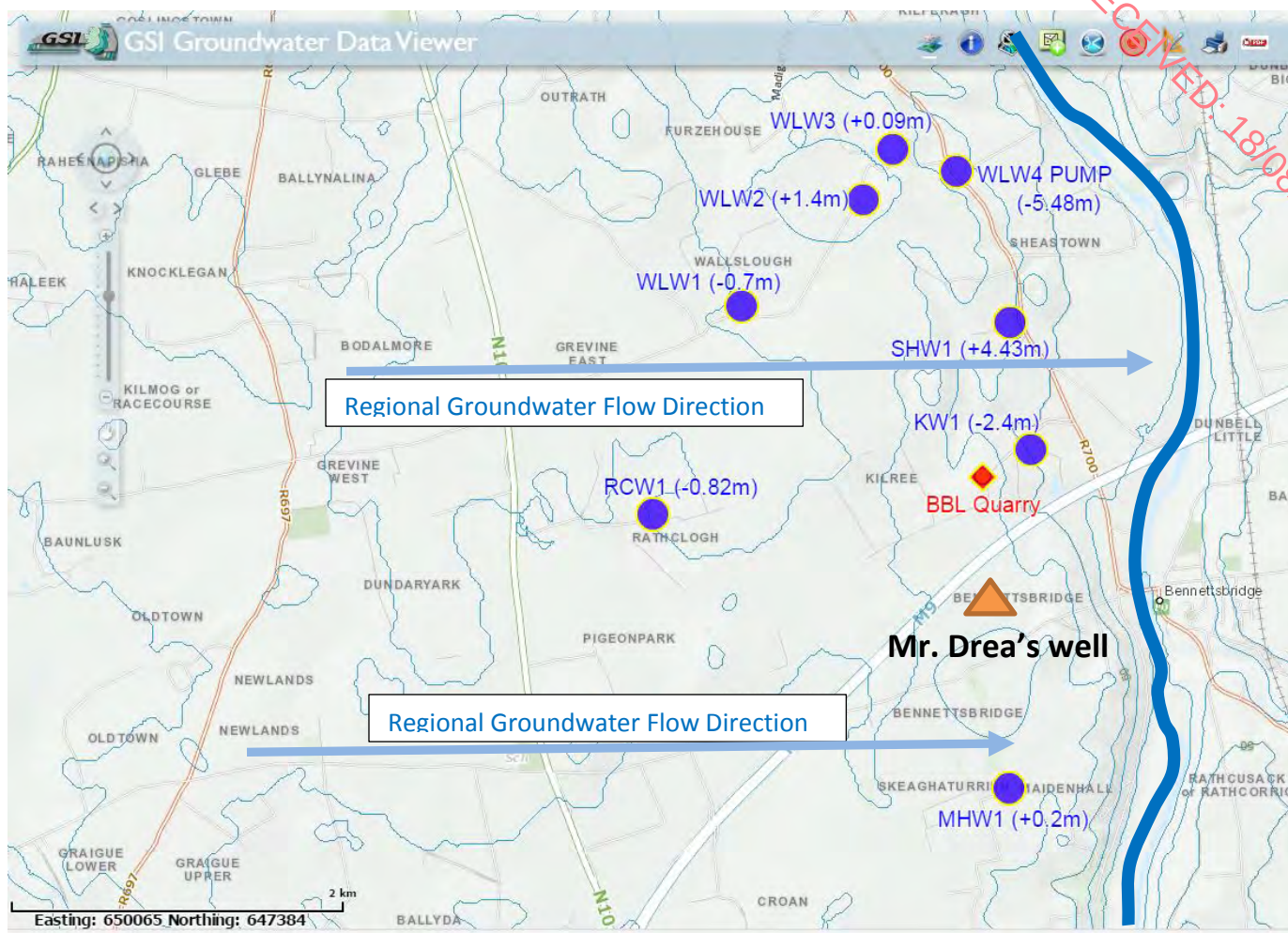


Figure 2

Location of local area monitoring points (2019), groundwater flow direction and groundwater level differences between the 1999 and recent survey [NOTE: RCW1 is now monitored manually each season, there is no datalogger at that location in 2019 but Mr. Drea's well is a new datalogger location monitoring point].

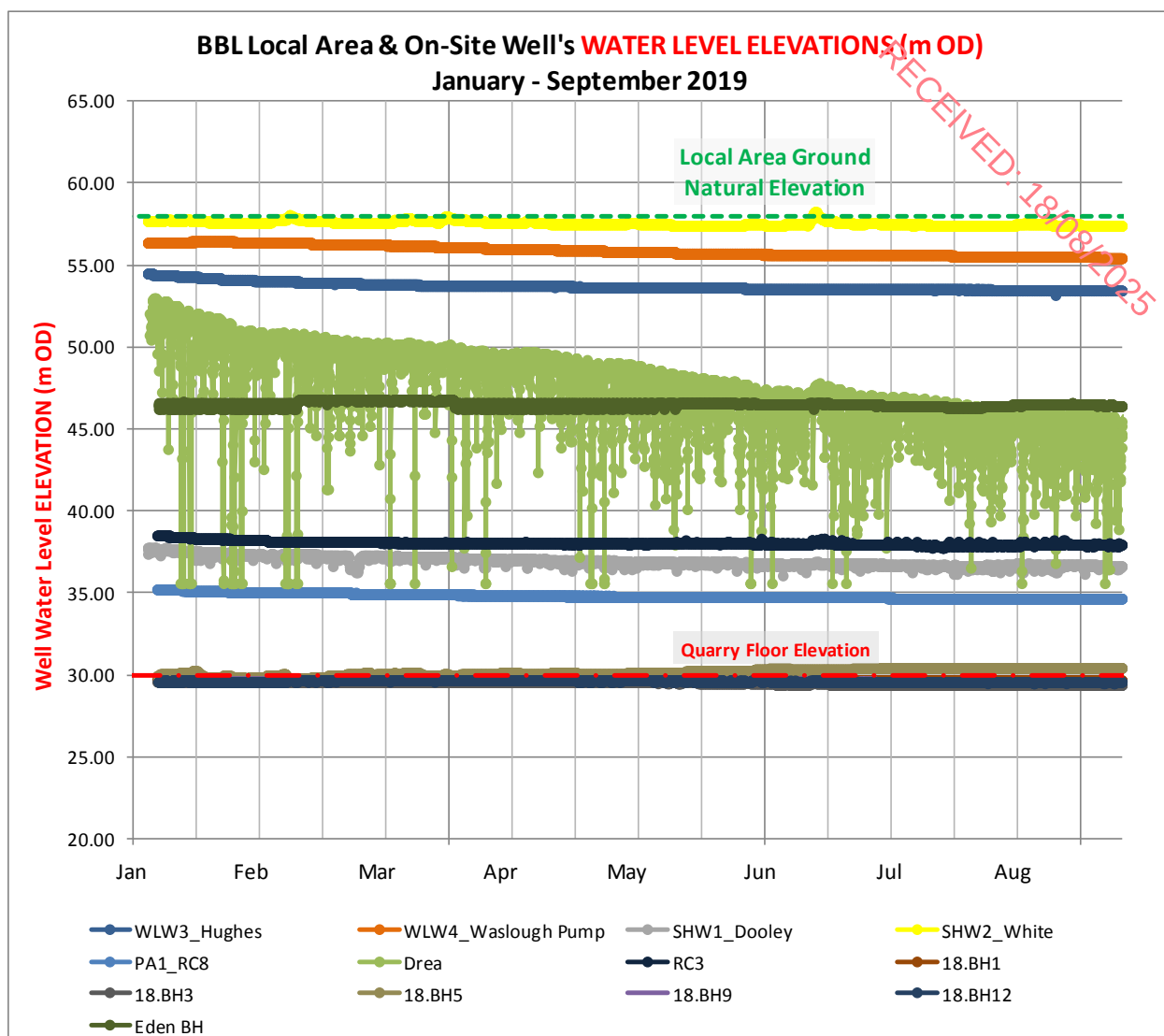


Figure 3 Groundwater levels (m OD): on-site & local area wells January – September 2019.

Considering the information presented in Figure 3, the following observations can be made:

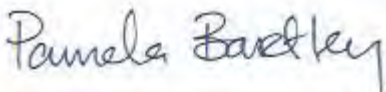
1. The quarry's water management regime, which enables dry working on the floor, keeps groundwater levels at the floor elevation of 30m OD, approximately. The quarry's managed groundwater level on the floor is very localised to the quarry floor itself. This can be confidently concluded for numerous reasons, as follows:
 - a. The 'EDEN BH' is within the quarry, close to the northern boundary, at a distance of 330m, approximately, of the centre of the quarry floor. Ground surface elevation at 'Eden BH' is 49m OD, approximately, and that is 19m above the quarry floor. Groundwater elevation at 'Eden BH' is 49m OD, approximately. There is a 19m elevation difference between the floor and ground level at 'Eden BH'. Since the datalogger record commenced in 2018, the water level in the 'Eden BH' monitoring point has always been about 2.5m below ground level. Groundwater elevation at the 'Eden BH' is 17m higher than groundwater level on the floor. Therefore, it is concluded that it maintains its relationship with the local groundwater regime rather than the

dewatering at the floor at a distance of 330m;

- b. Groundwater levels at the 'SHW2_White' monitoring point retains its usual elevation, which is close to ground level: this well is not pumped, it is a reference point well on a farm 700m to the north of the northern boundary of the quarry;
- c. The domestic well serving Hughes, in the townland of Waslough, at a distance of 1.6km to the north, north west, of the quarry, retains its usual elevation of 54.5 to 53m OD throughout the year. Overall, there is the expected drop in groundwater elevations as the year progresses. This 'annual recession' is expected and is the usual groundwater response to the dropping off of rainfall recharge from rainfall;
- d. The 'SHW1_Dooley' domestic well monitoring point is more or less half way between the quarry and the most northerly monitoring points in the townland of Waslough, namely 'Hughes' and 'Waslough Pump'. Ground elevation at Dooley's is 17m lower than the ground level at Hughes. The difference in groundwater levels at these two domestic monitoring points is similar to the difference in ground levels. It is therefore concluded that the groundwater levels are related to the monitoring points topography rather than water management at the quarry floor;
- e. The expected 'annual recession' in groundwater level is observed in the Waslough Pump monitoring point, 1.5km to the north of the quarry. This monitoring point is a disused water supply well for Kilkenny County Council. It is an old well that was probably hand excavated, given that it was not bored and is large diameter. It most likely taps a shallow groundwater or spring. It presents the most dipping recession in Figure 3, for the northerly zone, but 'Hughes' shows a similar response to the reduction in rainfall through the year;
- f. To the east of the quarry, in the direction of the River Nore (SAC), groundwater levels at monitoring points RC3 and PA1 RC8 present no cause for concern and no indication of groundwater level dropping to the managed floor's groundwater elevation of 30m OD. As observed at all locations, there is the expected small annual recession small drop off in groundwater elevation at RC3 and PA1 RC8;
- g. To the south, across the motorway, the 'Drea' monitoring point presents groundwater level response that is the same as previously observed at that location. This well presents large drawdowns and recovery on a daily basis in response to the switching on and off of the pump. It is a domestic/farm well. It is drilled at a point in the limestone that appears to be relatively low yielding compared to other monitoring wells targeting domestic users to the north of the quarry (e.g. Hughes & Dooley). The trend and response suggest no connectivity to the quarry's water levels.

Overall, the groundwater monitoring results suggest that

- A. The quarry's managed groundwater level on the floor is very localised to the quarry floor itself.
- B. In the wider catchment, there is the expected small drop in groundwater elevations as the year progresses. This 'annual recession' is expected and is the usual groundwater response to the dropping off of rainfall recharge from rainfall.



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Addendum

Tables 1 & 2

Monitoring Point Information

Table 1 On-site Datalogger location information

Dataloggers (On-site)							
Number	Townland	Well I.D.	Grid Ref	Ground Elevation (m OD)	Well Depth (m)	Base of Well Elevation (m OD)	2018 Water level Datalogger Installations Rationale/Reasoning
7	Kilree	Eden BH	254300, 150247	49	25	24	long term on site groundwater monitoring point, in front of sheds near Eden Spring, remote from working excavation area.
8	Kilree	RC3	254673, 149962	47	31	-1	adjacent to the final discharge lagoons, elevated above the floor, similar elevation to the current ground surface of the 2017 Grant of permission zones, which are adjacent to this BH RC3.
9	Kilree	18.BH1	254395, 149841	30	21	9	10" diameter investigatory BH located centrally on the 30m OD quarry floor
10	Kilree	18.BH2	254387, 149909	30	21	9	6" diameter investigatory BH on the 30m OD floor, targetting the collapse infill zone in the western face/wall of the worked pit, which is to the west of this monitoring BH "18.BH1".
11	Kilree	18.BH5	254287, 149766	30	21	9	6" diameter investigatory BH on the 30m OD floor, targetting the eastern zone of the worked part of the quarry.
12	Kilree	18.BH9	254191, 149869	30	18	12	6" diameter investigatory BH on the 30m OD floor, targetting the eastern zone of the worked part of the quarry, near springs & artesian investigation borehole "18.BH8".
13	Kilree	18.BH12	254275, 149937	30	36	-6	6" diameter investigatory BH in the worked floor/stockpile area, relatively close to the 'strong artesian' BH RC2 (Apex 2008).
14	Kilree	mobile Datalogger for on site pump tests					
BARO 1	Kilree	at Eden BH	254300, 150247	49	BARO Elevation applicable to local natural Ground level		
BARO 2	Kilree	at 18.BH1	254395, 149841	30	BARO Elevation applicable to 30m OD quarry floor level		

Table 2 Off-site Datalogger location information

Datalogger Number	Townland	Well I.D.	Well Name	Grid Reference	Ground Elevation (m OD)	Well Depth (m)	Base of Well ELEVATION (m OD)	2018 Water level Datalogger Installations Rationale/Reasoning
1	Walslough	WLW3	Hughes	253750, 151910	75	48.7	26.3	(WLW3) Installed water level datalogger in February 2018 for 30 minute interval recording of water level: Walslough Townland, North of quarry, Upgradient monitoring location, base elevation of the well is below the 30m OD lowest level elevation of excavations at the quarry. There is an established 1999 & 2017 monitoring record, which shows similar water levels with a 9cm difference (being a rise of 9cm when 1999 and 2017 data are compared).
2	Walslough	WLW4	Walslough pump	254050, 151850	68.47	n/a	n/a	(WLW4) Installed water level datalogger in February 2018 for 30 minute interval recording of water level: rationale = non pumping chamber for spring = untapped groundwater resource. With respect to groundwater flow direction and groundwater discharge to the Nore River, this spring chamber is upgradient or crossgradient of quarry, it is a monitoring point to the north of the quarry.
3	Sheastown	SHW1	Dooley	254600, 151210	58	61	-3	(SHW1) Installed water level datalogger in February 2018 for 30minute interval recording of water level. Domestic operational well in Sheastown, north west of quarry, base level of this domestic well is -3m OD and therefore significantly below the 30m OD quarry's proposed finished level of floor of the 2017 Grant of permission that is permitted in the excavation area (and the current 30m OD elevation of much of the floor).
4	Sheastown	SHW2	White	254570, 150850	61.02	48.7	12.32	(SHW2) installed water level datalogger in February 2018 for 30 minute interval water level recording. Rationale = disused well in townland of Sheastown, to the north west of the quarry, between quarry and the Nore. DISUSED Well signifies great potential for local groundwater level impact assessment. Comparison between water level in February 2017 (3.04m bgl) and August 2018 (2.71m bgl) suggests rising groundwater level.
5	Rathclough	RCW1	Kelly	252200, 149650	80	61	19	(RCW1) - Monitoring point east of quarry = upgradient of quarry in terms of regional groundwater discharge to the Nore. If the quarry was acting as a regional 'bath' void / soak area for regional groundwater then this well would show signs but comparison of 1999 data (33.68 m bgl) and 2017 data (34.5 m bgl) suggests similar levels with the small difference rationalised by weather and possible pumping regime changes.
6	Kilree	PA1 (Rotary Core Hole RC8 [yr 2008])		254897, 149991 (Apex 2008 Grid Ref)	41.79	25	17	(PA1/RC8) is a cored hole, unpumped and located between the quarry and the River Nore. (PA1/RC8) is 200m, approximately, west of the area of the quarry granted permission for extraction in 2017, in the direction of the Nore and it is 500m, approximately from the Nore.
7	Bennettsbridge	Drea		254221, 147984	69	115	-47	Installed in 2019 in response to request by Mr Drea, remains in the Monitoring Programme.



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17th February 2022

To:
Mr. Mark Galvin
Bennettsbridge Limestone Ltd.
Kilree, Sheastown
County Kilkenny, Ireland
R95 EY OR

Re: Bennettsbridge Limestone Groundwater Level REPORTING
Groundwater Monitoring Condition
[Planning Register No: P18/858]

Mark

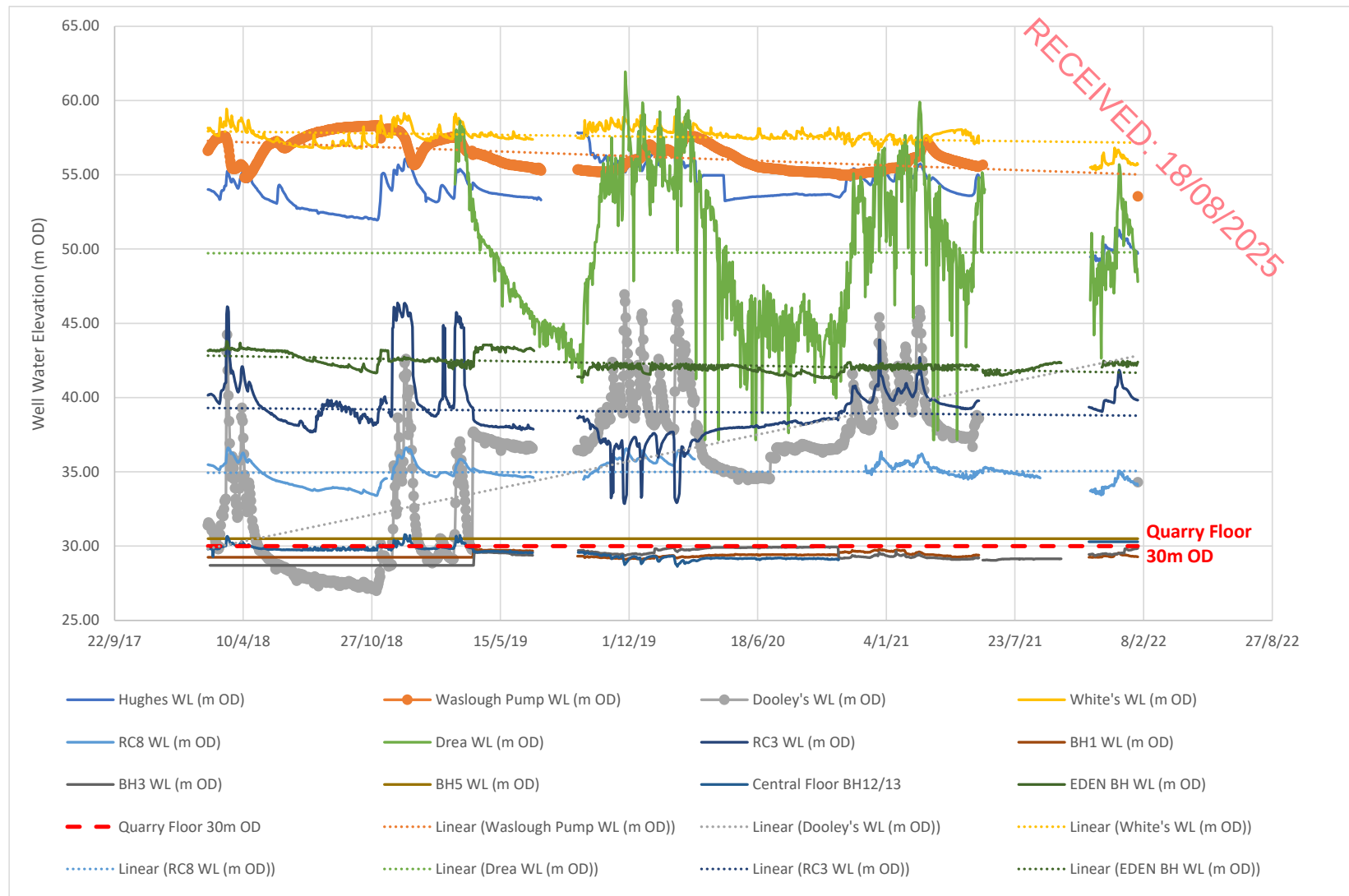
Ongoing Groundwater Monitoring is a Condition requirement of Planning Permission P18/858.

As stipulated in the grant of permission, Hydro-G and Bennettsbridge Limestone Ltd. formally notified Kilkenny County Council of the Groundwater Monitoring Plan in 2019.

Reports have previously been presented for the 2019 and 2020 monitoring years. This report presents the record for the 2021 monitoring period through to the most recent data download, which was last month January 2022.

Firstly, the entire record 2018 to present is presented and then the seasons are examined in more detail. The continuous water level record is presented here for the onsite boreholes within the quarry itself and for the offsite local wells. The locations of the wells instrumented with dataloggers were presented in the First Monitoring Report and is presented here as an Appendix for ease of reference. The continuously recording water level dataloggers at each monitoring point record water pressure above the datalogger position in each well. There are also two barometric loggers at the quarry at different elevations, which gives barometric pressure for compensation appropriate to the floor and the local area's topography.

Hydro-G has compensated each individual well's pressure record and related the determined water levels (m below ground level) to the elevation of the wellheads at each location. That water table elevation data is presented in Graph 1 and facilitates comparison of water levels elevations throughout the catchment from a common datum. Graph 1 presents the entire record to date (2018 to present).



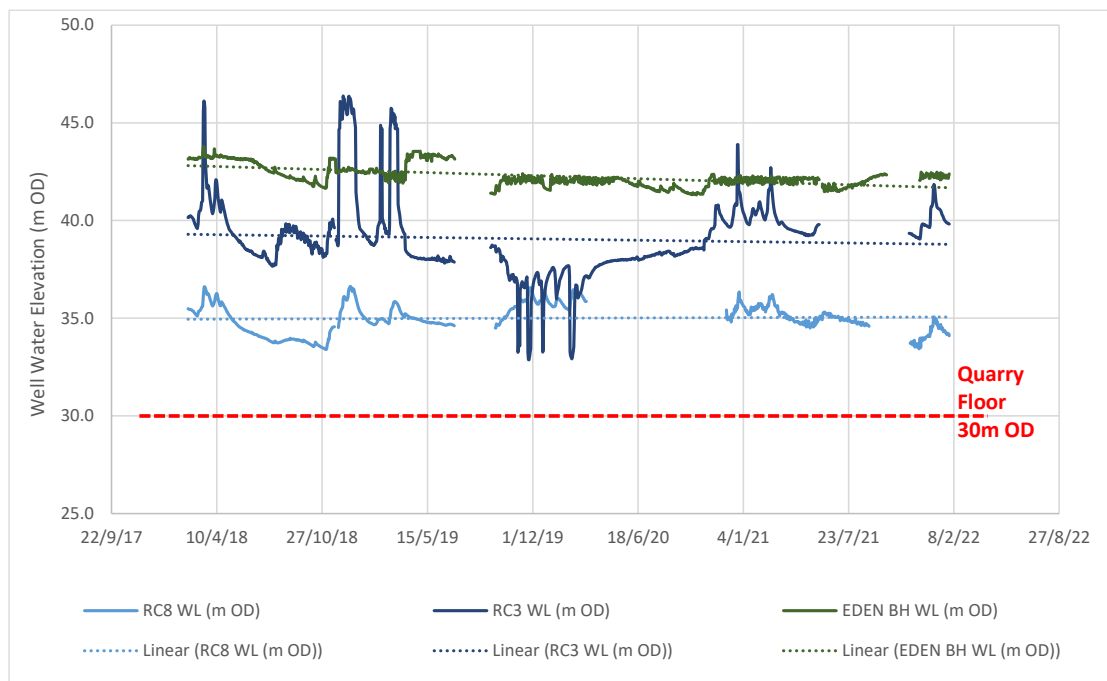
Graph 1 Groundwater levels (m OD): on-site & local area wells ALL Record to date. Linear Trendlines are also presented for each well's record.

Note: There are gaps in the data due to instrument issues. The gap in the summer of 2021 was due to the failure of all batteries in the loggers after three years, datalogger retrievals, sent back to supplier for reinstalls, battery calls from the UK to the USA, Brexit issues with UK etc., return of dataloggers to site and reinstalls in November 2021.

Comments

- The information presented in Graph 1 presents the record for all Monitoring Points (MPs) and spans the entire record since the beginning of monitoring in 2018.
- The water level response for the floor boreholes, @ 30m OD elevation, suggest no change in water levels on the floor and this is expected because the floor is a controlled environment. Water levels in those floor BHs (BH1, BH3, BH5 & Central BH12/BH13) are close to ground level on the floor. They have stayed this way since monitoring commenced in 2018. This is expected because rain that falls on the floor saturates the upper broken rock.
- There are three other MPs within or close to the quarry's site boundary but elevated above the quarry floor. Those three MPs are described as follows:
 - **Eden BH**, which is on ground close to the entrance to the working floor but is elevated above the floor at a well head elevation of 45m OD.
 - **RC3**, which is at ground level elevation of 47.8m OD and therefore 17.8m above the floor. RC3 is beside the channel leading to the settlement lagoons and its water level fluctuates with the flow in the channel.
 - **RC8** is just to the east of the quarry in a field alongside the local R700 road from Kilkenny to Bennettsbridge.

The groundwater elevation graphs for each of these MPs for the 2018 to present duration are presented as Graph 2.



Graph 2 Groundwater Level Elevations on-site BHs on lands above the quarry floor.

With reference to the information presented in Graph 2,

- RC8's groundwater elevation is low now in early January 2022 but the excel tool for Trendline on the graph shows that the overall trend is stable with no overall decrease in water level trend since 2018. This is the MP between the quarry and the River Nore.
- With respect to Eden BH MP and RC3, there is a very slight downward trend noticed in the water level trendline applied to each dataset's groundwater elevations for the monitoring period 2018 to January 2022.
- However, the EPA reports that 59% of national groundwater monitoring stations were 'below normal' and 'particularly low' for January averages (EPA, Monthly Hydrology Bulletin: Edition 021: January 2022 available @ <https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/hydrology-bulletin/>). Similarly, the EPA reported in December 2021 that 40% of groundwater monitoring stations observed levels 'below normal' for November averages.

In summary, for the on-site MPS, the water levels in the floor BHs are the same as before and the other on-site MP BHs show a small decrease in elevations, which concurs with the variances observed and reported by the EPA for the National Groundwater Monitoring Network (i.e. as reported in the Monthly Bulletins).

Summary characteristic groundwater elevation data for all on-site wells are presented in Table 1. These data assist insight into the graphical trend responses presented in Graph 2.

Table 1 On Site Groundwater Level Elevation Summary Values February 2018 to January 2022

		~Monitoring Point Ground Elevation (m OD)	~Monitoring Point Base of Hole Elevation (m OD)	Monitoring Point Depth (m bgl)	Feb 2018 to Jan 2022				Current WL < Average WL (m)
					WL Elevations (m OD)				
					MAX	Min	Average	End Jan '22	
Floor Monitoring Points (Floor is 30m OD)	Central Floor BH12/13	30.5	2.5	28	30.78	28.62	29.62	30.3	-0.68
	BH1	30	8	22	29.77	29.10	29.36	29.28	0.08
	BH3	30	9	21	29.94	28.70	29.26	29.85	-0.58
	BH5	30	8	22	30.50	30.50	30.50	30.5	0.00
MPs @ or close to Site but Elevated above quarry floor	EDEN BH	45	20	25	43.80	41.31	42.26	42.39	-0.13
	RC8	41.8	-4.2	46	36.62	33.40	34.99	34.1	0.89
	RC3	47.8	17.3	30.5	46.38	32.86	39.06	39.8	-0.76

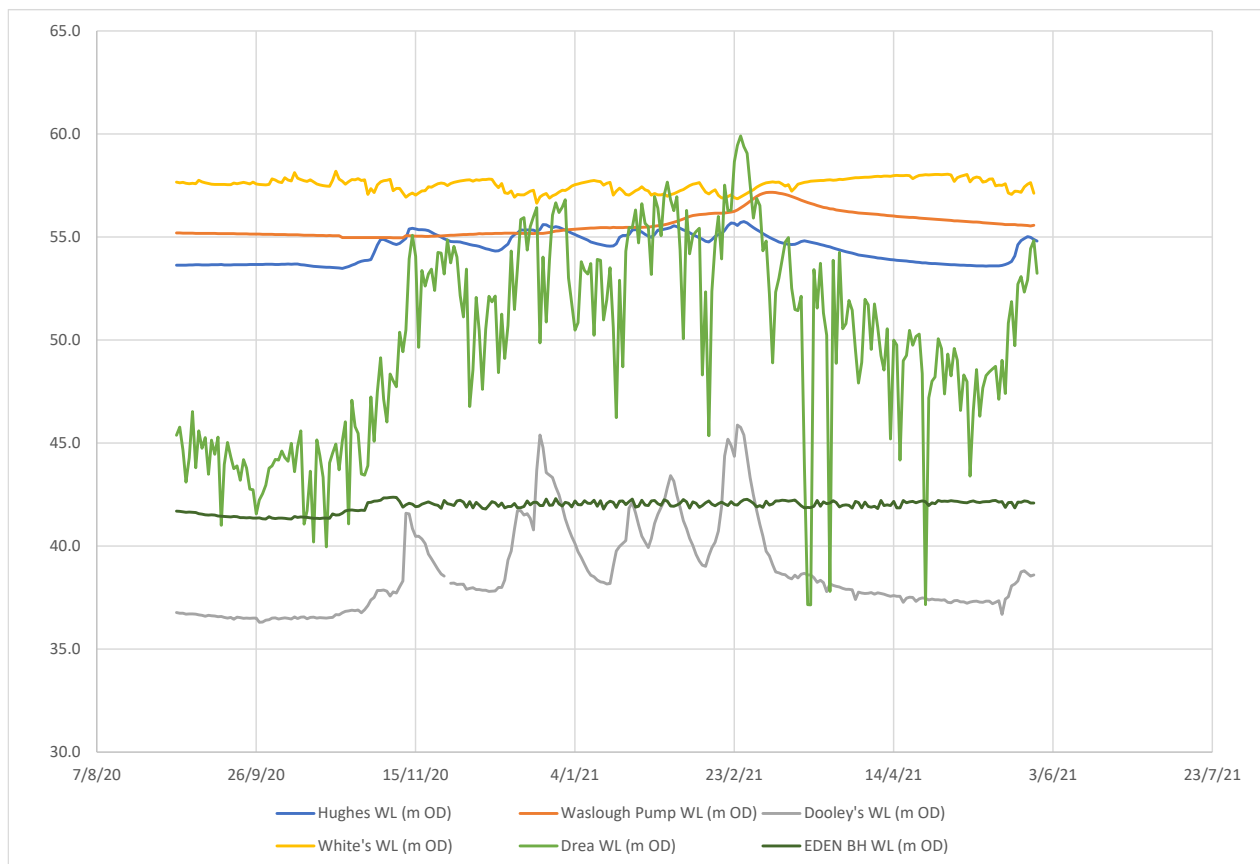
Information presented in Table 1 illustrates that the Floor MP's groundwater elevations remain at or around the floor levels in the controlled quarry environment. The other MPs around or close to the perimeter of the site are similar now to the average observed water level. However, it is winter now and the average elevation includes summer low and winter high water elevations. Until the National Groundwater Monitoring response (EPA Bulletins) reports a return to normal groundwater conditions in the southeast, it is difficult to evaluate the significance of the trends. I suggest that the water level data are revisited in April 2022.

With respect to the groundwater trend observed in the off-site groundwater levels, we have had long term groundwater sensor dataloggers in the following off-site wells:

- i. Drea's, which is to the south of the quarry across the motorway in the townland of Bennettsbridge (Ed Danesfort)
- ii. Whites
- iii. Dooley's
- iv. Waslough Pump BH
- v. Hughes
- vi. (Kelly's datalogger now is lost in the hole, cable attachment snapped but Drea's datalogger represents this geographical location because Drea's is adjacent to the Kelly Rathclough townland).

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The last reporting of water levels was in October 2020. October is considered the start of the hydrological year. Groundwater levels are generally considered to be at their lowest in October of each year and rainfall throughout the winter will recharge the systems. Information from October 2020 to Summer 2021, when all the datalogger batteries failed, are presented in Graph 3.

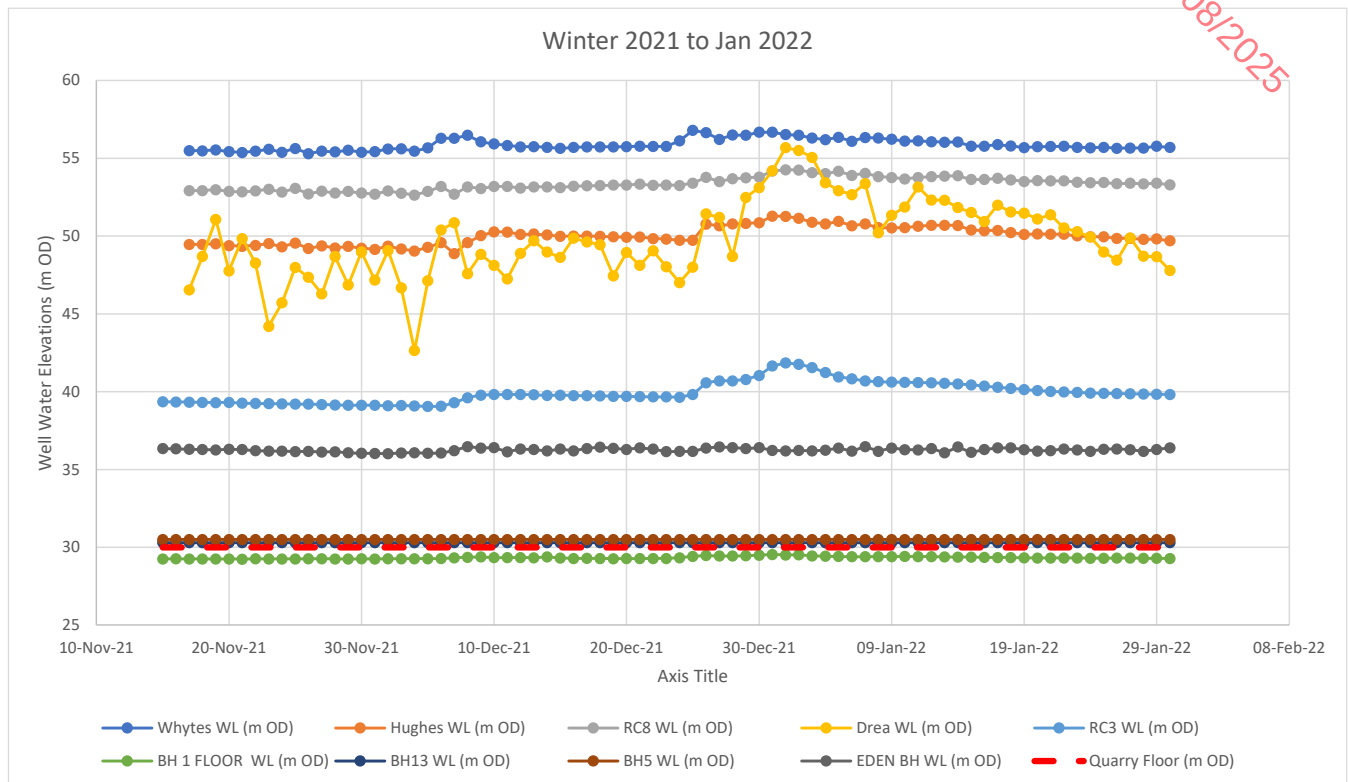


Graph 3 Groundwater Elevation record October 2020 to June 2021

With reference to Graph 3, monitoring data for the Winter of 2020 through to Summer 2021 suggests nothing unusual and normal groundwater responses.

As previously stated, there have been datalogger failures at the site. There is a large gap in the summer of 2021 because of a failure of all batteries in the loggers after three years (which was unexpected because

most datalogger battery lives are much longer). There was a certain amount of time that the dataloggers were dormant. The gap in the dataset reflects the amount of time taken to retrieve 13 dataloggers, obtain advice on repair/replacement, send back to supplier for reinstalls, battery calls from the UK to the USA, Brexit issues with UK etc., return of dataloggers to site and reinstalls in November 2021. The record for all wells since the dataloggers were reinstalled in November 2021 is shown in Graph 4.



Graph 4 Groundwater Elevation record November 2021 to end January 2022

With reference to data presented in Graph 4,

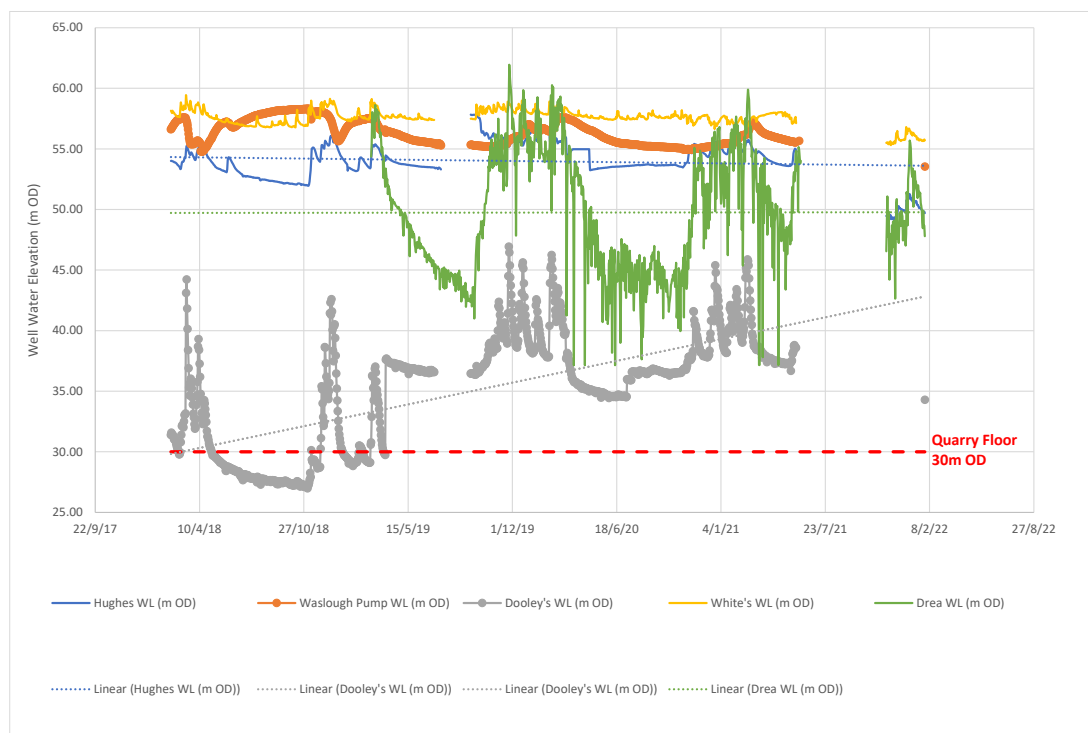
- The data for the winter of 2021 suggests little change in groundwater elevations either at the site or in the catchment for the monitoring duration end of November to end of January.
- The large rainfall event at Christmas (25/12/21 @ 58mm at Johnstown Castel, 37mm at Oakpark Met Stns) presents a very small increase in water levels in all wells except on the quarry floor's Monitoring Points, which are always the same because they are controlled at the floor level elevation of 30m OD.
- The rise and fall of the water elevation in Drea's well has always been very responsive to the daily pumping at the site. The drop in water level on the 4th December 2021 was a Saturday and this has been observed historically, and confirmed with Mr Drea on previous occasions, that power washing in the yard or other high water usage days can present temporary large drawdowns. Overall, Drea's well's water level is generally the same in January 2021 as it was in November 2021. The same is true for all Monitoring Points.

While the data for October 2020 to June 2021 (Graph 3) and for November 2021 to end of January 2022 (Graph 4) suggest relatively stable groundwater levels and responses in both monitoring periods, an issue arises when the data is considered relating the time when the dataloggers failed (June 2021) to the time when they were reinstalled (November 2021). Groundwater elevation comparisons for October 2020, June 2021, November 2021 and January 2022 are presented in Table 2.

Table 2 Groundwater elevation comparisons for October 2020, June 2021, November 2021 and January 2022

WINTER Spot Data for commentary	Ground Level Elev (m OD)	Oct-20	Jun-21	Nov-21	Jan-22
BH1 BBL WL (m OD)	30	29.4	29.4	29.3	29.3
BH3 BBL WL (m OD)	30	29.9	29.2	29.8	29.0
BH5 BBL WL (m OD)	30	30.9	30.5	30.9	30.9
BH12 BBL WL (m OD)	30.5	29.1	29.8	30.0	29.8
RC3 Lagoons BBL WL (m OD)	47.8	38.5	39.8	39.1	39.8
EDEN BH BBL WL (m OD)	45	45.9	42.7	42.2	42.4
DREA WL (m OD)	70	nm	54.8	48.7	47.8
RC8 WL (m OD)	41.8	34.6	35.0	33.6	34.1
Whites WL (m OD)	61	57.9	57.1	55.4	55.7
Dooley's WL (m OD)	58	36.7	37.9	na	34.3
Waslough Pump WL (m OD)	68.74	55.1	55.9	na	53.5
Hughes WL (m OD)	75	54.8	54.8	49.2	49.7

A graphical presentation of the complete record (February 2018 to January 2022) water level elevations in the off-site wells is presented in Graph 5.



Graph 5 A graphical presentation of water level elevations in the off-site wells.

Summary characteristic values for the off-site wells are presented in Table 3.

Table 3 Summary characteristic values for the off-site wells

					Feb 2018 to Jan 2022				Current WL < Average WL (m)			
					~Monitoring Point Ground Elevation (m OD)	~Monitoring Point Base of Hole Elevation (m OD)	Monitoring Point Depth (m bgl)	WL Elevations (m OD)				
								MAX		Min	Average	End Jan '22
Off Site Local Area Monitoring Points	Monitoring Point ID											
	Drea	70	-30	100	61.94	37.14	49.75	47.8	1.95			
	White's	61	12	49	59.43	55.30	57.58	55.70	1.88			
	Dooley's	58	-3	61	46.94	26.99	35.25	34.3	0.95			
	Waslough Pump BH	69	54	15	58.31	53.54	56.34	53.54	2.80			
	Hughes	75	26	49	57.84	48.88	54.01	49.70	4.31			

DISCUSSION

With reference to the water level trend in the off-site wells (Graph 5, above), the following can be stated:

- The trendlines for all monitoring points, except one (Dooley's), show a slight decrease when the full time period is considered 2018 to present. However, as stated previously, this same trend is being observed nationally (refer to EPA Hydrology Bulletin citation in the text above). The EPA bulletins for most of the recent winter months suggest very low rainfall at all stations across the country and most national groundwater monitoring points are below their long-term averages: specifically, EPA's January 2022 Bulletin suggests that "Groundwater levels were below normal at 45% of sites and **particularly low** at 14% of sites".
- This "**particularly low**" groundwater situation in Ireland, as reported by EPA Bulletins (Winter 2021 – January 2022). In January 2022, all wells off site are at least 1m lower than average (e.g., Dooley's), 2 off site wells are almost 2m lower than their long-term average (Drea & White), Waslough Pump BH's water level is 2.8m lower than its average elevation and Hughes well presents as 4.3m lower now than its average elevation for the 2018 – 2022 monitoring period record.
- The groundwater level in Drea's domestic well has always fluctuated greatly in response to pumping and water level now is similar to previously observed levels at similar times each year. The maximum and minimum groundwater elevation at this location is influenced so much by pumping that it is not possible to be definitive in an evaluation at this point.
- The water level in White's well in December 2021 was similar to December 2020. However, there are peaks and troughs in each month at this well, likely because of some connection to local land surface. The well is not pumped.
- Dooley's well is a well in which the domestic pump seriously affects water level recordings. The trendline in groundwater elevation is actually increasing (Graph 5). However, it is a difficult MP to reference in terms of an overall catchment response. Again, reference to the observed values in Table 3 enables some evaluation.
- The Waslough Pump BH MP presents a slight overall decreasing trend. However, the groundwater elevation at Waslough Pump BH was 55.3m OD, approximately, in each June/July, i.e. early summer, in all preceding

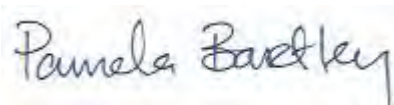
monitoring years 2018, 2019, 2020 and 2021. Now in late January 2022, groundwater elevation is 53.5m OD and this is lower than the groundwater elevation at this MP during the drought of 2018, when it was 54.8m OD. Water level now is 1.5m lower than in the 2018 drought. However, the bottom of this monitoring point is 24m ABOVE THE FLOOR of the quarry.

- g. Hughes well's groundwater elevation is particularly low, which is similar to 14% of the EPA's national Groundwater Monitoring Network's experience.

Summary comparative data are presented for winter times and summer times in Tables 4 and 5.

IN conclusion:

- The long term 2018 to end January 2022, as presented in Graphs 1, 2 & 3, present a lot of data and some downward trends, relative to the beginning of the record in 2018.
- However, from 2018 to October 2020 the data suggested that groundwater elevations in the area were not dropping.
- Seasonal effect Tables presented in the October 2020 report for wintertime and summertime groundwater elevations suggested no consistent water level drop in the area.
- For the 2018, 2019 and 2020 data, comparing year on year to the previous year, water levels rose and fell between observation periods. This is the natural expected groundwater variance.
- However, the current status of groundwater elevations presents a different picture and it is difficult to understand it. The current data may just be in agreement with the EPA's bulletins suggesting 'below normal' and 'particularly low' groundwater levels nationally. We have had almost zero rainfall and little to no groundwater recharge.
- Perhaps the system will equilibrate? We will evaluate this in March 2022.



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EPA Hydrology Bulletins available @

<https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/hydrology-bulletin/>

Table 4 Winter Time Comparative Elevations

WINTER Spot Data for commentary	Ground Level Elev (m OD)	Oct-18	Oct-19	Oct-20	Nov-21	Jan-22	Winter Difference 2021 vs 2018	Jan 2022 vs Oct 2018	Jan 2022 vs Oct 2019	Hydro-G Observations
BH1 BBL WL (m OD)	30	29.3	29.2	29.4	29.3	29.3	0.0	0.1	0.1	Higher WL
BH3 BBL WL (m OD)	30	29.8	29.5	29.9	29.8	29.0	0.0	-0.8	-0.5	not that significant
BH5 BBL WL (m OD)	30	29.4	30.0	30.9	30.9	30.9	1.5	1.5	0.9	WL is higher on the floor
BH12 BBL WL (m OD)	30.5	29.7	29.4	29.1	30.0	29.8	0.3	0.1	0.4	WL is higher on the floor
RC3 Lagoons BBL WL (m OD)	47.8	38.3	37.2	38.5	39.1	39.8	0.8	1.5	2.6	RC3 is higher WL
EDEN BH BBL WL (m OD)	45	45.8	45.6	45.9	42.2	42.4	-3.6	-3.4	-3.2	EDEN is dropping
DREA WL (m OD)	70		55.8		48.7	47.8	na	na	-8.0	8m is actually this BHs daily variation sometimes.
RC8 WL (m OD)	41.8	33.6	35.5	34.6	33.6	34.1	0.0	0.5	-1.4	sometimes up, sometimes down.
Whites WL (m OD)	61	57.0	58.0	57.9	55.4	55.7	-1.6	-1.3	-2.3	Whites dropping
Dooley's WL (m OD)	58	27.3	38.7	36.7	na	34.3	na	7.0	-4.4	Dooleys up and down. Naturally variable WL
Waslough Pump WL (m OD)	68.74	58.28	55.2	55.1	na	53.5	na	-4.7	-1.6	Significant drop in WL but the bottom of this monitoring
Hughes WL (m OD)	75	52.02	56.0	54.8	49.2	49.7	-2.8	-2.3	-6.3	Significant drop in WL compared to 2019 but this is a

Table 5 Summer Time Comparative Elevations

Summer Spot Data for commentary	Ground Level Elev (m OD)	Jul-18	Jul-19	Jul-20	Jun-21	Summer Difference 2021 to 2018	Summer Difference 2021 vs 2020	Hydro-G Observations 2021 Early Summer Data
BH1 BBL WL (m OD)	30	29.3	29.3	29.4	29.4	0.1	0.0	Water levels not dropping on floor
BH3 BBL WL (m OD)	30	27.3	29.2	29.9	29.2	1.9	-0.7	Water levels not dropping significantly on floor
BH5 BBL WL (m OD)	30	29.4	30.1	30.9	30.5	1.1	-0.4	Water levels not dropping significantly on floor
BH12 BBL WL (m OD)	30.5	29.8	30.3	29.2	29.8	0.0	0.6	Water levels not dropping on floor
RC3 Lagoons BBL WL (m OD)	47.8	38.1	45.1	38.1	39.8	1.7	1.7	Water elevation here is higher than 2018
EDEN BH BBL WL (m OD)	45	46.9	46.3	45.7	42.7	-4.2	-3.0	Eden is 3m lower than Summer last year and 4m lower than 2018
DREA WL (m OD)	70		57.1	57.5	54.8	na	-2.7	Drea's Summer WL is 2.7m lower than 2020
RC8 WL (m OD)	41.8	34.1	35.6		35.0	0.9	-0.6	RC8 relatively stable over time
Whites WL (m OD)	61	57.0	58.5	57.5	57.1	0.1	-0.4	Whites BH WL is same as 2018 but 0.4m lower than last year.
Dooley's WL (m OD)	58	28.0	34.3	34.6	37.9	9.9	3.3	Water level is 3m higher this year than last year and is 9.9m higher than 2018 record (Drought 2018 affected well).
Waslough Pump WL (m OD)	68.74	57.26	57.4	55.4	55.9	-1.3	0.5	Increased since last year but overall drop in water level elevation since 2018. However, the bottom of this monitoring point is 24m ABOVE THE FLOOR so it is perched and the quarry is unlikely to be the cause of changes here.
Hughes WL (m OD)	75	52.89	55.2	54.9	54.8	1.9	-0.1	2021 early summer WL = 54.8m OD and this is 100mm lower than last yr, which is not significant. Elevation of the well's water is higher in 2021 than summer 2018.



Hydro-G

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087 8072744

31/1/24

To:
Mr. Mark Galvin
Bennettsbridge Limestone Ltd.
Kilree, Sheastown. County Kilkenny, Ireland, R95 EY OR

Re: Bennettsbridge Limestone Groundwater Level REPORTING for Year 2023

Groundwater Monitoring Condition
[Planning Register No: P18/858]

Mark

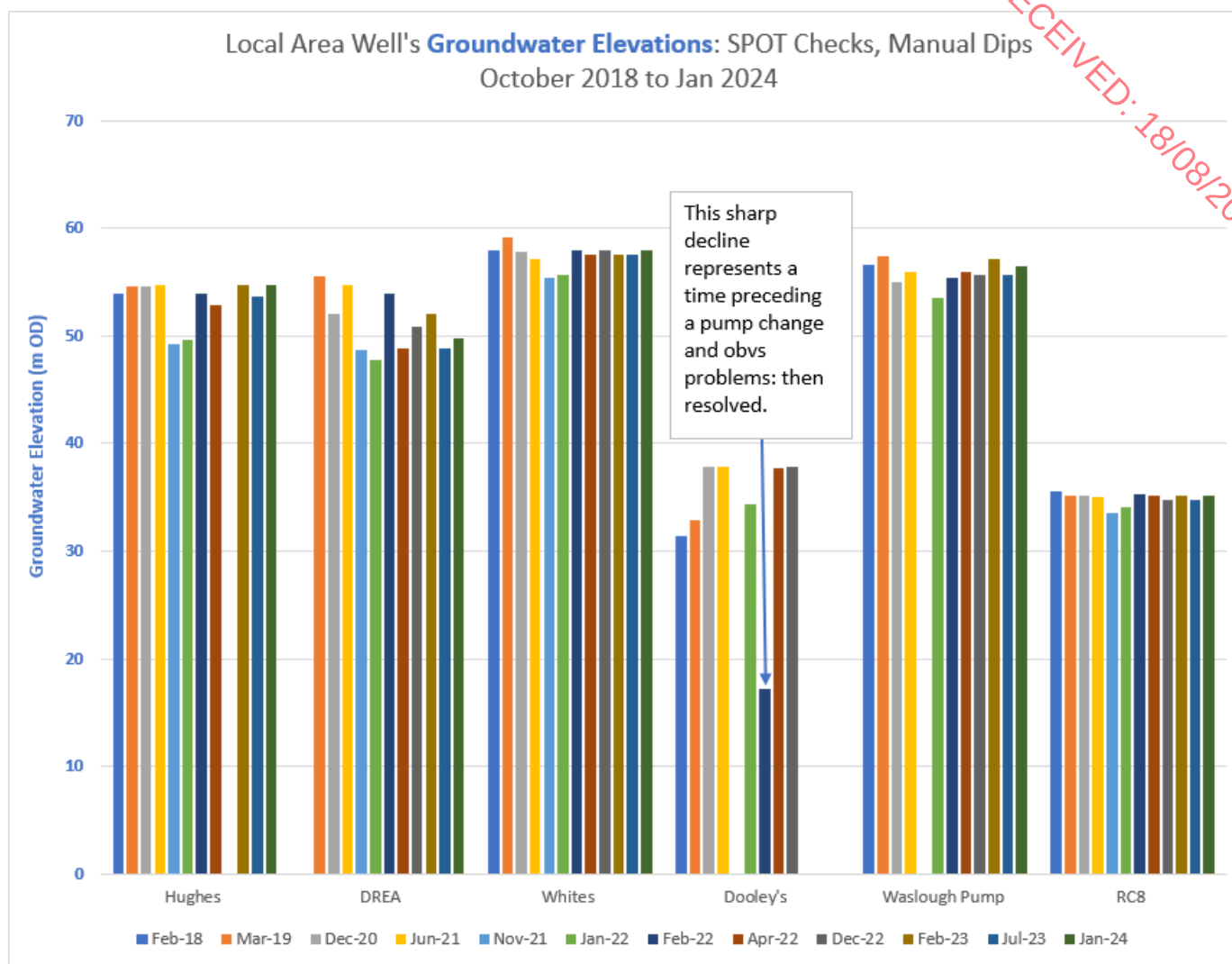
Ongoing Groundwater Monitoring is a Condition requirement of Planning Permission P18/858. As stipulated in the grant of permission, Hydro-G and Bennettsbridge Limestone Ltd. formally notified Kilkenny County Council of the Groundwater Monitoring Plan in 2019. Requisite Groundwater Monitoring Reports have been presented for the 2019 - 2022 monitoring years. This report presents the record for the monitoring period year 2023.

Groundwater levels in domestic wells on private sites, and the historic Waslough Pump, are monitored by continuous water level sensors (dataloggers) with routine manual dips using a dip meter, which act as a check to the dataloggers.

Groundwater levels are also recorded inside the quarry at wells on the floor (BBL1), at mid height (Eden BH) and at top natural ground level (RC3). Once base data is collated, Hydro-G converts the recorded 'depth to water' at each BH to elevations above sea level to enable direct comparison of trends across all monitoring points.

Previous reports have presented the data as trends and there is never any significant change in water level trends other than those related to weather or domestic pumping. As presented last year, given the amount of data collected since 2018, the data are presented differently, as shown in Graph 1, because it enables a clearer presentation over time. The data demonstrates that there is very little change over time in groundwater levels at any monitoring point.

STATEMENT: There have been no significant or unexplainable changes in groundwater level since 2018. Any observed changes can be explained by changes in use pattern by the consumer or pump issues. The most telling, and stable Groundwater Monitoring Point is RC8, which is between the Quarry and the River Nore. RC8 shows that the operation of the quarry has not caused any decline in groundwater levels in the wider landscape. The other wells are domestic and there will always be movement in the groundwater levels due to occupancy or use of home appliances such as showers, dishwashers and washing machines.



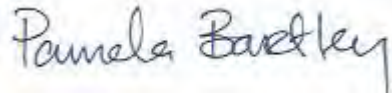
Graph 1 Local Groundwater Monitoring Elevations (m OD).

With respect to the differences in groundwater elevations, as seen in Graph 1, lower elevations occur in lower elevations in the landscape.

For the quarry:

- On the quarry floor at BBL1, groundwater level is controlled by virtue of compliance with the site's Section 4 Discharge Licence and remains beneath the current permitted floor elevation.
- Eden BH's trend remains reflective of small seasonal fluctuations, as expected, with no decline over time.
- RC3 at the Lagoons responds daily to the seasons, normal daily operations and water pumped from the floor sump as expected.

In the reporting of the 2022 data, in the AER dated February 2023, we offered that the reporting frequency could reasonably and justifiably be reduced to Annual Reporting to accompany the Annual Environmental Report for the Quarry, which is returned to the Environment Section each January.



Dr. Pamela Bartley B.Eng, M.Sc., Ph.D

pamela@hydro-g.com

To:
Mr. Mark Galvin
Bennettsbridge Limestone
Kilree, Sheastown,
County Kilkenny, Ireland, R95 EY OR

Re: Bennettsbridge Limestone Groundwater Level REPORTING for Year 2024
Groundwater Monitoring Condition [Planning Register No: P18/858]

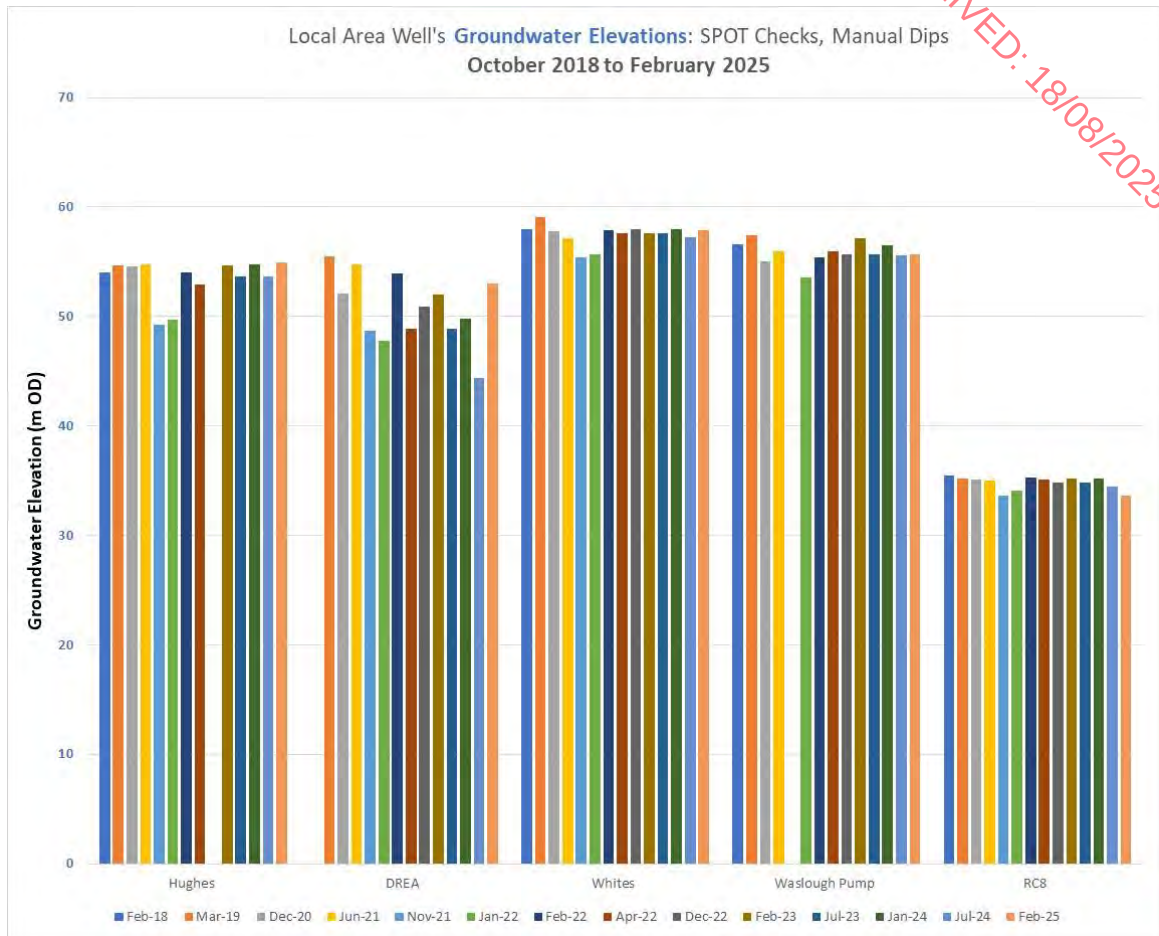
Mark

Ongoing Groundwater Monitoring is a Condition requirement of Planning Permission P18/858. As stipulated in the grant of permission, Hydro-G and Bennettsbridge Limestone formally notified Kilkenny County Council of the Groundwater Monitoring Plan in 2019. Requisite Groundwater Monitoring Reports have been presented for the 2019 - 2023 monitoring years. This report presents the record for the monitoring period year 2024.

Groundwater levels in domestic wells on private sites, and the historic Waslough Pump, are monitored by continuous water level sensors (dataloggers) with routine manual dips using a dip meter, which act as a check to the dataloggers. Groundwater levels are also recorded inside the quarry at wells on the floor (BBL1), at mid height (Eden BH) and at top natural ground level (RC3 beside the wetlands and RC8 near the motorway and the most easterly on-site MW). Once base data is collated, Hydro-G converts the recorded 'depth to water' at each BH to elevations above sea level to enable direct comparison of trends across all monitoring points.

As presented last year, given the amount of data collected since 2018, the data are presented differently, as shown in Graph 1, because it enables a clearer presentation over time. The data demonstrates that there is very little change over time in groundwater levels at any monitoring point.

With respect to groundwater elevations for each Monitoring Location, as seen in Graph 1, the most left hand vertical bar (blue coloured bar) is for February 2018 and the most right hand bar (orange coloured bar) at each location is February 2025. It is observed that the differences are minor, can be explained by differences in recharge, and in most cases water elevations in the wells are higher up in the wells (closer to the ground) than in January 2022, for example.



Graph 1 Local Groundwater Monitoring Elevations (m OD) – 2018 to 2025.

CLOSING STATEMENT: There have been no significant or unexplainable changes in groundwater level since 2018. Any observed changes were temporal and when January 2024 and February 2025 data are compared, water level results are similar. The most telling, and stable Groundwater Monitoring Point is RC8, which is between the Quarry and the River Nore. RC8 shows that the operation of the quarry has not caused any decline in groundwater levels in landscape between the quarry and the River Nore. Similarly, for the Hughes, Waslough Pump and Whites' Monitoring Points, each of which are currently not in use for user specific reasons, groundwater elevations in the wells are essentially the same now as when monitoring began in 2018.

Pamela Bartley

Dr. Pamela Bartley B.Eng, M.Sc., Ph.D

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4. Greenfield Application SI BHs.

Contents

1. Water Chapter related Summary Table with details for 7 no. Boreholes drilled in 2024 in the proposed Greenfield application area, installed with Piezometers and Dataloggers recording water level continuously.
2. Map showing locations of those 7 no. Boreholes drilled in 2024.

NOTE: REFER TO Lands, Soils & Geology Chapter's Appendices for Petersen Drilling BH Logs and each BH's Installation Details ('Standpipe Installations') for those 7 no. Boreholes drilled in 2024.

RECEIVED: 18/08/2025

Table 1 Petersen Drilling 2024 – Proposed Greenfield Extension Area (refer to Map, Drilling Records and Installation Details Over

2024 Drill Target ID	Location Target	2024 Drill Target ID	Grid Ref Easting	Grid Ref Northing	Surveyed Ground Elevation (m OD)	Drill Target Elevation (m OD)	Drill TARGET Depth (m)	Actual Drilled Depth (m)	Actual Base Elevation (m OD)	Water Seeps (Strike) Depth Information (m bgl)	Water Seeps (Strike) Elevation Information (m OD)	Install Details (See Petersen StandPipe Detail)	Water Level 1mth after Drilling (m bcl) 23/10/24	Water Elevation 1mth after Drilling (m OD) 23/10/24
SP1_24	northern boundary of greenfield (Apex 2018 Phase 2 Report)	SP1_24	653857.9	650249.3	63.3	25	38	48	15	19m and 31m: seepages only. Dry on Installation.	Seeps at 44m OD and 32m OD.	50mm Piezo	32.64	30.6
SP2(c)_24	To find Fault. Drilled 2(a) and 2(b) & Limestone at surface = Not in FAULT. Moved to SP2(c) and have found the Fault.	SP2_24	654053	649983.5	60.2	25	35	37	24	small seep at base of BH @ 36m bgl	24m OD	50mm Piezo	33.51	26.7
SP3_24	To find Fault	SP3_24	653812.2	649977.8	67.9	25	43	43	25	small seep at 37m bgl	31m OD	50mm Piezo	39.79	28.1
SP4_24	Greenfield north field: southern boundary with wall of operational quarry.	SP4_24	653954.4	649852.7	60.8	25	36	36	25	water not encountered during drilling SP4, SP5, SP6 or SP7. If seep is small, air of hammer masks it.		50mm Piezo	33.58	27.2
SP5_24	Central in proposed Greenfield Application Area. Northern part of the Forestry.	SP5_24	653781.6	649628	68.3	25	43	43	25			50mm Piezo	33.28	35.0
SP6_24	This is a westerly MP outside the proposed Greenfield Application Area.	SP6_24	653285.8	649483.7	76.3	25	51	51	25			50mm Piezo	48.53	27.8
SP7_24	This is a M9 MP outside the proposed Greenfield Application Area.	SP7_24	653764.9	649186.5	71.2	25	46	42	29			50mm Piezo	30.07	41.1



5. Greenfield Application Groundwater Quality.

Summary Table and Certs of Analysis

Table 1 Greenfield Groundwater Quality Hydrochemistry – General

	BHP Ref. No.	25/04/2251	25/06/0310	25/04/2251	25/06/0310	Groundwater Regulations (2010, as Amended 2016) Threshold Value	BBL 2025 Greenfield Average Groundwater Concentration	Hydro-G Comment
	Date Sampled	09/04/2025	03/06/2025	09/04/2025	03/06/2025			
Test	Units	Greenfield Wall - South	Greenfield Wall - South	B3G Seep - Greenfield Wall -North	B3G Seep - Greenfield Wall -North			
pH - Field	pH Units	7.27	7.75	6.65	7.40	not specified	7.27	neutral pH
Conductivity (25°C) - Field	µS/cm	847	818	773	772	800 - 1875	803	expected, normal EC
Total Organic Carbon	mg/L	2.2	3.8	2.5	2.7	not specified	2.8	2.8 mg/l TOC = Groundwater
B.O.D.	mg/L	0.10	0.3	0.60	0.5	not specified	0.4	VERY Low BOD = Good
C.O.D.	mg/L	<15	18	<15	<15	not specified	<15	<LOD COD =Good
Total Ammonia (as N)	mg/L	0.082	<0.05	<0.05	<0.05	0.065 to 0.175	<0.05	Compliant
Ionised Ammonium (as NH ₄)	mg/L	0.11	<0.064	<0.064	<0.064	not specified	<0.064	<LOD
Nitrate (as NO ₃)	mg/L	29	25	32	31	37.5	29	Compliant NO3 (entire region high)
Nitrate (as NO ₃ -N)	mg/L	7	6	7	7	not specified	7	
Nitrite (as NO ₂)	mg/L	<0.1	<0.1	<0.1	<0.1	0.375	<0.1	Compliant
OrthoPhosphate (as P)	mg/L	<0.01	<0.01	0.038	0.036	0.035	0.029	elevated P in northern field, <LOD in Southern field. Average = Compliant
Chloride (as Cl ⁻)	mg/L	67	88	26	28	24 — 187.5	52	Compliant
Total Hardness (as CaCO ₃)	mg/L	325	260	374	364	not specified	331	Hard Water = usual Limestone
Potassium (Total as K)	mg/L	<5	<5	<5	<5	not specified	<5	<LOD
Sodium (Total as Na)	mg/L	32	51	10	<10	not specified	31	low Sodium
Sulphate (as SO ₄ ²⁻)	mg/L	12	12	13	14	187.5	13	low and compliant
Total Petroleum Hydrocarbons (>C ₆ -C ₄₀)	mg/L	<0.01	<0.01	<0.01	<0.01	not specified	<0.01	<LOD hydrocarbons = compliant
Mineral Oils (>C ₁₀ -C ₄₀)	mg/L	<0.01	<0.01	<0.01	<0.01	not specified	<0.01	<LOD Mineral Oils
Total Suspended Solids	mg/L	<5	60	<5	<10	not specified	60	SS not relevant to GW
Total of 17 PAHs	mg/L	<0.002	<0.002	<0.002	<0.0001	0.000075	<0.0001	PAHs = <LOD = compliant

General Comment = Very Good Water Quality apart from elevated Nutrients, which is the regional situation.

Table 2 Greenfield Groundwater Quality: Metals & Organics

Test	Units	BHP Ref. No.	25/04/2251	25/06/0310	25/04/2251	25/06/0310	Groundwater Regulations (2010, as Amended 2016) Threshold Value	BBL 2025 Greenfield Average Groundwater Concentration	Hydro-G Comment
		Date Sampled	09/04/2025	03/06/2025	09/04/2025	03/06/2025			
			Wall - South	Wall - South	Greenfield Wall -North	Greenfield Wall -North			
Aluminium (Total as Al)	mg/L		<0.05	0.12	<0.05	<0.05	<0.05	<0.05	Compliant
Calcium (Total as Ca)	mg/L		135	107	134	125	not specified	125	usual Limestone signal = OK
Chromium (Total as Cr)	mg/L		<0.005	<0.005	<0.005	<0.005	0.0375	<0.005	Compliant
Copper (Total as Cu)	mg/L		<0.025	<0.025	<0.025	<0.025	not specified	<0.025	< LOD = Compliant
Iron (Total as Fe)	mg/L		<0.05	0.087	<0.05	<0.05	not specified	<0.05	< LOD = Compliant
Magnesium (Total as Mg)	mg/L		10	8.0	18	17.0	not specified	13.3	< LOD = Compliant
Manganese (Total as Mn)	mg/L		<0.01	0.012	<0.01	<0.01	not specified	<0.01	< LOD = Compliant
Lead (Total as Pb)	mg/L		<0.025	<0.025	<0.025	<0.025	0.0075	<0.025	< LOD = Compliant
Nickel (Total as Ni)	mg/L		<0.01	<0.01	<0.01	<0.01	not specified	<0.01	< LOD = Compliant
Zinc (Total as Zn)	mg/L		<0.025	<0.025	<0.025	<0.025	0.075	<0.025	< LOD = Compliant
Arsenic (Total as As)	mg/L		<0.0025	<0.0025	<0.0025	<0.0025	0.0075	<0.0025	< LOD = Compliant
Naphthalene	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	not specified	<0.0001	< LOD = Compliant
Acenaphthylene	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	not specified	<0.0001	< LOD = Compliant
Acenaphthene	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	not specified	<0.0001	< LOD = Compliant
Fluorene	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	not specified	<0.0001	< LOD = Compliant
Phenanthrene	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	not specified	<0.0001	< LOD = Compliant
Anthracene	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	not specified	<0.0001	< LOD = Compliant
Fluoranthene	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	not specified	<0.0001	< LOD = Compliant
Pyrene	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	not specified	<0.0001	< LOD = Compliant
Benzo[a]anthracene	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	not specified	<0.0001	< LOD = Compliant
Chrysene	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	not specified	<0.0001	< LOD = Compliant
Benzo[b]fluoranthene	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	not specified	<0.0001	< LOD = Compliant
Benzo[k]fluoranthene	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	not specified	<0.0001	< LOD = Compliant
Benzo[a]pyrene	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	0.0000075	<0.0001	< LOD = Compliant
Indeno(1,2,3-c,d)Pyrene	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	not specified	<0.0001	< LOD = Compliant
Dibenz(a,h)Anthracene	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	not specified	<0.0001	< LOD = Compliant
Benzo[g,h,i]perylene	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	not specified	<0.0001	< LOD = Compliant
Coronene	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	not specified	<0.0001	< LOD = Compliant
Benzene	mg/L		<0.001	<0.001	<0.001	<0.001	0.00075	<0.001	< LOD = Compliant
Toluene	mg/L		<0.001	<0.001	<0.001	<0.001	0.525	<0.001	< LOD = Compliant
Ethyl Benzene	mg/L		<0.001	<0.001	<0.001	<0.001	not specified	<0.001	< LOD = Compliant
m & p-Xylene	mg/L		<0.001	<0.001	<0.001	<0.001	not specified	<0.001	< LOD = Compliant
o-Xylene	mg/L		<0.001	<0.001	<0.001	<0.001	not specified	<0.001	< LOD = Compliant

TEST REPORT NO: 311913 .5**Client: Bennettsbridge Limestone Q**

Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 25/04/2254
Quote Ref: QM020101
Order No: N/A
Sales Order: 248798
Date Received: 09/04/2025
Date Sampled: 09/04/2025
Date Completed: 26/04/2025
Sample Type: Bore



**Testing
Analysing
Consulting**



BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie

FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly Bore****Client Ref: Greenfield Wall - South**

Test	Units	Results	Customer Limits	Date Analysed	Method
Total Ammonia (as N)	mg/L	0.082	Not Given	14/04/2025	BHP AC 095
Ionised Ammonium (as NH ₄)	mg/L	0.11	Not Given	14/04/2025	BHP AC 095
Chloride (as Cl ⁻)	mg/L	67	Not Given	11/04/2025	BHP AC 095
C.O.D.	mg/L	<15	Not Given	15/04/2025	BHP AC 006
Total Hardness (as CaCO ₃)	mg/L	325	Not Given	11/04/2025	BHP AC 095
Nitrate (as NO ₃)	mg/L	29	Not Given	18/04/2025	BHP AC 019
Nitrite (as NO ₂)	mg/L	<0.1	Not Given	23/04/2025	BHP AC 019
OrthoPhosphate (as P)	mg/L	<0.01	Not Given	16/04/2025	BHP AC 095
Sulphate (as SO ₄ ²⁻)	mg/L	12	Not Given	11/04/2025	BHP AC 095
Total Suspended Solids	mg/L	<5	Not Given	16/04/2025	BHP AC 012
Total Petroleum Hydrocarbons (>C ₆ -C ₄₀)	mg/L	<0.01	Not Given	15/04/2025	1670
Mineral Oils (>C ₁₀ -C ₄₀)	mg/L	<0.01	Not Given	15/04/2025	1670
Aluminium (Total as Al)	mg/L	<0.05	Not Given	17/04/2025	BHP AC 224
Calcium (Total as Ca)	mg/L	135	Not Given	17/04/2025	BHP AC 224

Authorised by:
Dervla Purcell**Date Authorised:** 05/05/2025**Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised**~ :** Sample Condition : ACCEPTABLE

This test report shall not be duplicated except in full and then only with the permission of the test laboratory.

Results apply only to the sample tested and where the laboratory is not responsible for sampling, result apply to the sample as received.

Information identifying the 'Client', 'FTAO', 'Site', 'Client Ref', 'Order No' and 'Date Sampled' where BHP have not taken the sample has been supplied by the customer.

Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 311913 .5**Client: Bennettsbridge Limestone Q**

Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 25/04/2254
Quote Ref: QM020101
Order No: N/A
Sales Order: 248798
Date Received: 09/04/2025
Date Sampled: 09/04/2025
Date Completed: 26/04/2025
Sample Type: Bore



Testing
Analysing
Consulting



BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie

FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly Bore****Client Ref: Greenfield Wall - South**

Test	Units	Results	Customer Limits	Date Analysed	Method
Chromium (Total as Cr)	mg/L	<0.005	Not Given	17/04/2025	BHP AC 224
Copper (Total as Cu)	mg/L	<0.025	Not Given	17/04/2025	BHP AC 224
Iron (Total as Fe)	mg/L	<0.05	Not Given	17/04/2025	BHP AC 224
Magnesium (Total as Mg)	mg/L	10	Not Given	17/04/2025	BHP AC 224
Manganese (Total as Mn)	mg/L	<0.01	Not Given	17/04/2025	BHP AC 224
Lead (Total as Pb)	mg/L	<0.025	Not Given	17/04/2025	BHP AC 224
Nickel (Total as Ni)	mg/L	<0.01	Not Given	17/04/2025	BHP AC 224
Potassium (Total as K)	mg/L	<5	Not Given	17/04/2025	BHP AC 224
Sodium (Total as Na)	mg/L	32	Not Given	17/04/2025	BHP AC 224
Zinc (Total as Zn)	mg/L	<0.025	Not Given	17/04/2025	BHP AC 224
Arsenic (Total as As)	mg/L	<0.0025	Not Given	17/04/2025	BHP AC 136
Total Organic Carbon	mg/L	2.2	Not Given	25/04/2025	BHP AC 215
pH - Field	pH Units	7.27	Not Given	09/04/2025	BHP AC 067
Conductivity (25°C) - Field	µS/cm	847	Not Given	09/04/2025	BHP AC 067

Authorised by:
Dervla Purcell**Date Authorised: 05/05/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised**~ :** Sample Condition : ACCEPTABLE

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Information identifying the 'Client', 'FTAO', 'Site', 'Client Ref', 'Order No' and 'Date Sampled' where BHP have not taken the sample has been supplied by the customer.

Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 311913 .5**Client: Bennettsbridge Limestone Q**

Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 25/04/2254
Quote Ref: QM020101
Order No: N/A
Sales Order: 248798
Date Received: 09/04/2025
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Testing
Analysing
Consulting



BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EEmail:dervlapurcell@bhp.ie

FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly Bore****Client Ref: Greenfield Wall - South**

Test	Units	Results	Customer Limits	Date Analysed	Method
Naphthalene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Acenaphthylene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Acenaphthene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Fluorene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Phenanthrene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Anthracene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Fluoranthene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Pyrene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[a]anthracene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Chrysene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[b]fluoranthene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[k]fluoranthene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[a]pyrene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Indeno(1,2,3-c,d)Pyrene *	mg/L	<0.0001	Not Given	22/04/2025	1700

Authorised by:
Dervla Purcell**Date Authorised: 05/05/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed

* Subcontracted to an approved accredited laboratory

** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

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Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 311913 .5**Client: Bennettsbridge Limestone Q**

Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 25/04/2254
Quote Ref: QM020101
Order No: N/A
Sales Order: 248798
Date Received: 09/04/2025
Date Sampled: 09/04/2025
Date Completed: 26/04/2025
Sample Type: Bore



**Testing
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 EMail: dervlapurcell@bhp.ie

FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly Bore****Client Ref: Greenfield Wall - South**

Test	Units	Results	Customer Limits	Date Analysed	Method
Dibenz(a,h)Anthracene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[g,h,i]perylene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Coronene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Total of 17 PAHs *	mg/L	<0.002	Not Given	22/04/2025	1700
Benzene *	mg/L	<0.001	Not Given	26/04/2025	1760
Toluene *	mg/L	<0.001	Not Given	26/04/2025	1760
Ethyl Benzene *	mg/L	<0.001	Not Given	26/04/2025	1760
m & p-Xylene *	mg/L	<0.001	Not Given	26/04/2025	1760
o-Xylene *	mg/L	<0.001	Not Given	26/04/2025	1760
B.O.D. Acc.	mg/L	0.10	Not Given	10/04/2025	BHP AC 005

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TEST REPORT NO: 311913 .3**Client: Bennettsbridge Limestone Q**

Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 25/04/2252
Quote Ref: QM020101
Order No: N/A
Sales Order: 248798
Date Received: 09/04/2025
Date Sampled: 09/04/2025
Date Completed: 26/04/2025
Sample Type: Bore



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FTAO: Mark Galvin
Site: Quarry Environmental Monitoring
BHP Ref: Monthly Bore
Client Ref: B3G - Greenfield Wall North

Test	Units	Results	Customer Limits	Date Analysed	Method
Total Ammonia (as N) Acc.	mg/L	<0.05	Not Given	14/04/2025	BHP AC 095
Ionised Ammonium (as NH ₄) Acc.	mg/L	<0.064	Not Given	14/04/2025	BHP AC 095
Chloride (as Cl ⁻) Acc.	mg/L	26	Not Given	11/04/2025	BHP AC 095
C.O.D.	mg/L	<15	Not Given	15/04/2025	BHP AC 006
Total Hardness (as CaCO ₃) Acc.	mg/L	374	Not Given	11/04/2025	BHP AC 095
Nitrate (as NO ₃)	mg/L	32	Not Given	18/04/2025	BHP AC 019
Nitrite (as NO ₂)	mg/L	<0.1	Not Given	23/04/2025	BHP AC 019
OrthoPhosphate (as P) Acc.	mg/L	0.038	Not Given	16/04/2025	BHP AC 095
Sulphate (as SO ₄ ²⁻) Acc.	mg/L	13	Not Given	11/04/2025	BHP AC 095
Total Suspended Solids	mg/L	<5	Not Given	16/04/2025	BHP AC 012
Total Petroleum Hydrocarbons (>C ₆ -C ₄₀) *	mg/L	<0.01	Not Given	15/04/2025	1670
Mineral Oils (>C ₁₀ -C ₄₀) *	mg/L	<0.01	Not Given	15/04/2025	1670
Aluminium (Total as Al)	mg/L	<0.05	Not Given	17/04/2025	BHP AC 224
Calcium (Total as Ca)	mg/L	134	Not Given	17/04/2025	BHP AC 224

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TEST REPORT NO: 311913 .3

Client: Bennettsbridge Limestone Q
 Kilree
 Sheastown
 Bennettsbridge
 Co. Kilkenny

BHP Ref. No: 25/04/2252
Quote Ref: QM020101
Order No: N/A
Sales Order: 248798
Date Received: 09/04/2025
Date Sampled: 09/04/2025
Date Completed: 26/04/2025
Sample Type: Bore



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FTAO: Mark Galvin
Site: Quarry Environmental Monitoring
BHP Ref: Monthly Bore
Client Ref: B3G - Greenfield Wall North

Test	Units	Results	Customer Limits	Date Analysed	Method
Chromium (Total as Cr)	mg/L	<0.005	Not Given	17/04/2025	BHP AC 224
Copper (Total as Cu)	mg/L	<0.025	Not Given	17/04/2025	BHP AC 224
Iron (Total as Fe)	mg/L	<0.05	Not Given	17/04/2025	BHP AC 224
Magnesium (Total as Mg)	mg/L	18	Not Given	17/04/2025	BHP AC 224
Manganese (Total as Mn)	mg/L	<0.01	Not Given	17/04/2025	BHP AC 224
Lead (Total as Pb)	mg/L	<0.025	Not Given	17/04/2025	BHP AC 224
Nickel (Total as Ni)	mg/L	<0.01	Not Given	17/04/2025	BHP AC 224
Potassium (Total as K)	mg/L	<5	Not Given	17/04/2025	BHP AC 224
Sodium (Total as Na)	mg/L	10	Not Given	17/04/2025	BHP AC 224
Zinc (Total as Zn)	mg/L	<0.025	Not Given	17/04/2025	BHP AC 224
Arsenic (Total as As)	mg/L	<0.0025	Not Given	17/04/2025	BHP AC 136
Total Organic Carbon	mg/L	2.5	Not Given	25/04/2025	BHP AC 215
pH - Field	pH Units	6.65	Not Given	09/04/2025	BHP AC 067
Conductivity (25°C) - Field	µS/cm	773	Not Given	09/04/2025	BHP AC 067

Authorised by:

Dervla Purcell

Date Authorised: 05/05/2025

Laboratory Manager

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TEST REPORT NO: 311913 .3**Client: Bennettsbridge Limestone Q**

Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 25/04/2252
Quote Ref: QM020101
Order No: N/A
Sales Order: 248798
Date Received: 09/04/2025
Date Sampled: 09/04/2025
Date Completed: 26/04/2025
Sample Type: Bore



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FTAO: Mark Galvin
Site: Quarry Environmental Monitoring
BHP Ref: Monthly Bore
Client Ref: B3G - Greenfield Wall North

Test	Units	Results	Customer Limits	Date Analysed	Method
Naphthalene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Acenaphthylene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Acenaphthene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Fluorene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Phenanthrene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Anthracene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Fluoranthene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Pyrene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[a]anthracene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Chrysene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[b]fluoranthene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[k]fluoranthene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[a]pyrene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Indeno(1,2,3-c,d)Pyrene *	mg/L	<0.0001	Not Given	22/04/2025	1700

Authorised by:
Dervla Purcell**Date Authorised:** 05/05/2025**Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed

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Sheastown
Bennettsbridge
Co. Kilkenny

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Quote Ref: QM020101
Order No: N/A
Sales Order: 248798
Date Received: 09/04/2025
Date Sampled: 09/04/2025
Date Completed: 26/04/2025
Sample Type: Bore



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FTAO: Mark Galvin
Site: Quarry Environmental Monitoring
BHP Ref: Monthly Bore
Client Ref: B3G - Greenfield Wall North

Test	Units	Results	Customer Limits	Date Analysed	Method
Dibenz(a,h)Anthracene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[g,h,i]perylene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Coronene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Total of 17 PAHs *	mg/L	<0.002	Not Given	22/04/2025	1700
Benzene *	mg/L	<0.001	Not Given	26/04/2025	1760
Toluene *	mg/L	<0.001	Not Given	26/04/2025	1760
Ethyl Benzene *	mg/L	<0.001	Not Given	26/04/2025	1760
m & p-Xylene *	mg/L	<0.001	Not Given	26/04/2025	1760
o-Xylene *	mg/L	<0.001	Not Given	26/04/2025	1760
B.O.D. Acc.	mg/L	0.60	Not Given	10/04/2025	BHP AC 005

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TEST REPORT NO: 316029 .6**Client: Bennettsbridge Limestone Q****Kilree****Sheastown****Bennettsbridge****Co. Kilkenny**

BHP Ref. No: 25/06/0314
Quote Ref: QM020406
Order No: Not Required
Sales Order: 254151
Date Received: 03/06/2025
Date Sampled: 03/06/2025
Date Completed: 27/06/2025
Sample Type: Bore



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Limerick
Tel: +353 61 455399
EMail: dervlapurcell@bhp.ie

FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly_Bore****Client Ref: Greenfield Wall - South**

Test	Units	Results	Customer Limits	Date Analysed	Method
Total Ammonia (as N) Acc.	mg/L	<0.05	Not Given	10/06/2025	BHP AC 095
Ionised Ammonium (as NH ₄) Acc.	mg/L	<0.064	Not Given	10/06/2025	BHP AC 095
Chloride (as Cl ⁻) Acc.	mg/L	88	Not Given	17/06/2025	BHP AC 095
C.O.D.	mg/L	18	Not Given	11/06/2025	BHP AC 006
Total Hardness (as CaCO ₃) Acc.	mg/L	260	Not Given	06/06/2025	BHP AC 095
Nitrate (as NO ₃)	mg/L	25	Not Given	04/06/2025	BHP AC 019
Nitrite (as NO ₂)	mg/L	<0.1	Not Given	04/06/2025	BHP AC 019
OrthoPhosphate (as P) Acc.	mg/L	<0.01	Not Given	06/06/2025	BHP AC 095
Sulphate (as SO ₄ ²⁻) Acc.	mg/L	12	Not Given	04/06/2025	BHP AC 095
Total Suspended Solids	mg/L	60	Not Given	06/06/2025	BHP AC 012
Total Petroleum Hydrocarbons (>C ₆ -C ₄₀) *	mg/L	<0.01	Not Given	16/06/2025	1670
Mineral Oils (>C ₁₀ -C ₄₀) *	mg/L	<0.01	Not Given	16/06/2025	1670
Aluminium (Total as Al)	mg/L	0.12	Not Given	23/06/2025	BHP AC 224

Authorised by:
Dervla Purcell**Date Authorised: 03/07/2025****Laboratory Manager**

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TEST REPORT NO: 316029 .6**Client: Bennettsbridge Limestone Q**

**Kilree
Sheastown
Bennettsbridge
Co. Kilkenny**

**BHP Ref. No: 25/06/0314
Quote Ref: QM020406
Order No: Not Required
Sales Order: 254151
Date Received: 03/06/2025
Date Sampled: 03/06/2025
Date Completed: 27/06/2025
Sample Type: Bore**



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EMail: dervlapurcell@bhp.ie**

**FTAO: Mark Galvin
Site: Quarry Environmental Monitoring
BHP Ref: Monthly_Bore
Client Ref: Greenfield Wall - South**

Test	Units	Results	Customer Limits	Date Analysed	Method
Calcium (Total as Ca)	mg/L	107	Not Given	23/06/2025	BHP AC 224
Chromium (Total as Cr)	mg/L	<0.005	Not Given	23/06/2025	BHP AC 224
Copper (Total as Cu)	mg/L	<0.025	Not Given	23/06/2025	BHP AC 224
Iron (Total as Fe)	mg/L	0.087	Not Given	23/06/2025	BHP AC 224
Magnesium (Total as Mg)	mg/L	8.0	Not Given	23/06/2025	BHP AC 224
Manganese (Total as Mn)	mg/L	0.012	Not Given	27/06/2025	BHP AC 224
Lead (Total as Pb)	mg/L	<0.025	Not Given	23/06/2025	BHP AC 224
Nickel (Total as Ni)	mg/L	<0.01	Not Given	23/06/2025	BHP AC 224
Potassium (Total as K)	mg/L	<5	Not Given	23/06/2025	BHP AC 224
Sodium (Total as Na)	mg/L	51	Not Given	23/06/2025	BHP AC 224
Zinc (Total as Zn)	mg/L	<0.025	Not Given	23/06/2025	BHP AC 224
Arsenic (Total as As)	mg/L	<0.0025	Not Given	11/06/2025	BHP AC 132
Total Organic Carbon	mg/L	3.8	Not Given	16/06/2025	BHP AC 215

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Dervla Purcell**Date Authorised: 03/07/2025****Laboratory Manager**

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Sheastown
Bennettsbridge
Co. Kilkenny

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Quote Ref: QM020406
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Sales Order: 254151
Date Received: 03/06/2025
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Date Completed: 27/06/2025
Sample Type: Bore



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FTAO: Mark Galvin
Site: Quarry Environmental Monitoring
BHP Ref: Monthly_Bore
Client Ref: Greenfield Wall - South

Test	Units	Results	Customer Limits	Date Analysed	Method
pH	Acc.	-	7.75	04/06/2025	BHP AC 217
Conductivity (25°C)	Acc.	µS/cm	818	04/06/2025	BHP AC 217
Naphthalene	*	mg/L	<0.0001	11/06/2025	1700
Acenaphthylene	*	mg/L	<0.0001	11/06/2025	1700
Acenaphthene	*	mg/L	<0.0001	11/06/2025	1700
Fluorene	*	mg/L	<0.0001	11/06/2025	1700
Phenanthrene	*	mg/L	<0.0001	11/06/2025	1700
Anthracene	*	mg/L	<0.0001	11/06/2025	1700
Fluoranthene	*	mg/L	<0.0001	11/06/2025	1700
Pyrene	*	mg/L	<0.0001	11/06/2025	1700
Benzo[a]anthracene	*	mg/L	<0.0001	11/06/2025	1700
Chrysene	*	mg/L	<0.0001	11/06/2025	1700
Benzo[b]fluoranthene	*	mg/L	<0.0001	11/06/2025	1700

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Dervla Purcell**Date Authorised:** 03/07/2025**Laboratory Manager**

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BHP Ref. No: 25/06/0314
Quote Ref: QM020406
Order No: Not Required
Sales Order: 254151
Date Received: 03/06/2025
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Tel: +353 61 455399
EMail: dervlapurcell@bhp.ie

FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly_Bore****Client Ref: Greenfield Wall - South**

Test	Units	Results	Customer Limits	Date Analysed	Method
Benzo[k]fluoranthene *	mg/L	<0.0001	Not Given	11/06/2025	1700
Benzo[a]pyrene *	mg/L	<0.0001	Not Given	11/06/2025	1700
Indeno(1,2,3-c,d)Pyrene *	mg/L	<0.0001	Not Given	11/06/2025	1700
Dibenz(a,h)Anthracene *	mg/L	<0.0001	Not Given	11/06/2025	1700
Benzo[g,h,i]perylene *	mg/L	<0.0001	Not Given	11/06/2025	1700
Coronene *	mg/L	<0.0001	Not Given	12/06/2025	1700
Total of 17 PAHs *	mg/L	<0.002	Not Given	12/06/2025	1700
Benzene *	mg/L	<0.001	Not Given	24/06/2025	1760
Toluene *	mg/L	<0.001	Not Given	24/06/2025	1760
Ethyl Benzene *	mg/L	<0.001	Not Given	24/06/2025	1760
m & p-Xylene *	mg/L	<0.001	Not Given	24/06/2025	1760
o-Xylene *	mg/L	<0.001	Not Given	24/06/2025	1760
B.O.D. Acc.	mg/L	0.3	Not Given	05/06/2025	BHP AC 005

Authorised by:
Dervla Purcell**Date Authorised: 03/07/2025****Laboratory Manager**

Additional Information:(Opinions, where stated, are not covered by accreditation)

Acc.: INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

Sample Condition : ACCEPTABLE

~ :

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Information identifying the 'Client', 'FTAO', 'Site', 'Client Ref', 'Order No' and 'Date Sampled' where BHP have not taken the sample has been supplied by the customer.

Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 316029 .6**Client: Bennettsbridge Limestone Q****Kilree****Sheastown****Bennettsbridge****Co. Kilkenny**

BHP Ref. No: 25/06/0314
Quote Ref: QM020406
Order No: Not Required
Sales Order: 254151
Date Received: 03/06/2025
Date Sampled: 03/06/2025
Date Completed: 27/06/2025
Sample Type: Bore



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BHP Laboratories**New Road****Thomondgate****Limerick****Tel: +353 61 455399****EMail: dervlapurcell@bhp.ie****FTAO: Mark Galvin****Site: Quarry Environmental Monitoring****BHP Ref: Monthly_Bore****Client Ref: Greenfield Wall - South**

Test	Units	Results	Customer Limits	Date Analysed	Method
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Authorised by:
Dervla Purcell**Date Authorised: 03/07/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

Sample Condition : ACCEPTABLE

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Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 316029 .3**Client: Bennettsbridge Limestone Q****Kilree****Sheastown****Bennettsbridge****Co. Kilkenny**

BHP Ref. No: 25/06/0311
Quote Ref: QM020406
Order No: Not Required
Sales Order: 254151
Date Received: 03/06/2025
Date Sampled: 03/06/2025
Date Completed: 27/06/2025
Sample Type: Bore



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EMail: dervlapurcell@bhp.ie

FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly_Bore****Client Ref: B3G - Greenfield Wall North**

Test	Units	Results	Customer Limits	Date Analysed	Method
Total Ammonia (as N)	Acc.	mg/L	<0.05	10/06/2025	BHP AC 095
Ionised Ammonium (as NH ₄)	Acc.	mg/L	<0.064	10/06/2025	BHP AC 095
Chloride (as Cl ⁻)	Acc.	mg/L	28	17/06/2025	BHP AC 095
C.O.D.		mg/L	<15	11/06/2025	BHP AC 006
Total Hardness (as CaCO ₃)	Acc.	mg/L	364	06/06/2025	BHP AC 095
Nitrate (as NO ₃)		mg/L	31	04/06/2025	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.1	04/06/2025	BHP AC 019
OrthoPhosphate (as P)	Acc.	mg/L	0.036	06/06/2025	BHP AC 095
Sulphate (as SO ₄ ²⁻)	Acc.	mg/L	14	04/06/2025	BHP AC 095
Total Suspended Solids		mg/L	<10	06/06/2025	BHP AC 012
Total Petroleum Hydrocarbons (>C ₆ -C ₄₀)	*	mg/L	<0.01	16/06/2025	1670
Mineral Oils (>C ₁₀ -C ₄₀)	*	mg/L	<0.01	16/06/2025	1670
Aluminium (Total as Al)		mg/L	<0.05	23/06/2025	BHP AC 224

Authorised by:
Dervla Purcell**Date Authorised: 03/07/2025****Laboratory Manager**

Additional Information:(Opinions, where stated, are not covered by accreditation)

Acc.: INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

Sample Condition : ACCEPTABLE

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Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 316029 .3**Client: Bennettsbridge Limestone Q****Kilree****Sheastown****Bennettsbridge****Co. Kilkenny**

BHP Ref. No: 25/06/0311
Quote Ref: QM020406
Order No: Not Required
Sales Order: 254151
Date Received: 03/06/2025
Date Sampled: 03/06/2025
Date Completed: 27/06/2025
Sample Type: Bore



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FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly_Bore****Client Ref: B3G - Greenfield Wall North**

Test	Units	Results	Customer Limits	Date Analysed	Method
Calcium (Total as Ca)	mg/L	125	Not Given	23/06/2025	BHP AC 224
Chromium (Total as Cr)	mg/L	<0.005	Not Given	23/06/2025	BHP AC 224
Copper (Total as Cu)	mg/L	<0.025	Not Given	23/06/2025	BHP AC 224
Iron (Total as Fe)	mg/L	<0.05	Not Given	23/06/2025	BHP AC 224
Magnesium (Total as Mg)	mg/L	17	Not Given	23/06/2025	BHP AC 224
Manganese (Total as Mn)	mg/L	<0.01	Not Given	27/06/2025	BHP AC 224
Lead (Total as Pb)	mg/L	<0.025	Not Given	23/06/2025	BHP AC 224
Nickel (Total as Ni)	mg/L	<0.01	Not Given	23/06/2025	BHP AC 224
Potassium (Total as K)	mg/L	<5	Not Given	23/06/2025	BHP AC 224
Sodium (Total as Na)	mg/L	<10	Not Given	23/06/2025	BHP AC 224
Zinc (Total as Zn)	mg/L	<0.025	Not Given	23/06/2025	BHP AC 224
Arsenic (Total as As)	mg/L	<0.0025	Not Given	11/06/2025	BHP AC 132
Total Organic Carbon	mg/L	2.7	Not Given	16/06/2025	BHP AC 215

Authorised by:
Dervla Purcell**Date Authorised: 03/07/2025****Laboratory Manager**

Additional Information:(Opinions, where stated, are not covered by accreditation)

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TEST REPORT NO: 316029 .3**Client: Bennettsbridge Limestone Q****Kilree****Sheastown****Bennettsbridge****Co. Kilkenny**

BHP Ref. No: 25/06/0311
Quote Ref: QM020406
Order No: Not Required
Sales Order: 254151
Date Received: 03/06/2025
Date Sampled: 03/06/2025
Date Completed: 27/06/2025
Sample Type: Bore



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EMail: dervlapurcell@bhp.ie

FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly_Bore****Client Ref: B3G - Greenfield Wall North**

Test	Units	Results	Customer Limits	Date Analysed	Method
pH	Acc.	-	7.40	04/06/2025	BHP AC 217
Conductivity (25°C)	Acc.	µS/cm	772	04/06/2025	BHP AC 217
Naphthalene	*	mg/L	<0.0001	11/06/2025	1700
Acenaphthylene	*	mg/L	<0.0001	11/06/2025	1700
Acenaphthene	*	mg/L	<0.0001	11/06/2025	1700
Fluorene	*	mg/L	<0.0001	11/06/2025	1700
Phenanthrene	*	mg/L	<0.0001	11/06/2025	1700
Anthracene	*	mg/L	<0.0001	11/06/2025	1700
Fluoranthene	*	mg/L	<0.0001	11/06/2025	1700
Pyrene	*	mg/L	<0.0001	11/06/2025	1700
Benzo[a]anthracene	*	mg/L	<0.0001	11/06/2025	1700
Chrysene	*	mg/L	<0.0001	11/06/2025	1700
Benzo[b]fluoranthene	*	mg/L	<0.0001	11/06/2025	1700

Authorised by:
Dervla Purcell**Date Authorised: 03/07/2025****Laboratory Manager**

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BHP Ref. No: 25/06/0311
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Date Received: 03/06/2025
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Date Completed: 27/06/2025
Sample Type: Bore



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FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly_Bore****Client Ref: B3G - Greenfield Wall North**

Test	Units	Results	Customer Limits	Date Analysed	Method
Benzo[k]fluoranthene *	mg/L	<0.0001	Not Given	11/06/2025	1700
Benzo[a]pyrene *	mg/L	<0.0001	Not Given	11/06/2025	1700
Indeno(1,2,3-c,d)Pyrene *	mg/L	<0.0001	Not Given	11/06/2025	1700
Dibenz(a,h)Anthracene *	mg/L	<0.0001	Not Given	11/06/2025	1700
Benzo[g,h,i]perylene *	mg/L	<0.0001	Not Given	11/06/2025	1700
Coronene *	mg/L	<0.0001	Not Given	12/06/2025	1700
Total of 17 PAHs *	mg/L	<0.0001	Not Given	12/06/2025	1700
Benzene *	mg/L	<0.001	Not Given	24/06/2025	1760
Toluene *	mg/L	<0.001	Not Given	24/06/2025	1760
Ethyl Benzene *	mg/L	<0.001	Not Given	24/06/2025	1760
m & p-Xylene *	mg/L	<0.001	Not Given	24/06/2025	1760
o-Xylene *	mg/L	<0.001	Not Given	24/06/2025	1760
B.O.D. Acc.	mg/L	0.5	Not Given	05/06/2025	BHP AC 005

Authorised by:
Dervla Purcell**Date Authorised: 03/07/2025****Laboratory Manager**

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TEST REPORT NO: 316029 .3

Client: Bennettsbridge Limestone Q
Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 25/06/0311
Quote Ref: QM020406
Order No: Not Required
Sales Order: 254151
Date Received: 03/06/2025
Date Sampled: 03/06/2025
Date Completed: 27/06/2025
Sample Type: Bore



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FTAO: Mark Galvin
Site: Quarry Environmental Monitoring
BHP Ref: Monthly_Bore
Client Ref: B3G - Greenfield Wall North

Test	Units	Results	Customer Limits	Date Analysed	Method
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Authorised by:  Dervla Purcell Date Authorised: 03/07/2025

Laboratory Manager

Additional Information:(Opinions, where stated, are not covered by accreditation)

Acc.: INAB Accredited

ND: None detected in volume analysed

* Subcontracted to an approved accredited laboratory

** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

Sample Condition : ACCEPTABLE

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Sampling is outside the scope of accreditation
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6. Surface Water Quality – River Nore 2025 Data Tables Summary and Certificates of Analysis

Table 1 Hydrochemistry River Nore Upstream & Downstream – April, May, June 2025

[with Discharge Licence Check June 2025]

Bennettsbridge Limestone Surface Water Sampling: Nore Upstream and Downstream	BHP Ref	25/04/2271		25/04/2271		25/06/0301		25/06/0301	Section 4 Licence (ENV/W/78) Emission Limit Values
	Month	Apr-25		May-25		Jun-25		Jun-25	
	Sample Date	09/04/2025		13/05/2025		03/06/2025		03/06/2025	
	Sample Location (ID)	Upstream Nore	Downstream Nore	Upstream Nore	Downstream Nore	Upstream Nore	Downstream Nore	June Quarry Discharge Analysis for Licence Parameters	
Test	Units	Results	Results	Results	Results	Results	Results	Results	mg/l ELV
Total Ammonia (as N)	mg/L	<0.05	<0.05	0.054	0.057	<0.05	<0.05	<0.05	0.17
Ionised Ammonium (as NH ₄)	mg/L	<0.064	<0.064	0.069	0.073	<0.064	<0.064		
B.O.D.	mg/L	0.8	0.60	Lab QC Error		0.8	0.6	<0.1	2
Chloride (as Cl ⁻)	mg/L	28	28	30	29	29	29		
C.O.D.	mg/L	<15	<15	<15	<15	<15	<15	<15*	10
Total Hardness (as CaCO ₃)	mg/L	317	313	287	294	262	281		
Nitrate (as NO ₃)	mg/L	18	18	15	17	15	15	28 as NO ₃ (6 as NO ₃ -N)	
Nitrate as NO ₃ -N (calculated)	mg/L	4	4	3	4	3	3	6	10
Nitrite (as NO ₂)	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
OrthoPhosphate (as P)	mg/L	<0.01	<0.01	0.012	0.011	0.025	0.021	<0.01	0.07
pH - Field	pH Units	7.44	7.48	7.05	7.45	7.46	7.40	7.38	6 to 9
Sulphate (as SO ₄ ²⁻)	mg/L	20	20	19	19	19	19		
Total Suspended Solids	mg/L	<5	<5	<5	<5	<10	<10	<10	10
Total Petroleum Hydrocarbons (>C ₁₀ -C ₄₀)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.7
Mineral Oils (>C ₁₀ -C ₄₀)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	COMMENT 1: COMPLIANT DISCHARGE and NO resultant changes in Nore WQ when Upstream and Downstream results are compared.	
Aluminium (Total as Al)	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		
Calcium (Total as Ca)	mg/L	109	113	107	102	93	95	*Note the Laboratory's Limit of Detection is 15mg/l for COD. The ELV of the Licence is 10mg/l COD. However, a <LOD result is legally interpreted as being 1/2 the LOD and so the <15 mg/l COD is taken to be a 7.5 mg/l COD Result and this is compliant with the 10mg/l COD.	
Chromium (Total as Cr)	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		
Copper (Total as Cu)	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025		
Iron (Total as Fe)	mg/L	0.068	0.067	0.20	0.053	0.085	0.091		
Magnesium (Total as Mg)	mg/L	13	14	12	11.5	11	11		
Manganese (Total as Mn)	mg/L	0.013	0.012	0.020	0.016	0.023	0.023		
Lead (Total as Pb)	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025		
Nickel (Total as Ni)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Potassium (Total as K)	mg/L	<5	<5	5.3	5.0	5.1	5.0	For all parameters specified in the Surface Water Regulations (2009, as amended), the River Nore upstream and downstream are compliant: this includes BOD, Ammonia, pH and ortho-P. Suspended Solids comply with the Salmonid Regulations limit of 25mg/l and in two months the results are reported as <5mg/l and in the third month as <10mg/l.	
Sodium (Total as Na)	mg/L	14	14	17	16	14	15		
Zinc (Total as Zn)	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025		
Arsenic (Total as As)	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025		
Total Organic Carbon	mg/L	4.8	4.7	3.3	3.5	7.4	7.9		
pH - Field	pH Units	7.44	7.48	8.23	8.22	8.28	8.26		
Conductivity (25°C) - Field	µS/cm	670	661	668	666	610	628		

Table 2 Organics, BVOCs, BTEX River Nore Upstream & Downstream – April, May, June 2025.

Bennettsbridge Limestone Surface Water Sampling	BHP Ref	25/04/2271	25/04/2271	25/04/2271	25/04/2271	25/06/0301	25/06/0301
	Month	Apr-25	Apr-25	May-25	May-25	Jun-25	Jun-25
	Sample Date	09/04/2025	09/04/2025	13/05/2025	13/05/2025	03/06/2025	03/06/2025
	Sample Location (ID)	Upstream Nore	Downstream Nore	Upstream Nore	Downstream Nore	Upstream Nore	Downstream Nore
Naphthalene	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Acenaphthylene	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Acenaphthene	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Fluorene	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Phenanthrene	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Anthracene	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Fluoranthene	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Pyrene	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Benzo[a]anthracene	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chrysene	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Benzo[b]fluoranthene	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Benzo[k]fluoranthene	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Benzo[a]pyrene	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Indeno(1,2,3-c,d)Pyrene	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Dibenz(a,h)Anthracene	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Benzo[g,h,i]perylene	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Coronene	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total of 17 PAHs	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Benzene	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Toluene	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Ethyl Benzene	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
m & p-Xylene	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
o-Xylene	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

TEST REPORT NO: 311913 .1**Client: Bennettsbridge Limestone Q**

Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 25/04/2271
Quote Ref: QM020101
Order No: N/A
Sales Order: 248804
Date Received: 09/04/2025
Date Sampled: 09/04/2025
Date Completed: 26/04/2025
Sample Type: Surface Water



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BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie

FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Upstream Nore**

Test	Units	Results	Customer Limits	Date Analysed	Method
Total Ammonia (as N) Acc.	mg/L	<0.05	Not Given	14/04/2025	BHP AC 095
Ionised Ammonium (as NH ₄) Acc.	mg/L	<0.064	Not Given	14/04/2025	BHP AC 095
B.O.D. Acc.	mg/L	0.8	Not Given	10/04/2025	BHP AC 005
Chloride (as Cl ⁻) Acc.	mg/L	28	Not Given	11/04/2025	BHP AC 095
C.O.D. Acc.	mg/L	<15	Not Given	15/04/2025	BHP AC 006
Total Hardness (as CaCO ₃) Acc.	mg/L	317	Not Given	11/04/2025	BHP AC 095
Nitrate (as NO ₃)	mg/L	18	Not Given	18/04/2025	BHP AC 019
Nitrite (as NO ₂)	mg/L	<0.1	Not Given	23/04/2025	BHP AC 019
OrthoPhosphate (as P) Acc.	mg/L	<0.01	Not Given	16/04/2025	BHP AC 095
pH - Field	pH Units	7.44	Not Given	09/04/2025	BHP AC 067
Sulphate (as SO ₄ ²⁻) Acc.	mg/L	20	Not Given	11/04/2025	BHP AC 095
Total Suspended Solids Acc.	mg/L	<5	Not Given	16/04/2025	BHP AC 012
Total Petroleum Hydrocarbons (>C ₆ -C ₄₀) *	mg/L	<0.01	Not Given	15/04/2025	1670
Mineral Oils (>C ₁₀ -C ₄₀) *	mg/L	<0.01	Not Given	15/04/2025	1670

Authorised by:
Dervla Purcell**Date Authorised: 05/05/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed

* Subcontracted to an approved accredited laboratory

** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

~ : Sample Condition : ACCEPTABLE

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Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 311913 .1**Client: Bennettsbridge Limestone Q**

Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 25/04/2271
Quote Ref: QM020101
Order No: N/A
Sales Order: 248804
Date Received: 09/04/2025
Date Sampled: 09/04/2025
Date Completed: 26/04/2025
Sample Type: Surface Water



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BHP Laboratories
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Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie

FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Upstream Nore**

Test	Units	Results	Customer Limits	Date Analysed	Method
Aluminium (Total as Al) Acc.	mg/L	<0.05	Not Given	17/04/2025	BHP AC 224
Calcium (Total as Ca) Acc.	mg/L	109	Not Given	17/04/2025	BHP AC 224
Chromium (Total as Cr) Acc.	mg/L	<0.005	Not Given	17/04/2025	BHP AC 224
Copper (Total as Cu) Acc.	mg/L	<0.025	Not Given	17/04/2025	BHP AC 224
Iron (Total as Fe) Acc.	mg/L	0.068	Not Given	17/04/2025	BHP AC 224
Magnesium (Total as Mg) Acc.	mg/L	13	Not Given	17/04/2025	BHP AC 224
Manganese (Total as Mn) Acc.	mg/L	0.013	Not Given	17/04/2025	BHP AC 224
Lead (Total as Pb) Acc.	mg/L	<0.025	Not Given	17/04/2025	BHP AC 224
Nickel (Total as Ni) Acc.	mg/L	<0.01	Not Given	17/04/2025	BHP AC 224
Potassium (Total as K) Acc.	mg/L	<5	Not Given	17/04/2025	BHP AC 224
Sodium (Total as Na) Acc.	mg/L	14	Not Given	17/04/2025	BHP AC 224
Zinc (Total as Zn) Acc.	mg/L	<0.025	Not Given	17/04/2025	BHP AC 224
Arsenic (Total as As)	mg/L	<0.0025	Not Given	17/04/2025	BHP AC 136
Total Organic Carbon	mg/L	4.8	Not Given	25/04/2025	BHP AC 215

Authorised by:
Dervla Purcell**Date Authorised:**

05/05/2025

Laboratory Manager**Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

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Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 311913 .1**Client: Bennettsbridge Limestone Q**

Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 25/04/2271
Quote Ref: QM020101
Order No: N/A
Sales Order: 248804
Date Received: 09/04/2025
Date Sampled: 09/04/2025
Date Completed: 26/04/2025
Sample Type: Surface Water



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FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Upstream Nore**

Test	Units	Results	Customer Limits	Date Analysed	Method
pH - Field	pH Units	7.44	Not Given	09/04/2025	BHP AC 067
Conductivity (25°C) - Field	µS/cm	670	Not Given	09/04/2025	BHP AC 067
Naphthalene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Acenaphthylene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Acenaphthene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Fluorene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Phenanthrene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Anthracene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Fluoranthene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Pyrene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[a]anthracene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Chrysene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[b]fluoranthene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[k]fluoranthene *	mg/L	<0.0001	Not Given	22/04/2025	1700

Authorised by:
Dervla Purcell**Date Authorised: 05/05/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed

* Subcontracted to an approved accredited laboratory

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TEST REPORT NO: 311913 .1**Client: Bennettsbridge Limestone Q**

Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 25/04/2271
Quote Ref: QM020101
Order No: N/A
Sales Order: 248804
Date Received: 09/04/2025
Date Sampled: 09/04/2025
Date Completed: 26/04/2025
Sample Type: Surface Water



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FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Upstream Nore**

Test	Units	Results	Customer Limits	Date Analysed	Method
Benzo[a]pyrene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Indeno(1,2,3-c,d)Pyrene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Dibenz[a,h]Anthracene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[g,h,i]perylene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Coronene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Total of 17 PAHs *	mg/L	<0.002	Not Given	22/04/2025	1700
Benzene *	mg/L	<0.001	Not Given	26/04/2025	1760
Toluene *	mg/L	<0.001	Not Given	26/04/2025	1760
Ethyl Benzene *	mg/L	<0.001	Not Given	26/04/2025	1760
m & p-Xylene *	mg/L	<0.001	Not Given	26/04/2025	1760
o-Xylene *	mg/L	<0.001	Not Given	26/04/2025	1760

Authorised by:
Dervla Purcell**Date Authorised: 05/05/2025****Laboratory Manager****Additional Information:(Opinions, where stated, are not covered by accreditation)****Acc.:** INAB Accredited**ND:** None detected in volume analysed

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Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 311913 .2**Client: Bennettsbridge Limestone Q**

Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 25/04/2272
Quote Ref: QM020101
Order No: N/A
Sales Order: 248804
Date Received: 09/04/2025
Date Sampled: 09/04/2025
Date Completed: 26/04/2025
Sample Type: Surface Water



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Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie

FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Downstream Nore**

Test	Units	Results	Customer Limits	Date Analysed	Method
Total Ammonia (as N) Acc.	mg/L	<0.05	Not Given	14/04/2025	BHP AC 095
Ionised Ammonium (as NH ₄) Acc.	mg/L	<0.064	Not Given	14/04/2025	BHP AC 095
B.O.D. Acc.	mg/L	0.60	Not Given	10/04/2025	BHP AC 005
Chloride (as Cl ⁻) Acc.	mg/L	28	Not Given	11/04/2025	BHP AC 095
C.O.D. Acc.	mg/L	<15	Not Given	15/04/2025	BHP AC 006
Total Hardness (as CaCO ₃) Acc.	mg/L	313	Not Given	11/04/2025	BHP AC 095
Nitrate (as NO ₃)	mg/L	18	Not Given	18/04/2025	BHP AC 019
Nitrite (as NO ₂)	mg/L	<0.1	Not Given	23/04/2025	BHP AC 019
OrthoPhosphate (as P) Acc.	mg/L	<0.01	Not Given	16/04/2025	BHP AC 095
pH - Field	pH Units	7.48	Not Given	09/04/2025	BHP AC 067
Sulphate (as SO ₄ ²⁻) Acc.	mg/L	20	Not Given	11/04/2025	BHP AC 095
Total Suspended Solids Acc.	mg/L	<5	Not Given	16/04/2025	BHP AC 012
Total Petroleum Hydrocarbons (>C ₆ -C ₄₀) *	mg/L	<0.01	Not Given	15/04/2025	1670
Mineral Oils (>C ₁₀ -C ₄₀) *	mg/L	<0.01	Not Given	15/04/2025	1670

Authorised by:
Dervla Purcell**Date Authorised: 05/05/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed

* Subcontracted to an approved accredited laboratory

** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

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Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 311913 .2**Client: Bennettsbridge Limestone Q**

**Kilree
Sheastown
Bennettsbridge
Co. Kilkenny**

**BHP Ref. No: 25/04/2272
Quote Ref: QM020101
Order No: N/A
Sales Order: 248804
Date Received: 09/04/2025
Date Sampled: 09/04/2025
Date Completed: 26/04/2025
Sample Type: Surface Water**



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Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie**

FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Downstream Nore**

Test	Units	Results	Customer Limits	Date Analysed	Method
Aluminium (Total as Al) Acc.	mg/L	<0.05	Not Given	17/04/2025	BHP AC 224
Calcium (Total as Ca) Acc.	mg/L	113	Not Given	17/04/2025	BHP AC 224
Chromium (Total as Cr) Acc.	mg/L	<0.005	Not Given	17/04/2025	BHP AC 224
Copper (Total as Cu) Acc.	mg/L	<0.025	Not Given	17/04/2025	BHP AC 224
Iron (Total as Fe) Acc.	mg/L	0.067	Not Given	17/04/2025	BHP AC 224
Magnesium (Total as Mg) Acc.	mg/L	14	Not Given	17/04/2025	BHP AC 224
Manganese (Total as Mn) Acc.	mg/L	0.012	Not Given	17/04/2025	BHP AC 224
Lead (Total as Pb) Acc.	mg/L	<0.025	Not Given	17/04/2025	BHP AC 224
Nickel (Total as Ni) Acc.	mg/L	<0.01	Not Given	17/04/2025	BHP AC 224
Potassium (Total as K) Acc.	mg/L	<5	Not Given	17/04/2025	BHP AC 224
Sodium (Total as Na) Acc.	mg/L	14	Not Given	17/04/2025	BHP AC 224
Zinc (Total as Zn) Acc.	mg/L	<0.025	Not Given	17/04/2025	BHP AC 224
Arsenic (Total as As)	mg/L	<0.0025	Not Given	17/04/2025	BHP AC 136
Total Organic Carbon	mg/L	4.7	Not Given	25/04/2025	BHP AC 215

Authorised by:
Dervla Purcell**Date Authorised: 05/05/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised**~ :** Sample Condition : ACCEPTABLE

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Sampling is outside the scope of accreditation

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TEST REPORT NO: 311913 .2**Client: Bennettsbridge Limestone Q**

Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 25/04/2272
Quote Ref: QM020101
Order No: N/A
Sales Order: 248804
Date Received: 09/04/2025
Date Sampled: 09/04/2025
Date Completed: 26/04/2025
Sample Type: Surface Water



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New Road
Thomondgate
Limerick
Tel: +353 61 455399
EEmail:dervlapurcell@bhp.ie

FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Downstream Nore**

Test	Units	Results	Customer Limits	Date Analysed	Method
pH - Field	pH Units	7.48	Not Given	09/04/2025	BHP AC 067
Conductivity (25°C) - Field	µS/cm	661	Not Given	09/04/2025	BHP AC 067
Naphthalene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Acenaphthylene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Acenaphthene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Fluorene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Phenanthrene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Anthracene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Fluoranthene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Pyrene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[a]anthracene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Chrysene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[b]fluoranthene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[k]fluoranthene *	mg/L	<0.0001	Not Given	22/04/2025	1700

Authorised by:
Dervla Purcell**Date Authorised: 05/05/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed

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TEST REPORT NO: 311913 .2**Client: Bennettsbridge Limestone Q**

**Kilree
Sheastown
Bennettsbridge
Co. Kilkenny**

**BHP Ref. No: 25/04/2272
Quote Ref: QM020101
Order No: N/A
Sales Order: 248804
Date Received: 09/04/2025
Date Sampled: 09/04/2025
Date Completed: 26/04/2025
Sample Type: Surface Water**



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Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie**

**FTAO: Mark Galvin
Site: Quarry Environmental Monitoring
BHP Ref: Monthly Surface Water
Client Ref: Downstream Nore**

Test	Units	Results	Customer Limits	Date Analysed	Method
Benzo[a]pyrene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Indeno(1,2,3-c,d)Pyrene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Dibenz[a,h]Anthracene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Benzo[g,h,i]perylene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Coronene *	mg/L	<0.0001	Not Given	22/04/2025	1700
Total of 17 PAHs *	mg/L	<0.002	Not Given	22/04/2025	1700
Benzene *	mg/L	<0.001	Not Given	26/04/2025	1760
Toluene *	mg/L	<0.001	Not Given	26/04/2025	1760
Ethyl Benzene *	mg/L	<0.001	Not Given	26/04/2025	1760
m & p-Xylene *	mg/L	<0.001	Not Given	26/04/2025	1760
o-Xylene *	mg/L	<0.001	Not Given	26/04/2025	1760

Authorised by:
Dervla Purcell**Date Authorised: 05/05/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed

* Subcontracted to an approved accredited laboratory

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Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 314404 .1**Client: Bennettsbridge Limestone Q****Kilree
Sheastown
Bennettsbridge
Co. Kilkenny****BHP Ref. No: 25/05/3684
Quote Ref: QM020406
Order No: Not Required
Sales Order: 252025
Date Received: 13/05/2025
Date Sampled: 13/05/2025
Date Completed: 27/06/2025
Sample Type: Surface Water****Testing
Analysing
Consulting****BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie****FTAO: Mark Galvin****Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Upstream**

Test		Units	Results	Customer Limits	Date Analysed	Method
Total Ammonia (as N)	Acc.	mg/L	0.054	Not Given	19/05/2025	BHP AC 095
Ionised Ammonium (as NH ₄)	Acc.	mg/L	0.069	Not Given	19/05/2025	BHP AC 095
B.O.D.	Acc. - Unr.	mg/L	~~	Not Given	15/05/2025	BHP AC 005
Chloride (as Cl ⁻)	Acc.	mg/L	30	Not Given	04/06/2025	BHP AC 095
C.O.D.	Acc.	mg/L	<15	Not Given	20/05/2025	BHP AC 006
Total Hardness (as CaCO ₃)	Acc.	mg/L	287	Not Given	16/05/2025	BHP AC 095
Nitrate (as NO ₃)		mg/L	15	Not Given	14/05/2025	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.1	Not Given	14/05/2025	BHP AC 019
OrthoPhosphate (as P)	Acc.	mg/L	0.012	Not Given	16/05/2025	BHP AC 095
pH - Field		pH Units	7.05	Not Given	13/05/2025	BHP AC 067
Sulphate (as SO ₄ ²⁻)	Acc.	mg/L	19	Not Given	14/05/2025	BHP AC 095
Total Suspended Solids	Acc.	mg/L	<5	Not Given	16/05/2025	BHP AC 012
Total Petroleum Hydrocarbons (>C ₆ -C ₄₀)	*	mg/L	<0.01	Not Given	22/05/2025	1670
Mineral Oils (>C ₁₀ -C ₄₀)	*	mg/L	<0.01	Not Given	22/05/2025	1670

Authorised by:
Dervla Purcell**Date Authorised: 29/06/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

Sample Condition : ACCEPTABLE - - B.O.D.: - - Unable to report due to QC failure

~ :

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Information identifying the 'Client', 'FTAO', 'Site', 'Client Ref', 'Order No' and 'Date Sampled' where BHP have not taken the sample has been supplied by the customer.

Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 314404 .1**Client: Bennettsbridge Limestone Q****Kilree
Sheastown
Bennettsbridge
Co. Kilkenny****BHP Ref. No: 25/05/3684
Quote Ref: QM020406
Order No: Not Required
Sales Order: 252025
Date Received: 13/05/2025
Date Sampled: 13/05/2025
Date Completed: 27/06/2025
Sample Type: Surface Water****Testing
Analysing
Consulting****BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie****FTAO: Mark Galvin****Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Upstream**

Test		Units	Results	Customer Limits	Date Analysed	Method
Aluminium (Total as Al)	Acc.	mg/L	<0.05	Not Given	22/05/2025	BHP AC 224
Calcium (Total as Ca)	Acc.	mg/L	107	Not Given	22/05/2025	BHP AC 224
Chromium (Total as Cr)	Acc.	mg/L	<0.005	Not Given	22/05/2025	BHP AC 224
Copper (Total as Cu)	Acc.	mg/L	<0.025	Not Given	22/05/2025	BHP AC 224
Iron (Total as Fe)	Acc.	mg/L	0.20	Not Given	22/05/2025	BHP AC 224
Magnesium (Total as Mg)	Acc.	mg/L	12	Not Given	22/05/2025	BHP AC 224
Manganese (Total as Mn)	Acc.	mg/L	0.020	Not Given	22/05/2025	BHP AC 224
Lead (Total as Pb)	Acc.	mg/L	<0.025	Not Given	22/05/2025	BHP AC 224
Nickel (Total as Ni)	Acc.	mg/L	<0.01	Not Given	22/05/2025	BHP AC 224
Potassium (Total as K)	Acc.	mg/L	5.3	Not Given	22/05/2025	BHP AC 224
Sodium (Total as Na)	Acc.	mg/L	17	Not Given	22/05/2025	BHP AC 224
Zinc (Total as Zn)	Acc.	mg/L	<0.025	Not Given	22/05/2025	BHP AC 224
Arsenic (Total as As)		mg/L	<0.0025	Not Given	07/06/2025	BHP AC 132
Total Organic Carbon		mg/L	3.3	Not Given	20/05/2025	BHP AC 215

Authorised by:
Dervla Purcell**Date Authorised: 29/06/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

Sample Condition : ACCEPTABLE - - B.O.D.- - Unable to report due to QC failure

~ :

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Information identifying the 'Client', 'FTAO', 'Site', 'Client Ref', 'Order No' and 'Date Sampled' where BHP have not taken the sample has been supplied by the customer.

Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 314404 .1**Client: Bennettsbridge Limestone Q****Kilree
Sheastown
Bennettsbridge
Co. Kilkenny****BHP Ref. No: 25/05/3684
Quote Ref: QM020406
Order No: Not Required
Sales Order: 252025
Date Received: 13/05/2025
Date Sampled: 13/05/2025
Date Completed: 27/06/2025
Sample Type: Surface Water****Testing
Analysing
Consulting****BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie****FTAO: Mark Galvin****Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Upstream**

Test	Units	Results	Customer Limits	Date Analysed	Method
pH	Acc.	-	8.23	14/05/2025	BHP AC 217
Conductivity (25°C)	Acc.	µS/cm	668	14/05/2025	BHP AC 217
Naphthalene	*	mg/L	<0.0001	27/05/2025	1700
Acenaphthylene	*	mg/L	<0.0001	27/05/2025	1700
Acenaphthene	*	mg/L	<0.0001	27/05/2025	1700
Fluorene	*	mg/L	<0.0001	27/05/2025	1700
Phenanthrene	*	mg/L	<0.0001	27/05/2025	1700
Anthracene	*	mg/L	<0.0001	27/05/2025	1700
Fluoranthene	*	mg/L	<0.0001	27/05/2025	1700
Pyrene	*	mg/L	<0.0001	27/05/2025	1700
Benzo[a]anthracene	*	mg/L	<0.0001	27/05/2025	1700
Chrysene	*	mg/L	<0.0001	27/05/2025	1700
Benzo[b]fluoranthene	*	mg/L	<0.0001	27/05/2025	1700
Benzo[k]fluoranthene	*	mg/L	<0.0001	27/05/2025	1700

Authorised by:
Dervla Purcell**Date Authorised: 29/06/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

Sample Condition : ACCEPTABLE - - B.O.D.- - Unable to report due to QC failure

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Information identifying the 'Client', 'FTAO', 'Site', 'Client Ref', 'Order No' and 'Date Sampled' where BHP have not taken the sample has been supplied by the customer.

Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 314404 .1**Client: Bennettsbridge Limestone Q****Kilree
Sheastown
Bennettsbridge
Co. Kilkenny****BHP Ref. No: 25/05/3684
Quote Ref: QM020406
Order No: Not Required
Sales Order: 252025
Date Received: 13/05/2025
Date Sampled: 13/05/2025
Date Completed: 27/06/2025
Sample Type: Surface Water****Testing
Analysing
Consulting****BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie****FTAO: Mark Galvin****Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Upstream**

Test	Units	Results	Customer Limits	Date Analysed	Method
Benzo[a]pyrene *	mg/L	<0.0001	Not Given	27/05/2025	1700
Indeno(1,2,3-c,d)Pyrene *	mg/L	<0.0001	Not Given	27/05/2025	1700
Dibenz(a,h)Anthracene *	mg/L	<0.0001	Not Given	27/05/2025	1700
Benzo[g,h,i]perylene *	mg/L	<0.0001	Not Given	27/05/2025	1700
Coronene *	mg/L	<0.0001	Not Given	27/05/2025	1700
Total of 17 PAHs *	mg/L	<0.002	Not Given	27/05/2025	1700
Benzene *	mg/L	<0.001	Not Given	27/06/2025	1760
Toluene *	mg/L	<0.001	Not Given	27/06/2025	1760
Ethyl Benzene *	mg/L	<0.001	Not Given	27/06/2025	1760
m & p-Xylene *	mg/L	<0.001	Not Given	27/06/2025	1760
o-Xylene *	mg/L	<0.001	Not Given	27/06/2025	1760

Authorised by:
Dervla Purcell**Date Authorised:****29/06/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

Sample Condition : ACCEPTABLE - - B.O.D.: - - Unable to report due to QC failure

~ :

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Information identifying the 'Client', 'FTAO', 'Site', 'Client Ref', 'Order No' and 'Date Sampled' where BHP have not taken the sample has been supplied by the customer.

Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 314404 .2**Client: Bennettsbridge Limestone Q****Kilree
Sheastown
Bennettsbridge
Co. Kilkenny****BHP Ref. No: 25/05/3685
Quote Ref: QM020406
Order No: Not Required
Sales Order: 252025
Date Received: 13/05/2025
Date Sampled: 13/05/2025
Date Completed: 27/06/2025
Sample Type: Surface Water****Testing
Analysing
Consulting****BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie****FTAO: Mark Galvin****Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Downstream**

Test		Units	Results	Customer Limits	Date Analysed	Method
Total Ammonia (as N)	Acc.	mg/L	0.057	Not Given	19/05/2025	BHP AC 095
Ionised Ammonium (as NH ₄)	Acc.	mg/L	0.073	Not Given	19/05/2025	BHP AC 095
B.O.D.	Acc. - Unr.	mg/L	~~	Not Given	15/05/2025	BHP AC 005
Chloride (as Cl ⁻)	Acc.	mg/L	29	Not Given	04/06/2025	BHP AC 095
C.O.D.	Acc.	mg/L	<15	Not Given	20/05/2025	BHP AC 006
Total Hardness (as CaCO ₃)	Acc.	mg/L	294	Not Given	16/05/2025	BHP AC 095
Nitrate (as NO ₃)		mg/L	17	Not Given	14/05/2025	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.1	Not Given	14/05/2025	BHP AC 019
OrthoPhosphate (as P)	Acc.	mg/L	0.011	Not Given	16/05/2025	BHP AC 095
pH - Field		pH Units	7.45	Not Given	13/05/2025	BHP AC 067
Sulphate (as SO ₄ ²⁻)	Acc.	mg/L	19	Not Given	14/05/2025	BHP AC 095
Total Suspended Solids	Acc.	mg/L	<5	Not Given	16/05/2025	BHP AC 012
Total Petroleum Hydrocarbons (>C ₆ -C ₄₀)	*	mg/L	<0.01	Not Given	22/05/2025	1670
Mineral Oils (>C ₁₀ -C ₄₀)	*	mg/L	<0.01	Not Given	22/05/2025	1670

Authorised by:
Dervla Purcell**Date Authorised: 29/06/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

Sample Condition : ACCEPTABLE - - B.O.D.: - - Unable to report due to QC failure

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Information identifying the 'Client', 'FTAO', 'Site', 'Client Ref', 'Order No' and 'Date Sampled' where BHP have not taken the sample has been supplied by the customer.

Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 314404 .2

Client: Bennettsbridge Limestone Q
Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 25/05/3685
Quote Ref: QM020406
Order No: Not Required
Sales Order: 252025
Date Received: 13/05/2025
Date Sampled: 13/05/2025
Date Completed: 27/06/2025
Sample Type: Surface Water



Testing
Analysing
Consulting



BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie

FTAO: Mark Galvin
Site: Quarry Environmental Monitoring
BHP Ref: Monthly Surface Water
Client Ref: Downstream

Test	Units	Results	Customer Limits	Date Analysed	Method
Aluminium (Total as Al) Acc.	mg/L	<0.05	Not Given	22/05/2025	BHP AC 224
Calcium (Total as Ca) Acc.	mg/L	102	Not Given	22/05/2025	BHP AC 224
Chromium (Total as Cr) Acc.	mg/L	<0.005	Not Given	22/05/2025	BHP AC 224
Copper (Total as Cu) Acc.	mg/L	<0.025	Not Given	22/05/2025	BHP AC 224
Iron (Total as Fe) Acc.	mg/L	0.053	Not Given	22/05/2025	BHP AC 224
Magnesium (Total as Mg) Acc.	mg/L	11.5	Not Given	22/05/2025	BHP AC 224
Manganese (Total as Mn) Acc.	mg/L	0.016	Not Given	22/05/2025	BHP AC 224
Lead (Total as Pb) Acc.	mg/L	<0.025	Not Given	22/05/2025	BHP AC 224
Nickel (Total as Ni) Acc.	mg/L	<0.01	Not Given	22/05/2025	BHP AC 224
Potassium (Total as K) Acc.	mg/L	5.0	Not Given	22/05/2025	BHP AC 224
Sodium (Total as Na) Acc.	mg/L	16	Not Given	22/05/2025	BHP AC 224
Zinc (Total as Zn) Acc.	mg/L	<0.025	Not Given	22/05/2025	BHP AC 224
Arsenic (Total as As)	mg/L	<0.0025	Not Given	07/06/2025	BHP AC 132
Total Organic Carbon	mg/L	3.5	Not Given	20/05/2025	BHP AC 215

Authorised by:

Dervla Purcell
Laboratory Manager

Date Authorised: 29/06/2025

Additional Information: (Opinions, where stated, are not covered by accreditation)

Acc.: INAB Accredited

ND: None detected in volume analysed

***** Subcontracted to an approved accredited laboratory

****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

Sample Condition : ACCEPTABLE - - B.O.D.: - - Unable to report due to QC failure

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Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 314404 .2**Client: Bennettsbridge Limestone Q****Kilree
Sheastown
Bennettsbridge
Co. Kilkenny****BHP Ref. No: 25/05/3685
Quote Ref: QM020406
Order No: Not Required
Sales Order: 252025
Date Received: 13/05/2025
Date Sampled: 13/05/2025
Date Completed: 27/06/2025
Sample Type: Surface Water****Testing
Analysing
Consulting****BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie****FTAO: Mark Galvin****Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Downstream**

Test	Units	Results	Customer Limits	Date Analysed	Method
pH	Acc.	-	8.22	14/05/2025	BHP AC 217
Conductivity (25°C)	Acc.	µS/cm	666	14/05/2025	BHP AC 217
Naphthalene	*	mg/L	<0.0001	27/05/2025	1700
Acenaphthylene	*	mg/L	<0.0001	27/05/2025	1700
Acenaphthene	*	mg/L	<0.0001	27/05/2025	1700
Fluorene	*	mg/L	<0.0001	27/05/2025	1700
Phenanthrene	*	mg/L	<0.0001	27/05/2025	1700
Anthracene	*	mg/L	<0.0001	27/05/2025	1700
Fluoranthene	*	mg/L	<0.0001	27/05/2025	1700
Pyrene	*	mg/L	<0.0001	27/05/2025	1700
Benzo[a]anthracene	*	mg/L	<0.0001	27/05/2025	1700
Chrysene	*	mg/L	<0.0001	27/05/2025	1700
Benzo[b]fluoranthene	*	mg/L	<0.0001	27/05/2025	1700
Benzo[k]fluoranthene	*	mg/L	<0.0001	27/05/2025	1700

Authorised by:
Dervla Purcell**Date Authorised: 29/06/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

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TEST REPORT NO: 314404 .2**Client: Bennettsbridge Limestone Q****Kilree
Sheastown
Bennettsbridge
Co. Kilkenny****BHP Ref. No: 25/05/3685
Quote Ref: QM020406
Order No: Not Required
Sales Order: 252025
Date Received: 13/05/2025
Date Sampled: 13/05/2025
Date Completed: 27/06/2025
Sample Type: Surface Water****Testing
Analysing
Consulting****BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie****FTAO: Mark Galvin****Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Downstream**

Test	Units	Results	Customer Limits	Date Analysed	Method
Benzo[a]pyrene *	mg/L	<0.0001	Not Given	27/05/2025	1700
Indeno(1,2,3-c,d)Pyrene *	mg/L	<0.0001	Not Given	27/05/2025	1700
Dibenz(a,h)Anthracene *	mg/L	<0.0001	Not Given	27/05/2025	1700
Benzo[g,h,i]perylene *	mg/L	<0.0001	Not Given	27/05/2025	1700
Coronene *	mg/L	<0.0001	Not Given	27/05/2025	1700
Total of 17 PAHs *	mg/L	<0.002	Not Given	27/05/2025	1700
Benzene *	mg/L	<0.001	Not Given	27/06/2025	1760
Toluene *	mg/L	<0.001	Not Given	27/06/2025	1760
Ethyl Benzene *	mg/L	<0.001	Not Given	27/06/2025	1760
m & p-Xylene *	mg/L	<0.001	Not Given	27/06/2025	1760
o-Xylene *	mg/L	<0.001	Not Given	27/06/2025	1760

Authorised by:
Dervla Purcell**Date Authorised: 29/06/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

Sample Condition : ACCEPTABLE - - B.O.D.: - - Unable to report due to QC failure

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Information identifying the 'Client', 'FTAO', 'Site', 'Client Ref', 'Order No' and 'Date Sampled' where BHP have not taken the sample has been supplied by the customer.

Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 316029 .1

Client: Bennettsbridge Limestone Q
Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 25/06/0325
Quote Ref: QM020406
Order No: Not Required
Sales Order: 254152
Date Received: 03/06/2025
Date Sampled: 03/06/2025
Date Completed: 27/06/2025
Sample Type: Surface Water



Testing
Analysing
Consulting



BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie

FTAO: Mark Galvin
Site: Quarry Environmental Monitoring
BHP Ref: Monthly Surface Water
Client Ref: Upstream

Test		Units	Results	Customer Limits	Date Analysed	Method
Total Ammonia (as N)	Acc.	mg/L	<0.05	Not Given	10/06/2025	BHP AC 095
Ionised Ammonium (as NH ₄)	Acc.	mg/L	<0.064	Not Given	10/06/2025	BHP AC 095
B.O.D.	Acc.	mg/L	0.8	Not Given	05/06/2025	BHP AC 005
Chloride (as Cl ⁻)	Acc.	mg/L	29	Not Given	17/06/2025	BHP AC 095
C.O.D.	Acc.	mg/L	<15	Not Given	11/06/2025	BHP AC 006
Total Hardness (as CaCO ₃)	Acc.	mg/L	262	Not Given	06/06/2025	BHP AC 095
Nitrate (as NO ₃)		mg/L	15	Not Given	04/06/2025	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.1	Not Given	04/06/2025	BHP AC 019
OrthoPhosphate (as P)	Acc.	mg/L	0.025	Not Given	06/06/2025	BHP AC 095
pH - Field		pH Units	7.46	Not Given	03/06/2025	BHP AC 067
Sulphate (as SO ₄ ²⁻)	Acc.	mg/L	19	Not Given	04/06/2025	BHP AC 095
Total Suspended Solids	Acc.	mg/L	<10	Not Given	06/06/2025	BHP AC 012
Total Petroleum Hydrocarbons (>C ₆ -C ₄₀)	*	mg/L	<0.01	Not Given	16/06/2025	1670
Mineral Oils (>C ₁₀ -C ₄₀)	*	mg/L	<0.01	Not Given	16/06/2025	1670

Authorised by:

Dervla Purcell
Laboratory Manager

Date Authorised: 03/07/2025

Additional Information:(Opinions, where stated, are not covered by accreditation)

Acc.: INAB Accredited

ND: None detected in volume analysed

***** Subcontracted to an approved accredited laboratory

****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

Sample Condition : ACCEPTABLE

~ :

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Information identifying the 'Client', 'FTAO', 'Site', 'Client Ref', 'Order No' and 'Date Sampled' where BHP have not taken the sample has been supplied by the customer.

Sampling is outside the scope of accreditation

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TEST REPORT NO: 316029 .1**Client: Bennettsbridge Limestone Q****Kilree
Sheastown
Bennettsbridge
Co. Kilkenny****BHP Ref. No: 25/06/0325
Quote Ref: QM020406
Order No: Not Required
Sales Order: 254152
Date Received: 03/06/2025
Date Sampled: 03/06/2025
Date Completed: 27/06/2025
Sample Type: Surface Water****Testing
Analysing
Consulting****BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie****FTAO: Mark Galvin****Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Upstream**

Test	Units	Results	Customer Limits	Date Analysed	Method
Aluminium (Total as Al) Acc.	mg/L	<0.05	Not Given	23/06/2025	BHP AC 224
Calcium (Total as Ca) Acc.	mg/L	93	Not Given	23/06/2025	BHP AC 224
Chromium (Total as Cr) Acc.	mg/L	<0.005	Not Given	23/06/2025	BHP AC 224
Copper (Total as Cu) Acc.	mg/L	<0.025	Not Given	23/06/2025	BHP AC 224
Iron (Total as Fe) Acc.	mg/L	0.085	Not Given	23/06/2025	BHP AC 224
Magnesium (Total as Mg) Acc.	mg/L	11	Not Given	23/06/2025	BHP AC 224
Manganese (Total as Mn) Acc.	mg/L	0.023	Not Given	27/06/2025	BHP AC 224
Lead (Total as Pb) Acc.	mg/L	<0.025	Not Given	23/06/2025	BHP AC 224
Nickel (Total as Ni) Acc.	mg/L	<0.01	Not Given	23/06/2025	BHP AC 224
Potassium (Total as K) Acc.	mg/L	5.1	Not Given	23/06/2025	BHP AC 224
Sodium (Total as Na) Acc.	mg/L	14	Not Given	23/06/2025	BHP AC 224
Zinc (Total as Zn) Acc.	mg/L	<0.025	Not Given	23/06/2025	BHP AC 224
Arsenic (Total as As)	mg/L	<0.0025	Not Given	11/06/2025	BHP AC 132
Total Organic Carbon	mg/L	7.4	Not Given	16/06/2025	BHP AC 215

Authorised by:
Dervla Purcell**Date Authorised: 03/07/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

Sample Condition : ACCEPTABLE

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Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 316029 .1

Client: Bennettsbridge Limestone Q
 Kilree
 Sheastown
 Bennettsbridge
 Co. Kilkenny

BHP Ref. No: 25/06/0325
Quote Ref: QM020406
Order No: Not Required
Sales Order: 254152
Date Received: 03/06/2025
Date Sampled: 03/06/2025
Date Completed: 27/06/2025
Sample Type: Surface Water



Testing
Analysing
Consulting



BHP Laboratories
 New Road
 Thomondgate
 Limerick
 Tel: +353 61 455399
 Email: dervlapurcell@bhp.ie

FTAO: Mark Galvin
Site: Quarry Environmental Monitoring
BHP Ref: Monthly Surface Water
Client Ref: Upstream

Test		Units	Results	Customer Limits	Date Analysed	Method
pH	Acc.	-	8.28	Not Given	04/06/2025	BHP AC 217
Conductivity (25°C)	Acc.	µS/cm	610	Not Given	04/06/2025	BHP AC 217
Naphthalene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Acenaphthylene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Acenaphthene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Fluorene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Phenanthrene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Anthracene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Fluoranthene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Pyrene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Benzo[a]anthracene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Chrysene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Benzo[b]fluoranthene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Benzo[k]fluoranthene	*	mg/L	<0.0001	Not Given	11/06/2025	1700

Authorised by:

Dervla Purcell
Laboratory Manager

Date Authorised: 03/07/2025

Additional Information:(Opinions, where stated, are not covered by accreditation)

Acc.: INAB Accredited

ND: None detected in volume analysed

***** Subcontracted to an approved accredited laboratory

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Sample Condition : ACCEPTABLE

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TEST REPORT NO: 316029 .1**Client: Bennettsbridge Limestone Q****Kilree
Sheastown
Bennettsbridge
Co. Kilkenny****BHP Ref. No: 25/06/0325
Quote Ref: QM020406
Order No: Not Required
Sales Order: 254152
Date Received: 03/06/2025
Date Sampled: 03/06/2025
Date Completed: 27/06/2025
Sample Type: Surface Water****Testing
Analysing
Consulting****BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie****FTAO: Mark Galvin****Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Upstream**

Test	Units	Results	Customer Limits	Date Analysed	Method
Benzo[a]pyrene *	mg/L	<0.0001	Not Given	11/06/2025	1700
Indeno(1,2,3-c,d)Pyrene *	mg/L	<0.0001	Not Given	11/06/2025	1700
Dibenz(a,h)Anthracene *	mg/L	<0.0001	Not Given	11/06/2025	1700
Benzo[g,h,i]perylene *	mg/L	<0.0001	Not Given	11/06/2025	1700
Coronene *	mg/L	<0.0001	Not Given	12/06/2025	1700
Total of 17 PAHs *	mg/L	<0.002	Not Given	12/06/2025	1700
Benzene *	mg/L	<0.001	Not Given	24/06/2025	1760
Toluene *	mg/L	<0.001	Not Given	24/06/2025	1760
Ethyl Benzene *	mg/L	<0.001	Not Given	24/06/2025	1760
m & p-Xylene *	mg/L	<0.001	Not Given	24/06/2025	1760
o-Xylene *	mg/L	<0.001	Not Given	24/06/2025	1760

Authorised by:
Dervla Purcell**Date Authorised:****03/07/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

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Information identifying the 'Client', 'FTAO', 'Site', 'Client Ref', 'Order No' and 'Date Sampled' where BHP have not taken the sample has been supplied by the customer.

Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 316029 .2**Client: Bennettsbridge Limestone Q****Kilree
Sheastown
Bennettsbridge
Co. Kilkenny****BHP Ref. No: 25/06/0326
Quote Ref: QM020406
Order No: Not Required
Sales Order: 254152
Date Received: 03/06/2025
Date Sampled: 03/06/2025
Date Completed: 27/06/2025
Sample Type: Surface Water****Testing
Analysing
Consulting****BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie****FTAO: Mark Galvin****Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Downstream**

Test		Units	Results	Customer Limits	Date Analysed	Method
Total Ammonia (as N)	Acc.	mg/L	<0.05	Not Given	10/06/2025	BHP AC 095
Ionised Ammonium (as NH ₄)	Acc.	mg/L	<0.064	Not Given	10/06/2025	BHP AC 095
B.O.D.	Acc.	mg/L	0.6	Not Given	05/06/2025	BHP AC 005
Chloride (as Cl ⁻)	Acc.	mg/L	29	Not Given	17/06/2025	BHP AC 095
C.O.D.	Acc.	mg/L	<15	Not Given	11/06/2025	BHP AC 006
Total Hardness (as CaCO ₃)	Acc.	mg/L	281	Not Given	06/06/2025	BHP AC 095
Nitrate (as NO ₃)		mg/L	15	Not Given	04/06/2025	BHP AC 019
Nitrite (as NO ₂)		mg/L	<0.1	Not Given	04/06/2025	BHP AC 019
OrthoPhosphate (as P)	Acc.	mg/L	0.021	Not Given	06/06/2025	BHP AC 095
pH - Field		pH Units	7.40	Not Given	03/06/2025	BHP AC 067
Sulphate (as SO ₄ ²⁻)	Acc.	mg/L	19	Not Given	04/06/2025	BHP AC 095
Total Suspended Solids	Acc.	mg/L	<10	Not Given	06/06/2025	BHP AC 012
Total Petroleum Hydrocarbons (>C ₆ -C ₄₀)	*	mg/L	<0.01	Not Given	16/06/2025	1670
Mineral Oils (>C ₁₀ -C ₄₀)	*	mg/L	<0.01	Not Given	16/06/2025	1670

Authorised by:
Dervla Purcell**Date Authorised: 03/07/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

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Information identifying the 'Client', 'FTAO', 'Site', 'Client Ref', 'Order No' and 'Date Sampled' where BHP have not taken the sample has been supplied by the customer.

Sampling is outside the scope of accreditation

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TEST REPORT NO: 316029 .2

Client: Bennettsbridge Limestone Q
Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 25/06/0326
Quote Ref: QM020406
Order No: Not Required
Sales Order: 254152
Date Received: 03/06/2025
Date Sampled: 03/06/2025
Date Completed: 27/06/2025
Sample Type: Surface Water



Testing
Analysing
Consulting



BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie

FTAO: Mark Galvin
Site: Quarry Environmental Monitoring
BHP Ref: Monthly Surface Water
Client Ref: Downstream

Test	Units	Results	Customer Limits	Date Analysed	Method
Aluminium (Total as Al) Acc.	mg/L	<0.05	Not Given	23/06/2025	BHP AC 224
Calcium (Total as Ca) Acc.	mg/L	95	Not Given	23/06/2025	BHP AC 224
Chromium (Total as Cr) Acc.	mg/L	<0.005	Not Given	23/06/2025	BHP AC 224
Copper (Total as Cu) Acc.	mg/L	<0.025	Not Given	23/06/2025	BHP AC 224
Iron (Total as Fe) Acc.	mg/L	0.091	Not Given	23/06/2025	BHP AC 224
Magnesium (Total as Mg) Acc.	mg/L	11	Not Given	23/06/2025	BHP AC 224
Manganese (Total as Mn) Acc.	mg/L	0.023	Not Given	27/06/2025	BHP AC 224
Lead (Total as Pb) Acc.	mg/L	<0.025	Not Given	23/06/2025	BHP AC 224
Nickel (Total as Ni) Acc.	mg/L	<0.01	Not Given	23/06/2025	BHP AC 224
Potassium (Total as K) Acc.	mg/L	5.0	Not Given	23/06/2025	BHP AC 224
Sodium (Total as Na) Acc.	mg/L	15	Not Given	23/06/2025	BHP AC 224
Zinc (Total as Zn) Acc.	mg/L	<0.025	Not Given	23/06/2025	BHP AC 224
Arsenic (Total as As)	mg/L	<0.0025	Not Given	11/06/2025	BHP AC 132
Total Organic Carbon	mg/L	7.9	Not Given	16/06/2025	BHP AC 215

Authorised by:

Dervla Purcell
Laboratory Manager

Date Authorised: 03/07/2025

Additional Information:(Opinions, where stated, are not covered by accreditation)

Acc.: INAB Accredited

ND: None detected in volume analysed

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TEST REPORT NO: 316029 .2**Client: Bennettsbridge Limestone Q****Kilree
Sheastown
Bennettsbridge
Co. Kilkenny****BHP Ref. No: 25/06/0326
Quote Ref: QM020406
Order No: Not Required
Sales Order: 254152
Date Received: 03/06/2025
Date Sampled: 03/06/2025
Date Completed: 27/06/2025
Sample Type: Surface Water****Testing
Analysing
Consulting****BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie****FTAO: Mark Galvin****Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Downstream**

Test		Units	Results	Customer Limits	Date Analysed	Method
pH	Acc.	-	8.26	Not Given	04/06/2025	BHP AC 217
Conductivity (25°C)	Acc.	µS/cm	628	Not Given	04/06/2025	BHP AC 217
Naphthalene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Acenaphthylene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Acenaphthene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Fluorene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Phenanthrene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Anthracene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Fluoranthene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Pyrene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Benzo[a]anthracene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Chrysene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Benzo[b]fluoranthene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Benzo[k]fluoranthene	*	mg/L	<0.0001	Not Given	11/06/2025	1700

Authorised by:
Dervla Purcell**Date Authorised: 03/07/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

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TEST REPORT NO: 316029 .2**Client: Bennettsbridge Limestone Q****Kilree
Sheastown
Bennettsbridge
Co. Kilkenny****BHP Ref. No: 25/06/0326
Quote Ref: QM020406
Order No: Not Required
Sales Order: 254152
Date Received: 03/06/2025
Date Sampled: 03/06/2025
Date Completed: 27/06/2025
Sample Type: Surface Water****Testing
Analysing
Consulting****BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
Email: dervlapurcell@bhp.ie****FTAO: Mark Galvin****Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Downstream**

Test		Units	Results	Customer Limits	Date Analysed	Method
Benzo[a]pyrene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Indeno(1,2,3-c,d)Pyrene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Dibenz(a,h)Anthracene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Benzo[g,h,i]perylene	*	mg/L	<0.0001	Not Given	11/06/2025	1700
Coronene	*	mg/L	<0.0001	Not Given	12/06/2025	1700
Total of 17 PAHs	*	mg/L	<0.002	Not Given	12/06/2025	1700
Benzene	*	mg/L	<0.001	Not Given	24/06/2025	1760
Toluene	*	mg/L	<0.001	Not Given	24/06/2025	1760
Ethyl Benzene	*	mg/L	<0.001	Not Given	24/06/2025	1760
m & p-Xylene	*	mg/L	<0.001	Not Given	24/06/2025	1760
o-Xylene	*	mg/L	<0.001	Not Given	24/06/2025	1760

Authorised by:
Dervla Purcell**Date Authorised: 03/07/2025****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

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7. Annual Environmental Reports (AERs) – Discharge Licence: 2018 – 2024.

RECEIVED: 18/08/2025

Data Contents of AERS

- a. Contains Daily Discharge Values
- b. Contains Summary Table for Monthly Discharge Quality for the Section 4 Licence ELVs.
- c. Presents discussion on results and compliance.
- d. Contains accredited Laboratory Certificates of Analysis for the Discharge Quality.

2018 Annual Environmental Report

for

Bennettsbridge Limestone Quarries Ltd

wrt

Discharge Licence ENV/W/78

At the request of

Bennettsbridge Limestone

Kilree,

Sheastown,

Bennettsbridge,

Co Kilkenny

Consultant Dr. Pamela Bartley

March 2020

**Hydro-G**

50 Henry St.

Galway

H91 FA4X

pamela@hydro-g.com

091 449950

087 8072744

Project No.: 161321_BBL AER

Report Status: Issue

Report Title: 2018 Annual Environmental Report for Bennettsbridge Limestone Quarries Ltd wrt Discharge Licence ENV/W/78

Date: 9/3/20

Prepared by:

Dr. Pamela Bartley B.Eng, M.SC., Ph.D.

NOTES:

This report is for the use solely of the party to whom it is addressed and no responsibility is accepted to any third party.

About the Author

Pamela Bartley is a water focussed civil engineer. After 22 years of field based practice in borehole drilling, groundwater monitoring and abstraction point management she is now a karst hydrogeology specialist: her Ph.D was a field based karst limestone environment study. She has also completed training with the GSI at their karst specialist course run in the Burren. Her primary qualification is a Diploma in Water and Wastewater Technology at Sligo RTC. She then completed her primary degree in Civil Engineering at Queens University, Belfast, followed by an M.Sc in Environmental Engineering, followed by a field-based hydrogeologically focussed Ph.D. within the School of Civil Engineering at Trinity College, Dublin. Her key work areas are groundwater development from large scale water supply boreholes, hydrogeological assessment of quarries and the evaluation of discharges to groundwater and surface waters. Pamela Bartley's company is Bartley Hydrogeology Ltd., registered to trade as Hydro-G.

Pamela has successfully completed post doctorate 'Professional Development' formal course training in the areas of:

- PSDP & PSCS (IOSH certified, 2016);
- Karst Hydrogeology (GSI, 2013);
- On Site Wastewater & Water Services Amendment Act 2012 (IE, Western Region 6-week programme 2012 & Dublin 2012);
- Zero Discharge Willow Wastewater Systems Design Courses (Denmark 2008 & 2011 & Ireland 2012);
- Expert Witness (IE, 2011);
- Planning & Development Act (IE, 2010);
- Surface Water Regulations 2009 (DoE, 2010 & 2011);
- Sustainable Drainage (Wallingford/CIRIA, 2005 & 2008);
- Source Protection Zone Delineation (IGI/GSI, 2007);
- Groundwater & Contaminant Microbiology (IGI/GSI, 2006);
- Applied Groundwater Modelling (ESI, UK, 2000);
- Site Suitability Assessment (FETAC, 2002).

As a result of work in evaluating planning appeals, Pamela has become specialist in planning evaluations in the context of enacted Irish Regulation and EU Directives concerning the water environment such as the Groundwater Regulations (S.I. No. 9 of 2010), Surface Water Regulations (S.I. No. 272 of 2009), Water Framework and Habitats' Directives. Pamela is a qualified and certified 'Site Assessor' and interviewer of examination candidates in respect of eligibility for the Site Suitability FETAC Qualification. In the past, she has lectured in third level institutions (WIT, CIT, 1996 – 1999), delivered practical laboratory instruction in the assessment of subsoils for the FETAC Site Assessor programme and also demonstrated hydraulics laboratory modules at Trinity College Dublin (1996). She has been an invited guest speaker at An Bord Pleanála, The Irish Concrete Federation, The Health Service Executive, Environmental Health Officers National Conference, The Irish Planning Institute's National Conference, The International Association of Hydrogeologists National Conference (Irish Branch) and has delivered hydrogeological lectures to the public during Science Week.

Hydro-G is the registered trading name of Pamela Bartley's company Bartley Hydrogeology Ltd., a company registered in Galway Ireland. The company holds employer's and public liability insurances and professional indemnity insurance of €2million for each and every claim in each period.

Pamela is qualified and IOSH certified to act as PSDP (Project Supervisor Design Phase) & PSCS (Project Supervisor Construction Stage) as defined by the Construction Regulations. The company is a registered Irish Water Supplier (no. 1855) and Pamela Bartley is HSQE approved within Irish Water.

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1.0 Introduction

Hydro G was commissioned by Bennettsbridge Limestone Quarries Ltd (BLQ) to prepare an Annual Environmental Report (AER), which is required as a condition of the Discharge Licence in place for the quarry operation at Kilree, Bennettsbridge, Co. Kilkenny (Kilkenny County Council Ref. No: ENV/W/78).

This report has been prepared to fulfil this requirement and pertains to the reporting period January 2018 - December 2018.

2.0 Pertinent Details of the Discharge Licence

The discharge licence relevant to this period is Kilkenny County Council Ref. No: ENV/W/78, dated September 15th 2017 (hereafter referred to as ENV/W/78 (2017)).

Licence conditions relevant to this report include the following:

Condition 3.2 of ENV/W/78 (2017) stipulates:

The licence holder shall ensure that

- (a) The mean daily discharge over the course of a year shall not exceed 22,000m³/day, and
- (b) The maximum daily discharge shall not exceed 70,000m³/day

Condition 4.1 of ENV/W/78 (2017) stipulates:

The characteristics of the effluent as discharged shall not exceed the following emission limit values (ELVs):

Table 1: Discharge Licence ENV/W/78 ELVs

Parameter	ELV	Units
pH	6-9	-
Suspended Solids	10	mg/l
BOD	2	mg/l
COD	10	mg/l
Nitrate	10	mg/l - N
Total Ammonia	0.17	mg/l - N
MRP	0.07	mg/l - P
Total Hydrocarbons	0.68	mg/l

Condition 5.5 of ENV/W/78 (2017) stipulates the following:

The licence holder shall submit an Annual Environmental Report from a suitably qualified person which shall be due within 21 days after the end of each calendar year. The report shall contain the following information in relation to the previous calendar year:

- a) All monitoring results relating to the previous calendar year including the information required under conditions 5.1, 5.2, & 5.3.
- b) An assessment of the results, particularly noting any trends. Such analysis of trends should take account of any previous reports submitted in relation to the discharge.
- c) Confirmation (or otherwise) that the conditions attached to the licence have been complied with.

3.0 Monitoring Results**3.1 Flow Data**

It is acknowledged in the discharge licence that the waters arising at the quarry are a combination of rainfall runoff and groundwater. This means that rain falling on the surrounding lands travels through the land and can discharge to the quarry excavation by means of the subsoil bedrock interface.

Daily discharge volumes are presented on a month by month basis in Table 2 for the monitoring period January – December 2018. Flow measurement is automated.

Condition 3.2 (a) of ENV/W/78 (2017) requires that the mean daily discharge over the course of the year shall not exceed 22,000m³/day;
and

Condition 3.2 (b) of ENV/W/78 (2017) requires that the maximum daily discharge shall not exceed 70,000m³/day.

Results presented in Table 2 demonstrate that these licence limits were achieved.

3.2 Water Quality Data

The site monitors water quality on a monthly basis. Water quality results are presented in Table 3 for the monitoring period January – December 2018. The samples are collected by staff of Southern Scientific accredited laboratory and transported to the laboratory on the same day. As part of the environmental management plan, the site monitors water quality at numerous points and results show that the quality of the water coming into the quarry, from surrounding lands, is the same as what is discharged.

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Table 2: Daily discharge volumes on a month by month basis

	See Note 1.													
Day	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18	Dec-18		
1st	28,028	27,410	17,501	26,004	20,161	12,207	6,864	8,148	6,735	7,489	6,664	37,039		
2nd	28,028	27,410	17,130	24,699	20,277	11,916	6,422	5,214	5,307	5,174	3,793	31,524		
3rd	37,852	27,410	16,971	27,043	19,453	11,640	7,193	6,227	8,943	6,740	7,302	29,423		
4th	37,852	27,410	17,316	29,767	19,263	11,172	6,637	7,393	4,960	6,142	4,955	27,566		
5th	37,852	27,410	18,265	33,775	18,178	11,084	6,713	5,991	6,198	4,787	6,356	25,190		
6th	37,852	27,410	24,250	37,127	18,180	10,512	6,816	7,675	6,145	7,521	10,332	40,205		
7th	37,852	27,410	27,650	44,575	17,505	10,997	6,766	4,974	6,239	5,490	8,738	52,329		
8th	35,617	27,410	27,492	51,408	17,642	10,460	6,911	8,850	6,362	4,671	9,824	46,860		
9th	35,617	27,410	26,843	46,663	17,174	10,586	5,980	4,994	6,669	6,936	8,498	43,712		
10th	35,617	27,410	26,266	44,250	16,739	10,483	7,180	7,258	7,610	6,007	9,506	41,064		
11th	35,617	27,410	27,459	40,897	16,530	10,574	6,349	5,078	6,004	6,452	14,723	38,582		
12th	35,617	23,342	29,972	35,799	17,450	11,313	5,055	8,089	6,100	5,538	9,608	37,113		
13th	35,617	23,342	31,095	34,568	16,049	10,100	7,360	4,955	6,626	8,394	11,444	35,250		
14th	35,617	23,342	30,248	29,918	15,416	10,187	5,400	6,599	6,582	8,178	12,441	39,394		
15th	35,617	23,342	41,339	27,511	15,330	11,087	7,606	6,750	6,313	9,708	12,332	42,942		
16th	54,545	23,342	67,338	26,771	15,035	10,892	6,415	7,641	5,404	4,960	11,207	52,704		
17th	54,545	17,741	63,548	26,962	14,039	10,156	6,063	5,633	8,049	7,564	11,938	60,410		
18th	54,545	23,243	59,320	34,529	14,251	10,136	8,072	7,179	6,125	5,171	10,864	60,836		
19th	54,545	24,068	53,721	37,175	14,039	10,781	4,591	6,495	6,280	6,872	10,618	61,961		
20th	54,545	23,088	47,814	35,322	14,054	7,329	7,571	6,754	6,486	5,056	10,071	60,209		
21st	54,545	22,669	41,690	32,542	14,164	7,458	5,481	4,959	6,019	5,970	9,850	58,481		
22nd	46,695	22,591	38,662	30,233	13,982	6,989	8,300	8,417	7,839	7,120	10,282	54,374		
23rd	46,695	21,658	36,365	28,890	13,128	6,633	4,774	4,254	7,611	5,423	8,515	49,592		
24th	46,695	21,237	41,566	27,404	12,937	7,122	8,934	8,270	6,361	4,856	9,542	53,088		
25th	46,695	20,585	40,381	26,028	13,120	6,895	4,192	5,286	5,891	7,306	11,236	55,173		
26th	46,695	19,082	38,473	24,468	11,808	6,877	6,450	7,648	6,392	5,195	7,591	56,942		
27th	46,695	18,688	36,180	23,255	12,794	6,871	7,407	6,187	6,676	5,238	9,158	50,093		
28th	46,695	18,012	33,399	22,773	12,763	7,119	8,335	8,127	6,388	6,971	14,614	47,643		
29th	27,410	-	31,359	21,628	11,945	6,658	7,225	6,268	5,331	4,457	18,574	40,576		
30th	27,410	-	29,984	20,867	12,197	6,759	8,946	6,485	5,667	6,980	26,382	37,512	Annual Stats (m3/d)	
31st	27,410	-	28,163	-	11,691	-	7,397	6,241	-	4,393	-	33,696		
MAX	54,545	27,410	67,338	51,408	20,277	12,207	8,946	8,850	8,943	9,708	26,382	61,961	67,338	MAX
MIN	27,410	17,741	16,971	20,867	11,691	6,633	4,192	4,254	4,960	4,393	3,793	25,190	3,793	MIN
AVERAGE	40,859	23,960	34,444	31,762	15,397	9,433	6,755	6,582	6,444	6,218	10,565	45,209	19,826	AVERAGE
ANNUAL DAILY AVERAGE:						19,826	m3/d							
Note 1.	17th Feb '18: automated flow Magmeter, constant recording flow meter installed. Prior to 17th Feb, daily volume is derived from a weekly manual reading and daily average calculated for that week.													

Table 3 Water quality results for the monitoring period January – December 2018

Bennettsbridge Limestone Final Discharge Quality 2018								
Parameter	pH	Suspended Solids	BOD	COD	Nitrate	Total Amonia	Molybdate Reactive Phosphate	Total Hydrocarbons
Units	pH units	mg/l	mg/l	mg/l	mg/l - N	mg/l - N	mg/l - P	mg/l
Jan-18	7.8	< 2	< 1.0	< 10.0	9.16	< 0.02	< 0.01	< 0.01
Feb-18	7.6	< 2	< 1.0	< 10.0	9.50	< 0.02	0.01	< 0.01
Mar-18	7.6	9	< 1.0	< 10.0	8.80	< 0.02	< 0.01	< 0.01
Apr-18	7.6	< 2	< 1.0	< 10.0	9.01	0.03	< 0.01	< 0.01
May-18	7.6	< 2	1.1	< 10.0	9.28	< 0.02	< 0.01	< 0.01
Jun-18	7.8	< 2	< 1.0	< 10.0	7.29	0.02	< 0.01	< 0.01
Jul-18	7.9	< 2	< 1.0	< 10.0	6.58	0.03	< 0.01	< 0.01
Aug-18	7.8	< 2	< 1.0	< 10.0	6.70	0.02	< 0.01	< 0.01
Sep-18	7.8	7	< 1.0	< 10.0	6.54	0.02	< 0.01	< 0.01
Oct-18	7.8	< 2	< 1.0	< 10.0	6.94	< 0.02	< 0.01	< 0.01
Nov-18	7.9	< 4	< 1.0	< 10.0	6.35	0.03	< 0.01	< 0.01
Dec-18	7.7	< 4	< 1.0	< 10.0	16.3	0.02	0.01	0.061
MAX	7.9	9	1.1	< 10.0	16.3	0.03	0.01	0.061
MIN	7.6	< 2	< 1.0	< 10.0	6.35	< 0.02	< 0.01	< 0.01
AVERAGE	7.7	3	< 1.0	< 10.0	8.5375	0.02	< 0.01	< 0.01
Discharge Licence ENV/W/78 (2017) ELV's	6-9	10	2	10	10	0.17	0.07	0.68
Hydro-G Comment	pH Compliant	SS Compliant	BOD Compliant	COD Compliant	Compliant for all but Dec 2018	Total Ammonia Compliant	MRP-P Compliant	Total Hydrocarbons Compliant

4.0 Assessment of the Results

With respect to the Volumetric ELV Conditions:

- Results presented in Table 2 demonstrate that the licence limits for discharge volume were complied with. Table 2's data are reproduced in Figure 1 to facilitate easier evaluation.
- Table 4 presents only the maximum, minimum and average values for daily discharge in each calendar month of the 2018 monitoring year. Table 4's data are reproduced in Figure 2 to facilitate easier evaluation.

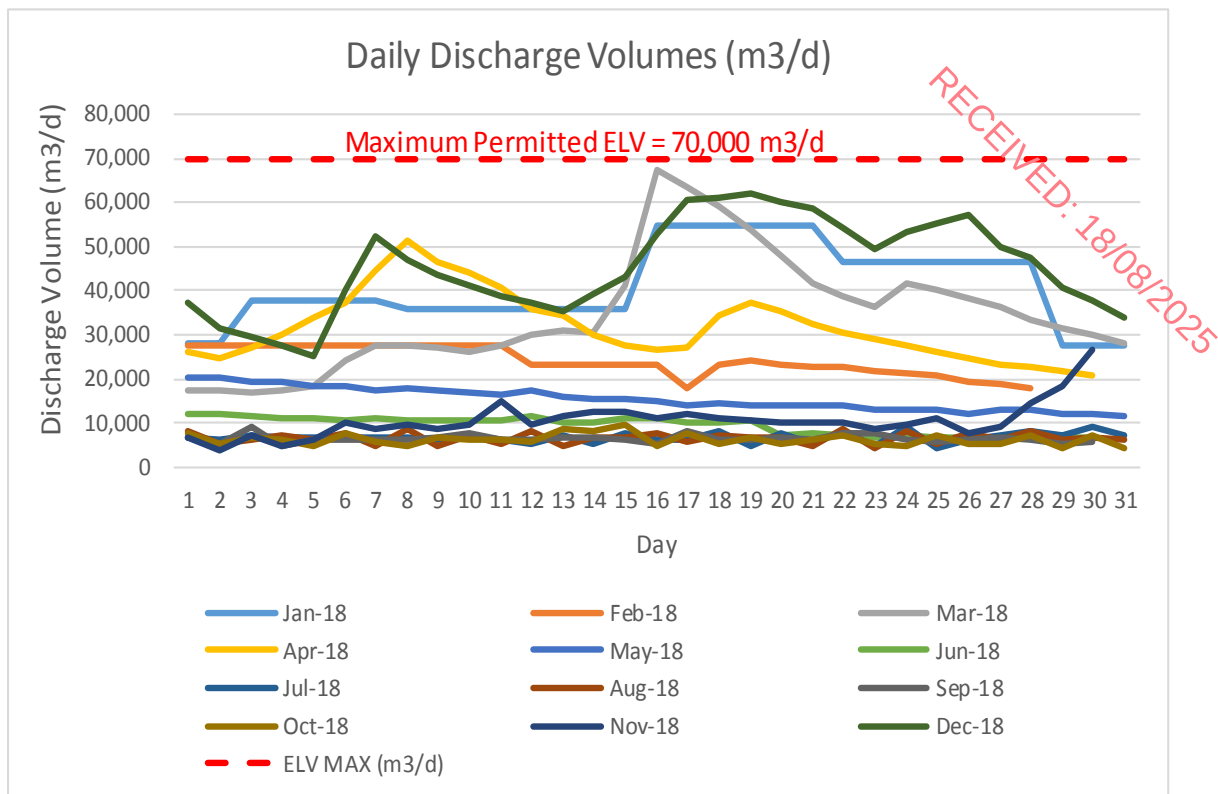


Figure 1 Daily Discharge Volumes by month: 2018

Table 4 Maximum, minimum and average values for daily discharge: 2018

	Discharge Volume Stats (m3/d)		
	MAX	MIN	AVERAGE
Jan-18	54,545	27,410	40,859
Feb-18	27,410	17,741	23,960
Mar-18	67,338	16,971	34,444
Apr-18	51,408	20,867	31,762
May-18	20,277	11,691	15,397
Jun-18	12,207	6,633	9,433
Jul-18	8,946	4,192	6,755
Aug-18	8,850	4,254	6,582
Sep-18	8,943	4,960	6,444
Oct-18	9,708	4,393	6,218
Nov-18	26,382	3,793	10,565
Dec-18	61,961	25,190	45,209
ANNUAL	67,338	3,793	19,826

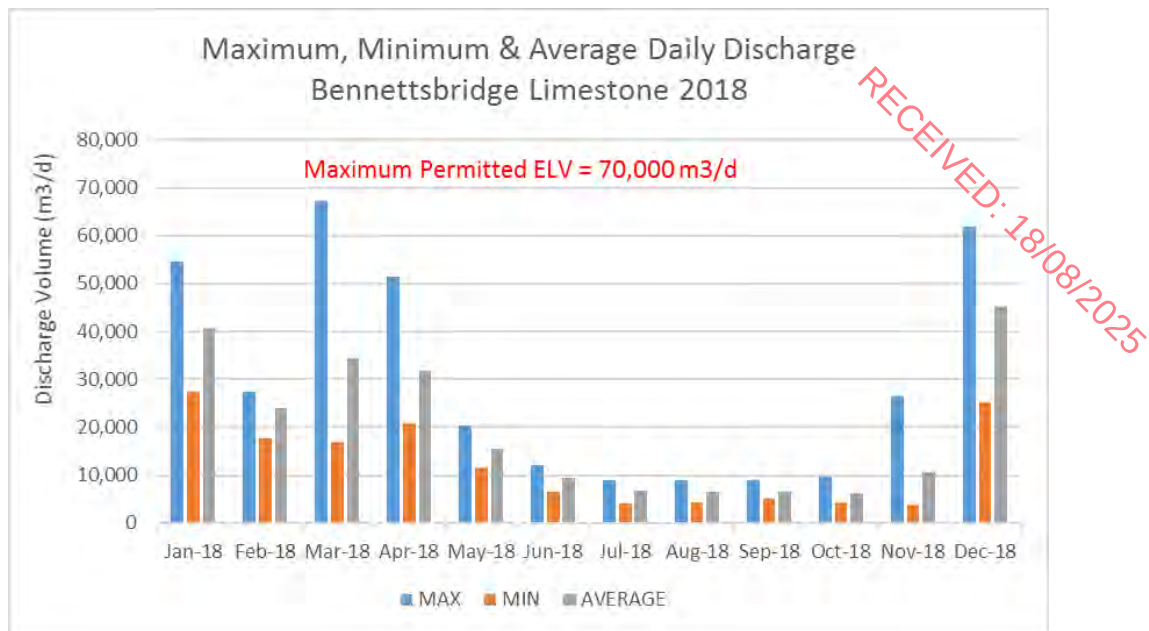


Figure 2 Maximum, Minimum & Average Daily Discharge Bennettsbridge Limestone 2018

As previously stated, it is acknowledged in the discharge licence that the waters arising at the quarry are a combination of rainfall runoff and groundwater. Results presented in Table 4 and Figure 2 demonstrate that during the seasons of high rainfall the discharge volumes peak and during low rainfall months the discharge from the quarry represents groundwater baseflow volumes. At no time does the daily discharge volume breach the 70,000m³/d ELV and the daily volume discharged, on an annual average basis, is 19,826 m³/d and this is within the 22,000 m³/d daily average ELV.

The Bennettsbridge Limestone quarry is in an area that is mapped by the Geological Survey of Ireland as being a Regionally Important Aquifer with a Karst (diffuse) flow mechanism. The diffuse flow mechanism is an important qualification. If most of the water in a karst aquifer is transported and transferred by diffuse means then excavating a void in which one exposes a large linear extent of epikarst, or transition zone, facilitates a mechanism for ‘groundwater’ ingress through the subsoil/bedrock interface. Alternatively, if an area was mapped as a Regionally Important Aquifer with a Karst (conduit) flow mechanism most of the water in that karst aquifer is transported and transferred by conduit mechanisms: in that case groundwater ingress shall be dictated by intersection between excavated areas and conduits (open pipelines in the limestone), if they exist in the area proposed for excavation. I use inverted commas for ‘groundwater’ ingress in the diffuse karst setting because a lot of non-hydrogeologists perceive most waters arising in a void to be groundwater. However, a question of merit might be ‘is very recent rainfall travelling through the transition zone actually groundwater?’. Of course, yes, “water held underground in the soil or in pores and crevices in rock” is the definition of groundwater. But the perception that groundwater is a resource from ‘deep underground’, to coin a term used by bottled water companies, is far from true in the Irish context anyway. The point is that the discharge volume ELVs were always complied. However, given that the data demonstrate that winter rainfalls create larger volumes of water at the site we use this knowledge in the evaluation of the water quality data: what comes in is what will go out. The rainfall is passing through local lands before entering the quarry and this may affect its quality.

With respect to Water Quality ELVs:

- Results presented in Table 3 indicate that the specified ELVs were complied with for all parameters in all 12 months except for one parameter in one month: that was a concentration of 16.3 mg/l NO₃-N in December 2018 (12th December). The Nitrate ELV was not exceeded in any monitoring events in any month previous. No other nutrients are elevated in December 2018: Ammonia-N and ortho-Phosphate were recorded at similar concentrations to previous months. Similarly, neither BOD nor COD were elevated above their usual < Limit of Detection of the analyser.
- With respect to potential for impact on the receiving water, which is the River Nore, arising from the December 2018 nitrate concentration of 16.3 mg/l NO₃-N, the following can be determined:
 - The 16.3 mg/l NO₃-N in the discharge waters was sampled on the 12th December 2018;
 - The volume of water discharged from Bennettsbridge Limestone Ltd's final settlement lagoon that day was 37,113 m³/d (or 0.4 m³/s);
 - The volume of water flowing on that day in the receiving water River Nore was high because it was winter. OPW flow monitoring data (<https://waterlevel.ie/hydro-data>) for its monitoring station at John's Bridge on the River Nore upstream of Bennettsbridge Limestone Ltd. discharged 37,113 m³/d: this means that the ratio of flow was 1 unit of quarry discharge added to 230 units of river flow, on average that day. This means that the river had good flow and dilution capacity;
 - It is known from KCC's historic water quality data for the upstream WQ monitoring Station on the River Nore (Stn 15N01-2000. 4km d/s Kilkenny (N of Warrington) – d/s Kilkenny City WWTP) that the average nitrate concentration is 13.3 mg/l as NO₃, which is equivalent to 3 mg/l NO₃ as N and it is this latter form of nitrate as N that the Discharge Licence's ELV and monitoring results for Bennettsbridge Limestone Ltd. are reported. Therefore, the receiving's water concentration is reasonably assumed to be 3 mg/l NO₃-N and the one monitoring event discharge concentration exceedance in was 16.3 mg/l NO₃-N;
 - If we apply the Department of Environment Guidance Assimilation Capacity Simulation formula for assessment of potential resultant concentrations arising from the 12th December 2018 discharge to surface water:

Assimilation capacity Simulation model $T = (FC+fc)/(F+f)$

Where: $T = \text{RESULTANT conc. in receiving water (mg/l)}$ $T = ?$

$F = \text{RECEIVING river flow (m}^3/\text{s)}$ $F = 99 \text{ m}^3/\text{s}$ & $C = \text{Concentration in receiving water (mg/l)}$ $C = 3 \text{ mg/l NO}_3\text{-N}$

$f = \text{Flow discharging to receiving waters (m}^3/\text{s)}$ $f = 0.4 \text{ m}^3/\text{s}$ & $c = \text{concentration in discharge (mg/l)}$ $c = 16.3 \text{ mg/l NO}_3\text{-N}$

RESULTANT concentration $T = [(99*3)+(0.4*16.3)]/[99+0.4] = 3 \text{ mg/l NO}_3\text{-N}$

The simulated resultant concentration, i.e. effect of the 16.3 mg/l NO₃-N discharge concentration, returns the same concentration in the river for the downstream location as it was for the upstream. Therefore, it is concluded that the ELV exceedance does not have the potential to cause a deterioration in water quality or status class of the receiving water.

Monitoring results for all other parameters are in compliance status for all 12 monthly monitoring events. Average results are presented in Table 5. Results demonstrate compliance, overall.

Table 5 Average Results, ELVs and Compliance @ Bennettsbridge Limestone 2018.

Parameter	Discharge Licence ENV/W/78 (2017) ELV's	AVERAGE Monitoring Result 2018		Hydro-G Comment
pH	6-9	7.7	pH units	pH Compliant
Suspended Solids	10	3	mg/l	SS Compliant
BOD	2	< 1.0	mg/l	BOD Compliant
COD	10	< 10.0	mg/l	COD Compliant
Nitrate	10	8.5	mg/l - N	Compliant for all but Dec 2018
Total Ammonia	0.17	0.02	mg/l - N	Total Ammonia Compliant
Molybdate Reactive Phosphate	0.07	< 0.01	mg/l - P	MRP-P Compliant
Total Hydrocarbons	0.68	< 0.01	mg/l	Total Hydrocarbons Compliant

5.0 Compliance with Licence Conditions

With respect to the Volumetric ELV Conditions:

- Data presented in Table 2 and in Figures 1 & 2 demonstrate that the licence limits for discharge volume were always complied with;
- On no day in 2018 did the discharge volume exceed the maximum permitted volume of 70,000 m³/d;
- The annual average discharge volume was 19,836 m³/d, which is in compliance with the specified Condition 3.2 (a) that 'The mean daily discharge over the course of a year shall not exceed 22,000m³/day'.

With respect to Water Quality ELVs:

- Results presented in Table 3 indicate that the prescribed ELVs were complied with for all parameters in all 12 months except for one parameter in one month: that was a concentration of 16.3 mg/l NO₃-N in December 2018. Nitrate was not exceeded in any monitoring events in any month previous. The average Nitrate concentration in 12 monitoring events in 2018 was 8.5 mg/l NO₃-N (Table 5). It is proposed that the 2019 nitrate response should be closely monitored to establish if the 16.3 mg/l NO₃-N December 2018 concentration was an out of the ordinary event or a trend establishing. The quarry will monitor and evaluate other points in the quarry, such as the 'Eden Spring' discharge and those small groundwater emission points in the western wall of the quarry, to try to identify where the nitrate might be coming from.

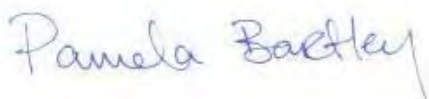
6.0 Register of Incidents

There were no serious incidents to report with respect to this discharge during 2018.

There was one single exceedance, in 12 months of monthly interval monitoring, of one of 8 specified hydrochemical ELVs: that one exceedance was for nitrate in the discharge waters. This occurred at the end of the year in the December 2018 monitoring. The site shall examine this in more detail in the monitoring of 2019: is it a once off anomaly or a trend? No other nutrients are elevated in December 2018: Ammonia-N and ortho-Phosphate were recorded at similar concentrations to previous months. Similarly, neither BOD nor COD were elevated above their usual < Limit of Detection of the analyser.

7.0 Conclusions

- 7.1 The site is in overall compliance with the requirements of Discharge Licence ENV/W/78 (2017).
- 7.2 At no time does the daily discharge volume breach the 70,000m³/d ELV.
- 7.3 The daily volume discharged, on an annual average basis, is 19,826 m³/d and this is within the 22,000 m³/d ELV for the daily average calculated using daily values over the entire year.
- 7.4 There was one exceedance of one hydrochemical ELV (nitrates). This one exceedance occurred at the end of the year and it shall be evaluated more when the results for the following months, i.e. early 2019, are evaluated. Water flow data demonstrate that winter rainfalls create larger volumes of water at the site we use this knowledge in the evaluation of the water quality data: what comes in is what will go out. The rainfall is passing through local lands before entering the quarry and this may affect its quality.
- 7.5 In any case, when the effect of the discharge exceedance is simulated, the resultant concentration in the River Nore receiving water, i.e. effect of the 16.3 mg/l NO₃-N discharge concentration, returns the same concentration in the river for the downstream location as it was for the upstream. Therefore, it is concluded that the ELV exceedance does not have the potential to cause a deterioration in water quality or status class of the receiving water.



Dr. Pamela Bartley B.Eng, M.SC., Ph.D.

Appendix A
Laboratory Certificates of Analysis

RECEIVED: 18/08/2025

ANALYSIS REPORT

CUSTOMER:	BENNETSBRIDGE LIMESTONE QUARRIES LTD	SAMPLE TYPE:	SURFACE WATER
ADDRESS:	Kilree, Sheastown, County Kilkenny	CONDITION OF SAMPLE ON RECEIPT:	Satisfactory
REPORT TO:	EOIN O CARROLL	DATE SAMPLED:	08 January 2018
SAMPLED BY:	Danny O Leary, Southern Scientific Services Ltd	DATE RECEIVED:	08 January 2018
SAMPLING PT:	BENNETSBRIDGE QUARRY	DATE ANALYSED:	09 - 29 January 2018
ORDER NO:		DATE REPORTED:	30 January 2018
		WORK NO.:	39617 C

TABLE OF RESULTS

Method	Parameter	Unit	C18-Jan 086 Exiting Lagoon	LIMITS Supplied by Customer
Chemical Analysis: (F)				
SCP 052	pH	pH Unit	7.8	6.0 – 9.0
SCP 052	Conductivity	µS/cm @ 20°C	711	
SCP 027a	Total Ammonia	mg/L N	<0.02	0.17 mg/L N
SCP 027g	Nitrate	mg/L as N	9.16	10 mg/L N
SCP 027f	Nitrite	mg/L as N	0.005	-
SCP 015	BOD	mg/L	<1.0	2 mg/L
SCP 016	COD	mg/L	<10	10 mg/L
SCP 010	Suspended Solids	mg/L	<2	10 mg/L
SCP 027c	MRP	mg/L P	<0.01	0.07 mg/L P
SCP 058	Turbidity	NTU	0.48	-
**5520F	* TPH's (C10-C40)	mg/L	<0.01	0.68 mg/L
On Site Monitoring				
-	* Temperature	°C	9.1	-

Ruth Murphy
Ruth Murphy
Chemistry Laboratory Manager

Index to symbols used:

*	Analysis is not INAB accredited.
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
(F)	Analysis carried out at our Farranfore Laboratory.

- The results relate only to the items tested.
- Opinions and interpretations expressed herein are outside the scope of INAB accreditation.
- The analysis report shall not be reproduced except in full without written approval of the laboratory.

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ANALYSIS REPORT

CUSTOMER:	BENNETSBRIDGE LIMESTONE QUARRIES LTD	SAMPLE TYPE:	SURFACE WATER
ADDRESS:	Kilree, Sheastown, County Kilkenny	CONDITION OF SAMPLE ON RECEIPT:	Satisfactory
REPORT TO:	EOIN O CARROLL	DATE SAMPLED:	05 February 2018
SAMPLED BY:	Danny O Leary, Southern Scientific Services Ltd	DATE RECEIVED:	05 February 2018
SAMPLING PT:	BENNETSBRIDGE QUARRY	DATE ANALYSED:	05 - 14 February 2018
ORDER NO:		DATE REPORTED:	19 February 2018
		WORK NO.:	39806 C

TABLE OF RESULTS

Method	Parameter	Unit	C18-Feb 051 Exiting Lagoon	LIMITS Supplied by Customer
Chemical Analysis: (F)				
SCP 052	pH	pH Unit	7.6	6.0 – 9.0
SCP 027a	Total Ammonia	mg/L N	<0.02	0.17 mg/L N
SCP 027g	Nitrate	mg/L as N	9.50	10 mg/L N
SCP 015	BOD	mg/L	<1.0	2 mg/L
SCP 016	COD	mg/L	<10.0	10 mg/L
SCP 010	Suspended Solids	mg/L	<2	10 mg/L
SCP 027c	MRP	mg/L P	0.01	0.07 mg/L P
**5520F	* TPH's (C10-C40)	mg/L	<0.01	0.68 mg/L
SCP 065b	* TOC	mg/L	2.89	-
SCP 065b	* Dissolved Organic Carbon	mg/L	1.88	-
On Site Monitoring				
-	* Temperature	°C	8.7	-

Ruth Murphy
Ruth Murphy
Chemistry Laboratory Manager

Index to symbols used:

*	Analysis is not INAB accredited.
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registered in ireland no 323196 | vat reg no IE 6343196 M

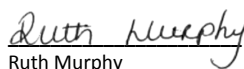


ANALYSIS REPORT

CUSTOMER:	BENNETSBRIDGE LIMESTONE QUARRIES LTD	SAMPLE TYPE:	SURFACE WATER
ADDRESS:	Kilree, Sheastown, County Kilkenny	CONDITION OF SAMPLE ON RECEIPT:	Satisfactory
REPORT TO:	EOIN O CARROLL	DATE SAMPLED:	06 March 2018
SAMPLED BY:	Danny O Leary, Southern Scientific Services Ltd	DATE RECEIVED:	06 March 2018
SAMPLING PT:	BENNETSBRIDGE QUARRY	DATE ANALYSED:	06 – 28 March 2018
ORDER NO:		DATE REPORTED:	28 March 2018
		WORK NO.:	40009 C

TABLE OF RESULTS

Method	Parameter	Unit	C18-Mar 064 Exiting Lagoon	LIMITS Supplied by Customer
Chemical Analysis: (F)				
SCP 052	pH	pH Unit	7.6	6.0 – 9.0
SCP 027a	Total Ammonia	mg/L N	<0.02	0.17 mg/L N
SCP 027g	Nitrate	mg/L as N	8.80	10 mg/L N
SCP 027f	Nitrite	mg/L as N	0.010	
SCP 015	BOD	mg/L	<1.0	2 mg/L
SCP 016	COD	mg/L	<10	10 mg/L
SCP 010	Suspended Solids	mg/L	9.0	10 mg/L
SCP 027c	MRP	mg/L P	<0.01	0.07 mg/L P
**5520F	* TPH's (C10-C40)	mg/L	<0.01	0.68 mg/L
SCP 065b	* TOC	mg/L	2.06	-
SCP 065b	* Dissolved Organic Carbon	mg/L	1.82	-
On Site Monitoring				
-	* Temperature	°C	11.1	-


Ruth Murphy
Chemistry Laboratory Manager

Index to symbols used:

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**	Adapted from Standard Methods for the Examination of Water and Wastewater.
(F)	Analysis carried out at our Farranfore Laboratory.

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web site www.southernscientificireland.com | e-mail info@southernscientificireland.com

directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M



ANALYSIS REPORT

CUSTOMER:	BENNETSBRIDGE LIMESTONE QUARRIES LTD	SAMPLE TYPE:	SURFACE WATER
ADDRESS:	Bennettsbridge, County Kilkenny	CONDITION OF SAMPLE ON RECEIPT:	Satisfactory
REPORT TO:	EOIN O CARROLL	DATE SAMPLED:	03 April 2018
SAMPLED BY:	Danny O Leary, Southern Scientific Services Ltd	DATE RECEIVED:	03 April 2018
SAMPLING PT:	BENNETSBRIDGE QUARRY	DATE ANALYSED:	03 – 19 April 2018
ORDER NO:		DATE REPORTED:	19 April 2018
		WORK NO.:	40260 C

TABLE OF RESULTS

Method	Parameter	Unit	C18-Apr 017 Exiting Lagoon	LIMITS Supplied by Customer
Chemical Analysis: (F)				
SCP 052	pH	pH Unit	7.6	6.0 – 9.0
SCP 027a	Total Ammonia	mg/L N	0.03	0.17 mg/L N
SCP 027g	Nitrate	mg/L as N	9.01	10 mg/L N
SCP 027f	Nitrite	mg/L as N	0.013	
SCP 015	BOD	mg/L	<1.0	2 mg/L
SCP 016	COD	mg/L	<10	10 mg/L
SCP 010	Suspended Solids	mg/L	<2	10 mg/L
SCP 027c	MRP	mg/L P	<0.01	0.07 mg/L P
**5520F	* TPH's (C10-C40)	mg/L	<0.01	0.68 mg/L
SCP 065b	* TOC	mg/L	2.05	-
SCP 065b	* Dissolved Organic Carbon	mg/L	1.98	-
On Site Monitoring				
-	* Temperature	°C	11.8	-

Ruth Murphy
Ruth Murphy
Chemistry Laboratory Manager

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ANALYSIS REPORT

CUSTOMER:	BENNETTSBRIDGE LIMESTONE QUARRIES LTD	SAMPLE TYPE:	SURFACE WATER
ADDRESS:	Bennettsbridge, County Kilkenny	CONDITION OF SAMPLE ON RECEIPT:	Satisfactory
REPORT TO:	EOIN O CARROLL	DATE SAMPLED:	03 May 2018
SAMPLED BY:	Danny O Leary, Southern Scientific Services Ltd	DATE RECEIVED:	03 May 2018
SAMPLING PT:	BENNETTSBRIDGE QUARRY	DATE ANALYSED:	03 – 09 May 2018
ORDER NO:		DATE REPORTED:	22 May 2018
		WORK NO.:	40497 C

Ruth Murphy

Ruth Murphy
Chemistry Laboratory Manager

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TABLE OF RESULTS

Method	Parameter	Unit	C18-May 067 Exiting Lagoon	LIMITS Supplied by Customer
Chemical Analysis: (F)				
SCP 052	pH	pH Unit	7.6	6.0 – 9.0
SCP 027d	Sulphate	mg/L	16.1	-
SCP 052	Conductivity	µS/cm @ 20°C	688	-
SCP 027a	Ammonia	mg/L	<0.02	0.17 mg/L N
SCP 027g	Nitrate	mg/L as N	9.28	10 mg/L N
SCP 027f	Nitrite	mg/L as N	0.02	-
SCP 053a	Calcium	mg/L	135	-
SCP 027i	Total Hardness	mg/L as CaCO ₃	408	-
SCP 010	Suspended Solids	mg/L	<2	10 mg/L
SCP 027c	MRP	mg/L P	<0.01	0.07 mg/L P
SCP 065b	TOC	mg/L	2.05	-
SCP 065	Dissolved Organic Carbon	mg/L	1.91	-
SCP 044	Total Phosphorus	mg/L P	<0.04	-
SCP 053a	Magnesium	mg/L	13.8	-
SCP 053a	Potassium	mg/L	2.88	-
SCP 053a	Sodium	mg/L	13.1	-
SCP 053a	Chloride	mg/L	32.9	-
SCP 053a	Manganese, Total	mg/L	<0.001	-
SCP 053a	Manganese, Dissolved	mg/L	<0.001	-
SCP 015	BOD	mg/L	1.1	2 mg/L
SCP 016	COD	mg/L	<10	10 mg/L
SCP 038	Iron, Total	mg/L	0.013	-
SCP 038	Iron, Dissolved	mg/L	0.012	-
**5520F	* TPH's (C10-C40)	mg/L	<0.01	0.68 mg/L
On Site Monitoring				
-	* Temperature	°C	13.7	-

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Method	Parameter	Unit	C18-May 067 Exiting Lagoon	LIMITS Supplied by Customer
PAH'S				
**6410 B	* PAH (Total)	µg/L	<0.16	-
**6410 B	* Acenaphthene	µg/L	<0.01	-
**6410 B	* Acenaphthylene	µg/L	<0.01	-
**6410 B	* Anthracene	µg/L	<0.01	-
**6410 B	* Benzo(a)anthracene	µg/L	<0.01	-
**6410 B	* Benzo(b)fluoranthene	µg/L	<0.01	-
**6410 B	* Benzo(k)fluoranthene	µg/L	<0.01	-
**6410 B	* Sum B/K	µg/L	<0.01	-
**6410 B	* Benzo(ghi)perylene	µg/L	<0.01	-
**6410 B	* Benzo(a)pyrene	µg/L	<0.01	-
**6410 B	* Chrysene	µg/L	<0.01	-
**6410 B	* Dibenzo(ah)anthracene	µg/L	<0.01	-
**6410 B	* Flouroanthene	µg/L	<0.01	-
**6410 B	* Flourene	µg/L	<0.01	-
**6410 B	* Indeno(1,2,3-cd)pyrene	µg/L	<0.01	-
**6410 B	* Naphthalene	µg/L	<0.01	-
**6410 B	* Phenanthrene	µg/L	<0.01	-
**6410 B	* Pyrene	µg/L	<0.01	-

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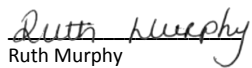
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ANALYSIS REPORT

CUSTOMER:	BENNETTSBRIDGE LIMESTONE QUARRIES LTD	SAMPLE TYPE:	SURFACE WATER
ADDRESS:	Bennettsbridge, County Kilkenny	CONDITION OF SAMPLE ON RECEIPT:	Satisfactory
REPORT TO:	EOIN O CARROLL	DATE SAMPLED:	11 June 2018
SAMPLED BY:	Danny O Leary, Southern Scientific Services Ltd	DATE RECEIVED:	11 June 2018
SAMPLING PT:	BENNETTSBRIDGE QUARRY	DATE ANALYSED:	12 – 30 June 2018
ORDER NO:		DATE REPORTED:	04 July 2018
		WORK NO.:	40853 C


Ruth Murphy
Chemistry Laboratory Manager

Index to symbols used:

*	Analysis is not INAB accredited.
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
(F)	Analysis carried out at our Farranfore Laboratory.
Note 4	The handling of the sample within the laboratory did not comply with the laboratories policy on holding times & handling instructions. As a result, it is possible that the results may have been compromised.
Note 5	Sample frozen on receipt.

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TABLE OF RESULTS

Method	Parameter	Unit	C18-Jun 178 Exiting Lagoon	LIMITS Supplied by Customer
Chemical Analysis: (F)				
SCP 052	pH	pH Unit	7.8	6.0 – 9.0
SCP 027a	Ammonia ^{Note 4 & 5}	mg/L N	0.02	0.17 mg/L N
SCP 027g	Nitrate	mg/L N	7.29	10 mg/L N
SCP 027	Nitrite	mg/L N	0.009	-
SCP 010	Suspended Solids	mg/L	<2	10 mg/L
SCP 027c	MRP	mg/L P	<0.01	0.07 mg/L P
SCP 065b *	TOC	mg/L	1.80	-
SCP 065 *	Dissolved Organic Carbon	mg/L	1.81	-
SCP 015	BOD	mg/L	<1.0	2 mg/L
SCP 016	COD	mg/L	<10	10 mg/L
**5520F *	TPH's (C10-C40)	mg/L	<0.01	0.68 mg/L
On Site Monitoring				
-	* Temperature	°C	14.9	-

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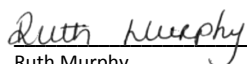
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ANALYSIS REPORT

CUSTOMER:	BENNETSBRIDGE LIMESTONE QUARRIES LTD	SAMPLE TYPE:	SURFACE WATER
ADDRESS:	Bennettsbridge, County Kilkenny	CONDITION OF SAMPLE ON RECEIPT:	Satisfactory
REPORT TO:	EOIN O CARROLL	DATE SAMPLED:	09 July 2018
SAMPLED BY:	Paul Byrne, Southern Scientific Services Ltd	DATE RECEIVED:	09 July 2018
SAMPLING PT:	BENNETSBRIDGE QUARRY	DATE ANALYSED:	09 – 16 July 2018
ORDER NO:		DATE REPORTED:	23 July 2018
		WORK NO.:	41088 C


Ruth Murphy
Chemistry Laboratory Manager

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TABLE OF RESULTS

Method	Parameter	Unit	C18-Jul 142 Exiting Lagoon	LIMITS <i>Supplied by Customer</i>
Chemical Analysis: (F)				
SCP 052	pH	pH Unit	7.9	6.0 – 9.0
SCP 027a	Ammonia	mg/L N	0.03	0.17 mg/L N
SCP 027g	Nitrate	mg/L N	6.58	10 mg/L N
SCP 027	Nitrite	mg/L N	0.02	-
SCP 010	Suspended Solids	mg/L	<2	10 mg/L
SCP 027c	MRP	mg/L P	<0.01	0.07 mg/L P
SCP 065b *	TOC	mg/L	1.78	-
SCP 065 *	Dissolved Organic Carbon	mg/L	1.78	-
SCP 015	BOD	mg/L	<1.0	2 mg/L
SCP 016	COD	mg/L	<10	10 mg/L
**5520F *	TPH's (C10-C40)	mg/L	<0.01	0.68 mg/L
On Site Monitoring				
-	* Temperature	°C	17.8	-

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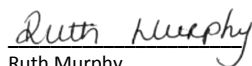
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ANALYSIS REPORT

CUSTOMER:	BENNETSBRIDGE LIMESTONE QUARRIES LTD	SAMPLE TYPE:	SURFACE WATER
ADDRESS:	Bennettsbridge, County Kilkenny	CONDITION OF SAMPLE ON RECEIPT:	Satisfactory
REPORT TO:	EOIN O CARROLL	DATE SAMPLED:	13 August 2018
SAMPLED BY:	Danny O Leary, Southern Scientific Services Ltd	DATE RECEIVED:	13 August 2018
SAMPLING PT:	EXITING LAGOON BENNETSBRIDGE QUARRY	DATE ANALYSED:	13 - 27 August 2018
ORDER NO:		DATE REPORTED:	30 August 2018
		WORK NO.:	41329 C


Ruth Murphy
Chemistry Laboratory Manager

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TABLE OF RESULTS

Method	Parameter	Unit	C18-Aug 222 Exiting Lagoon	LIMITS Supplied by Customer
Chemical Analysis: (F)				
SCP 052	pH	pH Unit	7.8	6.0 – 9.0
SCP 027a	Total Ammonia	mg/L N	0.02	0.17 mg/L N
SCP 027g	Nitrate	mg/L N	6.70	10 mg/L N
SCP 010	Suspended Solids	mg/L	<2	10 mg/L
SCP 027c	MRP	mg/L P	<0.01	0.07 mg/L P
SCP 065b	TOC	mg/L	2.31	-
SCP 065	Dissolved Organic Carbon	mg/L	2.01	-
SCP 052	Electrical Conductivity	µS/cm	659	-
**5320 F	* Total Hydrocarbons	mg/L	<0.01	-
SCP 053a	Potassium	mg/L	2.90	-
SCP 053a	Sodium	mg/L	12.0	-
SCP 027b	Chloride	mg/L	30.2	-
SCP 016	COD	mg/L	<10	10 mg/L
SCP 015	BOD	mg/L	<1.0	2 mg/L
SCP 027d	Sulphate	mg/L	18.7	-
SCP 027f	Nitrite	mg/L as N	0.02	-
SCP 053a	Calcium	mg/L	128	-
SCP 044	Total Phosphorus	mg/L P	<0.04	-
SCP 053a	Magnesium	mg/L	17.2	-
SCP 053	Iron, Total	mg/L	0.007	-
SCP 053	Iron, Dissolved	mg/L	<0.001	-
SCP 053a	Manganese, Total	mg/L	<0.001	-
SCP 053a	Manganese, Dissolved	mg/L	<0.001	-
PAH'S				
**6410 B	* PAH (Total)	µg/L	<0.16	-
**6410 B	* Acenaphthene	µg/L	<0.01	-
**6410 B	* Acenaphthylene	µg/L	<0.01	-
**6410 B	* Anthracene	µg/L	<0.01	-
**6410 B	* Benzo(a)anthracene	µg/L	<0.01	-
**6410 B	* Benzo(b)fluoranthene	µg/L	<0.01	-
**6410 B	* Benzo(k)fluoranthene	µg/L	<0.01	-
**6410 B	* Sum B/K	µg/L	<0.01	-
**6410 B	* Benzo(ghi)perylene	µg/L	<0.01	-
**6410 B	* Benzo(a)pyrene	µg/L	<0.01	-
**6410 B	* Chrysene	µg/L	<0.01	-
**6410 B	* Dibenzo(ah)anthracene	µg/L	<0.01	-
**6410 B	* Flouroanthene	µg/L	<0.01	-
**6410 B	* Flourene	µg/L	<0.01	-
**6410 B	* Indeno(1,2,3-cd)pyrene	µg/L	<0.01	-
**6410 B	* Naphthalene	µg/L	<0.01	-
**6410 B	* Phenanthrene	µg/L	<0.01	-
**6410 B	* Pyrene	µg/L	<0.01	-
On Site Monitoring				
-	* Temperature	°C	13.5	-

RECEIVED: 18/08/2018



ANALYSIS REPORT

CUSTOMER:	BENNETSBRIDGE LIMESTONE QUARRIES LTD	SAMPLE TYPE:	SURFACE WATER
ADDRESS:	Bennettsbridge, County Kilkenny	CONDITION OF SAMPLE ON RECEIPT:	Satisfactory
REPORT TO:	EOIN O CARROLL	DATE SAMPLED:	11 September 2018
SAMPLED BY:	Danny O Leary, Southern Scientific Services Ltd	DATE RECEIVED:	11 September 2018
SAMPLING PT:	EXITING LAGOON BENNETSBRIDGE QUARRY	DATE ANALYSED:	11-26 September 2018
ORDER NO:		DATE REPORTED:	02 October 2018
		WORK NO.:	41952 C

Ruth Murphy

Ruth Murphy
Chemistry Laboratory Manager

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registered in ireland no 323196 | vat reg no IE 6343196 M



TABLE OF RESULTS

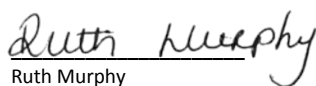
Method	Parameter	Unit	C18-Sep 209 Exiting Lagoon	LIMITS Supplied by Customer
Chemical Analysis: (F)				
SCP 052	pH	pH Unit	7.8	6.0 – 9.0
SCP 027a	Total Ammonia	mg/L N	0.02	0.17 mg/L N
SCP 027g	Nitrate	mg/L N	6.54	10 mg/L N
SCP 010	Suspended Solids	mg/L	7	10 mg/L
SCP 027c	MRP	mg/L P	<0.01	0.07 mg/L P
SCP 065b	TOC	mg/L	4.03	-
SCP 065	Dissolved Organic Carbon	mg/L	3.56	-
SCP 052	Electrical Conductivity	µS/cm	666	-
**5320 F	* Total Hydrocarbons	mg/L	<0.01	-
SCP 053a	Potassium	mg/L	2.95	-
SCP 053a	Sodium	mg/L	11.8	-
SCP 027b	Chloride	mg/L	30.2	-
SCP 016	COD	mg/L	<10	10 mg/L
SCP 015	BOD	mg/L	<1.0	2 mg/L
SCP 027d	Sulphate	mg/L	19.8	-
SCP 027f	Nitrite	mg/L as N	<0.016	-
SCP 053a	Calcium	mg/L	123	-
SCP 044	Total Phosphorus	mg/L P	<0.04	-
SCP 053a	Magnesium	mg/L	16.7	-
SCP 053	Iron, Total	µg/L	11	-
SCP 053	Iron, Dissolved	µg/L	6	-
SCP 053a	Manganese, Total	µg/L	1	-
SCP 053a	Manganese, Dissolved	µg/L	<1	-
PAH'S				
**6410 B	* PAH (Total)	µg/L	<0.16	-
**6410 B	* Acenaphthene	µg/L	<0.01	-
**6410 B	* Acenaphthylene	µg/L	<0.01	-
**6410 B	* Anthracene	µg/L	<0.01	-
**6410 B	* Benzo(a)anthracene	µg/L	<0.01	-
**6410 B	* Benzo(b)fluoranthene	µg/L	<0.01	-
**6410 B	* Benzo(k)fluoranthene	µg/L	<0.01	-
**6410 B	Sum B/K	µg/L	<0.01	-
**6410 B	* Benzo(ghi)perylene	µg/L	<0.01	-
**6410 B	* Benzo(a)pyrene	µg/L	<0.01	-
**6410 B	* Chrysene	µg/L	<0.01	-
**6410 B	* Dibenzo(ah)anthracene	µg/L	<0.01	-
**6410 B	* Flouroanthene	µg/L	<0.01	-
**6410 B	* Flourene	µg/L	<0.01	-
**6410 B	* Indeno(1,2,3-cd)pyrene	µg/L	<0.01	-
**6410 B	* Naphthalene	µg/L	<0.01	-
**6410 B	* Phenanthrene	µg/L	<0.01	-
**6410 B	* Pyrene	µg/L	<0.01	-
On Site Monitoring				
-	* Temperature	°C	13.1	-

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ANALYSIS REPORT

CUSTOMER:	BENNETSBRIDGE LIMESTONE QUARRIES LTD	SAMPLE TYPE:	SURFACE WATER
ADDRESS:	Bennettsbridge, County Kilkenny	CONDITION OF SAMPLE ON RECEIPT:	Satisfactory
REPORT TO:	EOIN O CARROLL	DATE SAMPLED:	08 October 2018
SAMPLED BY:	Danny O Leary, Southern Scientific Services Ltd	DATE RECEIVED:	08 October 2018
SAMPLING PT:	EXITING LAGOON BENNETSBRIDGE QUARRY	DATE ANALYSED:	08 October -11 November 2018
ORDER NO:		DATE REPORTED:	28 November 2018
		WORK NO.:	42187 C


Ruth Murphy
Chemistry Laboratory Manager

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M



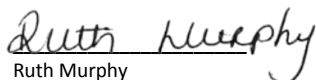
TABLE OF RESULTS

Method	Parameter	Unit	C18-Oct 173 Exiting Lagoon	LIMITS <i>Supplied by Customer</i>
Chemical Analysis: (F)				
	Temperature	°C	13.0	-
SCP 052	pH	pH Unit	7.8	6.0 – 9.0
SCP 027a	Total Ammonia	mg/L N	<0.02	0.17 mg/L N
SCP 027g	Nitrate	mg/L N	6.94	10 mg/L N
SCP 010	Suspended Solids	mg/L	<2	10 mg/L
**5520F	TPH's (c10-c40)	µg/L	<10	
SCP 027c	MRP	mg/L P	<0.01	0.07 mg/L P
SCP 065b	TOC	mg/L	2.84	-
SCP 065	Dissolved Organic Carbon	mg/L	2.31	-
SCP 052	Conductivity	µS/cm	672	-
SCP 053a	Potassium	mg/L	2.68	-
SCP 053a	Sodium	mg/L	11.5	-
SCP 027b	Chloride	mg/L	28.8	-
SCP 016	COD	mg/L	<10	10 mg/L
SCP 015	BOD	mg/L	<1.0	2 mg/L
SCP 027d	Sulphate	mg/L	21.7	-
SCP 027f	Nitrite	mg/L as N	0.01	-
SCP 053a	Calcium	mg/L	118	-
SCP 044	Total Phosphorus	mg/L P	<0.04	-
SCP 053a	Magnesium	mg/L	16.9	-
SCP 038	Iron, Total	µg/L	9	-
SCP 038	Iron, Dissolved	µg/L	9	-
SCP 038	Manganese, Total	µg/L	<1	-
SCP 038	Manganese, Dissolved	µg/L	<1	-
PAH'S				
**6410 B	* PAH (Total)	µg/L	<0.16	-
**6410 B	* Acenaphthene	µg/L	<0.01	-
**6410 B	* Acenaphthylene	µg/L	<0.01	-
**6410 B	* Anthracene	µg/L	<0.01	-
**6410 B	* Benzo(a)anthracene	µg/L	<0.01	-
**6410 B	* Benzo(b)fluoranthene	µg/L	<0.01	-
**6410 B	* Benzo(k)fluoranthene	µg/L	<0.01	-
**6410 B	Sum B/K	µg/L	<0.01	-
**6410 B	* Benzo(ghi)perylene	µg/L	<0.01	-
**6410 B	* Benzo(a)pyrene	µg/L	<0.01	-
**6410 B	* Chrysene	µg/L	<0.01	-
**6410 B	* Dibenzo(ah)anthracene	µg/L	<0.01	-
**6410 B	* Fluoroanthene	µg/L	<0.01	-
**6410 B	* Fluorene	µg/L	<0.01	-
**6410 B	* Indeno(1,2,3-cd)pyrene	µg/L	<0.01	-
**6410 B	* Naphthalene	µg/L	<0.01	-
**6410 B	* Phenanthrene	µg/L	<0.01	-
**6410 B	* Pyrene	µg/L	<0.01	-

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ANALYSIS REPORT

CUSTOMER:	BENNETSBRIDGE LIMESTONE QUARRIES LTD	SAMPLE TYPE:	SURFACE WATER
ADDRESS:	Bennettsbridge, County Kilkenny	CONDITION OF SAMPLE ON RECEIPT:	Satisfactory
REPORT TO:	EOIN O CARROLL	DATE SAMPLED:	06 November 2018
SAMPLED BY:	Danny O Leary, Southern Scientific Services Ltd	DATE RECEIVED:	06 November 2018
SAMPLING PT:	EXITING LAGOON BENNETSBRIDGE QUARRY	DATE ANALYSED:	06-27 November 2018
ORDER NO:		DATE REPORTED:	21 December 2018
		WORK NO.:	42391 C


Ruth Murphy
Chemistry Laboratory Manager

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TABLE OF RESULTS

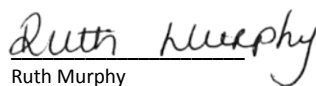
Method	Parameter	Unit	C18-Nov 092 Exiting Lagoon	LIMITS Supplied by Customer
Chemical Analysis: (F)				
SCP 052	pH	pH Unit	7.9	6.0 – 9.0
SCP 027a	Total Ammonia	mg/L N	0.03	0.17 mg/L N
SCP 027g	Nitrates	mg/L N	6.35	10 mg/L N
SCP 010	Suspended Solids	mg/L	<4	10 mg/L
SCP 027c	MRP	mg/L P	<0.01	0.07 mg/L P
SCP 065b	Total Organic Carbon	mg/L	1.6	-
SCP 065b	Dissolved Organic Carbon	mg/L	1.2	-
SCP 052	Electrical Conductivity	µS/cm	606	-
**5520F	* Total Hydrocarbons	µg/L	<10	-
SCP 053a	Potassium	mg/L	4.27	-
SCP 053a	Sodium	mg/L	12.9	-
SCP 027b	Chloride	mg/L	31.6	-
SCP 016	COD	mg/L	<10	10 mg/L
SCP 015	BOD	mg/L	<1.0	2 mg/L
SCP 027d	Sulphate	mg/L	23.5	-
SCP 027f	Nitrites	mg/L as N	0.01	-
SCP 053a	Calcium	mg/L	107	-
SCP 044	Total Phosphorus	mg/L P	<0.04	-
SCP 053a	Magnesium	mg/L	15.0	-
SCP 038	Iron, Total	mg/L	0.018	-
SCP 038	Iron, Dissolved	mg/L	0.009	-
SCP 038	Manganese, Total	mg/L	0.002	-
SCP 038	Manganese, Dissolved	mg/L	0.001	-
PAH'S				
**6410 B	* PAH (Total)	µg/L	<0.16	-
**6410 B	* Acenaphthene	µg/L	<0.01	-
**6410 B	* Acenaphthylene	µg/L	<0.01	-
**6410 B	* Anthracene	µg/L	<0.01	-
**6410 B	* Benzo(a)anthracene	µg/L	<0.01	-
**6410 B	* Benzo(b)fluoranthene	µg/L	<0.01	-
**6410 B	* Benzo(k)fluoranthene	µg/L	<0.01	-
**6410 B	* Sum B/K	µg/L	<0.01	-
**6410 B	* Benzo(ghi)perylene	µg/L	<0.01	-
**6410 B	* Benzo(a)pyrene	µg/L	<0.01	-
**6410 B	* Chrysene	µg/L	<0.01	-
**6410 B	* Dibenzo(ah)anthracene	µg/L	<0.01	-
**6410 B	* Flouroanthene	µg/L	<0.01	-
**6410 B	* Flourene	µg/L	<0.01	-
**6410 B	* Indeno(1,2,3-cd)pyrene	µg/L	<0.01	-
**6410 B	* Naphthalene	µg/L	<0.01	-
**6410 B	* Phenanthrene	µg/L	<0.01	-
**6410 B	* Pyrene	µg/L	<0.01	-
On Site Monitoring				
	* Temperature	°C	12.6	-

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ANALYSIS REPORT

CUSTOMER:	BENNETTSBRIDGE LIMESTONE QUARRIES LTD	SAMPLE TYPE:	SURFACE WATER
ADDRESS:	Bennettsbridge, County Kilkenny	CONDITION OF SAMPLE ON RECEIPT:	Satisfactory
REPORT TO:	EOIN O CARROLL	DATE SAMPLED:	12 December 2018
SAMPLED BY:	Danny O Leary, Southern Scientific Services Ltd	DATE RECEIVED:	12 December 2018
SAMPLING PT:	EXITING LAGOON BENNETTSBRIDGE QUARRY	DATE ANALYSED:	12 -21 December 2018
ORDER NO:		DATE REPORTED:	24 January 2019
		WORK NO.:	42641 C


Ruth Murphy
Chemistry Laboratory Manager

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registered in ireland no 323196 | vat reg no IE 6343196 M



TABLE OF RESULTS

Method	Parameter	Unit	C18-Dec-186 Exiting Lagoon	LIMITS <i>Supplied by Customer</i>
Chemical Analysis: (F)				
SCP 052	pH	pH Unit	7.7	6.0 – 9.0
SCP 027a	Total Ammonia	mg/L N	0.02	0.17 mg/L N
SCP 027g	Nitrates	mg/L N	16.3	10 mg/L N
SCP 010	Suspended Solids	mg/L	<4	10 mg/L
SCP 027c	MRP	mg/L P	0.01	0.07 mg/L P
SCP 065b	Total Organic Carbon	mg/L	1.8	-
SCP 065b	Dissolved Organic Carbon	mg/L	1.8	-
SCP 052	Electrical Conductivity	µS/cm	640	-
**5520F	* Total Hydrocarbons	µg/L	61	-
SCP 053a	Potassium	mg/L	2.83	-
SCP 053a	Sodium	mg/L	11.2	-
SCP 027b	Chloride	mg/L	33.5	-
SCP 016	COD	mg/L	<10	10 mg/L
SCP 015	BOD	mg/L	<1.0	2 mg/L
SCP 027d	Sulphate	mg/L	16.5	-
SCP 027f	Nitrites	mg/L as N	0.01	-
SCP 053a	Calcium	mg/L	121	-
SCP 044	Total Phosphorus	mg/L P	0.06	-
SCP 053a	Magnesium	mg/L	11.4	-
SCP 038	Iron, Total	mg/L	0.012	-
SCP 038	Iron, Dissolved	mg/L	0.004	-
SCP 038	Manganese, Total	mg/L	0.001	-
SCP 038	Manganese, Dissolved	mg/L	<0.001	-
PAH'S				
**6410 B	* PAH (Total)	µg/L	<0.16	-
**6410 B	* Acenaphthene	µg/L	<0.01	-
**6410 B	* Acenaphthylene	µg/L	<0.01	-
**6410 B	* Anthracene	µg/L	<0.01	-
**6410 B	* Benzo(a)anthracene	µg/L	<0.01	-
**6410 B	* Benzo(b)fluoranthene	µg/L	<0.01	-
**6410 B	* Benzo(k)fluoranthene	µg/L	<0.01	-
**6410 B	* Sum B/K	µg/L	<0.01	-
**6410 B	* Benzo(ghi)perylene	µg/L	<0.01	-
**6410 B	* Benzo(a)pyrene	µg/L	<0.01	-
**6410 B	* Chrysene	µg/L	<0.01	-
**6410 B	* Dibenzo(ah)anthracene	µg/L	<0.01	-
**6410 B	* Flouroanthene	µg/L	<0.01	-
**6410 B	* Flourene	µg/L	<0.01	-
**6410 B	* Indeno(1,2,3-cd)pyrene	µg/L	<0.01	-
**6410 B	* Naphthalene	µg/L	<0.01	-
**6410 B	* Phenanthrene	µg/L	<0.01	-
**6410 B	* Pyrene	µg/L	<0.01	-
On Site Monitoring				
	* Temperature	°C	12.4	-

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2019 Annual Environmental Report

for

Bennettsbridge Limestone Quarries Ltd

wrt

Discharge Licence ENV/W/78

At the request of

Bennettsbridge Limestone

Kilree,

Sheastown

Bennettsbridge

Co Kilkenny

Consultant Dr. Pamela Bartley

March 2020



Hydro-G

50 Henry St.

Galway

H91 FA4X

pamela@hydro-g.com

091 449950

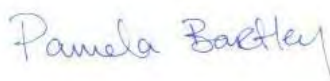
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Project No.: 161321_BBL AER_2

Report Status: Issue_draft

Report Title: 2019 Annual Environmental Report for
Bennettsbridge Limestone Quarries Ltd wrt
Discharge Licence ENV/W/78

Date: 09/03/20



Prepared by:

Dr. Pamela Bartley B.Eng, M.SC., Ph.D.

NOTES:

This report is for the use solely of the party to whom it is addressed and no responsibility is accepted to any third party.

About the Author

Pamela Bartley is a water focussed civil engineer. After 18 years of field based practice in borehole drilling, groundwater monitoring and abstraction point management she is now a karst hydrogeology specialist: her Ph.D was a field based karst limestone environment study. She has also completed training with the GSI at their karst specialist course run in the Burren. Her primary qualification is a Diploma in Water and Wastewater Technology at Sligo RTC. She then completed her primary degree in Civil Engineering at Queens University, Belfast, followed by an M.Sc in Environmental Engineering, followed by a field-based hydrogeologically focussed Ph.D. within the School of Civil Engineering at Trinity College, Dublin. Her key work areas are groundwater development from large scale water supply boreholes, hydrogeological assessment of quarries and the evaluation of discharges to groundwater and surface waters. Pamela Bartley's company is Bartley Hydrogeology Ltd., registered to trade as Hydro-G.

Pamela has successfully completed post doctorate 'Professional Development' formal course training in the areas of:

- PSDP & PSCS (IOSH certified, 2016);
- Karst Hydrogeology (GSI, 2013);
- On Site Wastewater & Water Services Amendment Act 2012 (IE, Western Region 6-week programme 2012 & Dublin 2012);
- Zero Discharge Willow Wastewater Systems Design Courses (Denmark 2008 & 2011 & Ireland 2012);
- Expert Witness (IE, 2011);
- Planning & Development Act (IE, 2010);
- Surface Water Regulations 2009 (DoE, 2010 & 2011);
- Sustainable Drainage (Wallingford/CIRIA, 2005 & 2008);
- Source Protection Zone Delineation (IGI/GSI, 2007);
- Groundwater & Contaminant Microbiology (IGI/GSI, 2006);
- Applied Groundwater Modelling (ESI, UK, 2000);
- Site Suitability Assessment (FETAC, 2002).

As a result of work in evaluating planning appeals, Pamela has become specialist in planning evaluations in the context of enacted Irish Regulation and EU Directives concerning the water environment such as the Groundwater Regulations (S.I. No. 9 of 2010), Surface Water Regulations (S.I. No. 272 of 2009), Water Framework and Habitats' Directives. Pamela is a qualified and certified 'Site Assessor' and interviewer of examination candidates in respect of eligibility for the Site Suitability FETAC Qualification. In the past, she has lectured in third level institutions (WIT, CIT, 1996 – 1999), delivered practical laboratory instruction in the assessment of subsoils for the FETAC Site Assessor programme and also demonstrated hydraulics laboratory modules at Trinity College Dublin (1996). She has been an invited guest speaker at An Bord Pleanála, The Irish Concrete Federation, The Health Service Executive, Environmental Health Officers National Conference, The Irish Planning Institute's National Conference, The International Association of Hydrogeologists National Conference (Irish Branch) and has delivered hydrogeological lectures to the public during Science Week.

Hydro-G is the registered trading name of Pamela Bartley's company Bartley Hydrogeology Ltd., a company registered in Galway Ireland. The company holds employer's and public liability insurances and professional indemnity insurance of €2million for each and every claim in each period.

Pamela is qualified and IOSH certified to act as PSDP (Project Supervisor Design Phase) & PSCS (Project Supervisor Construction Stage) as defined by the Construction Regulations. The company is a registered Irish Water Supplier (no. 1855) and Pamela Bartley is HSQE approved within Irish Water.

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*Appendix A Laboratory Certificates of Analysis: Routine Monthly Monitoring
Final Discharge & Collated Data for Nitrates (employed to create
graphs)*

Appendix B Laboratory Certificates of Analysis: Additional Monitoring at the Site

1.0 Introduction

Hydro G was commissioned by Bennettsbridge Limestone Quarries Ltd (BLQ) to prepare an Annual Environmental Report (AER), which is required as a condition of the Discharge Licence in place for the quarry operation at Kilree, Bennettsbridge, Co. Kilkenny (Kilkenny County Council Ref. No: ENV/W/78).

This report has been prepared to fulfil this requirement and pertains to the reporting period January 2019 - December 2019. However, in order to explore some of the monitoring results in more detail, specifically nitrate-N concentration in the discharge, reference was also made to 2018 results (which were reported in the Discharge Licence Conditions 2018 AER for the site).

2.0 Pertinent Details of the Discharge Licence

The discharge licence relevant to this period is Kilkenny County Council Ref. No: ENV/W/78, dated September 15th 2017 (hereafter referred to as ENV/W/78 (2017)).

Licence conditions relevant to this report include the following:

Condition 3.2 of ENV/W/78 (2017) stipulates:

The licence holder shall ensure that

- (a) The mean daily discharge over the course of a year shall not exceed 22,000m³/day, and
- (b) The maximum daily discharge shall not exceed 70,000m³/day

Condition 4.1 of ENV/W/78 (2017) stipulates:

The characteristics of the effluent as discharged shall not exceed the following emission limit values (ELVs):

Table 1: Discharge Licence ENV/W/78 ELVs

Parameter	ELV	Units
pH	6-9	-
Suspended Solids	10	mg/l
BOD	2	mg/l
COD	10	mg/l
Nitrate	10	mg/l - N
Total Ammonia	0.17	mg/l - N
MRP	0.07	mg/l - P
Total Hydrocarbons	0.68	mg/l

Condition 5.5 of ENV/W/78 (2017) stipulates the following:

The licence holder shall submit an Annual Environmental Report from a suitably qualified person which shall be due within 21 days after the end of each calendar year. The report shall contain the following information in relation to the previous calendar year:

- a) All monitoring results relating to the previous calendar year including the information required under conditions 5.1, 5.2, & 5.3.
- b) An assessment of the results, particularly noting any trends. Such analysis of trends should take account of any previous reports submitted in relation to the discharge.
- c) Confirmation (or otherwise) that the conditions attached to the licence have been complied with.

3.0 Monitoring Results**3.1 Flow Data**

It is acknowledged in the discharge licence that the waters arising at the quarry are a combination of rainfall runoff and groundwater. This means that rain falling on the surrounding lands travels through the land and can discharge to the quarry excavation by means of the subsoil bedrock interface.

Daily discharge volumes (m³/d) are presented on a month by month basis in Table 2 for the monitoring period January – December 2019. Flow measurement is automated.

Condition 3.2 (a) of ENV/W/78 (2017) requires that the mean daily discharge over the course of the year shall not exceed 22,000m³/day;
and

Condition 3.2 (b) of ENV/W/78 (2017) requires that the maximum daily discharge shall not exceed 70,000m³/day.

Results presented in Table 2 demonstrate that these licence limits were complied with.

3.2 Water Quality Data

The site routinely monitors water quality of the final discharge on a monthly basis. Water quality results are presented in Table 3 for the monitoring period January 2019 – December 2019. The samples are collected by staff of Southern Scientific accredited laboratory and transported to the laboratory on the same day. The laboratory Certificates of Analysis are presented in Appendix A for the routine monthly monitoring. As part of the environmental management plan, the site monitors water quality at numerous points and results show that the quality of the water coming into the quarry, from surrounding lands, is the same as what is discharged.

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Table 2: Daily discharge volumes (m3/d) on a month by month basis: 2019

Day	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	MAX Permitted (m3/d)		
1st	30,686	10,299	13,387	17,306	12,053	8,331	7,169	6,250	6,321	10,063	22,595	35,968	70,000		
2nd	28,264	11,419	13,094	16,805	12,388	8,861	7,189	7,496	7,426	9,285	25,981	32,758	70,000		
3rd	26,048	11,850	13,723	15,703	11,947	8,810	7,096	8,252	7,460	9,263	40,851	30,162	70,000		
4th	24,344	12,267	16,084	15,889	11,666	8,485	7,202	7,798	7,348	10,089	43,532	28,107	70,000		
5th	22,570	11,546	23,593	15,688	10,997	12,031	7,357	6,212	8,123	10,282	36,952	27,130	70,000		
6th	21,421	13,412	26,169	15,106	11,429	7,851	8,196	7,785	7,538	8,880	39,872	24,173	70,000		
7th	20,156	12,868	41,096	14,867	11,465	10,353	7,758	6,940	5,739	11,293	30,820	23,327	70,000		
8th	19,094	11,875	46,881	14,158	11,306	7,708	7,498	7,713	7,254	11,219	25,663	23,182	70,000		
9th	18,152	17,562	42,040	13,678	11,950	8,360	7,114	10,557	8,476	11,978	29,436	22,077	70,000		
10th	17,428	20,419	36,401	14,197	10,982	8,346	7,449	9,114	7,261	10,803	27,643	22,804	70,000		
11th	16,751	22,932	38,515	12,782	11,206	7,774	6,520	9,738	7,131	12,749	28,742	22,705	70,000		
12th	16,151	21,530	44,160	12,940	10,412	8,327	7,553	7,841	6,112	12,391	26,392	25,952	70,000		
13th	15,706	21,496	44,239	12,819	10,410	8,899	7,905	8,022	7,659	13,806	30,582	34,776	70,000		
14th	15,113	20,981	44,418	12,997	10,482	7,971	6,992	8,196	6,365	15,075	33,709	37,058	70,000		
15th	14,478	19,306	41,027	13,391	10,855	9,309	7,329	8,601	6,872	17,808	36,400	36,279	70,000		
16th	14,169	19,709	41,284	13,530	10,184	7,467	6,834	8,172	7,677	18,793	34,735	33,440	70,000		
17th	13,971	17,842	35,825	12,655	10,325	7,969	6,631	9,054	6,899	20,831	31,617	30,999	70,000		
18th	13,547	18,257	36,793	12,855	10,388	8,586	7,536	8,808	6,141	20,897	28,671	36,297	70,000		
19th	13,247	16,869	36,579	12,080	10,374	8,727	7,943	7,333	7,661	20,847	28,094	54,603	70,000		
20th	12,998	16,796	34,720	11,791	10,288	7,788	8,485	7,963	6,748	20,429	25,072	57,152	70,000		
21st	12,369	16,255	31,579	11,819	9,527	7,145	7,473	8,018	7,481	18,786	35,234	55,503	70,000		
22nd	11,330	15,459	30,694	11,646	9,267	7,188	7,440	8,088	11,313	18,791	50,962	51,588	70,000		
23rd	12,305	14,505	28,649	11,403	9,259	8,345	7,735	6,350	10,541	19,758	59,789	46,012	70,000		
24th	11,476	14,639	25,644	11,525	9,818	8,677	7,588	8,576	8,920	17,957	63,204	39,839	70,000		
25th	12,230	14,424	24,074	12,100	8,812	6,634	7,756	8,239	9,488	19,267	59,412	37,006	70,000		
26th	11,182	13,269	22,378	11,726	9,188	7,909	7,566	5,984	8,097	22,239	55,648	34,544	70,000		
27th	11,243	13,744	20,887	12,019	9,020	7,577	8,003	8,003	8,600	23,851	52,129	32,138	70,000		
28th	11,237	12,945	19,957	12,462	9,333	8,299	7,531	7,805	7,530	24,152	49,098	30,020	70,000		
29th	10,993	-	18,907	11,492	8,842	7,297	7,565	7,431	9,801	22,575	44,210	28,366	70,000	Annual Stats (m3/d)	
30th	9,388	-	18,310	11,047	8,117	8,419	7,303	7,401	10,309	21,590	38,559	27,169	70,000		
31st	11,742	-	17,702	-	9,038	-	7,426	7,631	-	21,806	-	25,811	70,000		
MAX	30,686	22,932	46,881	17,306	12,388	12,031	8,485	10,557	11,313	24,152	63,204	57,152	m3/d	63,204	MAX
MIN	9,388	10,299	13,094	11,047	8,117	6,634	6,520	5,984	5,739	8,880	22,595	22,077		5,739	MIN
AVERAGE	16,122	15,874	29,961	13,282	10,365	8,315	7,456	7,915	7,810	16,373	37,853	33,772		17,105	AVERAGE
	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19			

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Table 3 Water quality results for the monitoring period January – December 2019

Bennettsbridge Limestone Final Discharge Quality 2019								
	pH	Suspended Solids	BOD	COD	Nitrate	Total Amonia	Molybdate Reactive Phosphate	Total Hydrocarbons
Units	-	mg/l	mg/l	mg/l	mg/l - N	mg/l - N	mg/l - P	mg/l
Discharge Licence ENV/W/78 (2017) ELV's	6-9	10	2	10	10	0.17	0.07	0.68
Jan-19	7.7	< 4	< 1	< 10	10.6	< 0.02	0.01	0.01
Feb-19	7.9	< 4	< 1	< 10	11.6	< 0.02	<0.01	<0.01
Mar-19	7.9	< 4	< 1	< 10	11.8	< 0.02	<0.01	<0.01
Apr-19	7.6	< 4	< 1	< 10	9.26	< 0.02	<0.01	<0.01
May-19	7.8	< 2	< 1	< 10	9.2	0.036	<0.01	<0.01
Jun-19	7.8	< 2	< 1	< 10	8.86	< 0.02	<0.01	0.155
Jul-19	8.1	6	< 1	< 10	7.67	< 0.02	<0.01	<0.01
Aug-19	8	< 4	1.4	< 10	7.1	< 0.02	0.01	<0.01
Sep-19	7.9	2	1.7	< 10	7.21	< 0.02	<0.01	<0.01
Oct-19	7.8	< 2	< 1	< 10	8.11	0.03	<0.01	<0.01
Nov-19	7.4	< 4	< 1	< 10	11.3	< 0.02	0.012	<0.01
Dec-19	7.8	< 2	< 1	< 10	10.9	< 0.02	<0.01	<0.01
MAX	8.1	6	1.7	< 10.0	11.8	0.036	0.012	0.155
MIN	7.4	2	< 1	< 10.0	7.1	< 0.02	< 0.01	< 0.01
AVERAGE	7.8	<4	1	< 10.0	9.5	0.02	< 0.01	< 0.01
Discharge Licence ENV/W/78 (2017) ELV's	6-9	10	2	10	10	0.17	0.07	0.68
Hydro-G Comment	pH Compliant	SS Compliant	BOD Compliant	COD Compliant	Recharge Reated NO3-N exceedednces	Total Ammonia Compliant	MRP-P Compliant	Total Hydrocarbons Compliant

4.0 Assessment of the Results

4.1 With respect to the Volumetric ELV Conditions:

- Results presented in Table 2 demonstrate that the licence limits for discharge volume were complied with. Table 2's data are reproduced in Figure 1 to facilitate easier evaluation.

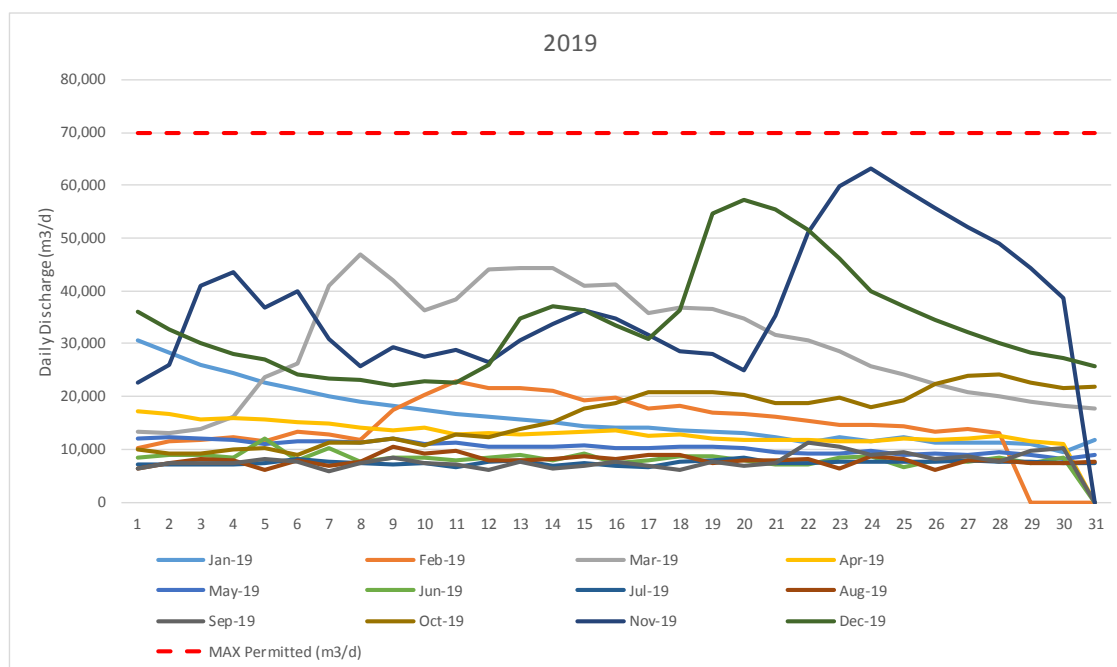


Figure 1 Daily Discharge Volumes by month: 2019

As previously stated, it is acknowledged in the discharge licence that the waters arising at the quarry are a combination of rainfall runoff on the floor, rainfall runoff from the lands around the walls and groundwater. Results presented demonstrate that during the seasons of high rainfall the discharge volumes peak and during low rainfall months the discharge from the quarry represents groundwater baseflow volumes. At no time does the daily discharge volume breach the maximum permitted 70,000m³/d ELV.

Data presented in Table 2 shows that the mean daily volume discharged, on an annual average basis, is 17,105 m³/d and this is within the specified ELV for mean daily volume of 22,000 m³/d, calculated on an annual average basis.

As outlined in the 2018 AER, the Bennettsbridge Limestone quarry is in an area that is mapped by the Geological Survey of Ireland as being a Regionally Important Aquifer with a Karst (diffuse) flow mechanism. The diffuse flow mechanism is an important qualification. If most of the water in a karst aquifer is transported and transferred by diffuse means then excavating a void in which one exposes a large linear extent of epi-karst, or transition zone, facilitates a mechanism for 'groundwater' ingress through the subsoil/bedrock interface. Alternatively, if an area was mapped as a Regionally Important Aquifer with a Karst (conduit) flow mechanism most of the water in that karst aquifer is transported and transferred by conduit mechanisms: in that case groundwater ingress shall be dictated by intersection between excavated areas and conduits (open pipelines in the limestone), if they exist in

the area proposed for excavation. I use inverted commas for 'groundwater' ingress in the diffuse karst setting because a lot of non-hydrogeologists perceive most waters arising in a void to be groundwater. However, a question of merit might be 'is very recent rainfall travelling through the transition zone actually groundwater?'. Of course, yes, "water held underground in the soil or in pores and crevices in rock" is the definition of groundwater. But the perception that groundwater is a resource from 'deep underground', to coin a term used by bottled water companies, is far from true in the Irish context anyway. The point is that the discharge volume ELVs were always complied. However, given that the data demonstrate that winter rainfalls create larger volumes of water at the site we use this knowledge in the evaluation of the water quality data: what comes in is what will go out. The rainfall is passing through local lands before entering the quarry and this may affect its quality.

4.2 With respect to Water Quality ELVs:

- Results presented in Table 3 indicate that the specified ELVs were complied with for all parameters in all 12 months except for one parameter: Nitrate-N. There were multiple exceedances of the Nitrate-N ELV. The exceedances for nitrate generally occurred in winter and the subsequent high rainfall recharge months of February and March 2019:
 - o At the time of the nitrate exceedances no other nutrients are elevated: Ammonia-N and ortho-Phosphate were recorded at similar concentrations to previous months, which is generally always below the limit of detection of the analyser.
 - o Similarly, at the time of the nitrate exceedances no other parameters of the Discharge Licence, such as BOD, SS and COD, were ever elevated above their usual concentrations, which are generally less than the Limit of Detection of the analyser on nearly every sampling event.
- The nitrate exceedances do not originate in the quarry itself. If these nitrates were associated with blast residues, one would most likely see exceedances of other nitrogen species also. There are never exceedances of ammonia or nitrite. The exceedances for nitrate happen in months in which the quarry does not blast. In any case, modern blasting techniques are designed so that no residues are left. Information presented with the most recent EIAR for the site presents calculations to show the extremely small resultant concentrations for N species residues that could occur at the site: blasting is not the issue.
- The site, as part of their own initiative overall environmental management principles and monitoring, conducts sampling at other locations within the landholding: such as seepages in the western wall (B3E & B3F), at Eden Spring in the northern portion of the quarry (which is not worked and homes storage sheds) and in the central floor's artesian Borehole B3D (which is a deep Rotary Core BH that has a water strike zone between 0m OD and -56m OD, when the floor is 30m OD, approximately). The results for all monitoring events and all parameters were evaluated by Hydro-G. A sample of the Certificates of Analysis are presented in Appendix B: they are too numerous to present in full. No parameters, other than Nitrate, present any concentrations of significance or assistance in determining the origin of the elevated nitrate at the site. However, it is worth noting that ammonia

concentrations are generally below the limit of detection of the analyser and that suggests that there is no organic/local source of the nitrogen species in the groundwater. The fact that it is elevated nitrate suggests that the N Cycle had time to turnover ammonia to nitrate in the N Cycle. The ammonia is therefore transformed and not detectable in the groundwater. Another point of note is that the artesian BH (B3D) that returns groundwater from 60 - >100m below local land level is heavily mineralised groundwater suggesting old age: its nitrate concentrations are nearly always below the limit of detection of the analyser.

- In response to the January and February exceedances for nitrate-N, a decision was made to complete an intensive monitoring event for a large suite of indicative parameters. The event's design was to collect water samples at many points throughout the site and in the River Nore upstream and downstream of the discharge. Hydro-G and Southern Scientific sampled together, and duplicate samples were analysed in the accredited laboratory 'Complete Laboratory Solutions' and the accredited laboratory 'Southern Scientific'. The field work was completed on the 9th April 2019. Certificates of Analysis are presented in Appendix B. the interlab checking confirmed the analysis results were correct.
- The results of the intensive monitoring event in April 2019 suggest that the reason for the increase and elevation above the Licensed Emission Limit Value of the site's Discharge Licence is most likely a result of two things, as follows:
 - o there has been an upward trend in Nitrate-N concentration since 2015: See Figures 2 & 3(a) & (b). Figure 2 shows that the final discharge has an increasing trendline and Figures 3(a) & (b) show increasing trendlines in the Eden Spring (north in the quarry) and the western face spring B3B;
 - o there is most likely an added effect in the first flush after the drought of summer 2018.

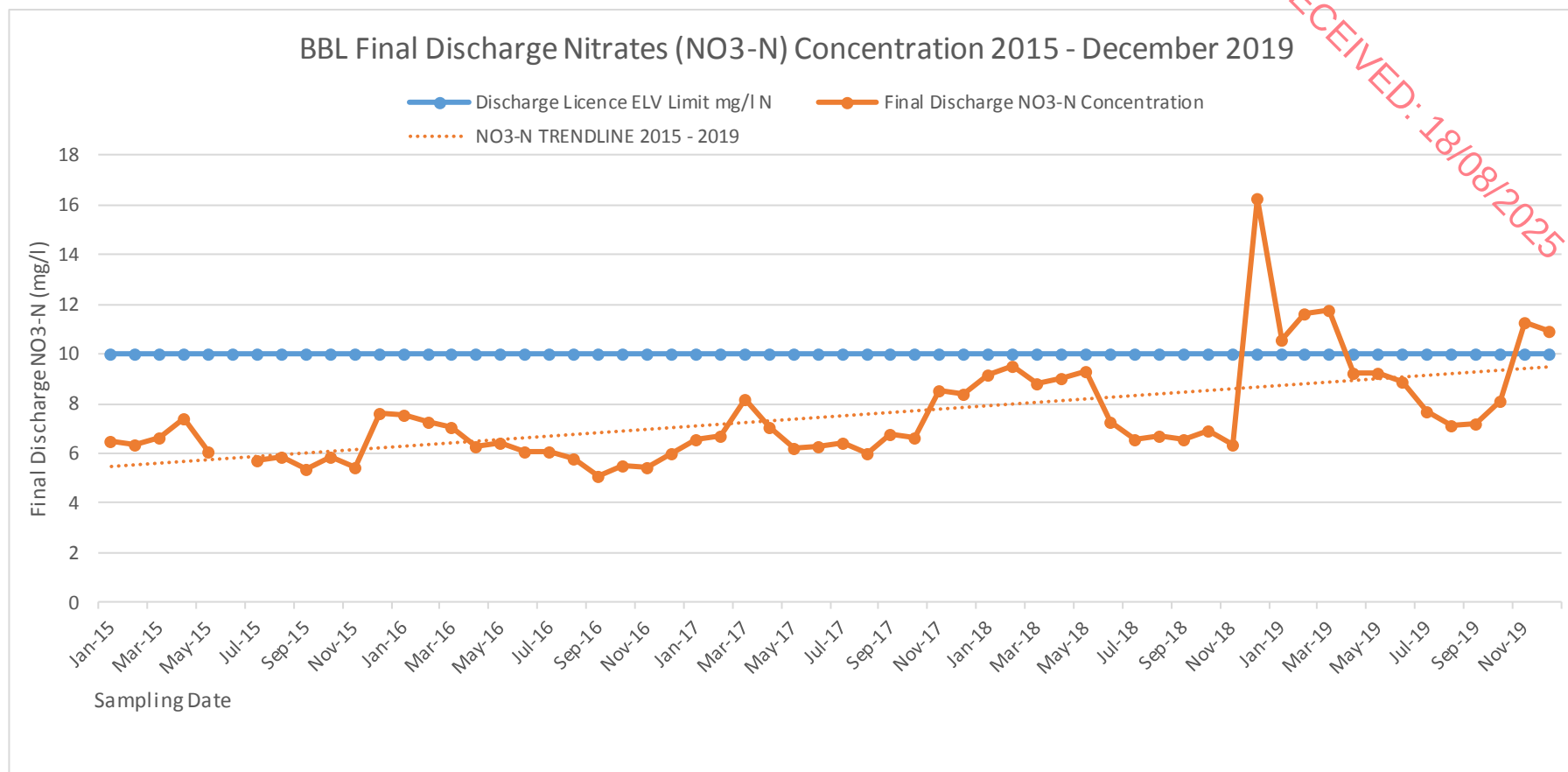


Figure 2 Final Discharge NO₃-N concentration showing increasing trendline

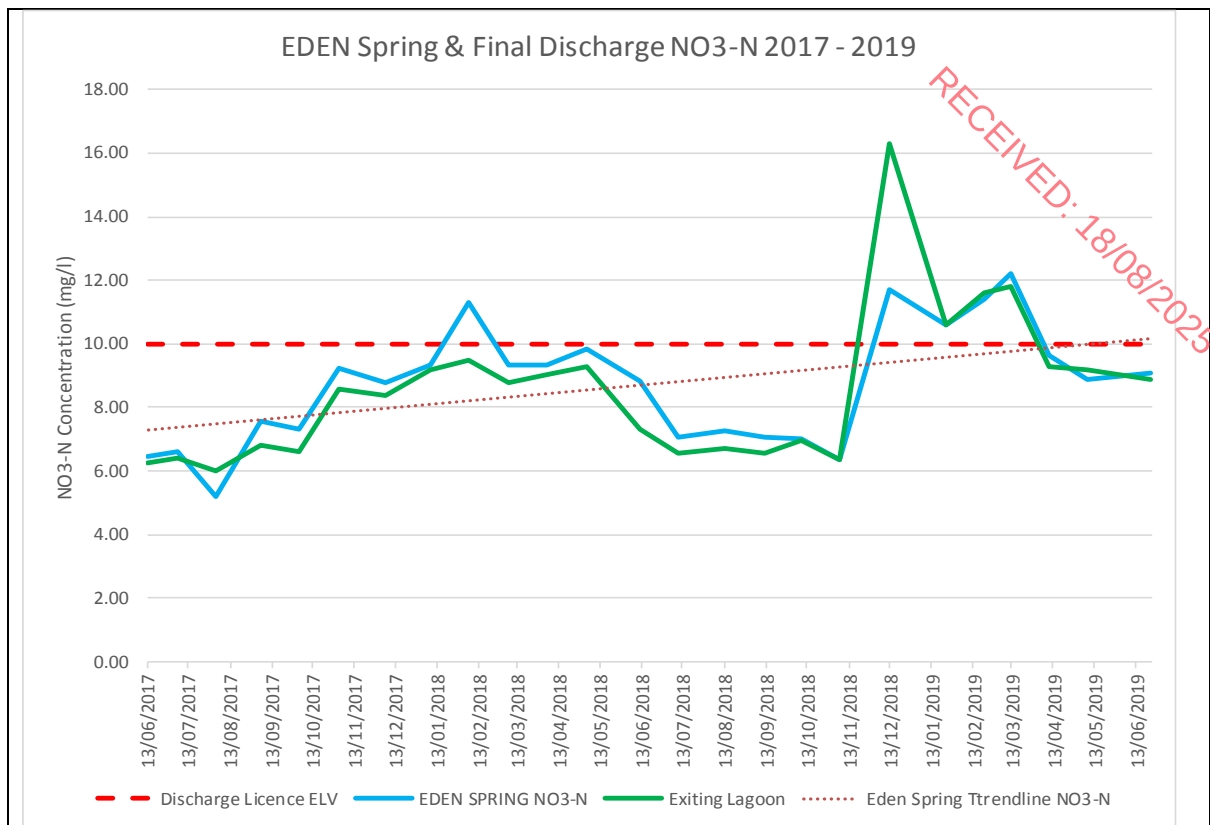


Figure 3 (a)

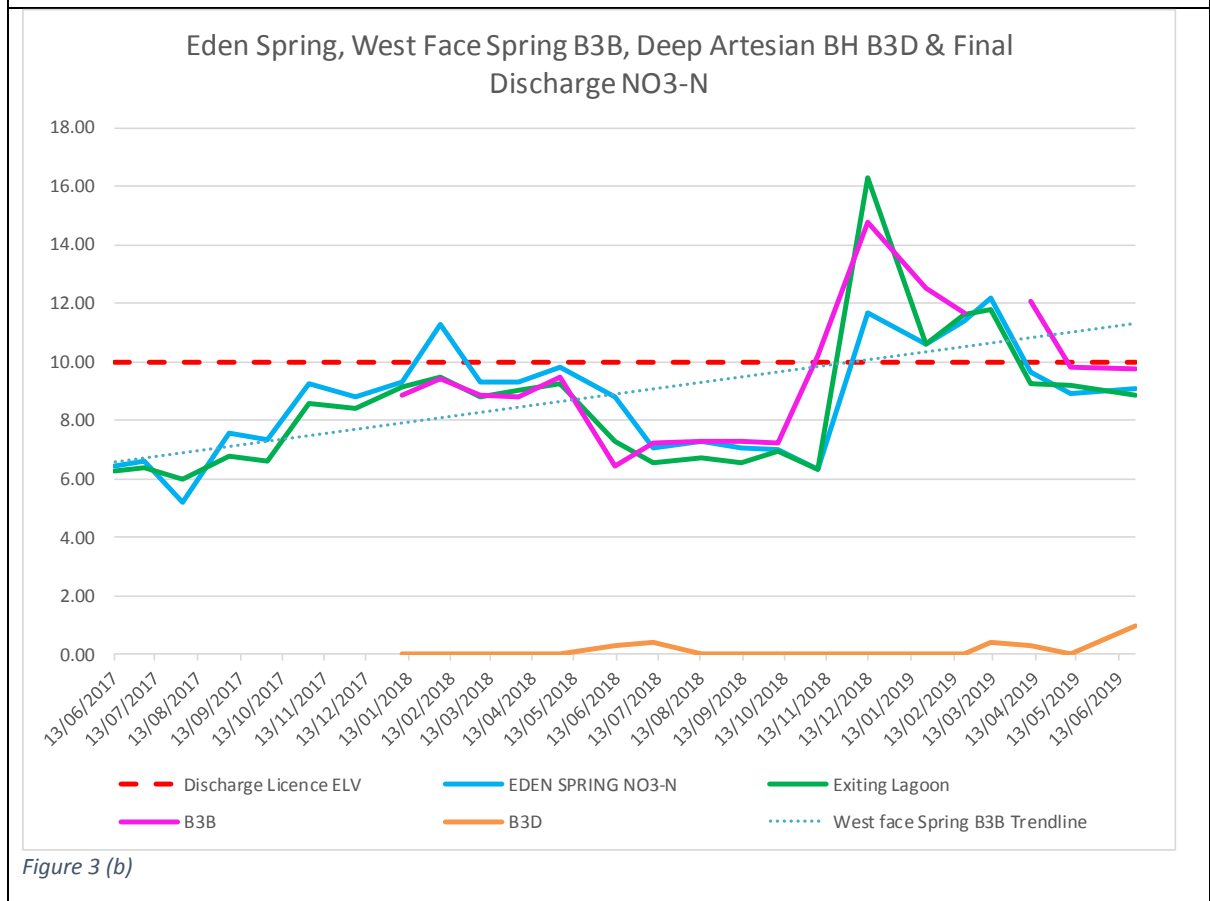


Figure 3 (b)

Figure 3 (a) & (b) NO3-N concentration relationships between Eden Spring and Final Discharge [Figure 3(a)] and similar correlation with Western Face Spring (B3B).

The Conceptual Hydrogeological Model for the quarry is that the discharge is mostly groundwater arising recently and driven by rainfall to Eden Spring and the epikarst zones in the walls, i.e. broken rock between the subsoil and bedrock. Therefore, groundwater fed to the settlement lagoons is heavily influenced by activity at ground level locally i.e. agriculture. My Ph.D focussed on Nitrates in Groundwater (Bartley, 2003). My research remit was to evaluate whether it was bagged Nitrogen fertiliser, slurry, dirty water arising from yard and milking parlour washings or another source of nitrogen that caused elevated nitrates in groundwater. Initially, the EPA and academics considered that perhaps bagged nitrogen fertilisers were the source of groundwater nitrate concentrations. However, the findings of my research verified the thoughts of Teagasc that farmers apply bagged fertiliser at relatively low rates of application and in phases throughout the year to match grass growth requirements: it would be economically and energetically wasteful for them to over apply bagged fertiliser. Therefore, bagged nitrogen fertiliser is well used by grass crops and not available to N Cycling in the subsoil and therefore not likely to leach to groundwater. My research found that groundwater nitrate response is positively correlated to the grazing dairy animal on grassland. The nitrogen cycle in subsoil and groundwater is dominated by ammonia deposited to the subsoil in the urine of grazing animals. A dairy cow urinates 10 times a day with each urination up to 10 litres in volume and launched from a height under force. Usually there is rainfall to dilute and absorb some of the deposits. In the official drought summer of 2018, there was no rainfall and little groundwater recharge. At that time the subsoil acted like a reservoir/hotbed storage area for nitrogen inputs, primarily as grazing animal's depositions of urine ammonia. The subsoil acts as an environment to facilitate Nitrogen Cycle transformations: where ammonia is transformed to gaseous forms of nitrogen emitted to the atmosphere and a store for converted nitrate that has an electrical charge that is readily washed from the soil when rains come. The 'first flush' of recharge will bring elevated nitrate concentrations. The increase in groundwater nitrate concentration has been observed at other locations in the country. I consulted with Mr. Barry Deane of the National Federation of Group Water Schemes and Ms. Monica Lee of the Groundwater Section of the Geological Survey of Ireland. Ploughing of tillage land is also known to be positively correlated with increased nitrate concentrations in groundwater.

5.0 Assessment of Potential Impact of the NO₃-N Exceedances

Given that the nitrate exceedances appear now to be a feature of groundwater ingress to the quarry, it is prudent to see if there is any potential for impact on the receiving water, which is the River Nore, arising from the elevated nitrate concentrations of approximately 12 mg/l NO₃-N, on average, in the first 3 and last 2 months of the year. With respect to river impact assessment, we can apply the Department of Environment (2010) Guidance Assimilation Capacity Simulation formula for assessment of potential resultant concentrations arising from a discharge to surface water:

Assimilation capacity Simulation model [$T = (FC+fc)/(F+f)$]

Where:

T = RESULTANT conc. in receiving water (mg/l)

T = resultant

F = RECEIVING river flow MEAN FLOW¹ (50%tile) (m³/s)

F = 19.38 m³/s

¹ Using MEAN flow because the exceedances occur in winter months and almost half of the yr.

C = Concentration in receiving water (mg/l)	$C = 3 \text{ mg/l NO}_3\text{-N}$
f = Flow discharging to receiving waters (m ³ /s)	$f = 0.73 \text{ m}^3/\text{s}$
c = concentration in discharge (mg/l), on average	$c = 12 \text{ mg/l NO}_3\text{-N}$

- o The AVERAGE exceedance value is 12 mg/l NO₃-N, approximately;
- o The MAXIMUM volume of water discharged from Bennettsbridge Limestone Ltd's final settlement lagoon in the exceedance months was 63,204 m³/d (or 0.73 m³/s). The maximum discharge amount is chosen for simulation input so that conservative assessment is completed;
- o OPW flow **STATISTICS**² for its monitoring station at John's Bridge on the River Nore upstream of Bennettsbridge suggests a 50%tile flow volume value of 19.38m³/s;
- o It is known from KCC's issue of historic water quality data for the upstream WQ monitoring Station on the River Nore (Stn 15N01-2000. 4km d/s Kilkenny (N of Warrington) – d/s Kilkenny City WWTP) that the average nitrate concentration is 13.3 mg/l as NO₃, which is equivalent to 3 mg/l NO₃ as N and it is this latter form of nitrate as N that the Discharge Licence's ELV and monitoring results for Bennettsbridge Limestone Ltd. are reported. Therefore, the receiving's water concentration is reasonably assumed to be 3 mg/l NO₃-N and the one monitoring event discharge concentration exceedance in was 16.3 mg/l NO₃-N;

Table 4 presents the result of the application of the Department of Environment (2010) Guidance Assimilation Capacity Simulation formula for assessment of potential resultant concentrations arising from a discharge to surface water.

Table 4 Assimilation capacity Simulation Results for Nitrate-N response in the Receiving River Nore

Nitrates as N: Assimilation Simulation Result					
$T = (FC+fc)/(F+f)$					
T = RESULTANT concentration in the receiving water (mg/l)	T	3.33	mg/l		
F = RECEIVING river flow, 50%tile flow (m ³ /s) for MAX DISCHARGE VOLUME condition	F	19.38	m ³ /s		
C = ASSUMED Baseline concentration in receiving water (mg/l)	C	3	mg/l		
f = MAX PREDICTED flow discharging to receiving waters (m ³ /s)	f	0.73	m ³ /s		
c = Discharge Concentration average exceedance (mg/l)	c	12.00	mg/l		

RESULTANT concentration $T = 3.33 \text{ mg/l NO}_3\text{-N}$

The simulated resultant concentration, i.e. effect of the five months of exceedances for the NO₃-N discharge concentration, returns the almost the same concentration in the river for the downstream location as it was for the upstream. The difference between 3 mg/l NO₃-N baseline concentration and 3.33 mg/l NO₃-N RESULTANT concentration IS INSIGNIFICANT. Nitrate is not even a parameter deemed significant enough to be listed in the Surface Water Regulations (2009 as amended 2015).

² <http://waterlevel.ie/hydro-data/stations/15002/station.html?1581612317>

Simulation results suggest that the ELV exceedances for Nitrate-N do not have the potential to cause a deterioration in water quality or status class of the receiving water. For the purposes of evaluation, results presented in Table 5 demonstrate that a constant discharge of 20mg/l NO₃-N, for the maximum permitted discharge volume of 70,000 m³/d and 95%tile flow in the River Nore, would result in a concentration of 6 mg/l N NO₃-N. That resultant concentration is not likely to cause any deterioration in water quality or Status Class. Nitrate is not a parameter of the Surface Water Regulations (2009 & 2016) and therefore there is no surface water quality objective to compare simulation results with. The Nitrates Directive and Good Agricultural Practice Regulations stipulate limits of 11.3 mg/l NO₃ as N or 50 mg/l as NO₃. The resultant simulated result for The River Nore is half the required limit.

Table 5 Assimilation Capacity Simulation results for a discharge ELV of 20mg/l NO₃-N

Nitrates as N				
T = RESULTANT concentration in the receiving water (mg/l)	T	6	mg/l	
F = RECEIVING river flow, 95%tile flow (m ³ /s)	F	3.67	m ³ /s	
C = Baseline concentration in receiving water (mg/l)	C	3	mg/l	
f = MAX PREDICTED flow discharging to receiving waters (m ³ /s)	f	0.81	m ³ /s	
c = MAX NO ₃ -N ELV (mg/l)	c	20.00	mg/l	

6.0 Compliance with Licence Conditions

With respect to the Volumetric ELV Conditions:

- Data presented in Table 2 and in Figures 1 & 2 demonstrate that the licence limits for discharge volume were always complied with;
- On no day in 2019 did the discharge volume exceed the maximum permitted volume of 70,000 m³/d;
- In 2019 the annual average discharge volume was 17,105 m³/d, which is in compliance with the specified Condition 3.2 (a) that 'The mean daily discharge over the course of a year shall not exceed 22,000m³/day'.

With respect to Water Quality ELVs:

- Results presented in Table 3 indicate that the prescribed ELVs were complied with for all parameters in all 12 months except for one parameter: nitrate-N. The quarry investigated many water ingress zones in April 2019 to attempt to identify the potential source of the nitrate. The 'Eden Spring' discharge and those small groundwater emission points in the western wall of the quarry, were identified as the source water with elevated nitrate concentration. This conforms with the conceptual hydrogeological model for the quarry: that significant ingress is recent rainfall on the catchment. There has been an increasing trend in nitrate-N concentration in the biggest spring on the site, which is EDEN, and with a spring on the western wall. This correlates with a consequent increasing trend in the concentration of NO₃-N in the final discharge.

7.0 Register of Incidents

- 7.1 There were no 'serious incidents' to report with respect to this discharge during 2019.
- 7.2 Nitrate concentrations in spring waters inflow in the north (Eden Spring) and western face of the quarry have become elevated. No other nutrients are elevated in 2019: Ammonia-N and ortho-Phosphate were recorded at similar concentrations to previous months, which is usually Less than the Limit of Detection of the analyser. Similarly, neither BOD, SS nor COD were elevated above their usual Less than the Limit of Detection of the analyser. The elevation in nitrate concentration coming into the quarry from the surrounding catchment in the winter recharge rainfalls now causes the discharge from the quarry to breach its ELV for nitrates in the recharge months.

8.0 Conclusions

- 8.1 The site is in overall compliance with the requirements of Discharge Licence ENV/W/78 (2017).
- 8.2 At all times the ELVs for volume are complied with.
- 8.3 At all times are all but one of the hydrochemical ELVs complied with.
- 8.4 One hydrochemical ELV (nitrates) has breached its ELV five times in 2019. The breaches occur in the high rainfall/winter spring months:
 - 8.4.1 The nitrate ELV was breached in January, February and March 2019;
 - 8.4.2 The nitrate ELV was complied with from April to October 2019, inclusive;
 - 8.4.3 Nitrate-N concentration again breached the 10 mg/l NO₃-N concentration in November and December 2019.

These breaches are associated with the first flush of winter recharge through agricultural soils in the catchment. The water that enters the quarry at Bennettsbridge Limestone Ltd. is enriched with nitrate and was heading to the River Nore in any event, whether it was first intercepted by the quarry or just delivered in catchment waters discharged to the river system.

In any case, when the effect of the discharge exceedance is simulated, the resultant concentration in the River Nore receiving water is not likely to cause any deterioration in water quality or Status Class. Nitrate is not a parameter of the Surface Water Regulations (2009 & 2016) and therefore there is no surface water quality objective to compare simulation results with. The River Nore is a fast-flowing river that can assimilate nitrate. There is little risk of eutrophication. The nitrate that arrives in the groundwater ingress to the void of the quarry is only intercepted by the quarry and was on its way to the River Nore anyway. Therefore, it is concluded that the ELV exceedance does not have the potential to cause a deterioration in water quality or status class of the receiving water.

Pamela Bartley

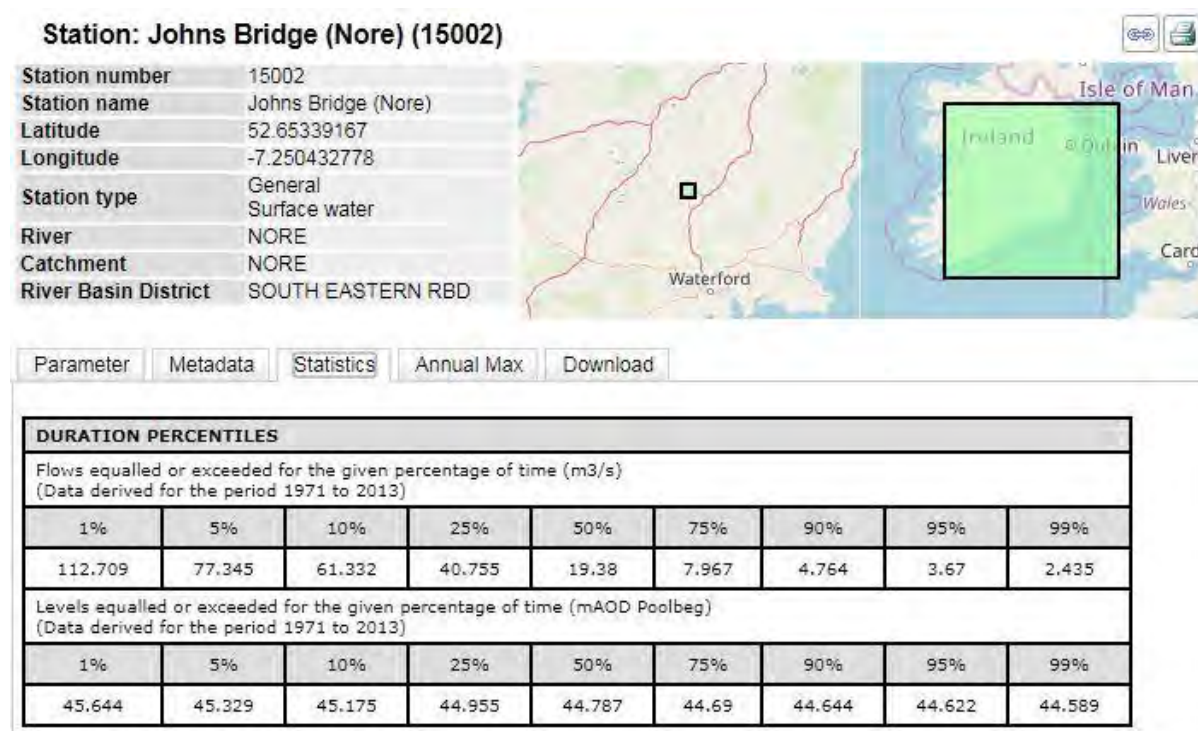
References

Bartley, P. (2003) Groundwater Nitrate Responses Beneath Grassland dairy agriculture. Ph.D Thesis submitted to Trinity College Dublin.

Department of the Environment, Heritage & Local Government (2010) Guidance, Procedures and Training on the Licensing of Discharges to Surface Waters and to Sewer for Local Authorities. Water Services Training Group.

Re Footnote:

OPW flow **STATISTICS** for its monitoring station at John's Bridge:



content generated at 13.02.2020 16:21:19

Source: ¹ <http://waterlevel.ie/hydro-data/stations/15002/station.html?1581612317>

Appendix A
Laboratory Certificates of Analysis
Routine Monthly Monitoring Final Discharge

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Certificate of Analysis

Customer	Bennettsbridge Limestone Quarries Ltd	Date Received	23/01/2019
		Date Analysed	24/01/2019 - 18/02/2019
Office	Bennettsbridge, Kilkenny	Issue Date	18/02/2019
		Quote No.	
Customer Contact	Eoin O' Carroll	Customer PO	
		BATCH NUMBER	19-00932

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

- ◆ The results relate only to the items tested.
- ◆ Opinions and interpretations expressed herein are outside the scope of INAB accreditation.
- ◆ The analysis report shall not be reproduced except in full without written approval of the laboratory.
- ◆ Sampling is outside the scope of the laboratory activities.

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M



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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:		Sampled By:	Danny O'Leary
Our Reference:	3199 (19-00932)	Sample Matrix:	Surface Water
Date Sampled:	23/01/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Chemical Analysis: (F)</u>			
SCP 038	Dissolved Manganese	µg/L	1	< 1
	<u>Onsite Measurements:</u>			
	* Temperature	°C		11.7
	<u>Chemical Analysis: (F)</u>			
SCP 010	Suspended Solids	mg/L	2.0	< 4.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.7
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10.0	< 10.0
SCP 027G	Nitrate	mg/L N	0.25	10.6
SCP 044	Total Phosphorus	mg/L P	0.04	0.06
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 038	Dissolved Iron	µg/L	5	< 5
SCP 027D	Sulphate	mg/L	0.5	17.4
SCP 053A	Magnesium	mg/L	0.2	14.7
SCP 038	Iron	µg/L	5	6
SCP 038	Manganese	µg/L	1	< 1
SCP 027B	Chloride	mg/L	0.5	31.3
SCP 053A	Sodium	mg/L	1.0	12.1
SCP 053A	Potassium	mg/L	1.00	2.80
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.6
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.6
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Acenaphthylene	µg/L	0.010	< 0.010
SCP 052	Conductivity	µS/cm @ 20 °C	15	672
SCP 027F	Nitrite	mg/L N	0.005	0.006
SCP 053A	Calcium	mg/L	1.0	134
**5520F	* Total Hydrocarbons C10-C40	µg/L	10	< 10
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160
SCP 060B	* Pyrene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.010	< 0.010
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.010	< 0.010
SCP 060B	* Fluorene	µg/L	0.010	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Chrysene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(ghi)perylene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.010	< 0.010
SCP 060B	* Benz(a)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Anthracene	µg/L	0.010	< 0.010

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:		Sampled By:	Danny O'Leary
Our Reference:	3199 (19-00932)	Sample Matrix:	Surface Water
Date Sampled:	23/01/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
SCP 060B	* Acenaphthene	µg/L	0.010	< 0.010

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Certificate of Analysis

Customer	Bennettsbridge Limestone Quarries Ltd	Date Received	20/02/2019
		Date Analysed	20/02/2019 - 25/03/2019
Office	Bennettsbridge, Kilkenny	Issue Date	28/03/2019
		Quote No.	
Customer Contact	Eoin O' Carroll	Customer PO	
		BATCH NUMBER	19-01153

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

**	Adapted from Standard Methods for the Examination of Water and Wastewater.
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrine Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.
*	Analysis is not INAB/UKAS accredited

Notes

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exit Lagoon Full List	Sampled By:	Danny O'Leary
Our Reference:	4046 (19-01153)	Sample Matrix:	Surface Water
Date Sampled:	20/02/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Onsite Measurements:</u>			
	* Temperature	°C		12.2
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	15	653
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10.0	10.0
SCP 010	Suspended Solids	mg/L	2.0	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	30.5
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 027G	Nitrate	mg/L N	0.25	11.6
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 027D	Sulphate	mg/L	0.5	16.0
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.3
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.9
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.2	13.0
SCP 053A	Potassium	mg/L	1.00	2.80
SCP 053A	Sodium	mg/L	1.0	12.6
SCP 053A	Calcium	mg/L	1.0	128
SCP 038	Dissolved Iron	µg/L	5	6
SCP 038	Dissolved Manganese	µg/L	1	< 1
SCP 038	Iron	µg/L	5	18
SCP 038	Manganese	µg/L	1	2
SCP 060B	* Acenaphthylene	µg/L	0.010	< 0.010
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.010	< 0.010
**5520F	* TPH C10-C40	µg/L	10	< 10
SCP 060B	* Acenaphthene	µg/L	0.010	< 0.010
SCP 060B	* Anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benz(a)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(ghi)perylene	µg/L	0.010	< 0.010
SCP 060B	* Chrysene	µg/L	0.010	< 0.010
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Fluorene	µg/L	0.010	< 0.010
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.010	< 0.010
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.010	< 0.010
SCP 060B	* Pyrene	µg/L	0.010	< 0.010
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exit Lagoon Full List	Sampled By:	Danny O'Leary
Our Reference:	4046 (19-01153)	Sample Matrix:	Surface Water
Date Sampled:	20/02/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
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Certificate of Analysis

Customer	Bennettsbridge Limestone Quarries Ltd	Date Received	12/03/2019
		Date Analysed	12/03/2019 - 26/03/2019
Office	Bennettsbridge, Kilkenny	Issue Date	29/03/2019
		Quote No.	
Customer Contact	Eoin O' Carroll	Customer PO	
		BATCH NUMBER	19-01358

Conor Murphy
Operations Manager

Index to symbols used & Notes

**	Adapted from Standard Methods for the Examination of Water and Wastewater.
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.
*	Analysis is not INAB/UKAS accredited

Notes

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exit Lagoon Full Lis	Sampled By:	Danny O'Leary
Our Reference:	4679 (19-01358)	Sample Matrix:	Surface Water
Date Sampled:	12/03/2019	Time Sampled:	11:30

Method:	Parameter:	Units	LOD	Result
	<u>Onsite Measurements:</u>			
	* Temperature	°C		12.1
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	15	654
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10.0	< 10.0
SCP 010	Suspended Solids	mg/L	2.0	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	36.5
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 027G	Nitrate	mg/L N	0.25	11.8
SCP 027F	Nitrite	mg/L N	0.005	0.005
SCP 027D	Sulphate	mg/L	0.5	15.4
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	2.1
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.7
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.2	10.5
SCP 053A	Potassium	mg/L	1.00	2.93
SCP 053A	Sodium	mg/L	1.0	12.4
SCP 053A	Calcium	mg/L	1.0	125
SCP 038	Dissolved Iron	µg/L	5	7
SCP 038	Dissolved Manganese	µg/L	1	< 1
SCP 038	Iron	µg/L	5	26
SCP 038	Manganese	µg/L	1	1
SCP 060B	* Acenaphthylene	µg/L	0.010	< 0.010
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.010	< 0.010
**5520F	* TPH C10-C40	µg/L	10	< 10
SCP 060B	* Acenaphthene	µg/L	0.010	< 0.010
SCP 060B	* Anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benz(a)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(ghi)perylene	µg/L	0.010	< 0.010
SCP 060B	* Chrysene	µg/L	0.010	< 0.010
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Fluorene	µg/L	0.010	< 0.010
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.010	< 0.010
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.010	< 0.010
SCP 060B	* Pyrene	µg/L	0.010	< 0.010
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exit Lagoon Full Lis	Sampled By:	Danny O'Leary
Our Reference:	4679 (19-01358)	Sample Matrix:	Surface Water
Date Sampled:	12/03/2019	Time Sampled:	11:30

Method:	Parameter:	Units	LOD	Result
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Certificate of Analysis

Customer	Bennettsbridge Limestone Quarries Ltd	Date Received	09/04/2019
		Date Analysed	10/04/2019 - 13/05/2019
Office	Bennettsbridge, Kilkenny	Issue Date	14/05/2019
		Quote No.	
Customer Contact	Eoin O' Carroll	Customer PO	
		BATCH NUMBER	19-01646

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

**	Adapted from Standard Methods for the Examination of Water and Wastewater.
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.
*	Analysis is not INAB/UKAS accredited

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exit Lagoon Full List	Sampled By:	Danny O'Leary
Our Reference:	5742 (19-01646)	Sample Matrix:	Surface Water
Date Sampled:	09/04/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Onsite Measurements:</u>			
	* Temperature	°C		12.4
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	14.7	684.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.6
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10.0	< 10.0
SCP 010	Suspended Solids	mg/L	2.0	< 4.0
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	31.6
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 027G	Nitrate	mg/L N	0.25	9.26
SCP 027F	Nitrite	mg/L N	0.005	0.011
SCP 027D	Sulphate	mg/L	0.5	17.1
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.5
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.6
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.2	13.6
SCP 053A	Potassium	mg/L	1.00	2.66
SCP 053A	Sodium	mg/L	1.0	11.9
SCP 053A	Calcium	mg/L	1.0	127
SCP 038	Dissolved Iron	µg/L	5	< 5
SCP 038	Dissolved Manganese	µg/L	1	1
SCP 038	Iron	µg/L	5	< 5
SCP 038	Manganese	µg/L	1	1
SCP 060B	* Acenaphthylene	µg/L	0.010	< 0.010
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.010
**5520F	* TPH C10-C40	µg/L	10	< 10
SCP 060B	* Acenaphthene	µg/L	0.010	< 0.010
SCP 060B	* Anthracene	µg/L	0.01	< 0.010
SCP 060B	* Benz(a)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(ghi)perylene	µg/L	0.010	< 0.010
SCP 060B	* Chrysene	µg/L	0.010	< 0.010
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Fluorene	µg/L	0.01	< 0.010
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.010
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.010
SCP 060B	* Pyrene	µg/L	0.01	< 0.010
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exit Lagoon Full List	Sampled By:	Danny O'Leary
Our Reference:	5742 (19-01646)	Sample Matrix:	Surface Water
Date Sampled:	09/04/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
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Certificate of Analysis

Customer	Bennettsbridge Limestone Quarries Ltd	Date Received	08/05/2019
		Date Analysed	08/05/2019 - 27/05/2019
Office	Bennettsbridge, Kilkenny	Issue Date	28/05/2019
		Quote No.	
Customer Contact	Eoin O' Carroll	Customer PO	
		BATCH NUMBER	19-01919

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

**	Adapted from Standard Methods for the Examination of Water and Wastewater.
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.
*	Analysis is not INAB/UKAS accredited

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exit Lagoon Full List	Sampled By:	Danny O'Leary , SSS LTD
Our Reference:	6610 (19-01919)	Sample Matrix:	Surface Water
Date Sampled:	08/05/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Onsite Measurements:</u>			
	* Temperature	°C		11.9
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	14.7	683.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10.0	< 10.0
SCP 010	Suspended Solids	mg/L	2.0	< 2.0
SCP 027A	Total Ammonia	mg/L N	0.020	0.036
SCP 027B	Chloride	mg/L	0.5	31.0
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	9.20
SCP 027F	Nitrite	mg/L N	0.005	0.009
SCP 027D	Sulphate	mg/L	0.5	15.0
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	2.4
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	3.1
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.2	16.1
SCP 053A	Potassium	mg/L	1.00	2.99
SCP 053A	Sodium	mg/L	1.0	13.5
SCP 053A	Calcium	mg/L	1.0	133
SCP 038	Dissolved Iron	µg/L	5	21
SCP 038	Dissolved Manganese	µg/L	1	< 1
SCP 038	Iron	µg/L	5	26
SCP 038	Manganese	µg/L	1	1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
**5520F	* TPH C10-C40	µg/L	10	< 10
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060B	* Anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benz(a)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(ghi)perylene	µg/L	0.010	< 0.010
SCP 060B	* Chrysene	µg/L	0.010	< 0.010
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Fluorene	µg/L	0.01	< 0.01
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060B	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exit Lagoon Full List	Sampled By:	Danny O'Leary , SSS LTD
Our Reference:	6610 (19-01919)	Sample Matrix:	Surface Water
Date Sampled:	08/05/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
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Certificate of Analysis

Customer	Bennettsbridge Limestone Quarries Ltd	Date Received	20/02/2019
		Date Analysed	06/06/2019 - 21/06/2019
Office	Bennettsbridge, Kilkenny	Issue Date	24/06/2019
		Quote No.	
Customer Contact	Eoin O' Carroll	Customer PO	
		BATCH NUMBER	19-02239
Project:	Exiting Lagoon		

Conor Murphy
Operations Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
****	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

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directors: K. Murphy, M. Murphy & C. Murphy
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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon	Sampled By:	Danny O'Leary
Our Reference:	7582 (19-02239)	Sample Matrix:	Surface Water
Date Sampled:	06/06/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Onsite Measurements:</u>			
	* Temperature	°C		12.2
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	14.7	677.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1	< 1
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 2
SCP 027A	Total Ammonia	mg/L N	0.020	< 0.020
SCP 027B	Chloride	mg/L	0.5	31.0
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	8.86
SCP 027F	Nitrite	mg/L N	0.005	0.012
SCP 027D	Sulphate	mg/L	0.5	18.3
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.8
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.9
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.20	17.0
SCP 053A	Potassium	mg/L	1.0	2.8
SCP 053A	Sodium	mg/L	1.0	12.2
SCP 053A	Calcium	mg/L	1.0	138
SCP 038	Dissolved Iron	µg/L	5	< 5
SCP 038	Dissolved Manganese	µg/L	1	2
SCP 038	Iron	µg/L	5	16
SCP 038	Manganese	µg/L	1	2
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
**5520F	* TPH C10-C40	µg/L	10	155
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060B	* Anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benz(a)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(ghi)perylene	µg/L	0.010	< 0.010
SCP 060B	* Chrysene	µg/L	0.010	< 0.010
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Fluorene	µg/L	0.01	< 0.01
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060B	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Customer Sample Ref: Exiting Lagoon		Customer Sample Code:	
Project:	Exiting Lagoon	Sampled By:	Danny O'Leary
Our Reference:	7582 (19-02239)	Sample Matrix:	Surface Water
Date Sampled:	06/06/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
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Certificate of Analysis

Customer	Bennettsbridge Limestone Quarries Ltd	Date Received	04/07/2019
		Date Analysed	04/07/2019 - 02/08/2019
Office	Bennettsbridge, Kilkenny	Issue Date	02/08/2019
		Quote No.	
Customer Contact	Eoin O' Carroll	Customer PO	
		BATCH NUMBER	19-02682
Project:	SW Monthly		

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
****	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

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Customer Sample Ref:	Entering Lagoon	Customer Sample Code:	
Project:	SW Monthly	Sampled By:	Danny O' Leary
Our Reference:	8767 (19-02682)	Sample Matrix:	Ground Water
Date Sampled:	04/07/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	14.7	626.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	8.1
**5520F	* Total Petroleum Hydrocarbons	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	6
SCP 027A	Ammonium	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	29.9
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	7.64
SCP 027F	Nitrite	mg/L N	0.005	0.016
SCP 027D	Sulphate	mg/L	0.5	18.8
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	2.4
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.8
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.20	14.80
SCP 053A	Potassium	mg/L	1.0	2.4
SCP 053A	Sodium	mg/L	1.0	11.5
SCP 053A	Calcium	mg/L	1.0	108
SCP 038	Dissolved Iron	µg/L	5	10
SCP 038	Dissolved Manganese	µg/L	1	< 1
SCP 038	Iron	µg/L	5	10
SCP 053A	Manganese	µg/L	1	< 1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060B	* Anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benz(a)anthracene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(ghi)perylene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Chrysene	µg/L	0.01	< 0.010
SCP 060B	* Dibenzo(a,h)anthracene	µg/L	0.01	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Fluorene	µg/L	0.01	< 0.01
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060B	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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directors: K. Murphy, M. Murphy & C. Murphy
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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	SW Monthly	Sampled By:	Danny O' Leary
Our Reference:	8768 (19-02682)	Sample Matrix:	Ground Water
Date Sampled:	04/07/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	14.7	668.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
**5520F	* Total Petroleum Hydrocarbons	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Ammonium	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	29.6
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	8.14
SCP 027F	Nitrite	mg/L N	0.005	0.013
SCP 027D	Sulphate	mg/L	0.5	18.2
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.9
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.4
SCP 044	Total Phosphorus	mg/L P	0.04	0.05
SCP 053A	Magnesium	mg/L	0.20	14.90
SCP 053A	Potassium	mg/L	1.0	2.6
SCP 053A	Sodium	mg/L	1.0	11.7
SCP 053A	Calcium	mg/L	1.0	119
SCP 038	Dissolved Iron	µg/L	5	7
SCP 038	Dissolved Manganese	µg/L	1	1
SCP 038	Iron	µg/L	5	9
SCP 053A	Manganese	µg/L	1	< 1
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benz(a)anthracene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(ghi)perylene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Chrysene	µg/L	0.01	< 0.010
SCP 060B	* Dibenzo(a,h)anthracene	µg/L	0.01	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Fluorene	µg/L	0.01	< 0.01
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060B	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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directors: K. Murphy, M. Murphy & C. Murphy
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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	SW Monthly	Sampled By:	Danny O' Leary
Our Reference:	8769 (19-02682)	Sample Matrix:	Ground Water
Date Sampled:	04/07/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	14.7	675.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.3
**5520F	* Total Petroleum Hydrocarbons	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Ammonium	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	28.4
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.020
SCP 027G	Nitrate	mg/L N	0.25	8.30
SCP 027F	Nitrite	mg/L N	0.005	0.013
SCP 027D	Sulphate	mg/L	0.5	13.2
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.8
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.1
SCP 044	Total Phosphorus	mg/L P	0.04	0.06
SCP 053A	Magnesium	mg/L	0.20	1.00
SCP 053A	Potassium	mg/L	1.0	3.3
SCP 053A	Sodium	mg/L	1.0	4.8
SCP 053A	Calcium	mg/L	1.0	5.0
SCP 038	Dissolved Iron	µg/L	5	5
SCP 038	Dissolved Manganese	µg/L	1	3
SCP 038	Iron	µg/L	5	15
SCP 053A	Manganese	µg/L	1	4
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benz(a)anthracene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(ghi)perylene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Chrysene	µg/L	0.01	< 0.010
SCP 060B	* Dibenzo(a,h)anthracene	µg/L	0.01	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Fluorene	µg/L	0.01	< 0.01
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060B	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exit Lagoon Full List
Address:	Bennettsbridge, Kilkenny	Date Received:	06/08/2019
Report to:	Eoin O' Carroll	Condition of Sample:	
Customer PO		Date Analysed:	06/08/2019 - 23/08/2019
Quote No.		Issue Date:	27/08/2019
		BATCH NUMBER:	19-03128

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
****	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrine Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

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dunrine | killarney | county kerry | ireland | telephone +353 64 66 33922 | fax +353 64 66 39022

web site www.southernscientificireland.com | e-mail info@southernscientificireland.com

directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M



Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exit Lagoon Full List	Sampled By:	Danny O'Leary
Our Reference:	9940 (19-03128)	Sample Matrix:	Surface Water
Date Sampled:	06/08/2019	Time Sampled:	11:05

Method:	Parameter:	Units	LOD	Result
	<u>Onsite Measurements:</u>			
	* Temperature	°C		15.9
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	14.7	641.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	8.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	1.4
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	29.9
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.010
SCP 027G	Nitrate	mg/L N	0.25	7.10
SCP 027F	Nitrite	mg/L N	0.005	0.030
SCP 027D	Sulphate	mg/L	0.5	17.8
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.7
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.7
SCP 044	Total Phosphorus	mg/L P	0.04	0.04
SCP 053A	Magnesium	mg/L	0.20	17.20
SCP 053A	Potassium	mg/L	1.0	2.8
SCP 053A	Sodium	mg/L	1.0	11.1
SCP 053A	Calcium	mg/L	1.0	116
SCP 038 /073	Dissolved Iron	µg/L	5	< 5
SCP 038 /073	Dissolved Manganese	µg/L	1	< 1
SCP 038/073	Iron	µg/L	5	9
SCP 038/073	Manganese	µg/L	1	1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060B	* Anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Chrysene	µg/L	0.01	< 0.01
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Fluorene	µg/L	0.01	< 0.01
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060B	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160
**5520F	* TPH C10-C40	µg/L	10	< 10

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exit Lagoon Full List	Sampled By:	Danny O'Leary
Our Reference:	9940 (19-03128)	Sample Matrix:	Surface Water
Date Sampled:	06/08/2019	Time Sampled:	11:05

Method:	Parameter:	Units	LOD	Result
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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exit Lagoon Full List
Address:	Bennettsbridge, Kilkenny	Date Received:	03/09/2019
Report to:	Eoin O' Carroll	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	03/09/2019 - 23/10/2019
Quote No.		Issue Date:	23/10/2019
		BATCH NUMBER:	19-03574

Conor Murphy
Operations Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
****	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exit Lagoon Full List	Sampled By:	Danny O'Leary
Our Reference:	11089 (19-03574)	Sample Matrix:	Surface Water
Date Sampled:	03/09/2019	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
Onsite Measurements:				
	* Temperature	°C		14.2
Chemical Analysis: (F)				
SCP 052	Conductivity	µS/cm @ 20 °C	15	659
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	1.7
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	2
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	30.2
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	7.21
SCP 027F	Nitrite	mg/L N	0.005	0.016
SCP 027D	Sulphate	mg/L	0.5	18.8
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.6
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.0
SCP 044	Total Phosphorus	mg/L P	0.04	0.05
SCP 053A	Magnesium	mg/L	0.20	17.70
SCP 053A	Potassium	mg/L	1.0	3.1
SCP 053A	Sodium	mg/L	1.0	11.7
SCP 053A	Calcium	mg/L	1.0	145
SCP 038 /073	Dissolved Iron	µg/L	5	< 5
SCP 038 /073	Dissolved Manganese	µg/L	1	< 1
SCP 038/073	Iron	µg/L	5	< 5
SCP 038/073	Manganese	µg/L	1	< 1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
**5520F	* TPH C10-C40	µg/L	10	< 10
SCP 060E	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060E	* Anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Chrysene	µg/L	0.01	< 0.01
SCP 060E	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Fluorene	µg/L	0.01	< 0.01
SCP 060E	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 114A/060E	* Naphthalene	µg/L	0.01	< 0.01
SCP 060E	* Phenanthrene	µg/L	0.01	< 0.01

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exit Lagoon Full List	Sampled By:	Danny O'Leary
Our Reference:	11089 (19-03574)	Sample Matrix:	Surface Water
Date Sampled:	03/09/2019	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
SCP 060E	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exit Lagoon Full List
Address:	Bennettsbridge, Kilkenny	Date Received:	09/10/2019
Report to:	Eoin O' Carroll	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	10/10/2019 - 30/10/2019
Quote No.		Issue Date:	30/10/2019
		BATCH NUMBER:	19-04090

Conor Murphy
Operations Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
****	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exit Lagoon Full List	Sampled By:	Paul Byrne, SSS LTD
Our Reference:	12638 (19-04090)	Sample Matrix:	Surface Water
Date Sampled:	09/10/2019	Time Sampled:	13:20

Method:	Parameter:	Units	LOD	Result
Onsite Measurements:				
	* Temperature	°C		11.5
Chemical Analysis: (F)				
SCP 052	Conductivity	µS/cm @ 20 °C	15	666
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 2
SCP 027A	Total Ammonia	mg/L N	0.02	0.03
SCP 027B	Chloride	mg/L	0.5	31.8
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	8.11
SCP 027F	Nitrite	mg/L N	0.005	0.024
SCP 027D	Sulphate	mg/L	0.5	20.1
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.3
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.8
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.20	15.50
SCP 053A	Potassium	mg/L	1.0	4.0
SCP 053A	Sodium	mg/L	1.0	12.8
SCP 053A	Calcium	mg/L	1.0	122
SCP 038 /073	Dissolved Iron	µg/L	5	< 5
SCP 038 /073	Dissolved Manganese	µg/L	1	< 1
SCP 038/073	Iron	µg/L	5	< 5
SCP 038/073	Manganese	µg/L	1	< 1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
**5520F	* TPH C10-C40	µg/L	10	< 10
SCP 060E	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060E	* Anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Chrysene	µg/L	0.01	< 0.01
SCP 060E	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Fluorene	µg/L	0.01	< 0.01
SCP 060E	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 114A/060E	* Naphthalene	µg/L	0.01	< 0.01
SCP 060E	* Phenanthrene	µg/L	0.01	< 0.01

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exit Lagoon Full List	Sampled By:	Paul Byrne, SSS LTD
Our Reference:	12638 (19-04090)	Sample Matrix:	Surface Water
Date Sampled:	09/10/2019	Time Sampled:	13:20

Method:	Parameter:	Units	LOD	Result
SCP 060E	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exit Lagoon Full List
Address:	Bennettsbridge, Kilkenny	Date Received:	07/11/2019
Report to:	Eoin O' Carroll	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	07/11/2019 - 12/12/2019
Quote No.		Issue Date:	16/12/2019
		BATCH NUMBER:	19-04513

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

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**	Adapted from Standard Methods for the Examination of Water and Wastewater.
****	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exit Lagoon Full List	Sampled By:	Danny O'Leary
Our Reference:	13876 (19-04513)	Sample Matrix:	Surface Water
Date Sampled:	07/11/2019	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
Onsite Measurements:				
	* Temperature	°C		11.2
Chemical Analysis: (F)				
SCP 052	Conductivity	µS/cm @ 20 °C	15	689
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.4
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	31.1
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.012
SCP 027G	Nitrate	mg/L N	0.25	11.3
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 027D	Sulphate	mg/L	0.5	14.5
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	2.2
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.0
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.20	9.95
SCP 053A	Potassium	mg/L	1.0	2.9
SCP 053A	Sodium	mg/L	1.0	9.6
SCP 053A	Calcium	mg/L	1.0	108
SCP 038 /073	Dissolved Iron	µg/L	5	< 5
SCP 038 /073	Dissolved Manganese	µg/L	1	1
SCP 038/073	Iron	µg/L	5	< 5
SCP 038/073	Manganese	µg/L	1	1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
**5520F	* TPH C10-C40	µg/L	10	< 10
SCP 060E	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060E	* Anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Chrysene	µg/L	0.01	< 0.01
SCP 060E	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Fluorene	µg/L	0.01	< 0.01
SCP 060E	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Naphthalene	µg/L	0.01	< 0.01
SCP 060E	* Phenanthrene	µg/L	0.01	< 0.01

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exit Lagoon Full List	Sampled By:	Danny O'Leary
Our Reference:	13876 (19-04513)	Sample Matrix:	Surface Water
Date Sampled:	07/11/2019	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
SCP 060E	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Surface Water Monitoring
Address:	Bennettsbridge, Kilkenny	Date Received:	05/12/2019
Report to:	Eoin O' Carroll	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	05/12/2019 - 07/01/2020
Quote No.		Issue Date:	07/01/2020
		BATCH NUMBER:	19-04946

Conor Murphy
Operations Manager

Index to symbols used & Notes

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****	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

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- ◆ Sampling is outside the scope of the laboratory activities.

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M



Customer Sample Ref:	Entering Lagoon	Customer Sample Code:	
Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15135 (19-04946)	Sample Matrix:	Surface Water
Date Sampled:	05/12/2019	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
Onsite Measurements:				
	* Temperature	°C		9.0
Chemical Analysis: (F)				
SCP 052	Conductivity	µS/cm @ 20 °C	15	666
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 2
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	31.3
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	10.9
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 027D	Sulphate	mg/L	0.5	16.6
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	2.5
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.9
SCP 044	Total Phosphorus	mg/L P	0.04	0.60
SCP 053A	Magnesium	mg/L	0.20	10.65
SCP 053A	Potassium	mg/L	1.0	2.5
SCP 053A	Sodium	mg/L	1.0	10.0
SCP 053A	Calcium	mg/L	1.0	116
SCP 038 /073	Dissolved Iron	µg/L	5	< 5
SCP 038 /073	Dissolved Manganese	µg/L	1	< 1
SCP 038/073	Iron	µg/L	5	< 5
SCP 038/073	Manganese	µg/L	1	< 1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 115A	* Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10
SCP 060E	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060E	* Anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Chrysene	µg/L	0.01	< 0.01
SCP 060E	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Fluorene	µg/L	0.01	< 0.01

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Customer Sample Ref:	Entering Lagoon	Customer Sample Code:	
Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15135 (19-04946)	Sample Matrix:	Surface Water
Date Sampled:	05/12/2019	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
SCP 060E	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Naphthalene	µg/L	0.01	< 0.01
SCP 060E	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060E	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15136 (19-04946)	Sample Matrix:	Surface Water
Date Sampled:	05/12/2019	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
Onsite Measurements:				
	* Temperature	°C		9.5
Chemical Analysis: (F)				
SCP 052	Conductivity	µS/cm @ 20 °C	15	672
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.7
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 2
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	31.1
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.011
SCP 027G	Nitrate	mg/L N	0.25	11.2
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 027D	Sulphate	mg/L	0.5	16.3
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	2.5
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	3.1
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.20	10.54
SCP 053A	Potassium	mg/L	1.0	2.5
SCP 053A	Sodium	mg/L	1.0	9.9
SCP 053A	Calcium	mg/L	1.0	117
SCP 038 /073	Dissolved Iron	µg/L	5	< 5
SCP 038 /073	Dissolved Manganese	µg/L	1	< 1
SCP 038/073	Iron	µg/L	5	< 5
SCP 038/073	Manganese	µg/L	1	< 1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 115A	* Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10
SCP 060E	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060E	* Anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Chrysene	µg/L	0.01	< 0.01
SCP 060E	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Fluorene	µg/L	0.01	< 0.01
SCP 060E	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Naphthalene	µg/L	0.01	< 0.01

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15136 (19-04946)	Sample Matrix:	Surface Water
Date Sampled:	05/12/2019	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
SCP 060E	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060E	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15137 (19-04946)	Sample Matrix:	Surface Water
Date Sampled:	05/12/2019	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
Onsite Measurements:				
	* Temperature	°C		10.1
Chemical Analysis: (F)				
SCP 052	Conductivity	µS/cm @ 20 °C	15	695
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.3
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	2
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	31.6
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.018
SCP 027G	Nitrate	mg/L N	0.25	2.47
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 027D	Sulphate	mg/L	0.5	15.1
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	2.6
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	3.0
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.20	10.44
SCP 053A	Potassium	mg/L	1.0	2.6
SCP 053A	Sodium	mg/L	1.0	10.2
SCP 053A	Calcium	mg/L	1.0	121
SCP 038 /073	Dissolved Iron	µg/L	5	< 5
SCP 038 /073	Dissolved Manganese	µg/L	1	< 2
SCP 038/073	Iron	µg/L	5	48
SCP 038/073	Manganese	µg/L	1	8
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 115A	* Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10
SCP 060E	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060E	* Anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Chrysene	µg/L	0.01	< 0.01
SCP 060E	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Fluorene	µg/L	0.01	< 0.01
SCP 060E	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Naphthalene	µg/L	0.01	< 0.01

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15137 (19-04946)	Sample Matrix:	Surface Water
Date Sampled:	05/12/2019	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
SCP 060E	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060E	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Appendix B

Collated Data for Nitrates (employed to create graphs)

Sampling Locations Map

&

Laboratory Certificates of Analysis

Additional Monitoring at the Site



Figure B1 Sampling Locations: Eden Spring, B3D on the floor, Western wall face springs (B3B & B3F), Exit Lagoon & River Nore

Table B1 Collated Data for Nitrates (employed to create graphs)

	mg/l NO3-N	mg/l NO3-N	mg/l NO3-N	mg/l NO3-N	mg/l NO3-N	mg/l NO3-N	mg/l NO3-N
	Discharge Licence ELV	EDEN SPRING NO3-N	Entering Lagoon	Exiting Lagoon	B3B	B3D	B3F
13/06/2017	10.00	6.47	6.39	6.25			
05/07/2017	10.00	6.61	6.44	6.39			
02/08/2017	10.00	5.18	6.55	6.00			
04/09/2017	10.00	7.59	6.99	6.79			
02/10/2017	10.00	7.33	7.35	6.61			
01/11/2017	10.00	9.23	8.79	8.56			
05/12/2017	10.00	8.78	8.24	8.40			
08/01/2018	10.00	9.33	9.20	9.16	8.88	<0.25	6.47
05/02/2018	10.00	11.30	9.37	9.50	9.4	<0.25	5.76
06/03/2018	10.00	9.34	8.91	8.80	8.86	<0.25	5.52
03/04/2018	10.00	9.34	8.97	9.01	8.82	<0.25	4.81
03/05/2018	10.00	9.84	9.39	9.28	9.48	<0.25	
11/06/2018	10.00	8.83	12.40	7.29	6.42	0.33	9.38
09/07/2018	10.00	7.08	6.35	6.58	7.21	0.41	5.26
13/08/2018	10.00	7.27	6.81	6.70	7.28	<0.25	4.75
11/09/2018	10.00	7.1	7.7	6.54	7.27	<0.25	9.62
08/10/2018	10.00	7.0	6.4	6.94	7.25	<0.25	8.64
06/11/2018	10.00	6.4	6.3	6.35	10.20	<0.25	10.1
12/12/2018	10.00	11.7	11.5	16.30	14.80	0.026	9.6
23/01/2019	10.00	10.6	10.8	10.60	12.50	<0.25	9.89
20/02/2019	10.00	11.4	11.4	11.60	11.70	<0.25	9.20
12/03/2019	10.00	12.2	11.6	11.80		0.39	10.30
09/04/2019	10.00	9.6	9.4	9.26	12.10	0.31	9.66
08/05/2019	10.00	8.9	9.1	9.20	9.80	<0.25	
24/06/2019	10.00	9.1	8.4	8.86	9.76	1.00	
					Spring West Face, up side ramp B3B (few metres south of B3A) 31m OD	ARTESIAN BH 80M DEEP: DEEP DEEP GW from elevation range 0m OD to -56m OD	Spring West Face, eternal, B3F (34m OD approx)



Certificate of Analysis

Customer	Bennettsbridge Limestone Quarries Ltd	Date Received	23/01/2019
		Date Analysed	24/01/2019 - 18/02/2019
Office	Bennettsbridge, Kilkenny	Issue Date	18/02/2019
		Quote No.	
Customer Contact	Eoin O' Carroll	Customer PO	
		BATCH NUMBER	19-01010

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrine Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

- ◆ The results relate only to the items tested.
- ◆ Opinions and interpretations expressed herein are outside the scope of INAB accreditation.
- ◆ The analysis report shall not be reproduced except in full without written approval of the laboratory.
- ◆ Sampling is outside the scope of the laboratory activities.

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RECEIVED: 18/08/2025

Customer Sample Ref:	Eden	Customer Sample Code:	3198
Project:		Sampled By:	Danny O'Leary, SSS
Our Reference:	3475 (19-01010) W	Sample Matrix:	Surface Water
Date Sampled:	23/02/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Chemical Analysis: (F)</u>			
SCP 038	Dissolved Manganese	µg/L	1	< 1
	<u>Onsite Measurements:</u>			
SEP 007	* Temperature	°C		10.2
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	15	697
**5520F	* Total Hydrocarbons C10-C40	µg/L	10	< 10
SCP 027G	Nitrate	mg/L N	0.25	10.6
SCP 010	Suspended Solids	mg/L	2.0	< 4.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10.0	< 10.0
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 044	Total Phosphorus	mg/L P	0.04	0.04
SCP 027D	Sulphate	mg/L	0.5	14.3
SCP 053A	Magnesium	mg/L	0.2	15.1
SCP 038	Dissolved Iron	µg/L	5	< 5
SCP 053A	Potassium	mg/L	1.00	2.72
SCP 053A	Calcium	mg/L	1.0	139
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.7
SCP 038	Iron	µg/L	5	< 5
SCP 027B	Chloride	mg/L	0.5	30.5
SCP 038	Manganese	µg/L	1	< 1
SCP 053A	Sodium	mg/L	1.0	11.7
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.7
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.010	< 0.01
SCP 060B	* Acenaphthylene	µg/L	0.010	< 0.01
SCP 060B	* Benz(a)anthracene	µg/L	0.010	< 0.01
SCP 060B	* Fluorene	µg/L	0.010	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Chrysene	µg/L	0.010	< 0.010
SCP 060B	* Anthracene	µg/L	0.010	< 0.01
SCP 060B	* Acenaphthene	µg/L	0.010	< 0.01
SCP 060B	* Benzo(ghi)perylene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160
SCP 060B	* Pyrene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.010	< 0.010
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.010	< 0.010

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RECEIVED: 18/08/2025

Customer Sample Ref:	Eden	Customer Sample Code:	3198
Project:		Sampled By:	Danny O'Leary, SSS
Our Reference:	3475 (19-01010) W	Sample Matrix:	Surface Water
Date Sampled:	23/02/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
SCP 060B	* Benzo(a)pyrene	µg/L	0.010	< 0.010

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RECEIVED: 18/08/2025

Sample Deviation Report

Sample Number	Customer Ref	Customer Code	Deviation Code(s)
3475	Eden	3198	W

Deviation Key

Deviation Code	Deviation Description
A	Exceeds sampling to extraction or analysis
C	Wrong container
D	Missing sample date
H	Headspace
P	Sample preservative required
R	Exceeds sampling to receipt
T	Storage temperature
W	Missing sample time for water
Note 5	Results outside the scope of accreditation.

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Certificate of Analysis

Customer	Bennettsbridge Limestone Quarries Ltd	Date Received	20/02/2019
		Date Analysed	20/02/2019 - 26/03/2019
Office	Bennettsbridge, Kilkenny	Issue Date	01/04/2019
		Quote No.	
Customer Contact	Eoin O Carroll	Customer PO	
		BATCH NUMBER	19-01154

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

**	Adapted from Standard Methods for the Examination of Water and Wastewater.
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrine Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.
*	Analysis is not INAB/UKAS accredited

Notes

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RECEIVED: 18/08/2025

Customer Sample Ref:	Eden	Customer Sample Code:	
Project:		Sampled By:	
Our Reference:	4047 (19-01154)	Sample Matrix:	Surface Water
Date Sampled:	20/02/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Onsite Measurements:</u>			
SEP 007	* Temperature	°C		11.4
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	15	694
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.5
**5520F	* Total Petroleum Hydrocarbons	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10.0	< 10.0
SCP 010	Suspended Solids	mg/L	2.0	< 4.0
SCP 027A	Ammonium	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	28.9
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.02
SCP 027G	Nitrate	mg/L N	0.25	11.4
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 027D	Sulphate	mg/L	0.5	13.8
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.5
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.5
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.2	13.2
SCP 053A	Potassium	mg/L	1.00	2.79
SCP 053A	Sodium	mg/L	1.0	12.0
SCP 053A	Calcium	mg/L	1.0	131
SCP 038	Dissolved Iron	µg/L	5	8
SCP 038	Dissolved Manganese	µg/L	1	< 1
SCP 038	Iron	µg/L	5	< 13
SCP 038	Manganese	µg/L	1	< 1
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Acenaphthene	µg/L	0.010	< 0.010
SCP 060B	* Acenaphthylene	µg/L	0.010	< 0.010
SCP 060B	* Anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benz(a)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(ghi)perylene	µg/L	0.010	< 0.010
SCP 060B	* Chrysene	µg/L	0.010	< 0.010
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Fluorene	µg/L	0.010	< 0.010
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.010	< 0.010
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.010	< 0.010
SCP 060B	* Pyrene	µg/L	0.010	< 0.010
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Certificate of Analysis

Customer	Bennettsbridge Limestone Quarries Ltd	Date Received	12/03/2019
		Date Analysed	12/03/2019 - 26/03/2019
Office	Bennettsbridge, Kilkenny	Issue Date	29/03/2019
		Quote No.	
Customer Contact	Eoin O' Carroll	Customer PO	
		BATCH NUMBER	19-01360

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

**	Adapted from Standard Methods for the Examination of Water and Wastewater.
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrine Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.
*	Analysis is not INAB/UKAS accredited

Notes

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Customer Sample Ref:	Eden	Customer Sample Code:	3198
Project:		Sampled By:	Danny O'Leary, SSS
Our Reference:	4681 (19-01360)	Sample Matrix:	Surface Water
Date Sampled:	12/03/2019	Time Sampled:	11:00

Method:	Parameter:	Units	LOD	Result
	<u>Onsite Measurements:</u>			
SEP 007	* Temperature	°C		12.1
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	15	683
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.3
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10.0	< 10.0
SCP 010	Suspended Solids	mg/L	2.0	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	36.6
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 027G	Nitrate	mg/L N	0.25	12.2
SCP 027F	Nitrite	mg/L N	0.005	0.005
SCP 027D	Sulphate	mg/L	0.5	14.5
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	2.2
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.2
SCP 044	Total Phosphorus	mg/L P	0.04	0.04
SCP 053A	Magnesium	mg/L	0.2	10.4
SCP 053A	Potassium	mg/L	1.00	3.10
SCP 053A	Sodium	mg/L	1.0	12.3
SCP 053A	Calcium	mg/L	1.0	130
SCP 038	Dissolved Iron	µg/L	5	< 5
SCP 038	Dissolved Manganese	µg/L	1	< 1
SCP 038	Iron	µg/L	5	14
SCP 038	Manganese	µg/L	1	1
SCP 060B	* Acenaphthylene	µg/L	0.010	< 0.010
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.010	< 0.010
**5520F	* TPH C10-C40	µg/L	10	< 10
SCP 060B	* Acenaphthene	µg/L	0.010	< 0.010
SCP 060B	* Anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benz(a)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(ghi)perylene	µg/L	0.010	< 0.010
SCP 060B	* Chrysene	µg/L	0.010	< 0.010
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Fluorene	µg/L	0.010	< 0.010
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.010	< 0.010
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.010	< 0.010
SCP 060B	* Pyrene	µg/L	0.010	< 0.010
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Customer Sample Ref:	Eden	Customer Sample Code:	3198
Project:		Sampled By:	Danny O'Leary, SSS
Our Reference:	4681 (19-01360)	Sample Matrix:	Surface Water
Date Sampled:	12/03/2019	Time Sampled:	11:00

Method:	Parameter:	Units	LOD	Result
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Certificate of Analysis

Customer	Bennettsbridge Limestone Quarries Ltd	Date Received	09/04/2019
		Date Analysed	10/04/2019 - 09/05/2019
Office	Bennettsbridge, Kilkenny	Issue Date	14/05/2019
		Quote No.	
Customer Contact	Eoin O' Carroll	Customer PO	
		BATCH NUMBER	19-01649

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

**	Adapted from Standard Methods for the Examination of Water and Wastewater.
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrine Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.
*	Analysis is not INAB/UKAS accredited

Notes

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directors: K. Murphy, M. Murphy & C. Murphy
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Customer Sample Ref:	Eden	Customer Sample Code:	3198
Project:		Sampled By:	Danny O'Leary, SSS
Our Reference:	5751 (19-01649)	Sample Matrix:	Surface Water
Date Sampled:	09/04/2019	Time Sampled:	11:00

Method:	Parameter:	Units	LOD	Result
	<u>Onsite Measurements:</u>			
SEP 007	* Temperature	°C		11.8
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	14.7	697.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.3
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10.0	< 10.0
SCP 010	Suspended Solids	mg/L	2.0	< 4.0
SCP 027A	Total Ammonia	mg/L N	0.02	0.04
SCP 027B	Chloride	mg/L	0.5	30.6
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.02
SCP 027G	Nitrate	mg/L N	0.25	9.63
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 027D	Sulphate	mg/L	0.5	14.4
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.4
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.3
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.2	14.0
SCP 053A	Potassium	mg/L	1.00	2.60
SCP 053A	Sodium	mg/L	1.0	11.6
SCP 053A	Calcium	mg/L	1.0	127
SCP 038	Dissolved Iron	µg/L	5	< 5
SCP 038	Dissolved Manganese	µg/L	1	< 1
SCP 038	Iron	µg/L	5	< 5
SCP 038	Manganese	µg/L	1	< 1
SCP 060B	* Acenaphthylene	µg/L	0.010	< 0.010
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.010
**5520F	* TPH C10-C40	µg/L	10	< 10
SCP 060B	* Acenaphthene	µg/L	0.010	< 0.010
SCP 060B	* Anthracene	µg/L	0.01	< 0.010
SCP 060B	* Benz(a)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(ghi)perylene	µg/L	0.010	< 0.010
SCP 060B	* Chrysene	µg/L	0.010	< 0.010
SCP 060B	* Dibenzo(a,h)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Fluorene	µg/L	0.01	< 0.010
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.010
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.010
SCP 060B	* Pyrene	µg/L	0.01	< 0.010
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Customer Sample Ref:	Eden	Customer Sample Code:	3198
Project:		Sampled By:	Danny O'Leary, SSS
Our Reference:	5751 (19-01649)	Sample Matrix:	Surface Water
Date Sampled:	09/04/2019	Time Sampled:	11:00

Method:	Parameter:	Units	LOD	Result
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Certificate of Analysis

Customer	Bennettsbridge Limestone Quarries Ltd	Date Received	09/04/2019
		Date Analysed	10/04/2019 - 09/05/2019
Office	Bennettsbridge, Kilkenny	Issue Date	14/05/2019
		Quote No.	
Customer Contact	Eoin O' Carroll	Customer PO	
		BATCH NUMBER	19-01647

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

**	Adapted from Standard Methods for the Examination of Water and Wastewater.
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.
*	Analysis is not INAB/UKAS accredited

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RECEIVED: 18/08/2025

Customer Sample Ref:	Upstream Bennetsbridge waste water treatment plant	Customer Sample Code:	
Project:	up/downstream R. Nore	Sampled By:	Danny O'Leary
Our Reference:	5743 (19-01647)	Sample Matrix:	Surface Water
Date Sampled:	09/04/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	14.7	563.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	8.1
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10.0	< 10.0
SCP 010	Suspended Solids	mg/L	2.0	< 4.0
SCP 027A	Total Ammonia	mg/L N	0.020	< 0.02
SCP 027B	Chloride	mg/L	0.5	27.1
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.03
SCP 027G	Nitrate	mg/L N	0.25	5.02
SCP 027F	Nitrite	mg/L N	0.005	0.016
SCP 027D	Sulphate	mg/L	0.5	21.7
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	4.2
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	5.0
SCP 044	Total Phosphorus	mg/L P	0.04	0.04
SCP 053A	Magnesium	mg/L	0.2	10.1
SCP 053A	Potassium	mg/L	1.00	3.62
SCP 053A	Sodium	mg/L	1.0	12.5
SCP 053A	Calcium	mg/L	1.0	106
SCP 038	Dissolved Iron	µg/L	5	38
SCP 038	Dissolved Manganese	µg/L	1	17
SCP 038	Iron	µg/L	5	104
SCP 038	Manganese	µg/L	1	24
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.010
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.010
**5520F	* TPH C10-C40	µg/L	10	< 10
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.010
SCP 060B	* Anthracene	µg/L	0.01	< 0.010
SCP 060B	* Benz(a)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(ghi)perylene	µg/L	0.010	< 0.010
SCP 060B	* Chrysene	µg/L	0.010	< 0.010
SCP 060B	* Dibenzo(a,h)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Fluorene	µg/L	0.01	< 0.010
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.010
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.010
SCP 060B	* Pyrene	µg/L	0.01	< 0.010
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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registered in ireland no 323196 | vat reg no IE 6343196 M



Customer Sample Ref:	NE of Warrington Downstream Kilkenny	Customer Sample Code:	
Project:	up/downstream R. Nore	Sampled By:	Danny O'Leary
Our Reference:	5744 (19-01647)	Sample Matrix:	Surface Water
Date Sampled:	09/04/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	14.7	566.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	8.1
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10.0	< 10.0
SCP 010	Suspended Solids	mg/L	2.0	< 4.0
SCP 027A	Total Ammonia	mg/L N	0.020	< 0.02
SCP 027B	Chloride	mg/L	0.5	26.7
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.05
SCP 027G	Nitrate	mg/L N	0.25	5.30
SCP 027F	Nitrite	mg/L N	0.005	0.020
SCP 027D	Sulphate	mg/L	0.5	22.0
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	4.3
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	5.1
SCP 044	Total Phosphorus	mg/L P	0.04	0.08
SCP 053A	Magnesium	mg/L	0.2	10.0
SCP 053A	Potassium	mg/L	1.00	3.78
SCP 053A	Sodium	mg/L	1.0	12.9
SCP 053A	Calcium	mg/L	1.0	107
SCP 038	Dissolved Iron	µg/L	5	44
SCP 038	Dissolved Manganese	µg/L	1	17
SCP 038	Iron	µg/L	5	115
SCP 038	Manganese	µg/L	1	26
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.010
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.010
**5520F	* TPH C10-C40	µg/L	10	< 10
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.010
SCP 060B	* Anthracene	µg/L	0.01	< 0.010
SCP 060B	* Benz(a)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(ghi)perylene	µg/L	0.010	< 0.010
SCP 060B	* Chrysene	µg/L	0.010	< 0.010
SCP 060B	* Dibenzo(a,h)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Fluorene	µg/L	0.01	< 0.010
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.010
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.010
SCP 060B	* Pyrene	µg/L	0.01	< 0.010
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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RECEIVED: 18/08/2025

Customer Sample Ref:	NE of Warrington Downstream Kilkenny	Customer Sample Code:	
Project:	up/downstream R. Nore	Sampled By:	Danny O'Leary
Our Reference:	5744 (19-01647)	Sample Matrix:	Surface Water
Date Sampled:	09/04/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
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Sample Comments

Note 4:

The handling of the sample within the laboratory did not comply with the laboratories policy on holding times & handling instructions. As a result, it is possible that the results may have been compromised.

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Certificate of Analysis

Customer	Bennettsbridge Limestone Quarries Ltd	Date Received	09/04/2019
		Date Analysed	10/04/2019 - 14/05/2019
Office	Bennettsbridge, Kilkenny	Issue Date	14/05/2019
		Quote No.	
Customer Contact	Eoin O' Carroll	Customer PO	
		BATCH NUMBER	19-01651

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

**	Adapted from Standard Methods for the Examination of Water and Wastewater.
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrine Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.
*	Analysis is not INAB/UKAS accredited

Notes

- ◆ The results relate only to the items tested.
- ◆ Opinions and interpretations expressed herein are outside the scope of INAB accreditation.
- ◆ The analysis report shall not be reproduced except in full without written approval of the laboratory.
- ◆ Sampling is outside the scope of the laboratory activities.

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Customer Sample Ref:	B3B	Customer Sample Code:	
Project:		Sampled By:	Danny O' Leary
Our Reference:	5753 (19-01651)	Sample Matrix:	Ground Water
Date Sampled:	09/04/2019	Time Sampled:	12:00

Method:	Parameter:	Units	LOD	Result
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	mS/cm @ 20 °C	0.01	706
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.1
**5520F	* Total Petroleum Hydrocarbons	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10.0	< 10.0
SCP 027A	Ammonium	mg/L N	0.02	< 0.02
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.02
SCP 027G	Nitrate	mg/L N	0.25	12.1
SCP 027F	Nitrite	mg/L N	0.005	0.011
SCP 027D	Sulphate	mg/L	0.5	13.9
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.7
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.7
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.2	11.6
SCP 053A	Calcium	mg/L	1.0	137
SCP 038	Dissolved Iron	µg/L	5	< 5
SCP 038	Dissolved Manganese	µg/L	1	2
SCP 038	Iron	µg/L	5	9
SCP 053A	Manganese	µg/L	1	4
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.010
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.010
SCP 010	Suspended Solids	mg/L	2.0	< 4.0
SCP 060B	* Anthracene	µg/L	0.01	< 0.010
SCP 060B	* Benz(a)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(ghi)perylene	µg/L	0.010	< 0.010
SCP 060B	* Chrysene	µg/L	0.010	< 0.010
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Fluorene	µg/L	0.01	< 0.010
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.010
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.010
SCP 060B	* Pyrene	µg/L	0.01	< 0.010
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

Sample Comments

Note 4:

The handling of the sample within the laboratory did not comply with the laboratories policy on holding times & handling instructions. As a result, it

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Customer Sample Ref:	B3B	Customer Sample Code:	
Project:		Sampled By:	Danny O' Leary
Our Reference:	5753 (19-01651)	Sample Matrix:	Ground Water
Date Sampled:	09/04/2019	Time Sampled:	12:00

Method:	Parameter:	Units	LOD	Result
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is possible that the results may have been compromised.

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Customer Sample Ref:	B3D	Customer Sample Code:	
Project:		Sampled By:	Danny O' Leary
Our Reference:	5754 (19-01651)	Sample Matrix:	Ground Water
Date Sampled:	09/04/2019	Time Sampled:	12:15

Method:	Parameter:	Units	LOD	Result
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	mS/cm @ 20 °C	0.01	664
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.3
**5520F	* Total Petroleum Hydrocarbons	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10.0	< 10.0
SCP 027A	Ammonium	mg/L N	0.02	0.04
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.01
SCP 027G	Nitrate	mg/L N	0.25	0.31
SCP 027F	Nitrite	mg/L N	0.005	0.110
SCP 027D	Sulphate	mg/L	0.5	42.4
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.0
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	0.9
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.2	26.1
SCP 053A	Calcium	mg/L	1.0	110
SCP 038	Dissolved Iron	µg/L	5	< 5
SCP 038	Dissolved Manganese	µg/L	1	< 1
SCP 038	Iron	µg/L	5	36
SCP 053A	Manganese	µg/L	1	5
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.010
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.010
SCP 010	Suspended Solids	mg/L	2.0	< 4.0
SCP 060B	* Anthracene	µg/L	0.01	< 0.010
SCP 060B	* Benz(a)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(ghi)perylene	µg/L	0.010	< 0.010
SCP 060B	* Chrysene	µg/L	0.010	< 0.010
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Fluorene	µg/L	0.01	< 0.010
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.010
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.010
SCP 060B	* Pyrene	µg/L	0.01	< 0.010
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

Sample Comments

Note 4:

The handling of the sample within the laboratory did not comply with the laboratories policy on holding times & handling instructions. As a result, it

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Customer Sample Ref:	B3D	Customer Sample Code:	
Project:		Sampled By:	Danny O' Leary
Our Reference:	5754 (19-01651)	Sample Matrix:	Ground Water
Date Sampled:	09/04/2019	Time Sampled:	12:15

Method:	Parameter:	Units	LOD	Result
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is possible that the results may have been compromised.

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Customer Sample Ref:	B3F	Customer Sample Code:	
Project:		Sampled By:	Danny O' Leary
Our Reference:	5755 (19-01651)	Sample Matrix:	Ground Water
Date Sampled:	09/04/2019	Time Sampled:	12:30

Method:	Parameter:	Units	LOD	Result
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	mS/cm @ 20 °C	0.01	753
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.4
**5520F	* Total Petroleum Hydrocarbons	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10.0	< 10.0
SCP 027A	Ammonium	mg/L N	0.02	< 0.02
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.01
SCP 027G	Nitrate	mg/L N	0.25	9.66
SCP 027F	Nitrite	mg/L N	0.005	0.009
SCP 027D	Sulphate	mg/L	0.5	9.5
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.4
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.5
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.2	8.9
SCP 053A	Calcium	mg/L	1.0	132
SCP 038	Dissolved Iron	µg/L	5	5
SCP 038	Dissolved Manganese	µg/L	1	2
SCP 038	Iron	µg/L	5	11
SCP 053A	Manganese	µg/L	1	3
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.010
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.010
SCP 010	Suspended Solids	mg/L	2.0	< 4.0
SCP 060B	* Anthracene	µg/L	0.01	< 0.010
SCP 060B	* Benz(a)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(ghi)perylene	µg/L	0.010	< 0.010
SCP 060B	* Chrysene	µg/L	0.010	< 0.010
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Fluorene	µg/L	0.01	< 0.010
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.010
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.010
SCP 060B	* Pyrene	µg/L	0.01	< 0.010
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Certificate of Analysis

Customer	Bennettsbridge Limestone Quarries Ltd	Date Received	08/05/2019
		Date Analysed	08/05/2019 - 27/05/2019
Office	Bennettsbridge, Kilkenny	Issue Date	28/05/2019
		Quote No.	
Customer Contact	Eoin O' Carroll	Customer PO	
		BATCH NUMBER	19-01920

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

**	Adapted from Standard Methods for the Examination of Water and Wastewater.
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.
*	Analysis is not INAB/UKAS accredited

Notes

- ◆ The results relate only to the items tested.
- ◆ Opinions and interpretations expressed herein are outside the scope of INAB accreditation.
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Customer Sample Ref:	Eden	Customer Sample Code:	3198
Project:	EDEN	Sampled By:	Danny O'Leary, SSS
Our Reference:	6611 (19-01920)	Sample Matrix:	Surface Water
Date Sampled:	08/05/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Onsite Measurements:</u>			
SEP 007	* Temperature	°C		11.9
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	14.7	681.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10.0	< 10.0
SCP 010	Suspended Solids	mg/L	2.0	< 2.0
SCP 027A	Total Ammonia	mg/L N	0.020	0.039
SCP 027B	Chloride	mg/L	0.5	29.0
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.010
SCP 027G	Nitrate	mg/L N	0.25	8.90
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 027D	Sulphate	mg/L	0.5	12.0
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	2.1
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.6
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.2	16.2
SCP 053A	Potassium	mg/L	1.00	2.88
SCP 053A	Sodium	mg/L	1.0	12.3
SCP 053A	Calcium	mg/L	1.0	137
SCP 038	Dissolved Iron	µg/L	5	22
SCP 038	Dissolved Manganese	µg/L	1	< 1
SCP 038	Iron	µg/L	5	29
SCP 038	Manganese	µg/L	1	< 1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
**5520F	* TPH C10-C40	µg/L	10	< 10
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060B	* Anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benz(a)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(ghi)perylene	µg/L	0.010	< 0.010
SCP 060B	* Chrysene	µg/L	0.010	< 0.010
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Fluorene	µg/L	0.01	< 0.01
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060B	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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RECEIVED: 18/08/2025

Customer Sample Ref:	Eden	Customer Sample Code:	3198
Project:	EDEN	Sampled By:	Danny O'Leary, SSS
Our Reference:	6611 (19-01920)	Sample Matrix:	Surface Water
Date Sampled:	08/05/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
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Certificate of Analysis

Customer	Bennettsbridge Limestone Quarries Ltd	Date Received	06/06/2019
		Date Analysed	06/06/2019 - 21/06/2019
Office	Bennettsbridge, Kilkenny	Issue Date	24/06/2019
		Quote No.	
Customer Contact	Eoin O' Carroll	Customer PO	
		BATCH NUMBER	19-02235
Project:	EDEN		

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
****	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

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- ♦ Sampling is outside the scope of the laboratory activities.

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M



Customer Sample Ref: Eden		Customer Sample Code:	
Project:	EDEN	Sampled By:	Danny O'Leary, SSS
Our Reference:	7574 (19-02235)	Sample Matrix:	Surface Water
Date Sampled:	06/06/2019	Time Sampled:	11:00

Method:	Parameter:	Units	LOD	Result
<u>Onsite Measurements:</u>				
SEP 007	* Temperature	°C		11.8
<u>Chemical Analysis: (F)</u>				
SCP 052	Conductivity	µS/cm @ 20 °C	14.7	690.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1	< 1
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 2
SCP 027A	Total Ammonia	mg/L N	0.020	< 0.020
SCP 027B	Chloride	mg/L	0.5	30.0
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.010
SCP 027G	Nitrate	mg/L N	0.25	9.10
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 027D	Sulphate	mg/L	0.5	12.8
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.7
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.8
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.20	13.6
SCP 053A	Potassium	mg/L	1.0	2.0
SCP 053A	Sodium	mg/L	1.0	9.1
SCP 053A	Calcium	mg/L	1.0	130
SCP 038	Dissolved Iron	µg/L	5	5
SCP 038	Dissolved Manganese	µg/L	1	< 1
SCP 038	Iron	µg/L	5	6
SCP 038	Manganese	µg/L	1	< 1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
**5520F	* TPH C10-C40	µg/L	10	75
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060B	* Anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benz(a)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.010	< 0.010
SCP 060B	* Benzo(ghi)perylene	µg/L	0.010	< 0.010
SCP 060B	* Chrysene	µg/L	0.010	< 0.010
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.010	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Fluorene	µg/L	0.01	< 0.01
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060B	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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RECEIVED: 18/08/2025

Customer Sample Ref: Eden		Customer Sample Code:	
Project:	EDEN	Sampled By:	Danny O'Leary, SSS
Our Reference:	7574 (19-02235)	Sample Matrix:	Surface Water
Date Sampled:	06/06/2019	Time Sampled:	11:00

Method:	Parameter:	Units	LOD	Result
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DETAILED IN SCOPE REG NO.1941

Certificate of Analysis

Customer	Bennettsbridge Limestone Quarries Ltd	Date Received	04/07/2019
		Date Analysed	04/07/2019 - 02/08/2019
Office	Bennettsbridge, Kilkenny	Issue Date	02/08/2019
		Quote No.	
Customer Contact	Eoin O' Carroll	Customer PO	
		BATCH NUMBER	19-02682
Project:	SW Monthly		

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

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****	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

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Customer Sample Ref:	Entering Lagoon	Customer Sample Code:	
Project:	SW Monthly	Sampled By:	Danny O' Leary
Our Reference:	8767 (19-02682)	Sample Matrix:	Ground Water
Date Sampled:	04/07/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	14.7	626.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	8.1
**5520F	* Total Petroleum Hydrocarbons	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	6
SCP 027A	Ammonium	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	29.9
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	7.64
SCP 027F	Nitrite	mg/L N	0.005	0.016
SCP 027D	Sulphate	mg/L	0.5	18.8
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	2.4
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.8
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.20	14.80
SCP 053A	Potassium	mg/L	1.0	2.4
SCP 053A	Sodium	mg/L	1.0	11.5
SCP 053A	Calcium	mg/L	1.0	108
SCP 038	Dissolved Iron	µg/L	5	10
SCP 038	Dissolved Manganese	µg/L	1	< 1
SCP 038	Iron	µg/L	5	10
SCP 053A	Manganese	µg/L	1	< 1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060B	* Anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benz(a)anthracene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(ghi)perylene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Chrysene	µg/L	0.01	< 0.010
SCP 060B	* Dibenzo(a,h)anthracene	µg/L	0.01	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Fluorene	µg/L	0.01	< 0.01
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060B	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	SW Monthly	Sampled By:	Danny O' Leary
Our Reference:	8768 (19-02682)	Sample Matrix:	Ground Water
Date Sampled:	04/07/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	14.7	668.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
**5520F	* Total Petroleum Hydrocarbons	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Ammonium	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	29.6
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	8.14
SCP 027F	Nitrite	mg/L N	0.005	0.013
SCP 027D	Sulphate	mg/L	0.5	18.2
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.9
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.4
SCP 044	Total Phosphorus	mg/L P	0.04	0.05
SCP 053A	Magnesium	mg/L	0.20	14.90
SCP 053A	Potassium	mg/L	1.0	2.6
SCP 053A	Sodium	mg/L	1.0	11.7
SCP 053A	Calcium	mg/L	1.0	119
SCP 038	Dissolved Iron	µg/L	5	7
SCP 038	Dissolved Manganese	µg/L	1	1
SCP 038	Iron	µg/L	5	9
SCP 053A	Manganese	µg/L	1	< 1
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benz(a)anthracene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(ghi)perylene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Chrysene	µg/L	0.01	< 0.010
SCP 060B	* Dibenzo(a,h)anthracene	µg/L	0.01	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Fluorene	µg/L	0.01	< 0.01
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060B	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Customer Sample Ref: Eden		Customer Sample Code:	
Project:	SW Monthly	Sampled By:	Danny O' Leary
Our Reference:	8769 (19-02682)	Sample Matrix:	Ground Water
Date Sampled:	04/07/2019	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	14.7	675.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.3
**5520F	* Total Petroleum Hydrocarbons	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Ammonium	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	28.4
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.020
SCP 027G	Nitrate	mg/L N	0.25	8.30
SCP 027F	Nitrite	mg/L N	0.005	0.013
SCP 027D	Sulphate	mg/L	0.5	13.2
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.8
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.1
SCP 044	Total Phosphorus	mg/L P	0.04	0.06
SCP 053A	Magnesium	mg/L	0.20	1.00
SCP 053A	Potassium	mg/L	1.0	3.3
SCP 053A	Sodium	mg/L	1.0	4.8
SCP 053A	Calcium	mg/L	1.0	5.0
SCP 038	Dissolved Iron	µg/L	5	5
SCP 038	Dissolved Manganese	µg/L	1	3
SCP 038	Iron	µg/L	5	15
SCP 053A	Manganese	µg/L	1	4
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benz(a)anthracene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(ghi)perylene	µg/L	0.01	< 0.010
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.01	< 0.010
SCP 060B	* Chrysene	µg/L	0.01	< 0.010
SCP 060B	* Dibenzo(a,h)anthracene	µg/L	0.01	< 0.010
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Fluorene	µg/L	0.01	< 0.01
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060B	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	SW Monitoring - Eden
Address:	Bennettsbridge, Kilkenny	Date Received:	06/08/2019
Report to:	Eoin O' Carroll	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	06/08/2019 - 23/08/2019
Quote No.		Issue Date:	27/08/2019
		BATCH NUMBER:	19-03129

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

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(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	SW Monitoring - Eden	Sampled By:	Danny O'Leary, SSS
Our Reference:	9941 (19-03129)	Sample Matrix:	Surface Water
Date Sampled:	06/08/2019	Time Sampled:	11:30

Method:	Parameter:	Units	LOD	Result
	<u>Onsite Measurements:</u>			
SEP 007	* Temperature	°C		11.2
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	14.7	687.0
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	28.5
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.010
SCP 027G	Nitrate	mg/L N	0.25	7.67
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 027D	Sulphate	mg/L	0.5	12.5
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.1
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.6
SCP 044	Total Phosphorus	mg/L P	0.04	0.04
SCP 053A	Magnesium	mg/L	0.20	18.10
SCP 053A	Potassium	mg/L	1.0	2.8
SCP 053A	Sodium	mg/L	1.0	10.9
SCP 053A	Calcium	mg/L	1.0	125
SCP 038 /073	Dissolved Iron	µg/L	5	< 5
SCP 038 /073	Dissolved Manganese	µg/L	1	< 1
SCP 038/073	Iron	µg/L	5	< 5
SCP 038/073	Manganese	µg/L	1	< 1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060B	* Anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Chrysene	µg/L	0.01	< 0.01
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Fluorene	µg/L	0.01	< 0.01
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Naphthalene	µg/L	0.010	< 0.010
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060B	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160
**5520F	* TPH C10-C40	µg/L	10	< 10

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	SW Monitoring - Eden	Sampled By:	Danny O'Leary, SSS
Our Reference:	9941 (19-03129)	Sample Matrix:	Surface Water
Date Sampled:	06/08/2019	Time Sampled:	11:30

Method:	Parameter:	Units	LOD	Result
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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	SW Monitoring - Eden
Address:	Bennettsbridge, Kilkenny	Date Received:	07/11/2019
Report to:	Eoin O' Carroll	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	07/11/2019 - 12/12/2019
Quote No.		Issue Date:	16/12/2019
		BATCH NUMBER:	19-04514

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
****	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

- ♦ The results relate only to the items tested.
- ♦ Opinions and interpretations expressed herein are outside the scope of INAB accreditation.
- ♦ The analysis report shall not be reproduced except in full without written approval of the laboratory.
- ♦ Sampling is outside the scope of the laboratory activities.

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	SW Monitoring - Eden	Sampled By:	Danny O'Leary, SSS
Our Reference:	13877 (19-04514)	Sample Matrix:	Surface Water
Date Sampled:	07/11/2019	Time Sampled:	11:30

Method:	Parameter:	Units	LOD	Result
Onsite Measurements:				
SEP 007	* Temperature	°C		10.8
Chemical Analysis: (F)				
SCP 052	Conductivity	µS/cm @ 20 °C	15	692
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	30.7
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.020
SCP 027G	Nitrate	mg/L N	0.25	11.8
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 027D	Sulphate	mg/L	0.5	15.0
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	2.2
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.0
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.20	10.70
SCP 053A	Potassium	mg/L	1.0	3.0
SCP 053A	Sodium	mg/L	1.0	10.0
SCP 053A	Calcium	mg/L	1.0	129
SCP 038 /073	Dissolved Iron	µg/L	5	< 5
SCP 038 /073	Dissolved Manganese	µg/L	1	< 1
SCP 038/073	Iron	µg/L	5	< 5
SCP 038/073	Manganese	µg/L	1	< 1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
**5520F	* TPH C10-C40	µg/L	10	< 10
SCP 060E	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060E	* Anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Chrysene	µg/L	0.01	< 0.01
SCP 060E	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Fluorene	µg/L	0.01	< 0.01
SCP 060E	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Naphthalene	µg/L	0.01	< 0.01
SCP 060E	* Phenanthrene	µg/L	0.01	< 0.01

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	SW Monitoring - Eden	Sampled By:	Danny O'Leary, SSS
Our Reference:	13877 (19-04514)	Sample Matrix:	Surface Water
Date Sampled:	07/11/2019	Time Sampled:	11:30

Method:	Parameter:	Units	LOD	Result
SCP 060E	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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RECEIVED: 18/08/2020

Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Surface Water Monitoring
Address:	Bennettsbridge, Kilkenny	Date Received:	05/12/2019
Report to:	Eoin O' Carroll	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	05/12/2019 - 07/01/2020
Quote No.		Issue Date:	07/01/2020
		BATCH NUMBER:	19-04946

Conor Murphy
Operations Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
****	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

- ◆ The results relate only to the items tested.
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Customer Sample Ref:	Entering Lagoon	Customer Sample Code:	
Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15135 (19-04946)	Sample Matrix:	Surface Water
Date Sampled:	05/12/2019	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
Onsite Measurements:				
	* Temperature	°C		9.0
Chemical Analysis: (F)				
SCP 052	Conductivity	µS/cm @ 20 °C	15	666
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 2
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	31.3
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	10.9
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 027D	Sulphate	mg/L	0.5	16.6
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	2.5
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.9
SCP 044	Total Phosphorus	mg/L P	0.04	0.60
SCP 053A	Magnesium	mg/L	0.20	10.65
SCP 053A	Potassium	mg/L	1.0	2.5
SCP 053A	Sodium	mg/L	1.0	10.0
SCP 053A	Calcium	mg/L	1.0	116
SCP 038 /073	Dissolved Iron	µg/L	5	< 5
SCP 038 /073	Dissolved Manganese	µg/L	1	< 1
SCP 038/073	Iron	µg/L	5	< 5
SCP 038/073	Manganese	µg/L	1	< 1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 115A	* Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10
SCP 060E	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060E	* Anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Chrysene	µg/L	0.01	< 0.01
SCP 060E	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Fluorene	µg/L	0.01	< 0.01

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Customer Sample Ref:	Entering Lagoon	Customer Sample Code:	
Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15135 (19-04946)	Sample Matrix:	Surface Water
Date Sampled:	05/12/2019	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
SCP 060E	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Naphthalene	µg/L	0.01	< 0.01
SCP 060E	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060E	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15136 (19-04946)	Sample Matrix:	Surface Water
Date Sampled:	05/12/2019	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
Onsite Measurements:				
	* Temperature	°C		9.5
Chemical Analysis: (F)				
SCP 052	Conductivity	µS/cm @ 20 °C	15	672
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.7
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 2
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	31.1
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.011
SCP 027G	Nitrate	mg/L N	0.25	11.2
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 027D	Sulphate	mg/L	0.5	16.3
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	2.5
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	3.1
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.20	10.54
SCP 053A	Potassium	mg/L	1.0	2.5
SCP 053A	Sodium	mg/L	1.0	9.9
SCP 053A	Calcium	mg/L	1.0	117
SCP 038 /073	Dissolved Iron	µg/L	5	< 5
SCP 038 /073	Dissolved Manganese	µg/L	1	< 1
SCP 038/073	Iron	µg/L	5	< 5
SCP 038/073	Manganese	µg/L	1	< 1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 115A	* Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10
SCP 060E	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060E	* Anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Chrysene	µg/L	0.01	< 0.01
SCP 060E	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Fluorene	µg/L	0.01	< 0.01
SCP 060E	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Naphthalene	µg/L	0.01	< 0.01

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15136 (19-04946)	Sample Matrix:	Surface Water
Date Sampled:	05/12/2019	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
SCP 060E	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060E	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15137 (19-04946)	Sample Matrix:	Surface Water
Date Sampled:	05/12/2019	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
Onsite Measurements:				
	* Temperature	°C		10.1
Chemical Analysis: (F)				
SCP 052	Conductivity	µS/cm @ 20 °C	15	695
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.3
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	2
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	31.6
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.018
SCP 027G	Nitrate	mg/L N	0.25	2.47
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 027D	Sulphate	mg/L	0.5	15.1
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	2.6
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	3.0
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.20	10.44
SCP 053A	Potassium	mg/L	1.0	2.6
SCP 053A	Sodium	mg/L	1.0	10.2
SCP 053A	Calcium	mg/L	1.0	121
SCP 038 /073	Dissolved Iron	µg/L	5	< 5
SCP 038 /073	Dissolved Manganese	µg/L	1	< 2
SCP 038/073	Iron	µg/L	5	48
SCP 038/073	Manganese	µg/L	1	8
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 115A	* Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10
SCP 060E	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060E	* Anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060E	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Chrysene	µg/L	0.01	< 0.01
SCP 060E	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060E	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060E	* Fluorene	µg/L	0.01	< 0.01
SCP 060E	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060E	* Naphthalene	µg/L	0.01	< 0.01

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Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15137 (19-04946)	Sample Matrix:	Surface Water
Date Sampled:	05/12/2019	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
SCP 060E	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060E	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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2020 Annual Environmental Report

for

Bennettsbridge Limestone Quarries Ltd

wrt

Discharge Licence ENV/W/78

At the request of

Bennettsbridge Limestone

Kilree,

Sheastown

Bennettsbridge

Co Kilkenny

Consultant Dr. Pamela Bartley

February 2021

**Hydro-G**

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Galway

H91 FA4X

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091 449950

087 8072744

Project No.: 161321_BBL AER_3

Report Status: Issue_Proofed

Report Title: 2020 Annual Environmental Report for Bennettsbridge Limestone Quarries Ltd wrt Discharge Licence ENV/W/78

Date: 04/02/20

Prepared by: _____

Dr. Pamela Bartley B.Eng, M.SC., Ph.D.

NOTES:

This report is for the use solely of the party to whom it is addressed and no responsibility is accepted to any third party.

About the Author

Pamela Bartley is a water focussed civil engineer. After over 20 years of field based practice in borehole drilling, groundwater monitoring and abstraction point management she is now a karst hydrogeology specialist: her Ph.D was a field based karst limestone environment study. She has also completed training with the GSI at their karst specialist course run in the Burren. Her primary qualification is a Diploma in Water and Wastewater Technology at Sligo RTC. She then completed her primary degree in Civil Engineering at Queens University, Belfast, followed by an M.Sc in Environmental Engineering, followed by a field-based hydrogeologically focussed Ph.D. within the School of Civil Engineering at Trinity College, Dublin. Her key work areas are groundwater development from large scale water supply boreholes, hydrogeological assessment of quarries and the evaluation of discharges to groundwater and surface waters. Pamela Bartley's company is Bartley Hydrogeology Ltd., registered to trade as Hydro-G.

Pamela has successfully completed post doctorate 'Professional Development' formal course training in the areas of:

- PSDP & PSCS (IOSH certified, 2016);
- Karst Hydrogeology (GSI, 2013);
- On Site Wastewater & Water Services Amendment Act 2012 (IE, Western Region 6-week programme 2012 & Dublin 2012);
- Zero Discharge Willow Wastewater Systems Design Courses (Denmark 2008 & 2011 & Ireland 2012);
- Expert Witness (IE, 2011);
- Planning & Development Act (IE, 2010);
- Surface Water Regulations 2009 (DoE, 2010 & 2011);
- Sustainable Drainage (Wallingford/CIRIA, 2005 & 2008);
- Source Protection Zone Delineation (IGI/GSI, 2007);
- Groundwater & Contaminant Microbiology (IGI/GSI, 2006);
- Applied Groundwater Modelling (ESI, UK, 2000);
- Site Suitability Assessment (FETAC, 2002).

As a result of work in evaluating planning appeals, Pamela has become specialist in planning evaluations in the context of enacted Irish Regulation and EU Directives concerning the water environment such as the Groundwater Regulations (S.I. No. 9 of 2010), Surface Water Regulations (S.I. No. 272 of 2009), Water Framework and Habitats' Directives. Pamela is a qualified and certified 'Site Assessor' and interviewer of examination candidates in respect of eligibility for the Site Suitability FETAC Qualification. In the past, she has lectured in third level institutions (WIT, CIT, 1996 – 1999), delivered practical laboratory instruction in the assessment of subsoils for the FETAC Site Assessor programme and also demonstrated hydraulics laboratory modules at Trinity College Dublin (1996). She has been an invited guest speaker at An Bord Pleanála, The Irish Concrete Federation, The Health Service Executive, Environmental Health Officers National Conference, The Irish Planning Institute's National Conference, The International Association of Hydrogeologists National Conference (Irish Branch) and has delivered hydrogeological lectures to the public during Science Week.

Hydro-G is the registered trading name of Pamela Bartley's company Bartley Hydrogeology Ltd., a company registered in Galway Ireland. The company holds requisite employer's and public liability insurances. In addition, the company holds professional indemnity insurance of €2million €2,000,000 any one CLAIM.

Pamela is qualified and IOSH certified to act as PSDP (Project Supervisor Design Phase) & PSCS (Project Supervisor Construction Stage) as defined by the Construction Regulations. The company is a registered Irish Water Supplier (no. 1855) and Pamela Bartley is HSQE approved within Irish Water.

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1.0 Introduction

Hydro G was commissioned by Bennettsbridge Limestone Quarries Ltd (BLQ) to prepare an Annual Environmental Report (AER), which is required as a condition of the Discharge Licence in place for the quarry operation at Kilree, Bennettsbridge, Co. Kilkenny (Kilkenny County Council Ref. No: ENV/W/78).

This report has been prepared to fulfil this requirement and pertains to the reporting period January 2020 - December 2020.

2.0 Pertinent Details of the Discharge Licence

The discharge licence relevant to this period is Kilkenny County Council Ref. No: ENV/W/78, dated September 15th 2017 (hereafter referred to as ENV/W/78 (2017)).

Licence conditions relevant to this report include the following:

Condition 3.2 of ENV/W/78 (2017) stipulates:

The licence holder shall ensure that

- (a) The mean daily discharge over the course of a year shall not exceed 22,000m³/day, and
- (b) The maximum daily discharge shall not exceed 70,000m³/day

Condition 4.1 of ENV/W/78 (2017) stipulates:

The characteristics of the effluent as discharged shall not exceed the following emission limit values (ELVs):

Table 1: Discharge Licence ENV/W/78 ELVs

Parameter	ELV	Units
pH	6-9	-
Suspended Solids	10	mg/l
BOD	2	mg/l
COD	10	mg/l
Nitrate	10	mg/l - N
Total Ammonia	0.17	mg/l - N
MRP	0.07	mg/l - P
Total Hydrocarbons	0.68	mg/l

Condition 5.5 of ENV/W/78 (2017) stipulates the following:

The licence holder shall submit an Annual Environmental Report from a suitably qualified person which shall be due within 21 days after the end of each calendar year. The report shall contain the following information in relation to the previous calendar year:

- a) All monitoring results relating to the previous calendar year including the information required under conditions 5.1, 5.2, & 5.3.
- b) An assessment of the results, particularly noting any trends. Such analysis of trends should take account of any previous reports submitted in relation to the discharge.
- c) Confirmation (or otherwise) that the conditions attached to the licence have been complied with.

3.0 Monitoring Results

3.1 Flow Data

Daily discharge volumes (m³/d) are presented on a month-by-month basis in Table 2 for the monitoring period January – December 2020. Flow measurement is automated.

Condition 3.2 (a) of ENV/W/78 (2017) requires that the mean daily discharge over the course of the year shall not exceed 22,000m³/day;
and

Condition 3.2 (b) of ENV/W/78 (2017) requires that the maximum daily discharge shall not exceed 70,000m³/day.

Results presented in Table 2 demonstrate that these licence limits were complied with.

With reference to Table 2, the bottom right cell of the Table presents the mean (average) daily discharge over the course of the year and this value is 17,361 m³/d, which is compliant with **Condition 3.2 (a)** Discharge Licence ENV/W/78 (2017) ELV for average discharge of 22,000 m³/d.

Similarly, the individual day values recorded at the site presented in Table 2 demonstrate that the site is always compliant with **Condition 3.2 (b)** of ENV/W/78 (2017) in that on no occasion throughout 2020 did the discharge volume exceed 70,000 m³/d.

Table 2: Daily discharge volumes (m3/d) on a month by month basis: 2020

Day	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	ELV MAX (m3/d)
1	24,482	16,623	42,414	16,980	11,045	9,078	8,098	9,811	8,111	7,558	14,111	18,329	70,000
2	23,888	16,783	39,276	15,682	9,078	8,614	8,171	7,129	8,323	7,424	12,811	18,169	70,000
3	21,718	16,198	39,054	15,983	9,623	9,169	7,932	8,510	8,183	8,696	14,671	17,838	70,000
4	20,994	14,944	36,032	14,862	10,397	8,783	8,097	7,362	7,888	7,628	14,134	17,220	70,000
5	20,398	14,797	34,197	17,388	9,535	7,942	7,708	7,794	8,884	7,012	11,808	16,989	70,000
6	20,812	15,040	31,820	15,796	9,606	8,906	7,454	8,530	7,102	7,537	12,959	15,811	70,000
7	17,980	14,989	29,917	15,024	9,717	9,199	8,211	7,926	8,077	9,199	12,465	15,972	70,000
8	17,713	15,015	27,935	14,468	8,989	7,590	8,130	8,256	8,030	7,379	15,085	15,111	70,000
9	20,098	22,426	27,841	14,159	9,213	9,064	8,361	7,131	7,651	7,786	15,408	15,904	70,000
10	19,892	42,990	27,715	13,892	9,807	8,146	7,399	6,785	7,809	9,150	18,822	17,388	70,000
11	21,226	55,617	27,600	13,760	9,525	8,944	7,636	7,138	7,785	7,048	22,925	17,742	70,000
12	22,815	56,424	28,446	13,900	9,347	8,806	7,409	7,352	8,979	7,535	38,196	19,551	70,000
13	28,606	60,202	29,310	13,040	9,359	8,039	7,435	7,409	7,260	7,985	38,317	22,914	70,000
14	42,779	60,949	30,351	13,051	9,050	8,145	7,741	7,480	7,053	7,580	36,313	26,383	70,000
15	46,037	56,036	30,536	12,627	9,080	7,441	7,838	8,654	7,453	7,391	31,895	28,890	70,000
16	44,893	51,723	29,624	12,568	9,210	10,079	7,623	7,292	7,388	7,785	34,649	34,989	70,000
17	40,419	47,473	28,911	12,254	8,940	7,146	7,385	8,244	8,605	8,112	33,622	40,521	70,000
18	37,001	45,129	27,404	12,719	9,855	11,136	7,628	9,543	6,393	8,202	31,434	40,001	70,000
19	35,030	43,070	26,401	11,705	9,794	10,642	7,705	8,515	8,594	6,892	28,447	38,324	70,000
20	32,597	39,851	24,712	11,626	9,593	7,856	7,040	8,915	6,754	10,309	26,852	39,016	70,000
21	31,808	34,225	24,353	11,602	9,498	9,766	7,410	9,153	6,597	8,395	24,615	39,974	70,000
22	27,077	30,954	22,457	11,456	9,837	10,774	7,457	8,837	7,527	8,063	24,592	37,265	70,000
23	26,114	34,202	21,885	11,228	9,012	8,464	7,873	7,014	7,103	8,715	24,791	49,747	70,000
24	24,508	43,100	21,031	10,737	8,836	8,213	7,519	8,097	7,640	9,537	22,684	61,308	70,000
25	23,358	47,749	20,056	10,023	9,226	8,037	7,752	11,253	7,520	8,102	21,874	55,487	70,000
26	22,251	46,952	19,472	11,746	9,446	8,244	7,297	8,928	8,114	9,823	21,794	52,388	70,000
27	21,061	43,033	18,241	9,520	9,288	8,356	7,285	8,701	6,486	8,046	20,789	51,960	70,000
28	19,859	41,905	18,402	9,833	8,383	8,872	8,004	8,546	6,785	8,086	20,760	52,398	70,000
29	18,540	42,123	17,463	10,457	9,537	7,726	7,067	9,510	7,289	8,812	19,613	47,328	70,000
30	17,791		17,351	10,468	8,997	8,098	7,366	6,982	8,538	8,947	19,379	43,427	70,000
31	17,374		16,353		8,336		8,561	7,880		11,325		41,543	70,000
SUM (m3/mth)	809,118	1,070,522	836,559	388,554	291,161	261,272	238,593	254,678	229,922	256,060	685,814	1,009,887	m3/mth
MAX (m3/d)	46,037	60,949	42,414	17,388	11,045	11,136	8,561	11,253	8,979	11,325	38,317	61,308	Overall ANNUAL Average (m3/d)
MIN (m3/d)	17,374	14,797	16,353	9,520	8,336	7,146	7,040	6,785	6,393	6,892	11,808	15,111	
AVERAGE (m3/d)	26,101	36,915	26,986	12,952	9,392	8,709	7,697	8,215	7,664	8,260	22,860	32,577	17,361

3.2 Water Quality Data

The site routinely monitors water quality of the final discharge on a monthly basis. The samples are collected by staff of Southern Scientific accredited laboratory and transported to the laboratory on the same day.

The laboratory Certificates of Analysis are presented in Appendix A for the routine monthly monitoring. In addition to sampling the Discharge itself each month, Southern Scientific are contracted to also collect samples at the inlet to the Lagoon system and from Eden Spring in the quarry. Therefore, the Laboratory Certificates of Analysis contain monitoring results for all three points (Appendix A).

Water quality results are presented in Table 3 for the monitoring period January 2020 – December 2020.

Table 3 Water quality results for the monitoring period January – December 2020

Bennettsbridge Limestone Final Discharge Quality 2020								
Parameter	pH	Suspended Solids	BOD	COD	Nitrate	Total Ammonia	Molybdate Reactive Phosphate	Total Hydrocarbons
Units	pH units	mg/l	mg/l	mg/l	mg/l - N	mg/l - N	mg/l - P	mg/l
Jan-20	8	<4	<1	10	10.35	<0.02	0.028	<0.01
Feb-20	7.9	<2	<1	<10	10.25	<0.02	<0.01	<0.01
Mar-20	7.8	<4	<1	<10	9.86	0.02	<0.01	<0.01
Apr-20	Covid-19	Covid-19	Covid-19	Covid-19	Covid-19	Covid-19	Covid-19	Covid-19
May-20	Covid-19	Covid-19	Covid-19	Covid-19	Covid-19	Covid-19	Covid-19	Covid-19
Jun-20	7.9	<4	<1	<10	10.10	<0.02	<0.01	<0.01
Jul-20	7.9	<4	<1	<10	7.86	0.02	<0.01	<0.01
Aug-20	7.9	5	<1	<10	8.09	0.03	<0.01	<0.01
Sep-20	7.8	<2	<1	<10	7.88	0.06	<0.01	<0.01
Oct-20	8	<5	<1	<10	6.94	0.02	<0.01	<0.01
Nov-20	7.9	<5	<1	<10	7.52	0.02	<0.01	<0.01
Dec-20	7.8	13	<1	<10	9.06	0.08	0.09	<0.01
MAX	8	5	<1	<10	10.35	0.08	0.09	0.01
MIN	7.8	2	<1	<10	6.94	<0.02	<0.01	0.01
AVERAGE	7.9	3.7	<1	<10	8.8	0.03	0.02	0.01
Discharge Licence ENV/W/78 (2017) ELV's	6-9	10	2	10	10	0.17	0.07	0.68

With respect to the monthly monitoring results and each parameter of the Discharge Licence, the site is compliant for all parameters at all time. Most of the time the quality of the water is below the limit of detection of the laboratory analyser. There are some very small exceedances in the results for nitrates i.e. 0.3 mg/l N on some occasions. However, the Degree of Precision or Level of Accuracy for Nitrate analysis is usually 1mg/l as N. Therefore, those occasional results of 10.35, 10.25 and 10.1 mg/l NO₃ as N are generally understood to comply with the ELV of 10 mg/l NO₃-N.

Results are presented graphically and discussed further in the following section.

4.0 Assessment of the Results

4.1 With respect to the Volumetric ELV Conditions:

Data presented in Table 2 show that the mean daily volume discharged, on an annual average basis, is 17,361 m³/d and this is within the specified ELV for mean daily volume of 22,000 m³/d, on an annual average basis. Results presented in Table 2 demonstrate that the licence limits for discharge volume were complied with. Table 2's data are reproduced in Figure 1 to facilitate easier evaluation.

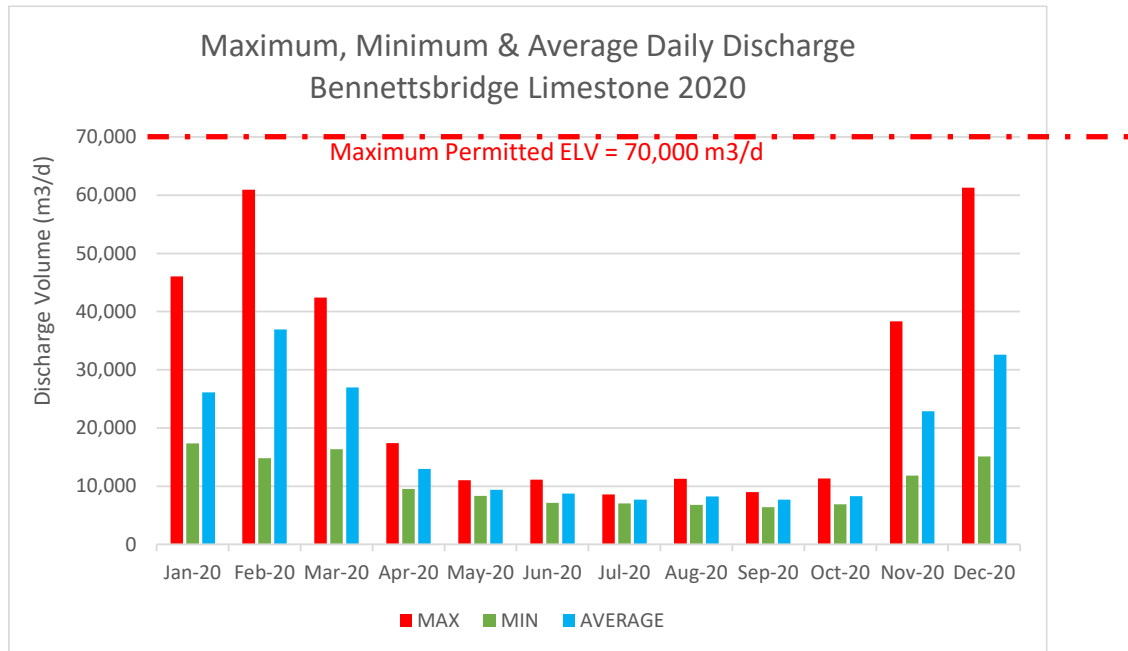


Figure 1 Daily Discharge Volumes by month: 2020

It is acknowledged in the discharge licence that the waters arising at the quarry are a combination of rainfall runoff on the floor, rainfall runoff from the lands around the walls of the void itself and groundwater. Results presented demonstrate that during the seasons of high rainfall the discharge volumes peak and during low rainfall months the discharge from the quarry represents groundwater baseflow volumes. At no time does the daily discharge volume breach the maximum permitted 70,000m³/d ELV.

4.2 With respect to Water Quality ELVs:

Results presented in Table 3 indicate that the specified ELVs were complied with for all parameters in all 12 months except for one parameter on 3 occasions: Nitrate-N.

For many parameters, the hydrochemistry of the sample of discharge presents a water so clean that the laboratory analysis machine cannot detect anything, such as BOD, COD, SS, Hydrocarbons.

- pH is always Compliant.
- Suspended Solids is always Compliant, results each month present at least <50% of ELV.
- BOD is always Compliant, results each month are at least 50% of ELV.

- COD is always Compliant, almost always reported by the laboratory as less than their 10mg/l Limit of Detection.
- Nitrate-N is Compliant ON AVERAGE @ 8.8 mg/l N with three minor exceedances <0.3mg/l = within the Degree of Precision of Analyser @ Laboratory. CONCLUDE COMPLIANT.
- Total Ammonia is always Compliant, Average Result is a small fraction of the ELV.
- MRP-P is always Compliant.
- Total Hydrocarbons is always compliant and always below the limit of detection of the analyser.

With respect to the exceedances for Nitrate-N. The 3 exceedances are so small that they can be rationalised that if the decimal point was converted to a full number then the result is the limit of 10 mg/l Nitrate-N. In addition, as previously presented, the Degree of Precision or Level of Accuracy for Nitrate analysis is usually 1mg/l as N. Therefore, those occasional results of 10.35, 10.25 and 10.1 mg/l NO₃ as N are generally understood to comply with the ELV of 10 mg/l NO₃-N. With reference to the 2018 and 2019 AER, the history of occasional elevated nitrate coming in from surrounding lands has been fully explained in the previous reports. In addition, the analyses in previous reports demonstrated that the occasional exceedances posed no threat to the receiving environment. Department of the Environment Assimilation Capacity simulations returned no significant increase in nitrate concentration in the receiving water.

5.0 Compliance with Licence Conditions

With respect to the Volumetric ELV Conditions: Data presented in Table 2 and in Figures 1 & 2 demonstrate that the licence limits for maximum and average discharge volume were always complied with.

With respect to Water Quality ELVs: Results presented in Table 3 indicate that the prescribed ELVs were complied with for all parameters in all 12 months.

6.0 Register of Incidents

6.1 There were no 'serious incidents' to report with respect to this discharge during 2020.

7.0 Conclusions

7.1 The site is in full compliance with the requirements of Discharge Licence ENV/W/78.

Pamela Bartley

Dr. Pamela Bartley B.Eng, M.SC., Ph.D. MIEI

Appendix A

Laboratory Certificates of Analysis Routine Monthly Monitoring at the Site

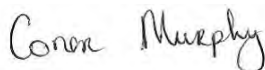
RECEIVED: 18/08/2025

Monitoring Points

- 1. Entering the Lagoon*
- 2. Final Discharge,*
- 3. Entering the Lagoon.*

Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Surface Water Monitoring
Address:	Bennettsbridge, Kilkenny	Date Received:	08/01/2020
Report to:	Eoin O' Carroll	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	08/01/2020 - 29/01/2020
Quote No.		Issue Date:	30/01/2020
		BATCH NUMBER:	20-05178



Conor Murphy
Operations Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
****	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

- ◆ The results relate only to the items tested.
- ◆ Opinions and interpretations expressed herein are outside the scope of INAB accreditation.
- ◆ The analysis report shall not be reproduced except in full without written approval of the laboratory.
- ◆ Sampling is outside the scope of the laboratory activities.

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M



Customer Sample Ref:	Entering Lagoon	Customer Sample Code:	
Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15751 (20-05178)	Sample Matrix:	Surface Water
Date Sampled:	08/01/2020	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
Onsite Measurements:				
	* Temperature	°C		10.1
Chemical Analysis: (F)				
SCP 052	Conductivity	µS/cm @ 20 °C	15	673
SCP 052	Hydrogen Ion (pH)	pH units	4.0	8.1
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	30.8
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.015
SCP 027G	Nitrate	mg/L N	0.25	10.41
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 027D	Sulphate	mg/L	0.5	15.5
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.4
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.7
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.20	12.99
SCP 053A	Potassium	mg/L	1.0	3.0
SCP 053A	Sodium	mg/L	1.0	11.8
SCP 053A	Calcium	mg/L	1.0	137
SCP 038 /073	Dissolved Iron	µg/L	5	14
SCP 038 /073	Dissolved Manganese	µg/L	1	< 1
SCP 038/073	Iron	µg/L	5	10
SCP 038/073	Manganese	µg/L	1	1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 115A	* Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10
SCP 060A	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060A	* Anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060A	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060A	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060A	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060A	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060A	* Chrysene	µg/L	0.01	< 0.01
SCP 060A	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060A	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060A	* Fluorene	µg/L	0.01	< 0.01

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Customer Sample Ref:	Entering Lagoon	Customer Sample Code:	
Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15751 (20-05178)	Sample Matrix:	Surface Water
Date Sampled:	08/01/2020	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
SCP 060A	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060A	* Naphthalene	µg/L	0.01	< 0.01
SCP 060A	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060A	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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dunrune | **killarney** | county kerry | ireland | telephone +353 64 66 33922 | fax +353 64 66 39022

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directors: K. Murphy, M. Murphy & C. Murphy
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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15752 (20-05178)	Sample Matrix:	Surface Water
Date Sampled:	08/01/2020	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
Onsite Measurements:				
	* Temperature	°C		10.3
Chemical Analysis: (F)				
SCP 052	Conductivity	µS/cm @ 20 °C	15	634
SCP 052	Hydrogen Ion (pH)	pH units	4.0	8.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	10
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	30.9
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.028
SCP 027G	Nitrate	mg/L N	0.25	10.35
SCP 027F	Nitrite	mg/L N	0.005	0.005
SCP 027D	Sulphate	mg/L	0.5	16.0
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.5
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.6
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.20	12.95
SCP 053A	Potassium	mg/L	1.0	3.0
SCP 053A	Sodium	mg/L	1.0	12.0
SCP 053A	Calcium	mg/L	1.0	129
SCP 038 /073	Dissolved Iron	µg/L	5	< 5
SCP 038 /073	Dissolved Manganese	µg/L	1	< 1
SCP 038/073	Iron	µg/L	5	7
SCP 038/073	Manganese	µg/L	1	1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 115A	* Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10
SCP 060A	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060A	* Anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060A	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060A	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060A	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060A	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060A	* Chrysene	µg/L	0.01	< 0.01
SCP 060A	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060A	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060A	* Fluorene	µg/L	0.01	< 0.01
SCP 060A	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060A	* Naphthalene	µg/L	0.01	< 0.01

(registered office)

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M




Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15752 (20-05178)	Sample Matrix:	Surface Water
Date Sampled:	08/01/2020	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
SCP 060A	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060A	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15753 (20-05178)	Sample Matrix:	Surface Water
Date Sampled:	08/01/2020	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
	<u>Onsite Measurements:</u>			
	* Temperature	°C		9.8
	<u>Chemical Analysis: (F)</u>			
SCP 052	Conductivity	µS/cm @ 20 °C	15	685
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	30.1
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.032
SCP 027G	Nitrate	mg/L N	0.25	10.56
SCP 027F	Nitrite	mg/L N	0.005	0.025
SCP 027D	Sulphate	mg/L	0.5	14.2
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.7
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.6
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.20	12.81
SCP 053A	Potassium	mg/L	1.0	3.0
SCP 053A	Sodium	mg/L	1.0	11.7
SCP 053A	Calcium	mg/L	1.0	140
SCP 038 /073	Dissolved Iron	µg/L	5	< 5
SCP 038 /073	Dissolved Manganese	µg/L	1	< 1
SCP 038/073	Iron	µg/L	5	14
SCP 038/073	Manganese	µg/L	1	< 1
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 115A	* Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10
SCP 060A	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060A	* Anthracene	µg/L	0.01	< 0.01
SCP 060E	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060A	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060A	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060A	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060A	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060A	* Chrysene	µg/L	0.01	< 0.01
SCP 060A	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060A	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060A	* Fluorene	µg/L	0.01	< 0.01
SCP 060A	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060A	* Naphthalene	µg/L	0.01	< 0.01

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Surface Water Monitoring	Sampled By:	Danny O'Leary, SSS Ltd
Our Reference:	15753 (20-05178)	Sample Matrix:	Surface Water
Date Sampled:	08/01/2020	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
SCP 060A	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060A	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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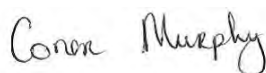
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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	SW
Address:	Bennettsbridge, Kilkenny	Date Received:	04/02/2020
Report to:	Eoin O' Carroll	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	04/02/2020 - 03/03/2020
Quote No.		Issue Date:	03/03/2020
		BATCH NUMBER:	20-05511



Conor Murphy
Operations Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
****	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

- ◆ The results relate only to the items tested.
- ◆ Opinions and interpretations expressed herein are outside the scope of INAB accreditation.
- ◆ The analysis report shall not be reproduced except in full without written approval of the laboratory.
- ◆ Sampling is outside the scope of the laboratory activities.

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Customer Sample Ref:	Entering Lagoon	Customer Sample Code:	
Project:	SW	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	16697 (20-05511)	Sample Matrix:	Surface Water
Date Sampled:	04/02/2020	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
Onsite Measurements:				
	* Temperature	°C		10.4
Chemical Analysis: (F)				
SCP 052	Conductivity	µS/cm @ 20 °C	15	663
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 2
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	31.3
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	10.27
SCP 027F	Nitrite	mg/L N	0.005	0.027
SCP 027D	Sulphate	mg/L	0.5	16.7
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	2.2
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.4
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.20	13.46
SCP 053A	Potassium	mg/L	1.0	3.0
SCP 053A	Sodium	mg/L	1.0	12.6
SCP 053A	Calcium	mg/L	1.0	111
SCP 038 /073	Dissolved Iron	µg/L	5	21
SCP 038 /073	Dissolved Manganese	µg/L	1	7
SCP 038/073	Iron	µg/L	5	28
SCP 038/073	Manganese	µg/L	1	8
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 115A	* Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060B	* Anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Chrysene	µg/L	0.01	< 0.01
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Fluorene	µg/L	0.01	< 0.01

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Customer Sample Ref:	Entering Lagoon	Customer Sample Code:	
Project:	SW	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	16697 (20-05511)	Sample Matrix:	Surface Water
Date Sampled:	04/02/2020	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Naphthalene	µg/L	0.01	< 0.01
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060B	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	SW	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	16698 (20-05511)	Sample Matrix:	Surface Water
Date Sampled:	04/02/2020	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
Onsite Measurements:				
	* Temperature	°C		10.3
Chemical Analysis: (F)				
SCP 052	Conductivity	µS/cm @ 20 °C	15	667
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 2
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	31.3
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.010
SCP 027G	Nitrate	mg/L N	0.25	10.25
SCP 027F	Nitrite	mg/L N	0.005	0.017
SCP 027D	Sulphate	mg/L	0.5	15.6
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.8
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.5
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.20	13.40
SCP 053A	Potassium	mg/L	1.0	3.0
SCP 053A	Sodium	mg/L	1.0	12.5
SCP 053A	Calcium	mg/L	1.0	114
SCP 038 /073	Dissolved Iron	µg/L	5	6
SCP 038 /073	Dissolved Manganese	µg/L	1	5
SCP 038/073	Iron	µg/L	5	16
SCP 038/073	Manganese	µg/L	1	5
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 115A	* Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060B	* Anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Chrysene	µg/L	0.01	< 0.01
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Fluorene	µg/L	0.01	< 0.01
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Naphthalene	µg/L	0.01	< 0.01

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	SW	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	16698 (20-05511)	Sample Matrix:	Surface Water
Date Sampled:	04/02/2020	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060B	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	SW	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	16699 (20-05511)	Sample Matrix:	Surface Water
Date Sampled:	04/02/2020	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
Onsite Measurements:				
	* Temperature	°C		10.9
Chemical Analysis: (F)				
SCP 052	Conductivity	µS/cm @ 20 °C	15	696
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.4
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 2
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027B	Chloride	mg/L	0.5	31.0
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.014
SCP 027G	Nitrate	mg/L N	0.25	10.71
SCP 027F	Nitrite	mg/L N	0.005	0.006
SCP 027D	Sulphate	mg/L	0.5	14.2
SCP 065B	Dissolved Organic Carbon (DOC)	mg/L	0.5	1.6
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.4
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 053A	Magnesium	mg/L	0.20	13.59
SCP 053A	Potassium	mg/L	1.0	3.0
SCP 053A	Sodium	mg/L	1.0	12.2
SCP 053A	Calcium	mg/L	1.0	121
SCP 038 /073	Dissolved Iron	µg/L	5	8
SCP 038 /073	Dissolved Manganese	µg/L	1	2
SCP 038/073	Iron	µg/L	5	99
SCP 038/073	Manganese	µg/L	1	2
SCP 060B	* Acenaphthylene	µg/L	0.01	< 0.01
SCP 060B	* Sum benzo b & k fluoranthene	µg/L	0.01	< 0.01
SCP 115A	* Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10
SCP 060B	* Acenaphthene	µg/L	0.01	< 0.01
SCP 060B	* Anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benz(a)anthracene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(a)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(b)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(ghi)perylene	µg/L	0.01	< 0.01
SCP 060B	* Benzo(k)fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Chrysene	µg/L	0.01	< 0.01
SCP 060B	* Dibenz(a,h)anthracene	µg/L	0.01	< 0.01
SCP 060B	* Fluoranthene	µg/L	0.01	< 0.01
SCP 060B	* Fluorene	µg/L	0.01	< 0.01
SCP 060B	* Indeno(1,2,3-cd)pyrene	µg/L	0.01	< 0.01
SCP 060B	* Naphthalene	µg/L	0.01	< 0.01

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M




Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	SW	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	16699 (20-05511)	Sample Matrix:	Surface Water
Date Sampled:	04/02/2020	Time Sampled:	11:15

Method:	Parameter:	Units	LOD	Result
SCP 060B	* Phenanthrene	µg/L	0.01	< 0.01
SCP 060B	* Pyrene	µg/L	0.01	< 0.01
SCP 060B	* Sum PAH's	µg/L	0.160	< 0.160

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Bennettsbridge, Kilkenny	Date Received:	04/03/2020
Report to:	Eoin O' Carroll	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	04/03/2020 - 18/03/2020
Quote No.		Issue Date:	19/03/2020
		BATCH NUMBER:	20-05903

Conor Murphy
Operations Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
****	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	17858 (20-05903)	Sample Matrix:	Surface Water
Date Sampled:	03/03/2020	Time Sampled:	13:35

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8
SCP 060E	* Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	10
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	0.02
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	9.86

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	17859 (20-05903)	Sample Matrix:	Surface Water
Date Sampled:	03/03/2020	Time Sampled:	13:55

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.4
SCP 060E	* Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	0.02
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.016
SCP 027G	Nitrate	mg/L N	0.25	9.66

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Bennettsbridge, Kilkenny	Date Received:	02/06/2020
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	02/06/2020 - 16/06/2020
Quote No.		Issue Date:	17/06/2020
		BATCH NUMBER:	20-06625

Conor Murphy
Operations Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
****	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	19824 (20-06625)	Sample Matrix:	Surface Water
Date Sampled:	02/06/2020	Time Sampled:	11:30

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
SCP 115A	* Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	10.10

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	19825 (20-06625)	Sample Matrix:	Surface Water
Date Sampled:	02/06/2020	Time Sampled:	12:01

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 115A	* Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	10.50

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Bennettsbridge, Kilkenny	Date Received:	02/07/2020
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	02/07/2020 - 15/07/2020
Quote No.		Issue Date:	16/07/2020
		BATCH NUMBER:	20-07097

Conor Murphy
Operations Manager

Index to symbols used & Notes

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**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	20956 (20-07097)	Sample Matrix:	Surface Water
Date Sampled:	02/07/2020	Time Sampled:	12:00

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
SCP 115A	* Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	0.02
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	7.86

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	20957 (20-07097)	Sample Matrix:	Surface Water
Date Sampled:	02/07/2020	Time Sampled:	12:15

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 115A	* Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	0.02
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.013
SCP 027G	Nitrate	mg/L N	0.25	8.10

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Bennettsbridge, Kilkenny	Date Received:	04/08/2020
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	04/08/2020 - 18/08/2020
Quote No.		Issue Date:	20/08/2020
		BATCH NUMBER:	20-07520

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

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(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	22081 (20-07520)	Sample Matrix:	Surface Water
Date Sampled:	04/08/2020	Time Sampled:	10:00

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
SCP 115A	Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	5
SCP 027A	Total Ammonia	mg/L N	0.02	0.03
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	8.09

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	22082 (20-07520)	Sample Matrix:	Surface Water
Date Sampled:	04/08/2020	Time Sampled:	10:30

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 115A	Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	14
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	0.011
SCP 027G	Nitrate	mg/L N	0.25	7.93

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RECEIVED: 18/08/2025

Sample Deviation Key

Deviation Code	Deviation Description
A	Sample received outside stability holding time, which may compromise results.
C	Sample was received in inappropriate container, which may compromise results.
D / W	The sampling date and/or time has not been provided and therefore the sample holding time cannot be determined. It is possible that the results may have been compromised.
H	Sample received in vial with inappropriate headspace which may compromise results.
P	Preservative not used for critical parameters, which may compromise results.
T	Inappropriate sample temperature upon receipt which may compromise results.
R	Sample holding time from sampling to receipt in laboratory exceeded. It is possible that the results may have been compromised.
Note 4	The handling of the sample within the laboratory did not comply with the laboratories policy on holding times / handling instructions. It is possible that the results may have been compromised.
Note 5	Result exceeds the accredited range of measurement for parameter, E.g. Result exceeds the accredited range of measurement for ammonia, 0.02-12 mg/L N.

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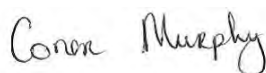
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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Entering Lagoon Suspended Solids
Address:	Bennettsbridge, Kilkenny	Date Received:	04/08/2020
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	04/08/2020 - 07/08/2020
Quote No.		Issue Date:	17/08/2020
		BATCH NUMBER:	20-07521



Conor Murphy
Operations Manager

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(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrine Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

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Customer Sample Ref:	Entering Lagoon	Customer Sample Code:	Entering Lagoon
Project:	Entering Lagoon Suspended Solids	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	22083 (20-07521)	Sample Matrix:	Surface Water
Date Sampled:	04/08/2020	Time Sampled:	11:40

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 010	Suspended Solids	mg/L	2	< 2

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Bennettsbridge, Kilkenny	Date Received:	03/09/2020
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	03/09/2020 - 17/09/2020
Quote No.		Issue Date:	18/09/2020
		BATCH NUMBER:	20-07946

Conor Murphy
Operations Manager

Index to symbols used & Notes

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***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	23203 (20-07946)	Sample Matrix:	Surface Water
Date Sampled:	03/09/2020	Time Sampled:	10:40

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8
SCP 115A	Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 2
SCP 027A	Total Ammonia	mg/L N	0.02	0.06
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	7.88

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directors: K. Murphy, M. Murphy & C. Murphy
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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	23204 (20-07946)	Sample Matrix:	Surface Water
Date Sampled:	03/09/2020	Time Sampled:	11:30

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.1
SCP 115A	Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	338
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.010	< 0.010
SCP 027G	Nitrate	mg/L N	0.25	7.37

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Bennettsbridge, Kilkenny	Date Received:	02/10/2020
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	02/10/2020 - 16/10/2020
Quote No.		Issue Date:	20/10/2020
		BATCH NUMBER:	20-08367

Conor Murphy
Operations Manager

Index to symbols used & Notes

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***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	24459 (20-08367)	Sample Matrix:	Surface Water
Date Sampled:	02/10/2020	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	8.0
SCP 115A	Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 5
SCP 027A	Total Ammonia	mg/L N	0.02	0.02
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 027G	Nitrate	mg/L N	0.25	6.94

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	24460 (20-08367)	Sample Matrix:	Surface Water
Date Sampled:	02/10/2020	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.4
SCP 115A	Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 5
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 027G	Nitrate	mg/L N	0.25	7.06

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co. Kilkenny	Date Received:	03/11/2020
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	03/11/2020 - 18/11/2020
Quote No.		Issue Date:	20/11/2020
		BATCH NUMBER:	20-08808

Ruth Murphy
Chemistry Laboratory Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	25874 (20-08808)	Sample Matrix:	Surface Water
Date Sampled:	03/11/2020	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
SCP 115A	Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 5
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 027G	Nitrate	mg/L N	0.25	7.52

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	25875 (20-08808)	Sample Matrix:	Surface Water
Date Sampled:	03/11/2020	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 115A	Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 5
SCP 027A	Total Ammonia	mg/L N	0.02	0.02
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.02
SCP 027G	Nitrate	mg/L N	0.25	7.47

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co. Kilkenny	Date Received:	03/12/2020
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	03/12/2020 - 15/12/2020
Quote No.		Issue Date:	17/12/2020
		BATCH NUMBER:	20-09328

Ruth Murphy
Chemistry Laboratory Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	27899 (20-09328)	Sample Matrix:	Surface Water
Date Sampled:	03/12/2020	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8
SCP 115A	Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	13
SCP 027A	Total Ammonia	mg/L N	0.02	0.08
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.09
SCP 027G	Nitrate	mg/L N	0.25	9.06

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	27900 (20-09328)	Sample Matrix:	Surface Water
Date Sampled:	03/12/2020	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.7
SCP 115A	Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 010	Suspended Solids	mg/L	2	< 5
SCP 027A	Total Ammonia	mg/L N	0.02	0.05
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.02
SCP 027G	Nitrate	mg/L N	0.25	8.91

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2021 Annual Environmental Report

for

Bennettsbridge Limestone Quarries Ltd

wrt

Discharge Licence ENV/W/78

At the request of

Bennettsbridge Limestone

Kilree,

Sheastown

Bennettsbridge

Co Kilkenny

Consultant Dr. Pamela Bartley

February 2022

**Hydro-G**

50 Henry St.

Galway

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Project No.: 22-4 BBL AER 2021

Report Status: Issue

Report Title: 2021 Annual Environmental Report for Bennettsbridge Limestone Quarries Ltd wrt Discharge Licence ENV/W/78

Date: 16/02/22

Prepared by:

Dr. Pamela Bartley B.Eng, M.SC., Ph.D.

NOTES:

This report is for the use solely of the party to whom it is addressed and no responsibility is accepted to any third party.

About the Author

Pamela Bartley is a water focussed civil engineer. After 25 years of field based practice in borehole drilling, groundwater monitoring and abstraction point management she is now a karst hydrogeology specialist: her Ph.D was a field based karst limestone environment study. She has also completed training with the GSI at their karst specialist course run in the Burren. Her primary qualification is a Diploma in Water and Wastewater Technology at Sligo RTC. She then completed her primary degree in Civil Engineering at Queens University, Belfast, followed by an M.Sc in Environmental Engineering, followed by a field-based hydrogeologically focussed Ph.D. within the School of Civil Engineering at Trinity College, Dublin. Her key work areas are groundwater development from large scale water supply boreholes, hydrogeological assessment of quarries and the evaluation of discharges to groundwater and surface waters. Pamela Bartley's company is Bartley Hydrogeology Ltd., registered to trade as Hydro-G.

Pamela has successfully completed post doctorate 'Professional Development' formal course training in the areas of:

- PSDP & PSCS (IOSH certified, 2016);
- Karst Hydrogeology (GSI, 2013);
- On Site Wastewater & Water Services Amendment Act 2012 (IE, Western Region 6-week programme 2012 & Dublin 2012);
- Zero Discharge Willow Wastewater Systems Design Courses (Denmark 2008 & 2011 & Ireland 2012);
- Expert Witness (IE, 2011);
- Planning & Development Act (IE, 2010);
- Surface Water Regulations 2009 (DoE, 2010 & 2011);
- Sustainable Drainage (Wallingford/CIRIA, 2005 & 2008);
- Source Protection Zone Delineation (IGI/GSI, 2007);
- Groundwater & Contaminant Microbiology (IGI/GSI, 2006);
- Applied Groundwater Modelling (ESI, UK, 2000);
- Site Suitability Assessment (FETAC, 2002).

As a result of work in evaluating planning appeals, Pamela has become specialist in planning evaluations in the context of enacted Irish Regulation and EU Directives concerning the water environment such as the Groundwater Regulations (S.I. No. 9 of 2010), Surface Water Regulations (S.I. No. 272 of 2009), Water Framework and Habitats' Directives. Pamela is a qualified and certified 'Site Assessor' and interviewer of examination candidates in respect of eligibility for the Site Suitability FETAC Qualification. In the past, she has lectured in third level institutions (WIT, CIT, 1996 – 1999), delivered practical laboratory instruction in the assessment of subsoils for the FETAC Site Assessor programme and demonstrated hydraulics laboratory modules at Trinity College Dublin (1996). She has been an invited guest speaker at An Bord Pleanála, The Irish Concrete Federation, The Health Service Executive, Environmental Health Officers National Conference, The Irish Planning Institute's National Conference, The International Association of Hydrogeologists National Conference (Irish Branch) and has delivered hydrogeological lectures to the public during Science Week.

Hydro-G is the registered trading name of Pamela Bartley's company Bartley Hydrogeology Ltd., a company registered in Galway Ireland. The company holds requisite employer's and public liability insurances. In addition, the company holds professional indemnity insurance of €2million €2,000,000 any one CLAIM.

Pamela is qualified and IOSH certified to act as PSDP (Project Supervisor Design Phase) & PSCS (Project Supervisor Construction Stage) as defined by the Construction Regulations. The company is a registered Irish Water Supplier (no. 1855) and Pamela Bartley is HSQE approved within Irish Water.

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1.0 Introduction

Hydro G was commissioned by Bennettsbridge Limestone Quarries Ltd (BLQ) to prepare an Annual Environmental Report (AER), which is required as a condition of the Discharge Licence in place for the quarry operation at Kilree, Bennettsbridge, Co. Kilkenny (Kilkenny County Council Ref. No: ENV/W/78).

This report has been prepared to fulfil this requirement and pertains to the reporting period January 2021 - December 2021.

2.0 Pertinent Details of the Discharge Licence

The discharge licence relevant to this period is Kilkenny County Council Ref. No: ENV/W/78, dated September 15th 2017 (hereafter referred to as ENV/W/78 (2017)).

Licence conditions relevant to this report include the following:

Condition 3.2 of ENV/W/78 (2017) stipulates:

The licence holder shall ensure that

- (a) The mean daily discharge over the course of a year shall not exceed 22,000m³/day, and
- (b) The maximum daily discharge shall not exceed 70,000m³/day

Condition 4.1 of ENV/W/78 (2017) stipulates:

The characteristics of the effluent as discharged shall not exceed the following emission limit values (ELVs):

Table 1: Discharge Licence ENV/W/78 ELVs

Parameter	ELV	Units
pH	6-9	-
Suspended Solids	10	mg/l
BOD	2	mg/l
COD	10	mg/l
Nitrate	10	mg/l - N
Total Ammonia	0.17	mg/l - N
MRP	0.07	mg/l - P
Total Hydrocarbons	0.68	mg/l

Condition 5.5 of ENV/W/78 (2017) stipulates the following:

The licence holder shall submit an Annual Environmental Report from a suitably qualified person which shall be due within 21 days after the end of each calendar year. The report shall contain the following information in relation to the previous calendar year:

- a) All monitoring results relating to the previous calendar year including the information required under conditions 5.1, 5.2, & 5.3.
- b) An assessment of the results, particularly noting any trends. Such analysis of trends should take account of any previous reports submitted in relation to the discharge.
- c) Confirmation (or otherwise) that the conditions attached to the licence have been complied with.

3.0 Monitoring Results

3.1 Flow Data

Daily discharge volumes (m³/d) are presented on a month-by-month basis in Table 2 for the monitoring period January – December 2021. Flow measurement is automated.

Condition 3.2 (a) of ENV/W/78 (2017) requires that the mean daily discharge over the course of the year shall not exceed 22,000m³/d;

and

Condition 3.2 (b) of ENV/W/78 (2017) requires that the maximum daily discharge shall not exceed 70,000m³/day.

Results presented in Table 2 demonstrate that these licence limits were complied with.

With reference to Table 2, the bottom right cell of the Table presents the mean daily discharge over the course of the year and this value is 17,227 m³/d, which is compliant with **Condition 3.2 (a)** Discharge Licence ENV/W/78 (2017) ELV for average discharge of 22,000 m³/d.

Similarly, the individual day values recorded at the site presented in Table 2 demonstrate that the site is always compliant with **Condition 3.2 (b)** of ENV/W/78 (2017) in that on no occasion throughout 2021 did the discharge volume exceed 70,000 m³/d. The actual maximum recorded value on one day was 63,271 m³/d in February, which is the same month each year, usually, in which the daily maximum is recorded.

Table 2: Daily discharge volumes (m3/d) on a month-by-month basis: 2021

Day	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21			
1st	37,800	39,661	48,488	15,508	10,691	23,366	11,168	9,259	10,233	5,963	12,843	7,679	RECEIVED 18/08/2025		
2nd	36,113	44,973	43,549	15,367	10,699	19,613	11,225	11,731	10,246	7,173	12,480	7,667			
3rd	32,935	47,591	39,024	16,401	11,567	19,996	10,716	9,541	11,305	5,779	10,895	8,013			
4th	31,208	46,863	35,896	13,755	10,270	18,626	12,195	9,801	11,423	5,486	10,626	9,022			
5th	29,290	42,090	32,795	16,030	10,753	19,064	11,855	11,332	9,706	5,787	9,816	6,620			
6th	26,569	38,359	30,454	13,306	10,125	18,160	9,879	11,321	10,281	5,969	9,416	8,290			
7th	26,458	36,415	27,927	14,666	10,600	16,421	10,998	12,185	9,645	6,063	9,226	14,875			
8th	24,905	33,712	25,925	14,645	12,959	17,648	12,104	9,334	10,879	6,270	9,686	19,995			
9th	22,892	31,519	25,252	14,143	10,364	16,375	9,674	10,772	9,862	7,312	8,674	23,500			
10th	21,910	29,080	23,685	13,368	10,978	16,076	12,056	10,083	10,445	5,534	8,705	20,549			
11th	21,504	27,176	23,676	13,668	11,090	15,726	9,671	10,472	11,713	5,225	8,663	19,310			
12th	20,910	25,516	23,456	13,422	12,835	14,274	10,633	10,227	9,903	5,516	8,593	18,408			
13th	21,188	25,450	22,331	13,023	11,384	15,922	10,470	10,290	9,478	5,986	8,086	17,559			
14th	20,222	26,838	23,560	12,854	11,037	14,028	10,325	12,027	9,936	6,399	8,452	16,896			
15th	20,769	30,139	24,498	12,512	11,924	14,480	10,286	9,552	10,196	5,298	8,360	16,000			
16th	25,250	33,167	25,193	12,827	13,361	13,966	10,117	10,092	10,127	7,008	7,769	15,645			
17th	31,425	34,332	25,221	13,461	14,215	13,607	11,449	10,132	10,572	5,751	8,308	14,915			
18th	30,771	38,676	24,800	11,845	13,796	13,182	9,015	10,245	11,512	5,078	8,178	15,418			
19th	31,895	47,406	24,064	12,346	13,594	13,209	9,989	10,382	9,256	6,065	8,000	12,782			
20th	34,175	59,755	24,031	12,710	16,803	13,990	9,619	11,219	10,992	6,505	8,115	13,682			
21st	41,230	60,739	23,357	12,066	19,538	12,598	9,935	13,265	8,623	5,979	7,516	13,562			
22nd	41,930	57,131	21,764	11,572	19,855	12,838	9,884	9,612	7,313	6,032	7,891	13,054			
23rd	38,884	57,843	21,949	11,881	22,899	13,587	10,040	10,563	5,670	7,193	7,860	13,698			
24th	35,590	63,271	20,786	11,103	22,454	11,966	11,363	10,366	5,914	6,933	7,878	13,098			
25th	32,374	62,712	20,188	12,264	22,934	12,567	9,906	10,385	6,858	5,909	7,702	25,111			
26th	30,960	59,239	19,707	10,616	20,846	12,328	9,564	10,534	6,044	6,254	7,800	44,382			
27th	30,056	52,773	19,411	10,666	22,352	11,603	9,730	10,136	5,351	8,982	8,431	39,940			
28th	32,888	48,488	18,593	11,466	23,685	11,664	9,941	11,555	5,754	13,935	6,542	40,393			
29th	35,914		18,052	11,148	21,084	10,731	10,445	9,508	5,785	10,322	7,685	40,056			
30th	37,126		17,538	10,600	21,311	11,048	12,346	9,947	6,412	9,056	7,621	46,259			Annual Stats (m3/d)
31st	38,510		17,011		22,060		11,694	10,200		12,408		57,966			
MAX	41,930	63,271	48,488	16,401	23,685	23,366	12,346	13,265	11,713	13,935	12,843	57,966	63,271		MAX
MIN	20,222	25,450	17,011	10,600	10,125	10,731	9,015	9,259	5,351	5,078	6,542	6,620	5,078	MIN	
AVERAGE	30,440	42,890	25,554	12,974	15,421	14,955	10,590	10,518	9,048	6,877	8,727	20,463	17,227	AVERAGE	

3.2 Water Quality Data

The site monitors water quality of the final discharge on a routine monthly basis. The samples are collected by staff of Southern Scientific accredited laboratory and transported to the laboratory on the same day. The laboratory Certificates of Analysis are presented in Appendix A for the routine monthly monitoring.

For the purposes of aiding the interpretation of the settlement lagoons prior to discharge, in addition to sampling the discharge itself each month, Southern Scientific are contracted to also collect a sample from Eden Spring in the quarry each month. Therefore, the Laboratory Certificates of Analysis contain monitoring results for both monitoring points (Appendix A).

Discharge Licence ENV/W/78 (2017) specifies ELVs for the final discharge and those water quality results are presented in Table 3 for the monitoring period January 2021 – December 2021.

Table 3 Water quality results for the monitoring period January – December 2021

Parameter	pH	Suspended Solids	BOD	COD	Nitrate	Total Ammonia	Molybdate Reactive Phosphate	Total Hydrocarbons
Units	pH units	mg/l	mg/l	mg/l	mg/l - N	mg/l - N	mg/l - P	mg/l
Jan-21	7.9	<2	<1	<10	9.71	0.02	0.01	<0.1
Feb-21	7.7	2	<1	<10	9.57	0.02	0.02	<0.1
Mar-21	7.8	<5	<1	10	9.60	0.03	<0.01	<0.1
Apr-21	7.7	<4	<1	12	9.23	<0.02	<0.01	<0.1
May-21	8.2	<5	1.5	10	8.46	0.04	<0.01	<0.1
Jun-21	7.7	<4	<1	11	8.34	0.03	0.01	<0.1
Jul-21	7.7	<4	<1	<10	8.02	<0.02	0.01	<0.1
Aug-21	8	<4	<1	<10	8.11	0.07	<0.01	<0.1
Sep-21	8	<4	1.1	<10	6.79	0.03	<0.01	<0.1
Oct-21	8	<4	<1	<10	6.92	0.03	<0.01	<0.1
Nov-21	8	<4	1.8	<10	9.44	0.31	<0.01	<0.1
Dec-21	7.9	5	<1	<10	7.76	0.09	0.07	<0.1
MAX	8.2	5	1.8	12	9.71	0.31	0.07	<0.1
MIN	7.7	2	1	10	6.79	0.02	0.01	<0.1
AVERAGE	7.9	<4	<1	<10	8.5	0.06	<0.01	<0.1
Discharge Licence ENV/W/78 (2017) ELV's	6-9	10	2	10	10	0.17	0.07	0.68
Hydro-G Comment	pH Compliant	SS Compliant	BOD Compliant	COD Compliant 11/12 occasions	N03-N Compliant	Total Ammonia Compliant 11/12 occasions	MRP-P Compliant	Total Hydrocarbons Compliant

With reference to the results presented in Table 3, and the associated Certificates of Analysis in Appendix A, the site is compliant for all ELV specified parameters almost all the time. Only on one occasion is COD slightly elevated above the ELV of 10mg/l COD (April 2021). On one occasion (November 2021) Total Ammonia is elevated with respect to the ELV. These are considered outliers that do not present the overall status of the discharge.

Most of the time the quality of the water is below the limit of detection of the laboratory analyser for most parameters, which is indicated by the < symbol in Table 3's results.

Results are presented graphically and discussed further in the following section.

4.0 Assessment of the Results

4.1 With respect to the Volumetric ELV Conditions:

Data presented in Table 2 show that the mean daily volume discharged, on an annual average basis, is 17,227 m³/d and this complies with the specified ELV for mean daily volume of 22,000 m³/d, on an annual average basis. Summary statistics for maximum, minimum and average daily discharge data, presented numerically in Table 2, are reproduced for each month in Figure 1 to facilitate easier evaluation.

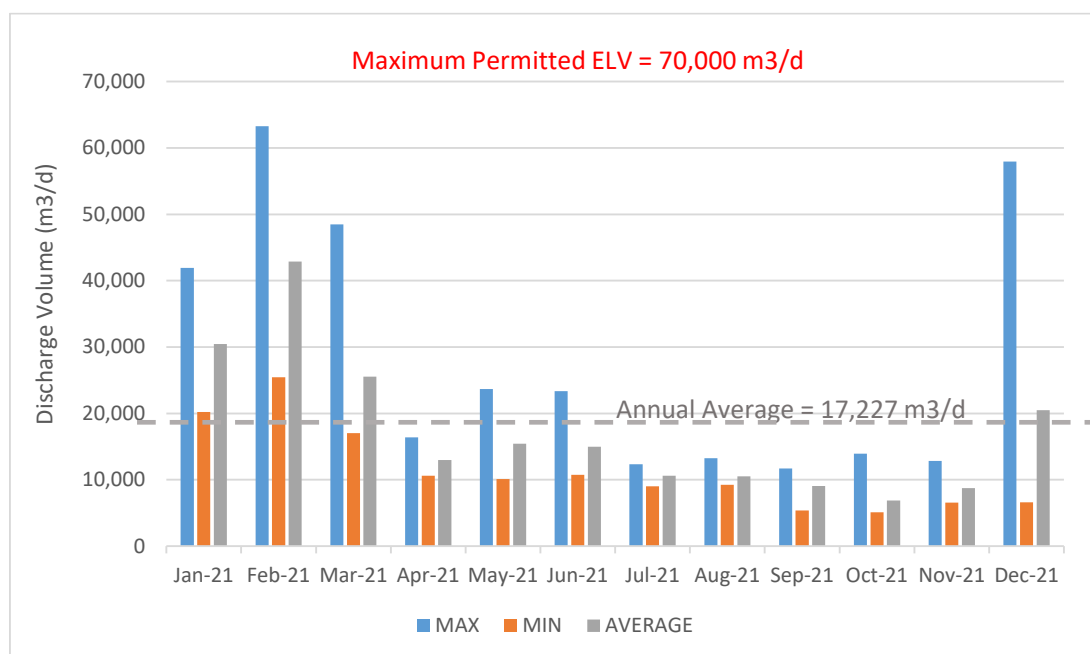


Figure 1 Daily Discharge Volumes by month: 2021

It is acknowledged in the discharge licence that the waters arising at the quarry are a combination of rainfall runoff on the floor, rainfall runoff from the lands around the walls of the void itself and groundwater. Ongoing monitoring data at the site demonstrate that during the seasons of high rainfall the discharge volumes peak and during low rainfall months the discharge from the quarry represents groundwater baseflow volumes. At no time does the daily discharge volume breach the maximum permitted 70,000m³/d ELV. The ongoing monitoring results justify the case presented in the discharge licence assimilation capacity simulations report: that at times of high discharge volumes from the site the receiving water's flow characteristic would be greater than the 95%tile flow characteristic.

4.2 With respect to Water Quality ELVs:

Results presented in Table 3 indicate that the specified ELVs were complied with for all parameters in all 12 months except for COD on one occasion and Total Ammonia on one occasion. For many parameters, the hydrochemistry of the sample of discharge presents a water so clean that the laboratory analysis machine cannot detect anything, such as BOD, COD, SS, Hydrocarbons. With

respect to each parameter of the Discharge Licence the following can be stated, with reference to the data presented as Table 3:

- pH of the discharge is always Compliant.
- Suspended Solids of the discharge is always Compliant, results each month present at least <50% of the Discharge Licence ELV.
- BOD is always compliant and for 9 of the 12 monitoring months the BOD is < the Limit of Detection of the analyser.
- COD is almost always reported by the laboratory as less than their 10mg/l Limit of Detection. On one occasion the concentration is reported to be 13mg/l COD. However, this is a relatively small exceedance and not a trend.
- Nitrate-N always compliant.
- The ELV for Total Ammonia is 0.17 mg/l. On most occasions the discharge concentration is 0.2 to 0.3 mg/l Total Ammonia. The average Total Ammonia is 0.06 mg/l, which is approximately 1/3 of the ELV. On only one occasion is there an exceedance of Total Ammonia and there are no other parameters in excess at that time (November 2021). BOD rises slightly to 1.8 mg/l but is still compliant with the ELV. The elevated Total Ammonia does not persist.
- MRP-P is always Compliant.
- Total Hydrocarbons is always compliant and always below the limit of detection of the analyser.

Considering that there are 8 parameters specified in the licence and those 8 parameters are analysed in each of the 12 months of the year: there are 96 results and of those 96 results, there are only 2 exceedances, which suggests 98% compliance on a result-by-result basis. However, on an annual average basis, the requirements of the Discharge Licence are met. That is demonstrated in Table 4.

Table 4 Average Compliance Results 2021

Parameter		Discharge Licence ENV/W/78 (2017) ELV's	AVERAGE Monitoring Result 2021	Hydro-G Comment
pH	pH units	6-9	7.9	pH Compliant
Suspended Solids	mg/l	10	<4	SS Compliant
BOD	mg/l	2	<1	BOD Compliant
COD	mg/l	10	<10	COD Compliant
Nitrate	mg/l - N	10	8.5	NO3-N Compliant
Total Amonia	mg/l - N	0.17	0.06	Total Ammonia Compliant
MRP-P	mg/l - P	0.07	<0.01	MRP-P Compliant
Total Hydrocarbons	mg/l	0.68	<0.1	Total Hydrocarbons Compliant

5.0 Compliance with Licence Conditions

With respect to the Volumetric ELV Conditions: Data presented in Table 2 and in Figures 1 & 2 demonstrate that the licence limits for maximum and average discharge volume were always complied with.

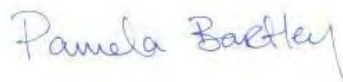
With respect to Water Quality ELVs: Results presented in Tables 3 and 4 indicate that the prescribed ELVs were complied with for all parameters in all 12 months except for one exceedance for Total Ammonia and one exceedance for COD. Those exceedances suggest 98% compliance with the requirements of the Discharge Licence's ELVs for water quality. On an annual average basis, there is full compliance. This means that the small exceedances in Total Ammonia and COD did not persist and are anomalies.

6.0 Register of Incidents

6.1 There were no 'serious incidents' to report with respect to this discharge during 2021.

7.0 Conclusions

7.1 The site is in full compliance with the requirements of Discharge Licence ENV/W/78.



Dr. Pamela Bartley B.Eng, M.SC., Ph.D. MIEI

Appendix A

Laboratory Certificates of Analysis Routine Monthly Monitoring at the Site

RECEIVED: 18/08/2025

Monitoring Points

- 1. Eden Spring*
- 2. Final Discharge*



Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co. Kilkenny	Date Received:	05/01/2021
Report to:	Eoin O' Carroll	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	05/01/2021 - 20/01/2021
Quote No.	Q21-00135	Issue Date:	20/01/2021
		BATCH NUMBER:	21-09614

Ruth Murphy
Chemistry Laboratory Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

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- ◆ Sampling is outside the scope of the laboratory activities.

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	28895 (21-09614)	Sample Matrix:	Surface Water
Date Sampled:	05/01/2021	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
SCP 115A	Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 2
SCP 027A	Total Ammonia	mg/L N	0.02	0.02
SCP 027G	Nitrate	mg/L N	0.25	9.71
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	28896 (21-09614)	Sample Matrix:	Surface Water
Date Sampled:	05/01/2021	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 115A	Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 2
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	9.73
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.02
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co. Kilkenny	Date Received:	04/02/2021
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	04/02/2021 - 18/02/2021
Quote No.	Q21-00135	Issue Date:	18/02/2021
		BATCH NUMBER:	21-10097

Ruth Murphy
Chemistry Laboratory Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

Notes

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- ♦ Sampling is outside the scope of the laboratory activities.

Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[NO_3]/50 + [NO_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	30417 (21-10097)	Sample Matrix:	Surface Water
Date Sampled:	04/02/2021	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.7
SCP 115A	Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	2
SCP 027A	Total Ammonia	mg/L N	0.02	0.02
SCP 027G	Nitrate	mg/L N	0.25	9.57
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.02
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	30418 (21-10097)	Sample Matrix:	Surface Water
Date Sampled:	04/02/2021	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 115A	Total Petroleum Hydrocarbons (C10-C40)	µg/L	10	< 10
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	3
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	9.46
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.10
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co. Kilkenny	Date Received:	04/03/2021
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	04/03/2021 - 10/03/2021
Quote No.	Q21-00135	Issue Date:	11/03/2021
		BATCH NUMBER:	21-10586

Joanne O'Halloran
Laboratory Personal

Index to symbols used & Notes

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(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Detection.
Note 6	Subcontracted Parameter.

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Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[NO_3]/50 + [NO_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	31973 (21-10586)	Sample Matrix:	Surface Water
Date Sampled:	04/03/2021	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 5
SCP 027A	Total Ammonia	mg/L N	0.02	0.03
SCP 027G	Nitrate	mg/L N	0.25	9.60
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	31974 (21-10586)	Sample Matrix:	Surface Water
Date Sampled:	04/03/2021	Time Sampled:	:

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	5
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	12.94
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.02
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10

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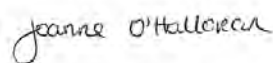
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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M



Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co. Kilkenny	Date Received:	02/04/2021
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	02/04/2021 - 13/04/2021
Quote No.	Q21-00135	Issue Date:	15/04/2021
		BATCH NUMBER:	21-11048



Joanne O'Halloran
Deputy Laboratory Manager

Index to symbols used & Notes

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LOD	Parameter Limit of Detection.
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Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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directors: K. Murphy, M. Murphy & C. Murphy
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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	33472 (21-11048)	Sample Matrix:	Surface Water
Date Sampled:	02/04/2021	Time Sampled:	10:15

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.7
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	9.23
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	12
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	33473 (21-11048)	Sample Matrix:	Surface Water
Date Sampled:	02/04/2021	Time Sampled:	10:30

Method:	Parameter:	Units	LOD	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	9.32
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.02
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10

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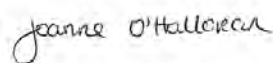
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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M



Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co. Kilkenny	Date Received:	05/05/2021
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	05/05/2021 - 12/05/2021
Quote No.	Q21-00135	Issue Date:	14/05/2021
		BATCH NUMBER:	21-11608



Joanne O'Halloran
Deputy Laboratory Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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- ♦ Sampling is outside the scope of the laboratory activities.

Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[NO_3]/50 + [NO_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

(registered office)

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	35199 (21-11608)	Sample Matrix:	Surface Water
Date Sampled:	05/05/2021	Time Sampled:	13:40

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	8.2
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	1.5
SCP 010	Suspended Solids	mg/L	2	< 5
SCP 027A	Total Ammonia	mg/L N	0.02	0.04
SCP 027G	Nitrate	mg/L N	0.25	8.46
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	35200 (21-11608)	Sample Matrix:	Surface Water
Date Sampled:	05/05/2021	Time Sampled:	13:51

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 5
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	8.59
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co. Kilkenny	Date Received:	02/06/2021
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	02/06/2021 - 14/06/2021
Quote No.	Q21-00135	Issue Date:	15/06/2021
		BATCH NUMBER:	21-12132

Joanne O'Halloran

Joanne O'Halloran
Deputy Laboratory Manager

Index to symbols used & Notes

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***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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- ♦ Sampling is outside the scope of the laboratory activities.

Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[NO_3]/50 + [NO_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	36723 (21-12132)	Sample Matrix:	Surface Water
Date Sampled:	02/06/2021	Time Sampled:	10:50

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.7
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	0.03
SCP 027G	Nitrate	mg/L N	0.25	8.34
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	11
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	36724 (21-12132)	Sample Matrix:	Surface Water
Date Sampled:	02/06/2021	Time Sampled:	10:55

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.3
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	8.31
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.05
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co. Kilkenny	Date Received:	02/07/2021
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	02/07/2021 - 07/07/2021
Quote No.	Q21-00135	Issue Date:	13/07/2021
		BATCH NUMBER:	21-12764

Joanne O'Halloran

Joanne O'Halloran
Deputy Laboratory Manager

Index to symbols used & Notes

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**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[NO_3]/50 + [NO_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	38923 (21-12764)	Sample Matrix:	Surface Water
Date Sampled:	02/07/2021	Time Sampled:	11:10

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.7
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	8.02
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	38924 (21-12764)	Sample Matrix:	Surface Water
Date Sampled:	02/07/2021	Time Sampled:	11:20

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	2.5
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	0.03
SCP 027G	Nitrate	mg/L N	0.25	7.96
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.13
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co. Kilkenny	Date Received:	04/08/2021
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	04/08/2021 - 12/08/2021
Quote No.	Q21-00135	Issue Date:	13/08/2021
		BATCH NUMBER:	21-13361

Ruth Murphy
Chemistry Laboratory Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[NO_3]/50 + [NO_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	40817 (21-13361)	Sample Matrix:	Surface Water
Date Sampled:	04/08/2021	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	8.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2.0	< 4.0
SCP 027A	Total Ammonia	mg/L N	0.02	0.07
SCP 027G	Nitrate	mg/L N	0.25	8.11
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	A µg/L	10	< 10

(registered office)

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	40818 (21-13361)	Sample Matrix:	Surface Water
Date Sampled:	04/08/2021	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2.0	< 4.0
SCP 027A	Total Ammonia	mg/L N	0.02	0.03
SCP 027G	Nitrate	mg/L N	0.25	7.77
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.04
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10	< 10

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RECEIVED: 18/08/2025

Sample Deviation Key

Deviation Code	Deviation Description
A	The handling of the sample within the laboratory did not comply with the laboratory's policy on holding times / handling instructions. It is possible that the results may have been compromised.
C	Sample was received in inappropriate container, which may compromise results.
D / W	The sampling date and/or time has not been provided and therefore the sample holding time cannot be determined. It is possible that the results may have been compromised.
H	Sample received in vial with inappropriate headspace which may compromise results.
P	Preservative not used for critical parameters, which may compromise results.
T	Inappropriate sample temperature upon receipt which may compromise results.
R	Sample holding time from sampling to receipt in laboratory exceeded. It is possible that the results may have been compromised.
Note 5	Result exceeds the accredited range of measurement for parameter, E.g. Result exceeds the accredited range of measurement for ammonia, 0.02-12 mg/L N.

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co. Kilkenny	Date Received:	02/09/2021
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	02/09/2021 - 09/09/2021
Quote No.	Q21-00135	Issue Date:	10/09/2021
		BATCH NUMBER:	21-14002

Joanne O'Halloran
Deputy Laboratory Manager

Index to symbols used & Notes

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(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

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Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[NO_3]/50 + [NO_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	43022 (21-14002)	Sample Matrix:	Surface Water
Date Sampled:	02/09/2021	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	8.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	1.1
SCP 010	Suspended Solids	mg/L	2.0	< 4.0
SCP 027A	Total Ammonia	mg/L N	0.02	0.03
SCP 027G	Nitrate	mg/L N	0.25	6.79
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10

(registered office)

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directors: K. Murphy, M. Murphy & C. Murphy
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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	43023 (21-14002)	Sample Matrix:	Surface Water
Date Sampled:	02/09/2021	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2.0	4.0
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	6.43
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M



Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co. Kilkenny	Date Received:	05/10/2021
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	05/10/2021 - 11/10/2021
Quote No.	Q21-00135	Issue Date:	18/10/2021
		BATCH NUMBER:	21-14730

Joanne O'Halloran

Joanne O'Halloran
Deputy Laboratory Manager

Index to symbols used & Notes

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(D)	Analysis carried out at our Dunrune Laboratory.
LOD	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

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Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[NO_3]/50 + [NO_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	45640 (21-14730)	Sample Matrix:	Surface Water
Date Sampled:	05/10/2021	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	8.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	0.03
SCP 027G	Nitrate	mg/L N	0.25	6.92
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	45641 (21-14730)	Sample Matrix:	Surface Water
Date Sampled:	05/10/2021	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.3
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	6.63
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co. Kilkenny	Date Received:	03/11/2021
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	03/11/2021 - 16/11/2021
Quote No.	Q21-00135	Issue Date:	17/11/2021
		BATCH NUMBER:	21-15441

Joanne O'Halloran

Joanne O'Halloran
Deputy Laboratory Manager

Index to symbols used & Notes

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LOD	Parameter Limit of Quantification
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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	48296 (21-15441)	Sample Matrix:	Surface Water
Date Sampled:	03/11/2021	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	8.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	1.8
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	0.31
SCP 027G	Nitrate	mg/L N	0.25	9.44
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	48297 (21-15441)	Sample Matrix:	Surface Water
Date Sampled:	03/11/2021	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.6
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	1.6
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	7.79
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co. Kilkenny	Date Received:	02/12/2021
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	02/12/2021 - 15/12/2021
Quote No.	Q21-00135	Issue Date:	16/12/2021
		BATCH NUMBER:	21-16135

Conor Murphy

Conor Murphy
Operations Manager

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	50894 (21-16135)	Sample Matrix:	Surface Water
Date Sampled:	02/12/2021	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	5
SCP 027A	Total Ammonia	mg/L N	0.02	0.09
SCP 027G	Nitrate	mg/L N	0.25	7.76
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.07
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	50895 (21-16135)	Sample Matrix:	Surface Water
Date Sampled:	02/12/2021	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.3
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	7.69
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	13
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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2022 Annual Environmental Report

for

Bennettsbridge Limestone Quarries Ltd

wrt

Discharge Licence ENV/W/78

At the request of

Bennettsbridge Limestone

Kilree,

Sheastown

Bennettsbridge

Co Kilkenny

Consultant Dr. Pamela Bartley

January 2023

**Hydro-G**

50 Henry St.

Galway

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091 449950

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Project No.: 23-4 BBL AER 2022

Report Status: ISSUE

Report Title: 2022 Annual Environmental Report for Bennettsbridge Limestone Quarries Ltd wrt Discharge Licence ENV/W/78

Date: 26/01/23

Prepared by:

Dr. Pamela Bartley B.Eng, M.SC., Ph.D.

NOTES:

This report is for the use solely of the party to whom it is addressed and no responsibility is accepted to any third party.

About the Author

Pamela Bartley is a water focussed civil engineer. After 25 years of field based practice in borehole drilling, groundwater monitoring and abstraction point management she may now be considered a karst hydrogeology specialist: her Ph.D was a field based karst limestone environment study. She has also completed training with the GSI at their karst specialist course run in the Burren. Her primary qualification is a Diploma in Water and Wastewater Technology at Sligo RTC. She then completed her primary degree in Civil Engineering at Queens University, Belfast, followed by an M.Sc in Environmental Engineering, followed by a field-based hydrogeologically focussed Ph.D. within the School of Civil Engineering at Trinity College, Dublin. Her key work areas are groundwater development from large scale water supply boreholes, hydrogeological assessment of quarries and the evaluation of discharges to groundwater and surface waters. Pamela Bartley's company is Bartley Hydrogeology Ltd., registered to trade as Hydro-G.

Pamela has successfully completed post doctorate 'Professional Development' formal course training in the areas of:

- PSDP & PSCS (IOSH certified, 2016);
- Karst Hydrogeology (GSI, 2013);
- On Site Wastewater & Water Services Amendment Act 2012 (IE, Western Region 6-week programme 2012 & Dublin 2012);
- Zero Discharge Willow Wastewater Systems Design Courses (Denmark 2008 & 2011 & Ireland 2012);
- Expert Witness (IE, 2011);
- Planning & Development Act (IE, 2010);
- Surface Water Regulations 2009 (DoE, 2010 & 2011);
- Sustainable Drainage (Wallingford/CIRIA, 2005 & 2008);
- Source Protection Zone Delineation (IGI/GSI, 2007);
- Groundwater & Contaminant Microbiology (IGI/GSI, 2006);
- Applied Groundwater Modelling (ESI, UK, 2000);
- Site Suitability Assessment (FETAC, 2002).

As a result of work in evaluating planning appeals, Pamela has become specialist in planning evaluations in the context of enacted Irish Regulation and EU Directives concerning the water environment such as the Groundwater Regulations (S.I. No. 9 of 2010), Surface Water Regulations (S.I. No. 272 of 2009), Water Framework and Habitats' Directives. Pamela is a qualified and certified 'Site Assessor' and interviewer of examination candidates in respect of eligibility for the Site Suitability FETAC Qualification. In the past, she has lectured in third level institutions (WIT, CIT, 1996 – 1999), delivered practical laboratory instruction in the assessment of subsoils for the FETAC Site Assessor programme and demonstrated hydraulics laboratory modules at Trinity College Dublin (1996). She has been an invited guest speaker at An Board Pleanála, The Irish Concrete Federation, The Health Service Executive, Environmental Health Officers National Conference, The Irish Planning Institute's National Conference, The International Association of Hydrogeologists National Conference (Irish Branch) and has delivered hydrogeological lectures to the public during Science Week.

Hydro-G is the registered trading name of Pamela Bartley's company Bartley Hydrogeology Ltd., a company registered in Galway Ireland. The company holds requisite employer's and public liability insurances. In addition, the company holds professional indemnity insurance of €2million €2,000,000 any one CLAIM.

Pamela is qualified and IOSH certified to act as PSDP (Project Supervisor Design Phase) & PSCS (Project Supervisor Construction Stage) as defined by the Construction Regulations. The company is a registered Irish Water Supplier (no. 1855) and Pamela Bartley is HSQE approved within Irish Water.

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1.0 Introduction

Hydro G was commissioned by Bennettsbridge Limestone Quarries Ltd (BLQ) to prepare an Annual Environmental Report (AER), which is required as a condition of the Discharge Licence in place for the quarry operation at Kilree, Bennettsbridge, Co. Kilkenny (Kilkenny County Council Ref. No. ENV/W/78).

This report has been prepared to fulfil this requirement and pertains to the reporting period January 2022 to December 2022, inclusive.

2.0 Pertinent Details of the Discharge Licence

The discharge licence relevant to this period is Kilkenny County Council Ref. No: ENV/W/78, dated September 15th 2017 (hereafter referred to as ENV/W/78 (2017)).

Licence conditions relevant to this report include the following:

Condition 3.2 of ENV/W/78 (2017) stipulates:

The licence holder shall ensure that

- (a) The mean daily discharge over the course of a year shall not exceed 22,000m³/day, and
- (b) The maximum daily discharge shall not exceed 70,000m³/day

Condition 4.1 of ENV/W/78 (2017) stipulates:

The characteristics of the effluent as discharged shall not exceed the following emission limit values (ELVs):

Table 1: Discharge Licence ENV/W/78 ELVs

Parameter	ELV	Units
pH	6-9	-
Suspended Solids	10	mg/l
BOD	2	mg/l
COD	10	mg/l
Nitrate	10	mg/l - N
Total Ammonia	0.17	mg/l - N
MRP	0.07	mg/l - P
Total Hydrocarbons	0.68	mg/l

Condition 5.5 of ENV/W/78 (2017) stipulates the following:

The licence holder shall submit an Annual Environmental Report from a suitably qualified person which shall be due within 21 days after the end of each calendar year. The report shall contain the following information in relation to the previous calendar year:

- a) All monitoring results relating to the previous calendar year including the information required under conditions 5.1, 5.2, & 5.3.
- b) An assessment of the results, particularly noting any trends. Such analysis of trends should take account of any previous reports submitted in relation to the discharge.
- c) Confirmation (or otherwise) that the conditions attached to the licence have been complied with.

3.0 Monitoring Results

3.1 Flow Data

Daily discharge volumes (m³/d) are presented on a month-by-month basis in Table 2 for the monitoring period January – December 2022. Flow measurement is automated.

Condition 3.2 (a) of ENV/W/78 (2017) requires that the mean daily discharge over the course of the year shall not exceed 22,000m³/d;
and

Condition 3.2 (b) of ENV/W/78 (2017) requires that the maximum daily discharge shall not exceed 70,000m³/day.

Results presented in Table 2 demonstrate that these licence limits were complied with.

With reference to Table 2, the bottom right cell of the Table presents the mean daily discharge over the course of the year and this value is 17,287 m³/d, which is compliant with **Condition 3.2 (a)** Discharge Licence ENV/W/78 (2017) ELV for mean discharge not to exceed 22,000m³/d. This mean discharge value is very similar to the mean value for the previous year, 2021, which was 17,227 m³/d.

Similarly, the individual day values recorded at the site presented in Table 2 demonstrate that the site is always compliant with **Condition 3.2 (b)** of ENV/W/78 (2017) in that on no occasion throughout 2022 did the discharge volume exceed 70,000 m³/d. The actual maximum recorded value on one day was 65,556 m³/d in November. This signifies a change in weather patterns in 2022. Usually, it is February in which the highest discharge is recorded each year. This has no significance to the compliance of the Licence Conditions it is just interesting to keep a record of climate conditions and response in the quarry over the years.

Table 2: Daily discharge volumes (m3/d) on a month-by-month basis: 2022

Day	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	ELV MAX (m3/d)	
1	56,975	12,510	22,486	15,022	11,409	7,919	9,834	5,611	5,909	6,439	62,983	33,806	70,000	
2	51,039	12,457	23,301	14,812	10,928	9,924	9,937	6,800	5,787	5,657	54,819	32,163	70,000	
3	45,660	12,379	21,044	13,580	10,784	9,544	9,537	5,884	5,814	6,517	50,992	29,672	70,000	
4	40,917	12,486	20,002	14,433	9,848	9,283	8,526	5,933	7,516	5,711	64,258	27,712	70,000	
5	37,190	12,002	18,705	13,754	10,139	9,602	10,234	5,672	6,751	6,967	65,566	25,539	70,000	
6	34,108	13,072	18,610	13,578	10,318	9,361	8,928	5,361	8,079	6,904	59,238	24,179	70,000	
7	30,311	12,112	17,454	12,798	10,171	9,105	9,146	6,097	10,150	5,660	54,977	22,827	70,000	
8	30,098	12,115	17,755	12,928	9,936	9,850	8,660	5,250	7,189	6,401	50,873	21,956	70,000	
9	30,622	11,453	26,434	12,232	10,356	9,529	8,607	6,044	9,868	6,303	45,493	20,234	70,000	
10	31,498	11,634	43,719	13,168	9,834	9,363	8,833	5,529	6,537	6,272	44,210	19,553	70,000	
11	30,971	11,509	45,054	12,653	9,981	8,823	9,771	5,561	8,363	6,446	38,065	18,451	70,000	
12	30,307	11,310	40,409	13,198	10,135	8,870	9,049	5,567	7,996	5,739	32,250	18,085	70,000	
13	28,958	13,252	43,780	12,839	9,636	9,587	8,776	5,260	6,248	6,824	32,468	17,238	70,000	
14	27,520	12,868	45,240	12,306	9,544	8,454	8,763	5,995	6,773	5,549	33,616	16,567	70,000	
15	26,326	12,671	43,863	12,164	9,834	9,678	8,894	7,030	6,464	6,811	32,961	15,859	70,000	
16	24,071	13,580	38,814	12,340	10,036	8,785	8,316	6,378	5,926	6,128	32,862	15,078	70,000	
17	23,342	13,687	33,720	12,545	10,311	9,169	8,880	6,054	5,650	7,234	31,798	15,140	70,000	
18	21,676	16,426	31,536	11,726	10,100	8,422	9,804	5,513	6,586	5,910	32,715	15,451	70,000	
19	20,230	17,407	28,516	11,298	9,840	8,984	8,493	6,584	5,364	9,674	26,439	17,304	70,000	
20	19,287	23,414	27,196	11,207	10,000	9,315	9,008	5,946	6,616	9,084	27,096	17,844	70,000	
21	18,273	34,036	25,323	11,502	9,992	8,608	8,599	5,412	5,451	9,844	31,866	18,526	70,000	
22	17,820	37,220	23,018	11,282	10,023	8,980	8,519	6,487	7,840	9,682	41,785	18,365	70,000	
23	17,067	35,696	21,919	10,942	9,525	8,866	8,622	6,044	6,347	23,509	47,173	18,953	70,000	
24	16,238	32,319	20,131	10,611	9,572	9,259	10,007	5,945	6,570	30,824	48,827	23,872	70,000	
25	15,437	29,088	19,301	10,573	9,730	8,903	8,862	5,856	6,059	27,096	45,713	37,213	70,000	
26	15,209	25,907	18,407	10,269	8,331	10,032	7,764	5,733	6,440	28,302	43,601	39,990	70,000	
27	14,515	26,420	18,008	10,201	8,311	10,126	5,793	5,292	5,752	30,664	44,067	39,449	70,000	
28	14,394	26,617	16,868	10,450	9,328	10,612	5,817	6,269	6,534	41,696	45,125	39,697	70,000	
29	13,903		16,197	10,178	8,745	8,153	5,858	5,258	5,350	48,106	39,565	40,909	70,000	
30	13,477		16,131	10,947	9,789	10,019	5,691	6,088	6,715	47,067	39,563	42,300	70,000	
31	13,099		15,291		8,928		6,524	5,641		52,348		42,054	70,000	
MAX	56,975	37,220	45,240	15,022	11,409	10,612	10,234	7,030	10,150	52,348	65,566	42,300	m3/d	Annual Values
MIN	13,099	11,310	15,291	10,178	8,311	7,919	5,691	5,250	5,350	5,549	26,439	15,078		65,566 MAX
AVERAGE	26,146	18,416	26,395	12,184	9,852	9,237	8,518	5,874	6,755	15,528	43,365	25,354		5,250 MIN
														17,287 AVERAGE

3.2 Water Quality Data

The site monitors water quality of the final discharge from the settlement lagoons on a routine monthly basis. The samples are collected by staff of Southern Scientific accredited laboratory and transported to the laboratory on the same day. The laboratory Certificates of Analysis are presented in Appendix A for the routine monthly monitoring.

For the purposes of aiding the interpretation of the settlement lagoons prior to discharge, in addition to sampling the discharge itself each month, Southern Scientific are contracted to also collect a sample from Eden Spring in the quarry each month. Therefore, the Laboratory Certificates of Analysis contain monitoring results for both monitoring points (Appendix A).

Discharge Licence ENV/W/78 (2017) specifies ELVs for the **final discharge** from the settlement lagoons and those water quality results are presented in Table 3 for the monitoring period January 2022 – December 2022.

Table 3 Water quality results for the monitoring period January – December 2022

Bennettsbridge Limestone Final Discharge Quality 2022								
Parameter	pH	Suspended Solids	BOD	COD	Nitrate-N	Total Amonia	Molybdate Reactive Phosphate	Total Hydrocarbons
Units	pH units	mg/l	mg/l	mg/l	mg/l - N	mg/l - N	mg/l - P	ug/l
Jan-22	7.7	<4	<1	<10	10.3	<.02	0.02	<10
Feb-22	7.7	<4	<1	<10	9.5	<.02	<.01	<10
Mar-22	7.6	<4	<1	<10	9.0	<.02	0.01	<10
Apr-22	7.7	<4	<1	<10	9.7	0.29	<.01	<10
May-22	7.8	<4	<1	<10	8.5	0.03	0.02	<10
Jun-22	8.1	<4	1.4	<10	7.7	0.05	<.01	<10
Jul-22	8.1	<4	1.6	<10	6.9	<.02	0.02	<10
Aug-22	7.9	<4	<1	<10	6.8	0.02	<.01	<10
Sep-22	7.9	<4	<1	<10	6.8	0.02	<.01	<10
Oct-22	7.8	<4	<1	<10	8.0	0.04	<.01	<10
Nov-22	7.6	12	<1	<10	10.0	0.11	0.03	<10
Dec-22	7.7	<4	<1	<10	10.1	0.03	<.01	<10
MAX	8.1	12	1.6	<10	10.3	0.29	0.03	<10
MIN	7.6	<4	<1	<10	6.81	0.02	<0.01	<10
AVERAGE	7.8	<4	<1	<10	8.6	0.07	<0.01	<10
Discharge Licence ENV/W/78 (2017) ELV's	6-9	10	2	10	10	0.17	0.07	0.68
Hydro-G Comment	pH Compliant	SS Compliant on all occasions except on One Occasion after an EXTREME winter Rainfall event	BOD Compliant	COD Compliant	Compliant within Degree of Precision for Laboratory Analyser for Nitrate	Compliant for all but April's Monitoring event	MRP-P Compliant	Total Hydrocarbons Compliant

With reference to the results presented in Table 3, and the associated Certificates of Analysis in Appendix A, the site is compliant for all ELV specified parameters almost all the time with exceptions for one exceedance for Suspended Solids and one separate exceedance for Ammonia. With respect to the veritable single event exceedances for Ammonia and Suspended Solids, the following comments are made:

- (a) On one occasion, in April 2022, Total Ammonia is elevated above the ELV of 0.17mg/l. The Ammonia exceedance is an anomaly and not repeated on the subsequent sampling in May 2022 or in any of the 11 of 12 months. In fact, for 10 of 12 sampling events the Ammonia concentration is one order of magnitude lower than the ELV of the licence. The average Ammonia concentration is 0.07mg/l and this suggests a compliant discharge.
- (b) Sampling on the 1st November 2022 returned a value of 12mg/l SS and the ELV of the licence is 10mg/l SS. That one exceedance followed a day where more than 1" of rain fell in the day i.e. 30mm recorded at the nearest Met Eireann Synoptic Weather Station at Oakpark, Carlow. This anomalous exceedance for SS is never again seen in the monitoring results. On every single other occasion the discharge from the settlement lagoons has a suspended solid's concentration lower than the limit of detection of the laboratory analyser, which is <4mg/l for SS.

Whilst it is noted that there are results of 10.3mg/l NO₃-N and 10.1 mg/l NO₃-N for January and December, respectively, these results should be considered insignificant. The degree of precision of the laboratory analyser is 14.96% and therefore a result of 10.1mg/l could just as well be 8.6mg/l NO₃-N.

Most of the time the quality of the water is below the limit of detection of the laboratory analyser for most parameters, which is indicated by the < symbol in Table 3's results. Suspended Solids, Ortho-P, COD, BOD and hydrocarbons are generally very low at the site.

Results are presented graphically and discussed further in the following section.

4.0 Assessment of the Results

4.1 With respect to the Volumetric ELV Conditions:

Data presented in Table 2 show that the mean daily volume discharged, on an annual average basis, is 17,287 m³/d and this complies with the specified ELV for mean daily volume of 22,000 m³/d, on an annual average basis. Summary statistics for maximum, minimum and average daily discharge data, presented numerically in Table 2, are reproduced for each month in Figure 1 to facilitate easier evaluation.

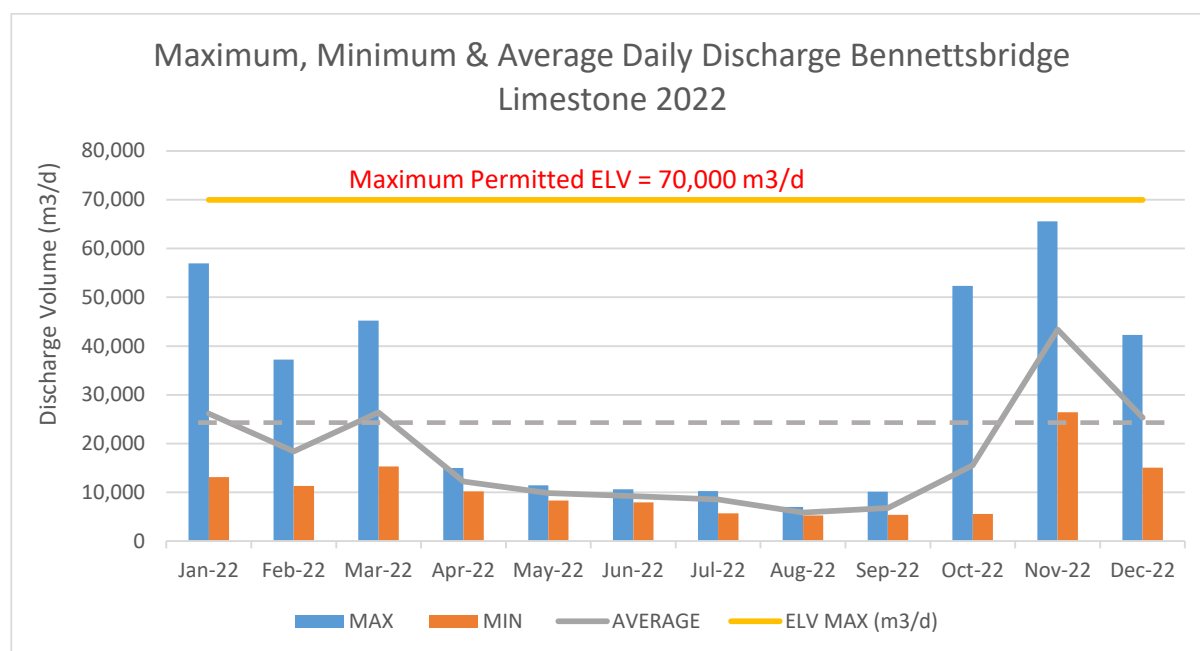


Figure 1 Daily Discharge Volumes by month: 2022

It is acknowledged in the discharge licence that the waters arising at the quarry are a combination of rainfall runoff on the floor, rainfall runoff from the lands around the walls of the void itself and groundwater. Ongoing monitoring data at the site demonstrate that during the seasons of high rainfall the discharge volumes peak and during low rainfall months the discharge from the quarry represents groundwater baseflow volumes. At no time does the daily discharge volume breach the maximum permitted 70,000m³/d ELV. The ongoing monitoring results justify the case presented in the discharge licence assimilation capacity simulations report: that at times of high discharge volumes from the site the receiving water's flow characteristic would be greater than the 95%tile flow characteristic.

4.2 With respect to Water Quality ELVs:

Results presented in Table 3 indicate that the specified ELVs were complied with for all parameters in all 12 months except for Total Ammonia on one occasion, Suspended Solids on one occasion and scientifically insignificant exceedances of Nitrates, when laboratory Degree of Precision is considered. For many parameters, the hydrochemistry of the sample of discharge presents a water so clean that

the laboratory analysis machine cannot detect anything: namely BOD, COD, SS, Hydrocarbons. With respect to each parameter of the Discharge Licence the following can be stated, with reference to the data presented as Table 3:

- pH of the discharge is always Compliant.
- Suspended Solids of the discharge is <4mg/l on 11 of 12 sampling occasions, which is Compliant with the 10mg/l SS ELV. On one occasion there was a storm driven response exceedance, but the river will have been able to carry this away (in the storm condition).
- BOD is always compliant with the Discharge Licence ELV of 2mg/l BOD and for 10 of the 12 monitoring months the BOD is < the Limit of Detection of the analyser.
- COD is always reported by the laboratory as less than their 10mg/l Limit of Detection.
- Nitrate-N always compliant when one considers the degree of precision of the laboratory analyser. The ELV is 10mg/l NO₃-N. The average value for the discharge is 8.6mg/l NO₃-N. On two occasions there are exceedances of 0.02 and 0.03mg/l NO₃-N. These values are neither scientifically nor environmentally significant.
- The ELV for Total Ammonia is 0.17 mg/l. On 6 of the 12 months the discharge concentration is 0.2 mg/l, or less, Total Ammonia. The average Total Ammonia is 0.07 mg/l, which is significantly lower than the 0.17mg/l Total Ammonia ELV. On only one occasion is there an exceedance of Total Ammonia and there are no other parameters in excess at that time (April 2022). BOD, ortho-P, COD and SS remain at <LOD at the time of the Ammonia exceedance. The elevated Total Ammonia does not persist. It is therefore considered anomalous and presents no threat to the receiving environment.
- The MRP-P concentration of the discharge is always Compliant with the 0.07 mg/l MRP-P concentration ELV of the Discharge Licence. Assimilation Capacity simulations completed for the Application for Discharge Licence suggested that at times of low flow in the receiving river, *i.e.*, 95%tile flow, the river would be able to receive and assimilate, with no environmental impact, the discharge at a concentration of 0.07 mg/l MRP-P. In the operational phase of this quarry the actual discharge concentration range is <0.01 to 0.03 mg/l MRP-P and the average result is <0.01 mg/l. Full compliance is achieved for ortho-Phosphate (MRP-P).
- Total Hydrocarbon concentration in the discharge is and always below the limit of detection of the laboratory analyser, which signifies no hydrocarbons are lost to the floor of this quarry. The discharge is always compliant with the Conditions of the Discharge Licence.

Considering that there are 8 parameters specified in the licence and those 8 parameters are analysed in each of the 12 months of the year: there are 96 results and of those 96 results, there are only 2 exceedances, which suggests 98% compliance on a result-by-result basis. However, on an annual average basis, the requirements of the Discharge Licence are met. That is demonstrated in Table 4.

Table 4 Average Compliance Results 2021

Parameter	Discharge Licence ENV/W/78 (2017) ELV's	AVERAGE Monitoring Result 2022		Hydro-G Comment
pH	6-9	7.8	pH units	pH Compliant
Suspended Solids	10	<4	mg/l	SS Compliant
BOD	2	<1	mg/l	BOD Compliant
COD	10	<10	mg/l	COD Compliant
Nitrate	10	8.6	mg/l - N	Compliant for all but Dec 2018
Total Ammonia	0.17	0.07	mg/l - N	Total Ammonia Compliant
Molybdate Reactive Phosphate as P	0.07	<0.01	mg/l - P	MRP-P Compliant
Total Hydrocarbons	0.68	<10	mg/l	Total Hydrocarbons Compliant

5.0 Compliance with Licence Conditions

With respect to the Volumetric ELV Conditions: Data presented in Table 2, in Figures 1 & 2 and discussed in Sections 3 and 4 of this AER demonstrate that the licence limits for maximum and average discharge volume were always complied with.

With respect to Water Quality ELVs: Results presented in Tables 3 and 4 and discussed in Sections 3 and 4 of this AER indicate that the prescribed ELVs were complied with for all parameters in all 12 months except for one exceedance for Total Ammonia and one exceedance for Suspended Solids. Those exceedances suggest 98% compliance with the requirements of the Discharge Licence's ELVs for water quality. On an annual average basis, there is full compliance. This means that the exceedances in Total Ammonia and Suspended Solids did not persist and are anomalies. As stated, the 0.02 and 0.03 mg/l exceedances for Nitrate-N are scientifically insignificant when the degree of precision of the analyser is considered. In addition, the average NO₃-N concentration is 8.6mg/l and therefore a conclusion of overall compliance with the objectives of the Licence is certain.

6.0 Register of Incidents

6.1 There were no 'serious incidents' to report with respect to this discharge during 2021.

7.0 Conclusions

7.1 The site is in compliance with the objectives and requirements of Discharge Licence ENV/W/78.

Pamela Bartley

Dr. Pamela Bartley B.Eng, M.SC., Ph.D. MIEI

Appendix A

Laboratory Certificates of Analysis Routine Monthly Monitoring at the Site

RECEIVED: 18/08/2025

Monitoring Points

- 1. Final Discharge = Point of Compliance for the Licence*
- 2. **Eden = Site's due diligence monitoring point for evaluating**
waters collected on the floor of the quarry.*

2023 Annual Environmental Report

for

Bennettsbridge Limestone Quarries Ltd

wrt

Section 6 Discharge Licence ENV/W/78 (2017)

At the request of

Bennettsbridge Limestone

Kilree, Sheastown,

Bennettsbridge

Co Kilkenny

Consultant Dr. Pamela Bartley

January 2024



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Project No.: 23-4 BBL AER 2023

Report Status: FINAL ISSUE

Report Title: 2023 Annual Environmental Report for Bennettsbridge Limestone Quarries Ltd wrt Discharge Licence ENV/W/78

Date: 30/1/24

Pamela Bartley

Prepared by:

Dr. Pamela Bartley B.Eng, M.SC., Ph.D.

NOTES:

This report is for the use solely of the party to whom it is addressed and no responsibility is accepted to any third party.

About the Author

Pamela Bartley is a water focussed civil engineer. After 25 years of field-based practice in borehole drilling, groundwater monitoring and abstraction point management she may now be considered a karst hydrogeology specialist: her Ph.D was a field based karst limestone environment study. She has also completed training with the GSI at their karst specialist course run in the Burren. Her primary qualification is a Diploma in Water and Wastewater Technology at Sligo RTC. She then completed her primary degree in Civil Engineering at Queens University, Belfast, followed by an M.Sc in Environmental Engineering, followed by a field-based hydrogeologically focussed Ph.D. within the School of Civil Engineering at Trinity College, Dublin. Her key work areas are groundwater development from large scale water supply boreholes, hydrogeological assessment of quarries and the evaluation of discharges to groundwater and surface waters. Pamela Bartley's company is Bartley Hydrogeology Ltd., registered to trade as Hydro-G.

Pamela has successfully completed post doctorate 'Professional Development' formal course training in the areas of:

- PSDP & PSCS (IOSH certified, 2016);
- Karst Hydrogeology (GSI, 2013);
- On Site Wastewater & Water Services Amendment Act 2012 (IE, Western Region 6-week programme 2012 & Dublin 2012);
- Zero Discharge Willow Wastewater Systems Design Courses (Denmark 2008 & 2011 & Ireland 2012);
- Expert Witness (IE, 2011);
- Planning & Development Act (IE, 2010);
- Surface Water Regulations 2009 (DoE, 2010 & 2011);
- Sustainable Drainage (Wallingford/CIRIA, 2005 & 2008);
- Source Protection Zone Delineation (IGI/GSI, 2007);
- Groundwater & Contaminant Microbiology (IGI/GSI, 2006);
- Applied Groundwater Modelling (ESI, UK, 2000);
- Site Suitability Assessment (FETAC, 2002).

As a result of work in evaluating planning appeals, Pamela has become specialist in planning evaluations in the context of enacted Irish Regulation and EU Directives concerning the water environment such as the Groundwater Regulations (S.I. No. 9 of 2010), Surface Water Regulations (S.I. No. 272 of 2009), Water Framework and Habitats' Directives. Pamela is a qualified and certified 'Site Assessor' and interviewer of examination candidates in respect of eligibility for the Site Suitability FETAC Qualification. In the past, she has lectured in third level institutions (WIT, CIT, 1996 – 1999), delivered practical laboratory instruction in the assessment of subsoils for the FETAC Site Assessor programme and demonstrated hydraulics laboratory modules at Trinity College Dublin (1996). She has been an invited guest speaker at An Board Pleanála, The Irish Concrete Federation, The Health Service Executive, Environmental Health Officers National Conference, The Irish Planning Institute's National Conference, The International Association of Hydrogeologists National Conference (Irish Branch) and has delivered hydrogeological lectures to the public during Science Week.

Hydro-G is the registered trading name of Pamela Bartley's company Bartley Hydrogeology Ltd., a company registered in Galway Ireland. The company holds requisite employer's and public liability insurances. In addition, the company holds professional indemnity insurance of €2million.

Pamela is qualified and IOSH certified to act as PSDP (Project Supervisor Design Phase) & PSCS (Project Supervisor Construction Stage) as defined by the Construction Regulations. The company is a registered Irish Water Supplier (no. 1855) and Pamela Bartley is HSQE approved within Irish Water.

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1.0 Introduction

Hydro G was commissioned by Bennettsbridge Limestone Quarries Ltd (BLQ) to prepare an Annual Environmental Report (AER), which is required as a condition of the Discharge Licence in place for the quarry operation at Kilree, Bennettsbridge, Co. Kilkenny (Kilkenny County Council Ref. No: ENV/W/78, 2017).

This report has been prepared to fulfil this requirement and pertains to the reporting period January 2023 to December 2023, inclusive.

2.0 Discharge Licence Conditions

The discharge licence relevant to this period is Kilkenny County Council Ref. No: ENV/W/78, dated September 15th 2017 (hereafter referred to as ENV/W/78 (2017)).

Licence conditions relevant to this report include the following:

Condition 3.2 of ENV/W/78 (2017) stipulated that the licence holder shall ensure:

- (a) The mean daily discharge over the course of a year shall not exceed 22,000m³/day,
and
- (b) The maximum daily discharge shall not exceed 70,000m³/day

Condition 4.1 of ENV/W/78 (2017) stipulates that the characteristics of the effluent as discharged shall not exceed the Emission Limit Values (ELVs) as presented in Table 1.

Table 1: Discharge Licence ENV/W/78 ELVs

Parameter	ELV	Units
pH	6-9	-
Suspended Solids	10	mg/l
BOD	2	mg/l
COD	10	mg/l
Nitrate	10	mg/l - N
Total Ammonia	0.17	mg/l - N
MRP	0.07	mg/l - P
Total Hydrocarbons	0.68	mg/l

Condition 5 of ENV/W/78 (2017) stipulates: The licence holder shall submit an Annual Environmental Report from a suitably qualified person which shall be due within 21 days after the end of each calendar year. The report shall contain the following information in relation to the previous calendar year:

- a) All monitoring results relating to the previous calendar year including the information required under conditions 5.1, 5.2, & 5.3 (refer to final page of this AER for the text of those Conditions).
- b) An assessment of the results, particularly noting any trends. Such analysis of trends should take account of any previous reports submitted in relation to the discharge.
- c) Confirmation (or otherwise) that the conditions attached to the licence have been complied with.

Conditions 5.1, 5.2, 5.3 are presented in ENV/W/78 (2017), as Follows:

ENV/W/78 – Bennettsbridge Limestone Quarries Ltd.	
Condition 5: Reporting	
5.1	The licence holder shall compile and submit to the licensing authority a report within 14 days of the end of each sampling period as specified by condition 4.2, including the results of all monitoring relating to the previous sampling period.
5.2	The format of the monitoring reports shall include a daily record of the discharge volumes, a listing of the limit values together with the monitoring results in tabular format. Where the characteristics of the discharged effluent exceed the limit values specified in condition 4.1 the report shall also include a detailed explanation for any exceedances, steps taken to minimise its impact and details of proposed measures to prevent a reoccurrence.
5.3	The periodic report shall include a register of any incident referred to in Conditions 2.2 and 2.3.

3.0 Monitoring Results

3.1 Flow Data

Results presented in Table 2 presents the daily total (m³/d) for every day of the year January – December 2023. Continuous recording of water level in a calibrated control structure, flume, is sent to the office. With reference to Table 2:

- **Condition 3.2 (a) mean daily** discharge ELV over the course of the year shall not exceed **22,000m³/d**: the bottom right cell of the Table presents the mean daily discharge over the course of the year value of **17,353 m³/d**, which is compliant.

and

- **Condition 3.2 (b)** that the **maximum** daily discharge shall not exceed **70,000m³/day**. Similarly, the individual day values recorded at the site presented in Table 2 demonstrate that the site is always compliant with **Condition 3.2 (b)**. The actual maximum recorded value on one day was **62,174 m³/d** in October 2023.

Table 2: Daily discharge volumes (m3/d) on a month-by-month basis (2023) & Annual Statistics: Max, Min, Mean Daily.

Day	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23		
1st	41,470	17,895	10,851	10,851	14,532	7,233	8,972	10,123	10,179	35,074	59,058	18,158	RECEIVED 18/08/2025	
2nd	40,531	17,416	10,994	10,994	14,479	7,362	8,408	9,619	8,965	34,895	58,529	16,987		
3rd	41,211	16,835	10,912	10,912	14,564	7,286	9,657	9,502	9,056	32,227	53,479	16,314		
4th	40,716	16,303	10,585	10,585	12,545	7,335	10,382	9,568	8,495	29,008	44,710	17,920		
5th	40,024	15,756	10,469	10,469	15,940	7,071	9,732	10,392	9,510	27,908	46,686	19,860		
6th	39,011	15,550	11,027	11,027	13,682	7,113	9,474	9,753	9,197	26,426	39,771	15,423		
7th	38,778	14,935	10,599	10,599	15,284	7,284	9,682	9,671	9,382	23,980	38,897	18,231		
8th	38,473	14,791	10,422	10,422	12,439	7,443	9,616	10,883	9,247	22,805	32,472	17,798		
9th	37,158	14,223	12,299	12,299	15,886	7,202	10,085	9,813	9,515	22,666	29,037	18,256		
10th	40,024	14,209	11,434	11,434	13,522	7,593	12,642	9,357	9,379	21,215	29,891	21,402		
11th	45,631	13,723	11,579	11,579	14,477	7,510	11,086	9,512	13,755	23,088	26,450	25,833		
12th	56,514	13,603	11,654	11,654	13,178	7,520	10,803	8,932	9,180	27,697	30,702	35,368		
13th	52,426	13,202	15,299	15,299	13,105	7,112	10,716	8,465	9,530	36,650	31,990	39,054		
14th	51,586	13,061	15,868	15,868	13,364	7,306	11,423	8,015	9,265	40,734	34,967	31,222		
15th	51,817	13,357	18,894	18,894	13,284	7,150	12,345	8,545	16,063	38,260	33,256	28,661		
16th	54,187	12,986	24,271	24,271	12,558	7,566	11,581	9,009	17,448	38,566	35,268	26,317		
17th	45,379	12,664	28,250	28,250	12,873	15,338	10,708	10,477	19,292	34,333	31,729	25,647		
18th	41,690	12,609	28,941	28,941	12,963	9,729	14,634	10,177	23,424	31,966	27,817	24,493		
19th	38,458	12,193	28,906	28,906	12,762	8,463	12,758	9,814	20,196	38,390	32,262	21,686		
20th	32,734	12,158	28,572	28,572	13,141	9,369	11,279	9,442	16,864	46,134	30,894	21,537		
21st	31,669	11,970	28,781	28,781	12,571	8,768	12,586	9,300	17,440	44,435	28,998	20,902		
22nd	29,547	11,899	30,615	30,615	12,619	8,190	10,703	7,478	18,508	40,015	30,443	20,408		
23rd	27,293	11,569	34,808	34,808	12,144	8,917	11,316	12,371	15,207	46,781	27,157	19,931		
24th	25,554	11,621	37,151	37,151	12,349	8,493	11,014	11,111	14,998	55,041	27,970	19,782		
25th	24,325	11,424	35,717	35,717	11,722	8,670	9,962	8,931	14,621	61,444	24,931	19,313		
26th	23,563	11,207	33,317	33,317	11,752	8,855	11,082	8,951	15,082	57,000	23,623	19,114		
27th	21,085	11,032	30,257	30,257	11,747	8,966	10,438	8,964	23,581	51,565	22,440	26,603		
28th	20,973	11,346	28,730	28,730	11,868	8,874	10,439	12,217	38,429	47,448	22,695	39,396		
29th	20,438		27,365	27,365	6,770	9,124	10,332	9,878	36,807	59,106	20,921	41,990		
30th	19,093		25,806	25,806	7,589	9,507	10,642	9,677	35,006	62,174	19,895	49,731		Annual Stats (m3/d)
31st	18,634		26,468		7,458		9,646	9,825		58,886		53,256		
MAX	56,514	17,895	37,151	37,151	15,940	15,338	14,634	12,371	38,429	62,174	59,058	53,256	62,174	MAX
MIN	18,634	11,032	10,422	10,422	6,770	7,071	8,408	7,478	8,495	21,215	19,895	15,423	6,770	MIN
MEAN	34,671	13,422	19,143	18,937	12,469	8,166	10,710	9,618	14,274	37,271	31,917	24,016	17,353	MEAN

3.2 Water Quality Data

The site monitors water quality of the final discharge from the settlement lagoons on a routine monthly basis. The samples are collected by staff of Southern Scientific accredited laboratory and transported to the laboratory on the same day. The laboratory Certificates of Analysis are presented in Appendix A for the routine monthly monitoring.

Discharge Licence ENV/W/78 (2017) specifies ELVs for the **final discharge** from the settlement lagoons and those water quality results are presented in Table 3, with each parameter's ELV, for the monitoring period January 2023 – December 2023.

Table 3 Bennettsbridge Limestone Final Discharge Quality 2023

Parameter	pH	Suspended Solids	BOD	COD	Nitrate-N	Total Amonia	Molybdate Reactive Phosphate as P	Total Hydrocarbons
Units	pH units	mg/l	mg/l	mg/l	mg/l - N	mg/l - N	mg/l - P	ug/l
Jan-23	8.1	9	<1	<10	9.7	<0.02	<0.01	<10
Feb-23	7.8	<4	<1	<10	9.4	<0.02	0.01	<10
Mar-23	7.8	<4	<1	<10	8.1	<0.02	0.02	<10
Apr-23	7.6	<4	<1	<10	8.8	0.04	<0.01	<10
May-23	7.7	<4	<1	<10	8.6	<0.02	<0.01	<10
Jun-23	8.1	<4	1.4	<10	7.2	0.05	<0.01	<10
Jul-23	7.6	<4	<1	<10	7.1	<0.02	<0.01	<10
Aug-23	7.9	<4	<1	<10	8.8	0.2	<0.01	<10
Sep-23	7.8	<2	<1	<10	7.2	<0.02	<0.01	<10
Oct-23	7.8	5	<1	14	7.9	<0.02	<0.01	<10
Nov-23	7.8	8	<2	<10	7.2	<0.02	<0.01	<10
Dec-23	7.8	<4	<1	<10	7.9	<0.02	<0.01	<10
MAX RESULT	8.1	9	1.4	<10	9.7	0.2	0.02	<10
MIN RESULT	7.6	<4	<2	<10	7.06	<0.02	<0.01	<10
AVERAGE RESULT	7.8	<4	<1	<10	8.1	0.03	<0.01	<10
Discharge Licence ENV/W/78 (2017) ELV's	6-9	10	2	10	10	0.17	0.07	0.68 as mg/l
Hydro-G Comment	pH Compliant	SS Compliant on all occasions.	BOD Compliant	COD Compliant	Compliant	Compliant	MRP-P Compliant	Total Hydrocarbons Compliant

With reference to the results presented in Table 3, and the associated Certificates of Analysis in Appendix A, the site is compliant for all ELV specified parameters on all sampling occasions except for one anomalous result for ammonia in August 2023 and one COD result in October 2023. For the 12 months and 96 parametric results, there are two results that cannot be explained and have no associated indicator hydrochemistry to support the laboratory reported elevated results.

Most of the time the quality of the water is below the limit of detection of the laboratory analyser for most parameters, which is indicated by the < symbol in Table 3's results. Suspended Solids, Ortho-P, BOD and hydrocarbons are less than the Limit of Detection (LOD) for the majority of monthly events and the LODs at the laboratory are low values, *i.e.*, BOD <1 mg/l LOD is a low LOD for Irish Laboratories.

4.0 Assessment of the Results

4.1 With respect to the Volumetric ELV Conditions:

Data presented in Table 2, above, the mean daily discharge over the course of the year and this value is 17,353 m³/d, which is compliant with the Condition 3.2 (a) of Section 4 Discharge Licence ENV/W/78 (2017) ELV and this complies with the specified ELV for mean daily volume of 22,000 m³/d, on an annual average basis.

As stated earlier, the maximum recorded value on one day was 62,174m³/d in October 2023, which is in full compliance with the Licenced maximum value of 70,000 m³/d. The winter occurrence of the maximum observed discharge volume repeats the observed change in weather patterns experienced in the previous year 2022. From 2017 to 2021 it was February in which the highest discharge was recorded each year. In 2022 and 2023 the highest volumes were recorded in early Winter. This has no significance to the compliance of the Licence Conditions it is just interesting to keep a record of climate conditions and response in the quarry over the years.

Summary statistics for maximum, minimum and average daily discharge data, as presented numerically in Table 2 earlier in this AER, are reproduced for each month in Figure 1 to facilitate easier evaluation.

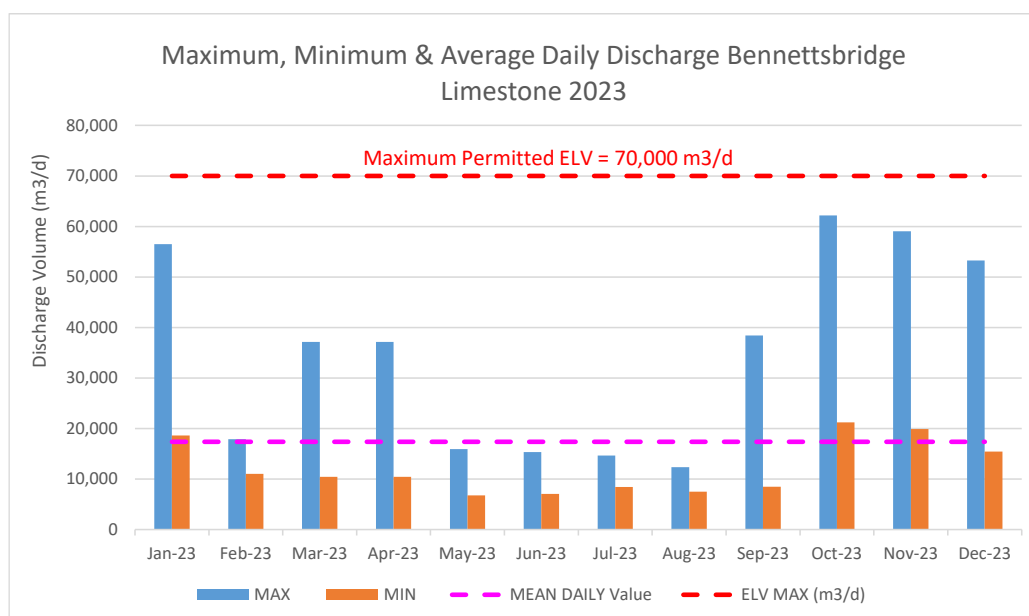


Figure 1 2023 Daily Discharge MAX & MIN Stats each month, with Annual Mean.

Ongoing monitoring data at the site demonstrate that during the seasons of high rainfall the discharge volumes peak and during low rainfall months the discharge from the quarry represents groundwater baseflow volumes. This is the acknowledged model for the site and accepted in the issue of the Section 4 Discharge Licence: that the waters arising at the quarry are a combination of rainfall runoff on the floor, rainfall runoff from the lands around the walls of the void itself and groundwater. At no time does the daily discharge volume breach the maximum permitted 70,000m³/d ELV. The ongoing monitoring results justify the case presented in the discharge licence assimilation capacity simulations report: that at times of high discharge volumes from the site the receiving water's flow characteristic would be far greater than the published 95%tile flow characteristic in the receiving water.

4.2 With respect to Water Quality ELVs:

Results presented in Table 3, above, indicate that the specified ELVs were complied with **on all occasions for all parameters**, with one single anomaly for OCD in October 2023. For many parameters, the hydrochemistry of the sample of discharge presents a water so clean that the laboratory analysis machine cannot detect anything: namely BOD, COD, SS, Hydrocarbons. With respect to each parameter of the Discharge Licence the following can be stated, with reference to the data presented as Table 3:

- pH of the discharge is always Compliant.
- Suspended Solids of the discharge is < LOD of that lab (<4mg/l) on 9 of 12 sampling occasions. And the site's discharge is compliant with the 10mg/l SS ELV on all occasions.
- BOD is always compliant with the Discharge Licence ELV of 2mg/l BOD and for all occasions BOD is < the Limit of Detection of the analyser.
- COD is reported by the laboratory in 11 of the 12 months as less than their 10mg/l Limit of Detection. In October 2023 there is a result of 14 mg/l COD, whereas the ELV of the Licence is 14mg/l. This single occurrence of an elevation to 14mg/l COD is not accompanied by any other markers of a problem in water hydrochemistry. There is an associated increase in Suspended Solids to 5mg/l SS, whereas SS is usually < LOD, but 5mg/l SHOULD not result in a Chemical Oxygen Demand. The 5mg/l SS is compliant with the 10mg/l SS ELV. A highly elevated SS results could result in an elevated Biochemical Oxygen Demand but it does not here. The reported elevation in Chemical Oxygen Demand is not accompanied by any other hydrochemical indicator supporting a change in how the water is experiencing any demand: Other parameters such as BOD, ammonia or hydrocarbons are NOT elevated above their usual <LOD concentrations. The COD result is not exceeded in the following month. It is reasonable to say that the result appears to be anomalous.
- Nitrate-N concentration is always compliant. The ELV is 10mg/l NO₃-N. An interesting downward trend in nitrate is observed. It has always been the case that the site receives nitrates from the epikarst waters bringing recent rainfall from agricultural lands upgradient. There may be a change in catchment activities resulting in lower nitrate concentrations.
- The ELV for Total Ammonia is 0.17 mg/l. For 10 of the 12 months of 2023 the discharge concentration is <0.02 mg/l, or less, Total Ammonia. The average Total Ammonia is <0.02 mg/l, which is significantly lower than the 0.17mg/l Total Ammonia ELV. There is one exceedance of the Ammonia ELV at 0.2 mg/l in August 2023. However, no other parameters are elevated at that time: it would be unusual for Ammonia to ACTUALLY be 0.2 mg/l but yet the Biochemical Oxygen Demand be < Limit of Detection 1mg/l, which it was. The singular parameter exceedances reported by the laboratory are difficult to accept when pH, BOD, COD, Nitrates and Ortho-P are all reported as < LOD and therefore do not suggest any hydrochemical issue.

- The MRP-P concentration of the discharge is always Compliant with the 0.07 mg/l MRP-P concentration ELV of the Discharge Licence. Assimilation Capacity simulations completed for the Application for Discharge Licence suggested that at times of low flow in the receiving river, *i.e.*, 95%tile flow, the river would be able to receive and assimilate, with no environmental impact, the discharge at a concentration of 0.07 mg/l MRP-P. In the operational phase of this quarry the actual discharge concentration range is <0.01 mg/l MRP-P for 11 of the 12 months. On the one other month, the discharge concentration was only 0.02mg/l MRP-P. The site presents no eutrophication or enrichment risk to the receiving water.
- Total Hydrocarbon concentration in the discharge is and always below the limit of detection of the laboratory analyser, which signifies no hydrocarbons are lost to the floor of this quarry.

5.0 Compliance with Licence Conditions

With respect to the Volumetric ELV Conditions: Data presented in Table 2, in Figures 1 & 2 and discussed in Sections 3 and 4 of this AER, demonstrate that the licence limits for maximum and average discharge volume were always complied with.

With respect to Water Quality ELVs: Results presented in Tables 3 and 4, and discussed in Sections 3 and 4 of this AER, indicate that the prescribed ELVs were complied with for all parameters in all 12 months. Therefore, there is full compliance.

6.0 Register of Incidents

- 6.1 There were no 'serious incidents' to report with respect to this discharge during 2023.

7.0 Conclusions

- 7.1 The site is in compliance with Section 4 Discharge Licence ENV/W/78 (2017).



Dr. Pamela Bartley B.Eng, M.SC., Ph.D. MIEI

*Appendix A**Laboratory Certificates of Analysis
Routine Monthly Monitoring at the Site*

RECEIVED: 18/08/2025

[Note: For the purposes of aiding the interpretation of the settlement lagoons prior to discharge, in addition to sampling the discharge itself each month, Southern Scientific are contracted to also collect a sample from Eden Spring in the quarry. Eden Spring is the primary groundwater component of the site. This is not a Licence Condition and it is not a Planning Condition, it is the site's own way to determine if the recent rainfall contribution from surrounding landscape brings any anthropogenic contributions from agriculture or other sources. Therefore, the Laboratory Certificates of Analysis contain monitoring results for both monitoring points (Appendix A). Given that there were no anomalous results in the Discharge in 2023, the Eden results are not necessary for interpretation. However, that sampling location will be retained for ongoing baseline assessment.]



Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co. Kilkenny	Date Received:	04/01/2023
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	04/01/2023 - 11/01/2023
Quote No.	Q21-00135	Issue Date:	18/01/2023
		BATCH NUMBER:	23-25356

Ruth Murphy
Chemistry Laboratory Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

- ♦ The results relate only to the items tested.
- ♦ Opinions and interpretations expressed herein are outside the scope of INAB accreditation.
- ♦ The analysis report shall not be reproduced except in full without written approval of the laboratory.
- ♦ Sampling is outside the scope of the laboratory activities.

Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[NO_3]/50 + [NO_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

(registered office)

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	81442 (23-25356)	Sample Matrix:	Surface Water
Date Sampled:	04/01/2023	Time Sampled:	10:40

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	8.1
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	9
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	9.68
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

(registered office)

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	81443 (23-25356)	Sample Matrix:	Surface Water
Date Sampled:	04/01/2023	Time Sampled:	11:30

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.5
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	7
SCP 027A	Total Ammonia	mg/L N	0.02	0.04
SCP 027G	Nitrate	mg/L N	0.25	9.72
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.02
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site	
		Date Received:	13/02/2023
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	13/02/2023 - 21/02/2023
Customer PO		Issue Date:	13/03/2023
Quote No.	Q21-00135	BATCH NUMBER:	23-26153

Ruth Murphy
Chemistry Laboratory Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrinye Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

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Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	84005 (23-26153)	Sample Matrix:	Surface Water
Date Sampled:	13/02/2023	Time Sampled:	11:00

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	9.42
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	84006 (23-26153)	Sample Matrix:	Surface Water
Date Sampled:	13/02/2023	Time Sampled:	11:30

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	9.31
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site	
		Date Received:	07/03/2023
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	07/03/2023 - 15/03/2023
Customer PO		Issue Date:	21/03/2023
Quote No.	Q21-00135	BATCH NUMBER:	23-26710

Joanne O'Halloran
Deputy Laboratory Manager

Index to symbols used & Notes

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**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrinc Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	85776 (23-26710)	Sample Matrix:	Surface Water
Date Sampled:	07/03/2023	Time Sampled:	12:30

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	8.10
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.02
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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registered in ireland no 323196 | vat reg no IE 6343196 M





Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	85777 (23-26710)	Sample Matrix:	Surface Water
Date Sampled:	07/03/2023	Time Sampled:	12:35

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.3
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	8.30
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

(registered office)

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web site www.southernscientificireland.com | e-mail info@southernscientificireland.com

directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site	
		Date Received:	04/04/2023
		Condition of Sample:	Satisfactory
Report to:	markg@bbl.ie	Date Analysed:	04/04/2023 - 12/04/2023
Customer PO		Issue Date:	19/04/2023
Quote No.	Q21-00135	BATCH NUMBER:	23-27377

Loretta Corcoran
Chief Scientific Officer

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrinc Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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- ◆ The analysis report shall not be reproduced except in full without written approval of the laboratory.
- ◆ Sampling is outside the scope of the laboratory activities.

Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[\text{NO}_3]/50 + [\text{NO}_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

(registered office)

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	87690 (23-27377)	Sample Matrix:	Surface Water
Date Sampled:	04/04/2023	Time Sampled:	11:35

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.6
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	0.04
SCP 027G	Nitrate	mg/L N	0.25	8.77
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	87691 (23-27377)	Sample Matrix:	Surface Water
Date Sampled:	04/04/2023	Time Sampled:	12:00

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	8.86
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site	
		Date Received:	03/05/2023
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	03/05/2023 - 12/05/2023
Customer PO		Issue Date:	15/05/2023
Quote No.	Q21-00135	BATCH NUMBER:	23-28086

Loretta Corcoran
Chief Scientific Officer

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrinye Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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- ◆ Sampling is outside the scope of the laboratory activities.

Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[\text{NO}_3]/50 + [\text{NO}_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	89971 (23-28086)	Sample Matrix:	Surface Water
Date Sampled:	03/05/2023	Time Sampled:	11:20

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.7
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	8.57
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	89972 (23-28086)	Sample Matrix:	Surface Water
Date Sampled:	03/05/2023	Time Sampled:	11:40

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	8.84
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Certificate of Analysis

Customer:	Bennettsbridge Limestone Quarries Ltd	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co. Kilkenny	Date Received:	02/06/2022
Report to:	Mark Galvin	Condition of Sample:	Satisfactory
Customer PO		Date Analysed:	02/06/2022 - 24/06/2022
Quote No.	Q21-00135	Issue Date:	27/06/2022
		BATCH NUMBER:	22-20106

Aoife Moriarty

Aoife Moriarty
Organics Laboratory Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[NO_3]/50 + [NO_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	64867 (22-20106)	Sample Matrix:	Surface Water
Date Sampled:	02/06/2022	Time Sampled:	12:00

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	8.1
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	1.4
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	0.05
SCP 027G	Nitrate	mg/L N	0.25	7.70
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	64868 (22-20106)	Sample Matrix:	Surface Water
Date Sampled:	02/06/2022	Time Sampled:	12:10

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	7.94
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site	
		Date Received:	10/07/2023
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	10/07/2023 - 18/07/2023
Customer PO		Issue Date:	26/07/2023
Quote No.	Q21-00135	BATCH NUMBER:	23-30451

Sadhbh O'Brien

Sadhbh O'Brien
Chemistry Team Lead

Index to symbols used & Notes

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**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrine Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[\text{NO}_3]/50 + [\text{NO}_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

(registered office)

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	96708 (23-30451)	Sample Matrix:	Surface Water
Date Sampled:	10/07/2023	Time Sampled:	11:00

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.6
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	7.06
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	96709 (23-30451)	Sample Matrix:	Surface Water
Date Sampled:	10/07/2023	Time Sampled:	11:00

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.1
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	7.03
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site	
		Date Received:	01/08/2023
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	01/08/2023 - 10/08/2023
Customer PO		Issue Date:	11/08/2023
Quote No.	Q21-00135	BATCH NUMBER:	23-31329

Ruth Murphy
Chemistry Laboratory Manager

Index to symbols used & Notes

*	Analysis is not INAB/UKAS accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrinc Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[\text{NO}_3]/50 + [\text{NO}_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

(registered office)

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	99185 (23-31329)	Sample Matrix:	Surface Water
Date Sampled:	01/08/2023	Time Sampled:	11:30

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	0.20
SCP 027G	Nitrate	mg/L N	0.25	8.78
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

(registered office)

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Danny O Leary, SSS Ltd
Our Reference:	99186 (23-31329)	Sample Matrix:	Surface Water
Date Sampled:	01/08/2023	Time Sampled:	12:00

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.3
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	0.02
SCP 027G	Nitrate	mg/L N	0.25	7.80
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.03
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

(registered office)

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directors: K. Murphy, M. Murphy & C. Murphy
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Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site	
		Date Received:	29/09/2023
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	29/09/2023 - 10/10/2023
Customer PO		Issue Date:	12/10/2023
Quote No.	Q21-00135	BATCH NUMBER:	23-33715

Sadhbh O'Brien

Sadhbh O'Brien
Chemistry Team Lead

Index to symbols used & Notes

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***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[\text{NO}_3]/50 + [\text{NO}_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

(registered office)

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Sarah O Connor SSS Ltd
Our Reference:	105857 (23-33715)	Sample Matrix:	Surface Water
Date Sampled:	29/09/2023	Time Sampled:	11:00

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 2
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	7.19
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Sarah O Connor SSS Ltd
Our Reference:	105858 (23-33715)	Sample Matrix:	Surface Water
Date Sampled:	29/09/2023	Time Sampled:	11:30

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.1
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	7.51
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site	
		Date Received:	26/10/2023
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	26/10/2023 - 02/11/2023
Customer PO		Issue Date:	13/11/2023
Quote No.	Q21-00135	BATCH NUMBER:	23-34753

Jake Grunfield
Laboratory Analyst

Index to symbols used & Notes

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(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrinye Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

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Notes for Drinking Water samples

Note A	The water should not be aggressive
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Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Kieran Doody SSS Ltd
Our Reference:	108579 (23-34753)	Sample Matrix:	Surface Water
Date Sampled:	26/10/2023	Time Sampled:	10:45

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	5
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	7.88
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	14
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Kieran Doody SSS Ltd
Our Reference:	108580 (23-34753)	Sample Matrix:	Surface Water
Date Sampled:	26/10/2023	Time Sampled:	11:00

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.1
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	8.13
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site	
		Date Received:	28/11/2023
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	28/11/2023 - 14/12/2023
Customer PO		Issue Date:	14/12/2023
Quote No.	Q21-00135	BATCH NUMBER:	23-36458

Jake Grunfield
Laboratory Analyst

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(D)	Analysis carried out at our Dunrine Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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Notes for Drinking Water samples

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Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Kevin SSS Ltd
Our Reference:	113273 (23-36458)	Sample Matrix:	Surface Water
Date Sampled:	28/11/2023	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	<2
SCP 010	Suspended Solids	mg/L	2	8
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	7.18
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Kevin SSS Ltd
Our Reference:	113274 (23-36458)	Sample Matrix:	Surface Water
Date Sampled:	28/11/2023	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.3
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	<2
SCP 010	Suspended Solids	mg/L	2	<4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	7.98
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site	
		Date Received:	20/12/2023
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	20/12/2023 - 10/01/2024
Customer PO		Issue Date:	11/01/2024
Quote No.	Q21-00135	BATCH NUMBER:	23-36983

Conor Murphy

Conor Murphy
Operations Manager

Index to symbols used & Notes

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LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Kieran Doody SSS Ltd
Our Reference:	114732 (23-36983)	Sample Matrix:	Surface Water
Date Sampled:	18/12/2023	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	<4
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	7.9
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

(registered office)

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	Kieran Doody SSS Ltd
Our Reference:	114733 (23-36983)	Sample Matrix:	Surface Water
Date Sampled:	18/12/2023	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.3
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0
SCP 010	Suspended Solids	mg/L	2	8
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	7.89
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	12
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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2024 Annual Environmental Report

for

Bennettsbridge Limestone Quarries Ltd

Section 6 Discharge Licence ENV/W/78 (2017)

At the request of

Bennettsbridge Limestone

Kilree, Sheastown,

Bennettsbridge

Co Kilkenny

Consultant Dr. Pamela Bartley

January 2025



Hydro-G

50 Henry St.

Galway

H91 FA4X

pamela@hydro-g.com

091 449950

087 8072744

Project No.: 25-04 BBL AER 2024

Report Status: ISSUE_1

Report Title: 2024 Annual Environmental Report for Bennettsbridge Limestone Quarries Ltd. Discharge Licence ENV/W/78

Date: 30/01/2025

Pamela Bartley

Prepared by:

Dr. Pamela Bartley B.Eng, M.SC., Ph.D.

NOTES:

This report is for the use solely of the party to whom it is addressed and no responsibility is accepted to any third party.

About the Author

Pamela Bartley is a water focussed civil engineer. After almost 30 years of field-based practice in borehole drilling, groundwater monitoring and abstraction point management she may now be considered a karst hydrogeology specialist: her Ph.D was a field based karst limestone environment study. She has also completed training with the GSI at their karst specialist course run in the Burren. Her primary qualification is a Diploma in Water and Wastewater Technology at Sligo RTC. She then completed her primary degree in Civil Engineering at Queens University, Belfast, followed by an M.Sc. in Environmental Engineering, followed by a field-based hydrogeologically focussed Ph.D. within the School of Civil Engineering at Trinity College, Dublin. Her key work areas are groundwater development from large scale water supply boreholes, hydrogeological assessment of quarries and the evaluation of discharges to groundwater and surface waters. Pamela Bartley's company is Bartley Hydrogeology Ltd., registered to trade as Hydro-G.

Pamela has successfully completed post doctorate 'Professional Development' formal course training in the areas of:

- PSDP & PSCS (IOSH certified, 2016);
- Karst Hydrogeology (GSI, 2013);
- On Site Wastewater & Water Services Amendment Act 2012 (IE, Western Region 6-week programme 2012 & Dublin 2012);
- Zero Discharge Willow Wastewater Systems Design Courses (Denmark 2008 & 2011 & Ireland 2012);
- Expert Witness (IE, 2011);
- Planning & Development Act (IE, 2010);
- Surface Water Regulations 2009 (DoE, 2010 & 2011);
- Sustainable Drainage (Wallingford/CIRIA, 2005 & 2008);
- Source Protection Zone Delineation (IGI/GSI, 2007);
- Groundwater & Contaminant Microbiology (IGI/GSI, 2006);
- Applied Groundwater Modelling (ESI, UK, 2000);
- Site Suitability Assessment (FETAC, 2002).

As a result of work in evaluating planning appeals, Pamela has become specialist in planning evaluations in the context of enacted Irish Regulation and EU Directives concerning the water environment such as the Groundwater Regulations (S.I. No. 9 of 2010), Surface Water Regulations (S.I. No. 272 of 2009), Water Framework and Habitats' Directives. Pamela is a qualified and certified 'Site Assessor' and interviewer of examination candidates in respect of eligibility for the Site Suitability FETAC Qualification. In the past, she has lectured in third level institutions (WIT, CIT, 1996 – 1999), delivered practical laboratory instruction in the assessment of subsoils for the FETAC Site Assessor programme and demonstrated hydraulics laboratory modules at Trinity College Dublin (1996). She has been an invited guest speaker at An Board Pleanála, The Irish Concrete Federation, The Health Service Executive, Environmental Health Officers National Conference, The Irish Planning Institute's National Conference, The International Association of Hydrogeologists National Conference (Irish Branch) and has delivered hydrogeological lectures to the public during Science Week.

Hydro-G is the registered trading name of Pamela Bartley's company Bartley Hydrogeology Ltd., a company registered in Galway Ireland. The company holds requisite employer's and public liability insurances. In addition, the company holds professional indemnity insurance of €2million.

Pamela is qualified and IOSH certified to act as PSDP (Project Supervisor Design Phase) & PSCS (Project Supervisor Construction Stage) as defined by the Construction Regulations. The company is a registered Irish Water Supplier (no. 1855) and Pamela Bartley is HSQE approved within Irish Water.

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1.0 Introduction

Hydro G was commissioned by Bennettsbridge Limestone Quarries Ltd (BLQ) to prepare an Annual Environmental Report (AER), which is required as a condition of the Discharge Licence in place for the quarry operation at Kilree, Bennettsbridge, Co. Kilkenny (Kilkenny County Council Ref. No: ENV/W/78, 2017).

This report has been prepared to fulfil this requirement and pertains to the reporting period January 2024 to December 2024, inclusive.

2.0 Discharge Licence Conditions

The discharge licence relevant to this period is Kilkenny County Council Ref. No: ENV/W/78, dated September 15th 2017 (hereafter referred to as ENV/W/78 (2017)).

Licence conditions relevant to this report include the following:

Condition 3.2 of ENV/W/78 (2017) stipulated that the licence holder shall ensure:

- (a) The mean daily discharge over the course of a year shall not exceed 22,000m³/day,
- and
- (b) The maximum daily discharge shall not exceed 70,000m³/day

Condition 4.1 of ENV/W/78 (2017) stipulates that the characteristics of the effluent as discharged shall not exceed the Emission Limit Values (ELVs) as presented in Table 1.

Table 1: Discharge Licence ENV/W/78 ELVs

Parameter	ELV	Units
pH	6-9	-
Suspended Solids	10	mg/l
BOD	2	mg/l
COD	10	mg/l
Nitrate	10	mg/l - N
Total Ammonia	0.17	mg/l - N
MRP	0.07	mg/l - P
Total Hydrocarbons	0.68	mg/l

Condition 5 of ENV/W/78 (2017) stipulates: The licence holder shall submit an Annual Environmental Report from a suitably qualified person which shall be due within 21 days after the end of each calendar year. The report shall contain the following information in relation to the previous calendar year:

- a) All monitoring results relating to the previous calendar year including the information required under conditions 5.1, 5.2, & 5.3 (refer to final page of this AER for the text of those Conditions).
- b) An assessment of the results, particularly noting any trends. Such analysis of trends should take account of any previous reports submitted in relation to the discharge.
- c) Confirmation (or otherwise) that the conditions attached to the licence have been complied with.

Conditions 5.1, 5.2, 5.3 are presented in ENV/W/78 (2017), as Follows:

ENV/W/78 – Bennettsbridge Limestone Quarries Ltd.	
Condition 5: Reporting	
5.1	The licence holder shall compile and submit to the licensing authority a report within 14 days of the end of each sampling period as specified by condition 4.2, including the results of all monitoring relating to the previous sampling period.
5.2	The format of the monitoring reports shall include a daily record of the discharge volumes, a listing of the limit values together with the monitoring results in tabular format. Where the characteristics of the discharged effluent exceed the limit values specified in condition 4.1 the report shall also include a detailed explanation for any exceedances, steps taken to minimise its impact and details of proposed measures to prevent a reoccurrence.
5.3	The periodic report shall include a register of any incident referred to in Conditions 2.2 and 2.3.

3.0 Monitoring Results

3.1 Flow Data

Results presented in Table 2 presents the daily total (m³/d) for every day of the year January – December 2024. Continuous recording of water level in a calibrated control structure, flume, is sent to the office. With reference to Table 2:

- **Condition 3.2 (a) mean daily** discharge ELV over the course of the year shall not exceed **22,000m³/d**: the bottom right cell of the Table presents the mean daily discharge over the course of the year value of **16,776 m³/d**, which is compliant.

and

- **Condition 3.2 (b)** that the **maximum** daily discharge shall not exceed **70,000m³/day**. Similarly, the individual day values recorded at the site presented in Table 2 demonstrate that the site is always compliant with **Condition 3.2 (b)**. The actual maximum recorded value on one day was **62,078 m³/d** in January 2024.

Table 2: Daily discharge volumes (m3/d) on a month-by-month basis (2024) & Annual Statistics: Max, Min, Mean Daily.

Day	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sept-24	Oct-24	Nov-24	Dec-24		
1st	52180.40	30952	27924.5	32536.4	16629.6	12211.5	12107	10582.5	8204.66	17592.5	14812.2	22712.8		
2nd	56623.10	27881.3	29053.9	41477.5	17414.8	14689.2	10585.8	10336.2	8170.9	18069.3	16767.3	22819.6		
3rd	62078.10	23267.2	28661.2	35967.2	19044.5	15154.9	10614.7	10151.4	8051.59	17800.9	13691.9	23174.1		
4th	61743.70	22964.4	29512	37206.2	16510.4	13908.2	10577.2	10406.9	7832.68	17283.5	18658.7	22746.2		
5th	48120.70	21999.5	29719.6	39294.9	15390.7	13753	10599.5	11477.6	8072.45	17454.1	16718.2	23851		
6th	40415.20	25504.5	29973.5	46962	16913.3	13008.8	9719.63	10215	7891.46	17389.9	16306.4	25765.2		
7th	37543.30	29680	30552.8	52826.3	15548.2	13638.9	9679.22	10017.8	8066.74	18889.2	12901.7	29831.4		
8th	34298.60	28939.9	30384	56686.3	15353.3	11981.7	8097.7	10058.6	8174.37	20293.6	17953.6	33339.1		
9th	31743.30	38612.9	29052.3	55967.8	15593.3	15260.9	9910.73	8855.37	8010.75	19118.2	14684.9	33417.8		
10th	30087.40	40873.9	27599.4	56987.4	14114.1	13825.5	12165.2	8870.57	8275.9	17448.1	16045	29467.7		
11th	28586.90	38657.3	30346.9	57646	14235	13155.6	9249.42	10707.6	7756.97	17338.6	14974.1	27490.8		
12th	30153.70	41489.1	26720.6	53137.9	15409.3	12084.8	8490.76	9882.38	8501.74	17577.7	14791.9	34404.4		
13th	34135.00	37933.5	27349	49047.8	15521.3	14585.8	8138.86	8842	8711.73	17930.7	16492.8	26245.2		
14th	29218.80	33985.5	29966.1	43295.9	15066	12354.3	8155.29	6864.86	8782.65	18133.4	15640.8	23848.2		
15th	24274.40	36474.3	31471.9	38637.3	12706.5	12408.8	11658.4	7094.33	7303.62	17827.7	15151	24209.8		
16th	21969.80	32547.7	32316	31679	15982.7	14448.9	11038.2	6432.56	10372.9	17853.5	14706.8	32229.5		
17th	21393.60	32694.4	31383.3	29772.7	16416	13891	9944.76	4586.35	8470.47	17563.6	15382.5	23395.5		
18th	20071.80	32598.6	29866.7	27993.2	15006.5	11897.9	10322.3	4581.45	9348.09	17949.8	15356.8	13924.2		
19th	19079.40	31215.4	20022.4	26841.6	13454.3	12857.8	8028.43	7067.68	12308.2	17437.9	17220.9	20031.3		
20th	18671.30	29389.5	27297.7	24452.2	12859.4	12039.7	8668.94	8241.56	14405.2	16726.5	16734.6	18955.9		
21st	19676.30	32391.4	26684	23090.3	15736.2	12752.8	10009.8	8669.5	16078	17357.8	15051.4	2608.08		
22nd	18827.30	31490.8	25000	22323.2	14053.2	10580.2	10933.2	8629.35	15492.6	16743	15570	2895.26		
23rd	19138.80	30506.1	23272	21055.2	15172	13237.4	9901.62	8345.08	13856.3	16871.5	22572.1	3155.31		
24th	18980.00	29581.7	24360.2	19245.3	14194.3	12188.1	10236.5	8115.85	15039	15647.3	29938.3	3375.01		
25th	20187.20	33288.8	24457.3	19217.2	14934.8	11311.6	10035.8	8011.1	14244	16567.2	27883.7	3546.19		
26th	21161.20	30514.6	28232.7	18383.2	14896.3	11261.4	9391.12	7754.34	16161.2	16367.7	24524.4	3777.47		
27th	21196.50	24790.2	41299.1	17016.6	15583.3	11298.8	8665.07	7698.5	15956.4	15167.5	23001.4	3923.98		
28th	21019.60	25740.9	41552.7	17670.4	15266	11017.5	8413.61	7472.75	19192	17097.9	22972.6	4111.51		
29th	25176.40	28628.4	44264	16784.8		10289.5	10707.6	7267.19	18878.7	16863.3	23764.3	7305.04		
30th	28527.70		40191.7	17247.8		11881.9	11956.3	7446.42	19069.7	16093.7	21169	14268.8		
31st	32386.90		32370.8					7676.74		16554		17446.8	Annual Stats (m3/d)	
MAX	62,078	41,489	44,264	57,646	19,045	15,261	12,165	11,478	19,192	20,294	29,938	34,404	62,078	MAX
MIN	18,671	22,000	20,022	16,785	12,707	10,290	8,028	4,581	7,304	15,168	12,902	2,608	2,608	MIN
AVERAGE	30,602	31,193	30,028	34,348	15,322	12,766	9,933	8,463	11,356	17,387	18,048	18,654	16,776	MEAN

3.2 Water Quality Data

The site monitors water quality of the final discharge from the settlement lagoons on a routine monthly basis. The samples are collected by staff of an accredited laboratory and transported to the laboratory on the same day. The laboratory Certificates of Analysis are presented in Appendix A for the routine monthly monitoring. Discharge Licence ENV/W/78 (2017) specifies ELVs for the **final discharge** from the settlement lagoons and those water quality results are presented in Table 3, with each parameter's ELV, for the monitoring period January 2024 – December 2024.

Table 3 Bennettsbridge Limestone Final Discharge Quality 2024

Parameter	pH	Suspended Solids	BOD	COD	Nitrate-N	Total Ammonia	Molybdate Reactive Phosphate	Total Hydrocarbons
Units	pH units	mg/l	mg/l	mg/l	mg/l - N	mg/l - N	mg/l - P	ug/l
Jan-24	7.7	<4	<3	<15	2.1	<0.08	<0.03	<10
Feb-24	7.7	<4	<3	<15	7.7	<0.08	<0.03	<10
Mar-24	7.8	10	<3	<15	5.4	0.56	0.22	<10
Apr-24	7.7	4	<1	<10	8.1	0.06	0.02	<10
May-24	7.6	<4	<1	<10	7.9	<0.02	<0.01	<10
Jun-24	7.9	<4	<1	<10	6.4	0.03	0.02	<10
Jul-24	7.7	21	2	14	6.6	0.09	<0.01	0.309
Aug-24	7.6	5	<1	<10	6.2	<0.02	<0.01	<10
Sept-24	7.6	<4	<1	<10	6.0	0.13	<0.01	0.0643
Oct-24	7.8	<4	<1	<10	5.8	0.03	0.01	<10
Nov-24	8.2	<10	0.6	<15	6.6	<0.05	<0.01	<0.01
Dec-24	7.86	<10	<1	<15	7.2	<0.05	<0.01	<0.01
MAX	8.2	21	2	14.0	8.1	0.56	0.22	<10
MIN	7.6	<4	<1	<10	2.1	<0.02	<0.01	<0.01
AVERAGE	7.8	5.0	<1	<10	6.3	0.10	<0.03	<5
Discharge Licence ENV/W/78 (2017) ELV's	6-9	10	2	10	10	0.17	0.07	0.68 as mg/l (which is 680 ug/l)
Hydro-G Comment	pH Compliant	SS Compliant on all occasions except on One Occasion, which the site photographs suggest was a sampling error.	BOD Compliant	COD Compliant except one occasion and similar to the SS result, error in sampling.	Nitrate N Compliant	Compliant for all but March's Monitoring event	MRP-P Compliant	Total Hydrocarbons Compliant

With reference to the results presented in Table 3, and the associated Certificates of Analysis in Appendix A, commentary is as follows:

- Most of the time the quality of the water is below the limit of detection of the laboratory analyser for most parameters, which is indicated by the < symbol in Table 3's results.
- Suspended Solids, Ortho-P, BOD and hydrocarbons are less than the Limit of Detection (LOD) of the analyser at the accredited laboratory for the majority of monthly events.
- An anomalous elevated Total Ammonia-N result in March 2024. That result was not accompanied with high BOD or high COD. Whilst Nitrate was low, ortho-P was high and it too was higher than the ELV permits. There is no source of ortho-P on a quarry floor. Therefore, the results must be considered as anomalous because they did not occur as elevated on any other of the 11 months of sampling. March exceedances are coincident with the opening of

slurry spreading season in the wider farming landscape nationally after the winter, as permitted by the Good Agricultural Practice Regulations.

- A sampling event, in July 2024, where results of elevated Suspended Solids and an associated COD were reported but site photographs demonstrate clear water and suggest that there is either a sampling, transport or analysis error.

4.0 Assessment of the Results

4.1 With respect to the Volumetric ELV Conditions:

Data presented in Table 2, above, suggest that the mean daily discharge over the course of the year and this value **16,776 m³/d**, which is compliant with the Condition 3.2 (a) of Section 4 Discharge Licence ENV/W/78 (2017) ELV and this complies with the specified ELV for mean daily volume of 22,000 m³/d, on an annual average basis.

As stated earlier, the maximum recorded value on one day was 62,078 m³/d in January 2024, which is in compliance with the Licenced maximum value of 70,000 m³/d. The winter occurrence of the maximum observed discharge volume repeats the observed change in weather patterns experienced in the previous year 2023. From 2017 to 2021 it was February in which the highest discharge was recorded each year. In 2022 the highest volumes were recorded in early Winter and in 2024 the highest was in January. This has no significance to the compliance of the Licence Conditions it is just interesting to keep a record of climate conditions and response in the quarry over the years.

Summary statistics for maximum and minimum actual daily discharge data, as presented numerically in Table 2 earlier in this AER, are reproduced for each month in Figure 1 to facilitate easier evaluation: also shown is the maximum permitted daily ELV of the Licence.

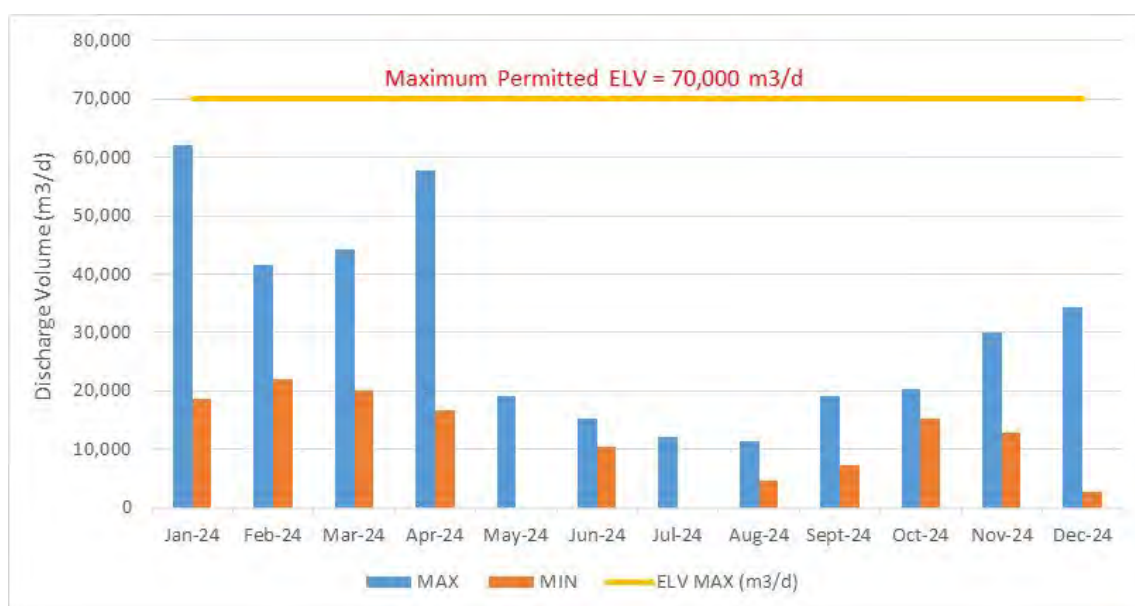


Figure 1 2024 Daily Discharge MAX & MIN Stats each month, with Annual Mean.

Ongoing monitoring data at the site demonstrate that during the seasons of high rainfall the discharge volumes peak and during low rainfall months the discharge from the quarry represents groundwater baseflow volumes. This is the acknowledged model for the site and accepted in the issue of the Section 4 Discharge Licence: that the waters arising at the quarry are a combination of rainfall runoff on the floor, rainfall runoff from the lands around the walls of the void itself and groundwater. At no time does the daily discharge volume breach the maximum permitted 70,000m³/d ELV. The ongoing monitoring results justify the case presented in the discharge licence assimilation capacity simulations report: that at times of high discharge volumes from the site the receiving water's flow characteristic would be far greater than the published 95%tile flow characteristic in the receiving water.

4.2 With respect to Water Quality ELVs

Results presented in Table 3, above, indicate that the specified ELVs were complied with most of the time and the quality of the water is below the limit of detection of the laboratory analyser for most parameters, which is indicated by the < symbol in Table 3's results. There were three unusual results of 96 analyses (8 parameters each of 12 months).

For many parameters, the hydrochemistry of the sample of discharge presents a water so clean that the laboratory analysis machine cannot detect anything: namely BOD, COD, SS, Hydrocarbons. Suspended Solids, Ortho-P, BOD and hydrocarbons are less than the Limit of Detection (LOD) for the majority of monthly events.

With respect to each parameter of the Discharge Licence the following can be stated, with reference to the data presented as Table 3:

- pH of the discharge is always Compliant.
- Suspended Solids of the discharge is < LOD of that lab (<4mg/l) on 6 of 12 sampling occasions. And the site's discharge is compliant with the 10mg/l SS ELV on all occasions with an average result of 5mg/l. The only exception is the one sampling error in July.
- BOD is always compliant with the Discharge Licence ELV of 2mg/l BOD and for all occasions BOD is < the Limit of Detection of the analyser.
- COD is reported by the laboratory in 11 of the 12 months as less than their Limit of Detection. In July 2024 there is a result of 14 mg/l COD. This single occurrence of an elevation to 14mg/l COD is not accompanied by any other markers of a problem in water hydrochemistry but there is an elevated SS result associated. But this should not result in a Chemical Oxygen Demand. The reported elevation in Chemical Oxygen Demand is not accompanied by any other hydrochemical indicator supporting a change in how the water is experiencing any demand: Other parameters such as BOD, ammonia or hydrocarbons are NOT elevated. The COD result is not exceeded in the following month. It is reasonable to say that the result appears to be anomalous.

- Nitrate-N concentration is always compliant. The ELV is 10mg/l NO₃-N. An interesting downward trend in nitrate is observed. It has always been the case that the site receives nitrates from the epikarst waters bringing recent rainfall from agricultural lands upgradient. There may be a change in catchment activities resulting in lower nitrate concentrations. The 2023 average Nitrate-N result was 8.1 mg/l and the 2024 average is 6.3 mg/l. The difference is highly significant and suggests a great improvement in catchment waters and catchment management and in the achievement of WFD Objectives.
- The ELV for Total Ammonia is 0.17 mg/l as N. For 10 of the 12 months of 2024 the discharge sampling concentration is an order of magnitude lower than permitted for Total Ammonia as N. For 11 of 12 of the months of the 2024 discharge sampling the result is compliant with the ELV. There is one single exceedance of the Ammonia ELV at 0.56 mg/l in March 2024. The exceedance is accompanied by an exceedance of Ortho-P. All other parameters are reported as < LOD and therefore do not suggest any hydrochemical issue at the quarry. As stated, the March exceedances are coincident with the opening of slurry spreading season in the wider farming landscape nationally after the winter, as permitted by the Good Agricultural Practice Regulations.
- The MRP-P concentration of the discharge is Compliant with the 0.07 mg/l MRP-P concentration ELV of the Discharge Licence with 11 of the 12 months less than 0.03mg/l. Assimilation Capacity simulations completed for the Application for Discharge Licence suggested that at times of low flow in the receiving river, *i.e.*, 95%tile flow, the river would be able to receive and assimilate, with no environmental impact, the discharge at a concentration of 0.07 mg/l MRP-P. In the operational phase of this quarry the actual discharge concentration range is <0.01 to <0.03 mg/l MRP-P for the majority of the 12 months. The elevated result, as discussed with Ammonia above, did not originate on the floor of the quarry. The site presents no eutrophication or enrichment risk to the receiving water.
- Total Hydrocarbon concentration in the discharge is always below the limit of detection of the laboratory analyser, which signifies no hydrocarbons are lost to the floor of this quarry.

5.0 Compliance with Licence Conditions

With respect to the Volumetric ELV Conditions: Data presented in Table 2, in Figures 1 & 2 and discussed in Sections 3 and 4 of this AER, demonstrate that the licence limits for maximum and average discharge volume were always complied with.

With respect to Water Quality ELVs: Results presented in Tables 3 and 4, and discussed in Sections 3 and 4 of this AER, indicate that the prescribed ELVs were complied with for most of the time and the quality of the water is below the limit of detection of the laboratory analyser for most parameters, which is indicated by the < symbol in Table 3's results. There were three unusual results of 96 analyses

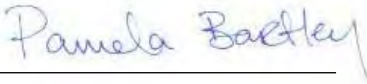
(8 parameters each of 12 months). Exceedances are explainable and it is concluded that the requirements and environmental quality objectives of the licence are complied with.

6.0 Register of Incidents

6.1 There were no 'serious incidents' to report with respect to this discharge during 2024.

7.0 Conclusions

7.1 The site is in compliance with Section 4 Discharge Licence ENV/W/78 (2017).



Dr. Pamela Bartley B.Eng, M.SC., Ph.D. MIEI

Dated: 30/01/2025

Appendix A**Laboratory Certificates of Analysis
Routine Monthly Monitoring at the Site**

RECEIVED: 18/08/2025

[Note: For the purposes of aiding the interpretation of the settlement lagoons prior to discharge, in addition to sampling the discharge itself each month, the accredited laboratory is contracted to also collect a sample from Eden Spring in the quarry. Eden Spring is the primary groundwater component of the site. This is not a Licence Condition and it is not a Planning Condition, it is the site's own way to determine if the recent rainfall contribution from surrounding landscape brings any anthropogenic contributions from agriculture or other sources. Therefore, the Laboratory Certificates of Analysis contain monitoring results for both monitoring points (Appendix A). Given that there were no anomalous results in the Discharge in 2024, the Eden results are not necessary for interpretation. However, that sampling location will be retained for ongoing baseline assessment.]



Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site	
		Date Received:	22/01/2024
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	22/01/2024 - 08/02/2024
Customer PO		Issue Date:	08/02/2024
Quote No.	Q21-00135	BATCH NUMBER:	24-37726

Sadhbh O'Brien

Sadhbh O'Brien
Chemistry Team Lead

Index to symbols used & Notes

*	Analysis is not INAB accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

- ◆ The results relate only to the items tested.
- ◆ Opinions and interpretations expressed herein are outside the scope of INAB accreditation.
- ◆ The analysis report shall not be reproduced except in full without written approval of the laboratory.
- ◆ Sampling is outside the scope of the laboratory activities.

Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[\text{NO}_3]/50 + [\text{NO}_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

(registered office)

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





RECEIVED: 18/08/2025

Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS LTD
Our Reference:	117018 (24-37726)	Sample Matrix:	Surface Water
Date Sampled:	22/01/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.7
- Note 6	* Biological Oxygen Demand (BOD)	mg/L	3.0	< 3.0
- Note 6	Suspended Solids	mg/L	4	< 4
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	* Nitrate	mg/L N	0.30	2.10
- Note 6	* Orthophosphate	mg/L P	0.03	< 0.03
- Note 6	Chemical Oxygen Demand (COD)	mg/L	15	< 15
<u>Chemical Analysis: (F)</u>				
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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registered in ireland no 323196 | vat reg no IE 6343196 M



RECEIVED: 18/08/2025

Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS LTD
Our Reference:	117019 (24-37726)	Sample Matrix:	Surface Water
Date Sampled:	22/01/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.1
- Note 6	* Biological Oxygen Demand (BOD)	mg/L	3.0	< 3.0
- Note 6	Suspended Solids	mg/L	4	< 4
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	* Nitrate	mg/L N	0.30	2.10
- Note 6	* Orthophosphate	mg/L P	0.03	0.03
- Note 6	Chemical Oxygen Demand (COD)	mg/L	15	< 15
<u>Chemical Analysis: (F)</u>				
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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registered in ireland no 323196 | vat reg no IE 6343196 M



Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site	
		Date Received:	23/02/2024
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	23/02/2024 - 07/03/2024
Customer PO		Issue Date:	07/03/2024
Quote No.	Q21-00135	BATCH NUMBER:	24-38992

Aoife Moriarty

Aoife Moriarty
Organics Laboratory Manager

Index to symbols used & Notes

*	Analysis is not INAB accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrinye Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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- ◆ The analysis report shall not be reproduced except in full without written approval of the laboratory.
- ◆ Sampling is outside the scope of the laboratory activities.

Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[\text{NO}_3]/50 + [\text{NO}_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





RECEIVED: 18/08/2025

Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS LTD
Our Reference:	120604 (24-38992)	Sample Matrix:	Surface Water
Date Sampled:	19/02/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.7
- Note 6	* Biological Oxygen Demand (BOD)	mg/L	3.0	< 3.0
- Note 6	Suspended Solids	mg/L	4	< 4
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	* Nitrate	mg/L N	0.30	7.50
- Note 6	* Orthophosphate	mg/L P	0.03	< 0.03
- Note 6	Chemical Oxygen Demand (COD)	mg/L	15	< 15
<u>Chemical Analysis: (F)</u>				
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

(registered office)

4 park business centre | farranfore | county kerry | ireland | telephone +353 66 976 3588 | fax +353 66 976 3589
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web site www.southernscientificireland.com | e-mail info@southernscientificireland.com

directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





RECEIVED: 18/08/2025

Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS LTD
Our Reference:	120605 (24-38992)	Sample Matrix:	Surface Water
Date Sampled:	19/02/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.2
- Note 6	* Biological Oxygen Demand (BOD)	mg/L	3.0	< 3.0
- Note 6	Suspended Solids	mg/L	4	< 4
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	* Nitrate	mg/L N	0.30	7.60
- Note 6	* Orthophosphate	mg/L P	0.03	< 0.03
- Note 6	Chemical Oxygen Demand (COD)	mg/L	15	< 15
<u>Chemical Analysis: (F)</u>				
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

(registered office)

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Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site	
		Date Received:	20/03/2024
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	20/03/2024 - 04/04/2024
Customer PO		Issue Date:	04/04/2024
Quote No.	Q21-00135	BATCH NUMBER:	24-40180

Sadhbh O'Brien

Sadhbh O'Brien
Chemistry Team Lead

Index to symbols used & Notes

*	Analysis is not INAB accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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- ◆ The analysis report shall not be reproduced except in full without written approval of the laboratory.
- ◆ Sampling is outside the scope of the laboratory activities.

Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[\text{NO}_3]/50 + [\text{NO}_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS LTD
Our Reference:	124219 (24-40180)	Sample Matrix:	Surface Water
Date Sampled:	20/03/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.8
- Note 6	* Biological Oxygen Demand (BOD)	mg/L	3.0	< 3.0
- Note 6	Suspended Solids	mg/L	4	10
- Note 6	Total Ammonia	mg/L N	0.08	0.56
- Note 6	* Nitrate	mg/L N	0.30	5.40
- Note 6	* Orthophosphate	mg/L P	0.03	0.22
- Note 6	Chemical Oxygen Demand (COD)	mg/L	15	< 15
<u>Chemical Analysis: (F)</u>				
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

(registered office)

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS LTD
Our Reference:	124220 (24-40180)	Sample Matrix:	Surface Water
Date Sampled:	20/03/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
<u>Chemical Analysis: (F)</u>				
- Note 6	Hydrogen Ion (pH)	pH units	4.0	7.4
- Note 6	* Biological Oxygen Demand (BOD)	mg/L	3.0	< 3.0
- Note 6	Suspended Solids	mg/L	4	< 4
- Note 6	Total Ammonia	mg/L N	0.08	< 0.08
- Note 6	* Nitrate	mg/L N	0.30	4.90
- Note 6	* Orthophosphate	mg/L P	0.03	0.10
- Note 6	Chemical Oxygen Demand (COD)	mg/L	15	< 15
<u>Chemical Analysis: (F)</u>				
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site	Bennettsbridge
		Date Received:	22/04/2024
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	22/04/2024 - 07/05/2024
Customer PO		Issue Date:	07/05/2024
Quote No.	Q21-00135	BATCH NUMBER:	24-41252

Sadhbh O'Brien

Sadhbh O'Brien
Chemistry Team Lead

Index to symbols used & Notes

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***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[\text{NO}_3]/50 + [\text{NO}_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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RECEIVED: 18/08/2025

Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS Ltd
Our Reference:	127227 (24-41252)	Sample Matrix:	Surface Water
Date Sampled:	22/04/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result	***Limits
<u>Chemical Analysis: (F)</u>					
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.7	6.0 - 9.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0	2.0
SCP 010	Suspended Solids	mg/L	2	4	10
SCP 027A	Total Ammonia	mg/L N	0.02	0.06	0.17
SCP 027G	Nitrate	mg/L N	0.25	8.06	10.00
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.02	0.07
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10	10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0	680.0

(registered office)

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS Ltd
Our Reference:	127228 (24-41252)	Sample Matrix:	Surface Water
Date Sampled:	22/04/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result	***Limits
<u>Chemical Analysis: (F)</u>					
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2	6.0 - 9.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0	2.0
SCP 010	Suspended Solids	mg/L	2	< 4	10
SCP 027A	Total Ammonia	mg/L N	0.02	0.07	0.17
SCP 027G	Nitrate	mg/L N	0.25	8.35	10.00
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01	0.07
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10	10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0	680.0

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Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site:	Bennettsbridge
		Date Received:	09/05/2024
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	09/05/2024 - 22/05/2024
Customer PO		Issue Date:	24/05/2024
Quote No.	Q21-00135	BATCH NUMBER:	24-42108

Sadhbh O'Brien

Sadhbh O'Brien
Chemistry Team Lead

Index to symbols used & Notes

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***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrune Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[\text{NO}_3]/50 + [\text{NO}_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS Ltd
Our Reference:	129716 (24-42108)	Sample Matrix:	Surface Water
Date Sampled:	09/05/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result	***Limits
<u>Chemical Analysis: (F)</u>					
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.6	6.0 - 9.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0	2.0
SCP 010	Suspended Solids	mg/L	2	< 4	10
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02	0.17
SCP 027G	Nitrate	mg/L N	0.25	7.93	10.00
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01	0.07
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10	10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0	680.0

(registered office)

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS Ltd
Our Reference:	129717 (24-42108)	Sample Matrix:	Surface Water
Date Sampled:	09/05/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result	***Limits
<u>Chemical Analysis: (F)</u>					
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.2	6.0 - 9.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0	2.0
SCP 010	Suspended Solids	mg/L	2	< 4	10
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02	0.17
SCP 027G	Nitrate	mg/L N	0.25	8.16	10.00
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.02	0.07
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10	10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0	680.0

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Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site:	Bennettsbridge
		Date Received:	17/06/2024
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	17/06/2024 - 08/07/2024
Customer PO		Issue Date:	08/07/2024
Quote No.	Q24-00720	BATCH NUMBER:	24-43752

Aoife Moriarty

Aoife Moriarty
Organics Laboratory Manager

Index to symbols used & Notes

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(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrinye Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[\text{NO}_3]/50 + [\text{NO}_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS Ltd
Our Reference:	134159 (24-43752)	Sample Matrix:	Surface Water
Date Sampled:	17/06/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result	***Limits
<u>Chemical Analysis: (F)</u>					
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9	6.0 - 9.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0	2.0
SCP 010	Suspended Solids	mg/L	2	< 4	10
SCP 027A	Total Ammonia	mg/L N	0.02	0.03	0.17
SCP 027G	Nitrate	mg/L N	0.25	6.35	10.00
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.02	0.07
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10	10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0	680.0

(registered office)

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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS Ltd
Our Reference:	134160 (24-43752)	Sample Matrix:	Surface Water
Date Sampled:	17/06/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result	***Limits
<u>Chemical Analysis: (F)</u>					
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.3	6.0 - 9.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0	2.0
SCP 010	Suspended Solids	mg/L	2	22	10
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02	0.17
SCP 027G	Nitrate	mg/L N	0.25	6.35	10.00
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.06	0.07
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10	10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0	680.0

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Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site:	Bennettsbridge
		Date Received:	16/07/2024
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	16/07/2024 - 30/07/2024
Customer PO		Issue Date:	02/08/2024
Quote No.	Q24-00720	BATCH NUMBER:	24-45213

Jake Grunfield
Laboratory Analyst

Index to symbols used & Notes

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LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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- ◆ Sampling is outside the scope of the laboratory activities.

Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[\text{NO}_3]/50 + [\text{NO}_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS Ltd
Our Reference:	137899 (24-45213)	Sample Matrix:	Surface Water
Date Sampled:	16/07/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result	NIL
<u>Chemical Analysis: (F)</u>					
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.7	6.0 - 9.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	2.1	2.0
SCP 010	Suspended Solids	mg/L	2	21	10
SCP 027A	Total Ammonia	mg/L N	0.02	0.09	0.17
SCP 027G	Nitrate	mg/L N	0.25	6.58	10.00
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01	0.07
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	14	10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	30.9	680.0

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directors: K. Murphy, M. Murphy & C. Murphy
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RECEIVED: 18/08/2025

Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS Ltd
Our Reference:	137900 (24-45213)	Sample Matrix:	Surface Water
Date Sampled:	16/07/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result	NIL
<u>Chemical Analysis: (F)</u>					
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.3	6.0 - 9.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0	2.0
SCP 010	Suspended Solids	mg/L	2	< 4	10
SCP 027A	Total Ammonia	mg/L N	0.02	0.08	0.17
SCP 027G	Nitrate	mg/L N	0.25	6.79	10.00
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01	0.07
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10	10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0	680.0

(registered office)

4 park business centre | **farranfore** | county kerry | ireland | telephone +353 66 976 3588 | fax +353 66 976 3589
dunrine | **killarney** | county kerry | ireland | telephone +353 64 66 33922 | fax +353 64 66 39022

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site:	Bennettsbridge
		Date Received:	16/08/2024
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	16/08/2024 - 26/08/2024
Customer PO		Issue Date:	30/08/2024
Quote No.	Q24-00720	BATCH NUMBER:	24-46550

Sadhbh O'Brien

Sadhbh O'Brien
Chemistry Laboratory Manager

Index to symbols used & Notes

*	Analysis is not INAB accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrinye Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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- ◆ The analysis report shall not be reproduced except in full without written approval of the laboratory.
- ◆ Sampling is outside the scope of the laboratory activities.

Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[\text{NO}_3]/50 + [\text{NO}_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

(registered office)

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS Ltd
Our Reference:	141518 (24-46550)	Sample Matrix:	Surface Water
Date Sampled:	16/08/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result	NIL
Chemical Analysis: (F)					
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.6	6.0 - 9.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0	2.0
SCP 010	Suspended Solids	mg/L	2	5	10
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02	0.17
SCP 027G	Nitrate	mg/L N	0.25	6.21	10.00
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01	0.07
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10	10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0	680.0

(registered office)

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directors: K. Murphy, M. Murphy & C. Murphy
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Customer Sample Ref:	Eden	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS Ltd
Our Reference:	141519 (24-46550)	Sample Matrix:	Surface Water
Date Sampled:	16/08/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result	NIL
<u>Chemical Analysis: (F)</u>					
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.4	6.0 - 9.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0	2.0
SCP 010	Suspended Solids	mg/L	2	5	10
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02	0.17
SCP 027G	Nitrate	mg/L N	0.25	6.75	10.00
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01	0.07
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10	10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0	680.0

(registered office)

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directors: K. Murphy, M. Murphy & C. Murphy
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Customer Sample Ref:	Exiting Lagoon 2	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS Ltd
Our Reference:	141532 (24-46550)	Sample Matrix:	Surface Water
Date Sampled:	16/08/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result	NIL
<u>Chemical Analysis: (F)</u>					
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.6	6.0 - 9.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	1.8	2.0
SCP 010	Suspended Solids	mg/L	2	< 4	10
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02	0.17
SCP 027G	Nitrate	mg/L N	0.25	6.10	10.00
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01	0.07
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10	10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0	680.0

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directors: K. Murphy, M. Murphy & C. Murphy
registered in ireland no 323196 | vat reg no IE 6343196 M





Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site:	Bennettsbridge
		Date Received:	17/09/2024
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	17/09/2024 - 09/10/2024
Customer PO		Issue Date:	09/10/2024
Quote No.	Q24-00720	BATCH NUMBER:	24-47872

Joanne O'Halloran
Deputy Laboratory Manager

Index to symbols used & Notes

*	Analysis is not INAB accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrinc Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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- ◆ Sampling is outside the scope of the laboratory activities.

Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[\text{NO}_3]/50 + [\text{NO}_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS Ltd
Our Reference:	145310 (24-47872)	Sample Matrix:	Surface Water
Date Sampled:	17/09/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result	NIL
<u>Chemical Analysis: (F)</u>					
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.6	6.0 - 9.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0	2.0
SCP 010	Suspended Solids	mg/L	2	< 4	10
SCP 027A	Total Ammonia	mg/L N	0.02	0.13	0.17
SCP 027G	Nitrate	mg/L N	0.25	5.96	10.00
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01	0.07
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10	10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	64.3	680.0

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directors: K. Murphy, M. Murphy & C. Murphy
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Certificate of Analysis

Customer:	Bennettsbridge Limestone	Project:	Exiting Lagoon & Eden
Address:	Kilree Sheastown Co Kilkenny R95 EYOR	Site:	Bennettsbridge
		Date Received:	23/10/2024
		Condition of Sample:	Satisfactory
Report to:	Mark Galvin	Date Analysed:	23/10/2024 - 14/11/2024
Customer PO		Issue Date:	18/11/2024
Quote No.	Q24-00720	BATCH NUMBER:	24-49466

Leanne Savage

Leanne Savage
Laboratory Analyst

Index to symbols used & Notes

*	Analysis is not INAB accredited
**	Adapted from Standard Methods for the Examination of Water and Wastewater.
***	Customer specific limits
(F)	Analysis carried out at our Farranfore Laboratory.
(D)	Analysis carried out at our Dunrinye Laboratory.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

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- ◆ Sampling is outside the scope of the laboratory activities.

Notes for Drinking Water samples

Note A	The water should not be aggressive
Note B	Compliance must be ensured with the conditions that $[\text{NO}_3]/50 + [\text{NO}_2]/3 = 1$
Note C	Acceptable to customers and no abnormal change
Note D	In the case of surface water treatment, a parametric value not exceeding 1 NTU in the water ex treatment works must be strived for
Note F	Fluoridated supplies 0.8 mg/L; Natural supplies 1.5 mg/L.

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Customer Sample Ref:	Exiting Lagoon	Customer Sample Code:	
Project:	Exiting Lagoon & Eden	Sampled By:	SSS Ltd
Our Reference:	150136 (24-49466)	Sample Matrix:	Surface Water
Date Sampled:	22/10/2024	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result	NIL
Chemical Analysis: (F)					
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8	6.0 - 9.0
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	< 1.0	2.0
SCP 010	Suspended Solids	mg/L	2	< 4	10
SCP 027A	Total Ammonia	mg/L N	0.02	0.03	0.17
SCP 027G	Nitrate	mg/L N	0.25	5.80	10.00
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01	0.07
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10	10
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0	680.0

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TEST REPORT NO: 301029 .1**Client: Bennettsbridge Limestone Q**

**Kilree
Sheastown
Bennettsbridge
Co. Kilkenny**

**BHP Ref. No: 24/11/2901
Quote Ref: QM018184
Order No: N/A
Sales Order: 234815
Date Received: 13/11/2024
Date Sampled: 13/11/2024
Date Completed: 13/11/2024
Sample Type: Surface Water**



**Testing
Analysing
Consulting**



**BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EMail: dervlapurcell@bhp.ie**

FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Eden**

Test	Units	Results	Customer Limits	Date Analysed	Method
Total Ammonia (as N)	mg/L	~	0.17		BHP AC 095
B.O.D. Acc.	mg/L	~	2		BHP AC 005
C.O.D. Acc.	mg/L	~	10		BHP AC 006
Molybdate Reactive Phosphorus (as P)	mg/L	~	0.07		BHP AC 095
Nitrate (as NO ₃)	mg/L	~	-		BHP AC 019
OrthoPhosphate (as P)	mg/L	~	0.07		BHP AC 095
pH - Field	pH Units	~	6-9		BHP AC 067
Total Suspended Solids Acc.	mg/L	~	10		BHP AC 012
Total Petroleum Hydrocarbons (>C ₆ -C ₄₀) *	mg/L	~	0.68		1670
Nitrate (as NO ₃ -N)	mg/L	~	10		BHP AC 019

Authorised by:
Dervla Purcell**Date Authorised: 02/12/2024****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed***** Subcontracted to an approved accredited laboratory****** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised**~ :** Sample Condition : UNACCEPTABLE:- Sample location was dry.

This test report shall not be duplicated except in full and then only with the permission of the test laboratory.

Results apply only to the sample tested and where the laboratory is not responsible for sampling, result apply to the sample as received.

Information identifying the 'Client', 'FTAO', 'Site', 'Client Ref', 'Order No' and 'Date Sampled' where BHP have not taken the sample has been supplied by the customer.

Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 301029 .2**Client: Bennettsbridge Limestone Q**

Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 24/11/2902
Quote Ref: QM018184
Order No: N/A
Sales Order: 234815
Date Received: 13/11/2024
Date Sampled: 13/11/2024
Date Completed: 25/11/2024
Sample Type: Surface Water



Testing
Analysing
Consulting



BHP Laboratories
New Road
Thomondgate
Limerick
Tel: +353 61 455399
EEmail:dervlapurcell@bhp.ie

FTAO: Mark Galvin**Site: Quarry Environmental Monitoring****BHP Ref: Monthly Surface Water****Client Ref: Existing Lagoon**

Test	Units	Results	Customer Limits	Date Analysed	Method
Total Ammonia (as N)	mg/L	<0.05	0.17	18/11/2024	BHP AC 095
B.O.D. Acc.	mg/L	0.60	2	20/11/2024	BHP AC 005
C.O.D. Acc.	mg/L	<15	10	19/11/2024	BHP AC 006
Molybdate Reactive Phosphorus (as P)	mg/L	<0.01	0.07	14/11/2024	BHP AC 095
Nitrate (as NO ₃)	mg/L	29	-	25/11/2024	BHP AC 019
OrthoPhosphate (as P)	mg/L	<0.01	0.07	14/11/2024	BHP AC 095
pH - Field	pH Units	8.20	6-9	13/11/2024	BHP AC 067
Total Suspended Solids Acc.	mg/L	<10	10	19/11/2024	BHP AC 012
Total Petroleum Hydrocarbons (>C ₆ -C ₄₀) *	mg/L	<0.01	0.68	22/11/2024	1670
Nitrate (as NO ₃ -N)	mg/L	6.6	10	14/11/2024	BHP AC 019

Authorised by:
Dervla Purcell**Date Authorised: 02/12/2024****Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed

* Subcontracted to an approved accredited laboratory

** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

~ : Sample Condition : ACCEPTABLE

This test report shall not be duplicated except in full and then only with the permission of the test laboratory.

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Information identifying the 'Client', 'FTAO', 'Site', 'Client Ref', 'Order No' and 'Date Sampled' where BHP have not taken the sample has been supplied by the customer.

Sampling is outside the scope of accreditation

BHP Laboratory's decision rule: When we report a statement of compliance, we base it on the actual result of the test compared to the standard being used, regardless of the uncertainty

TEST REPORT NO: 302451**Client:** Bennettsbridge Limestone Q

Kilree
Sheastown
Bennettsbridge
Co. Kilkenny

BHP Ref. No: 24/12/0277
Quote Ref: QM018184
Order No: N/A
Sales Order: 236707
Date Received: 02/12/2024
Date Sampled: 02/12/2024
Date Completed: 12/12/2024
Sample Type: Surface Water



**Testing
Analysing
Consulting**



BHP Laboratories
 New Road
 Thomondgate
 Limerick
 Tel: +353 61 455399
 EMail: dervlapurcell@bhp.ie

FTAO: Mark Galvin**Site:** Quarry Environmental Monitoring**BHP Ref:** Monthly Surface Water**Client Ref:** Existing Lagoon

Test	Units	Results	Customer Limits	Date Analysed	Method
Total Ammonia (as N)	mg/L	<0.05	0.17	09/12/2024	BHP AC 095
B.O.D. Acc.	mg/L	1.1	2	04/12/2024	BHP AC 005
C.O.D. Acc.	mg/L	<15	10	03/12/2024	BHP AC 006
Molybdate Reactive Phosphorus (as P)	mg/L	<0.01	0.07	03/12/2024	BHP AC 095
Nitrate (as NO ₃)	mg/L	32	-	09/12/2024	BHP AC 019
OrthoPhosphate (as P)	mg/L	<0.01	0.07	03/12/2024	BHP AC 095
pH - Field	pH Units	7.86	6-9	02/12/2024	BHP AC 067
Total Suspended Solids Acc.	mg/L	<10	10	03/12/2024	BHP AC 012
Total Petroleum Hydrocarbons (>C ₆ -C ₄₀) *	mg/L	<0.01	0.68	12/12/2024	1670
Nitrate (as NO ₃ -N)	mg/L	7.2	10	03/12/2024	BHP AC 019

Authorised by:
Dervla Purcell**Date Authorised:** 13/12/2024**Laboratory Manager****Additional Information:**(Opinions, where stated, are not covered by accreditation)**Acc.:** INAB Accredited**ND:** None detected in volume analysed

* Subcontracted to an approved accredited laboratory

** This sample has been analysed outside recommended stability times. It is therefore possible that the results provided may be compromised

~ : Sample Condition : ACCEPTABLE

This test report shall not be duplicated except in full and then only with the permission of the test laboratory.

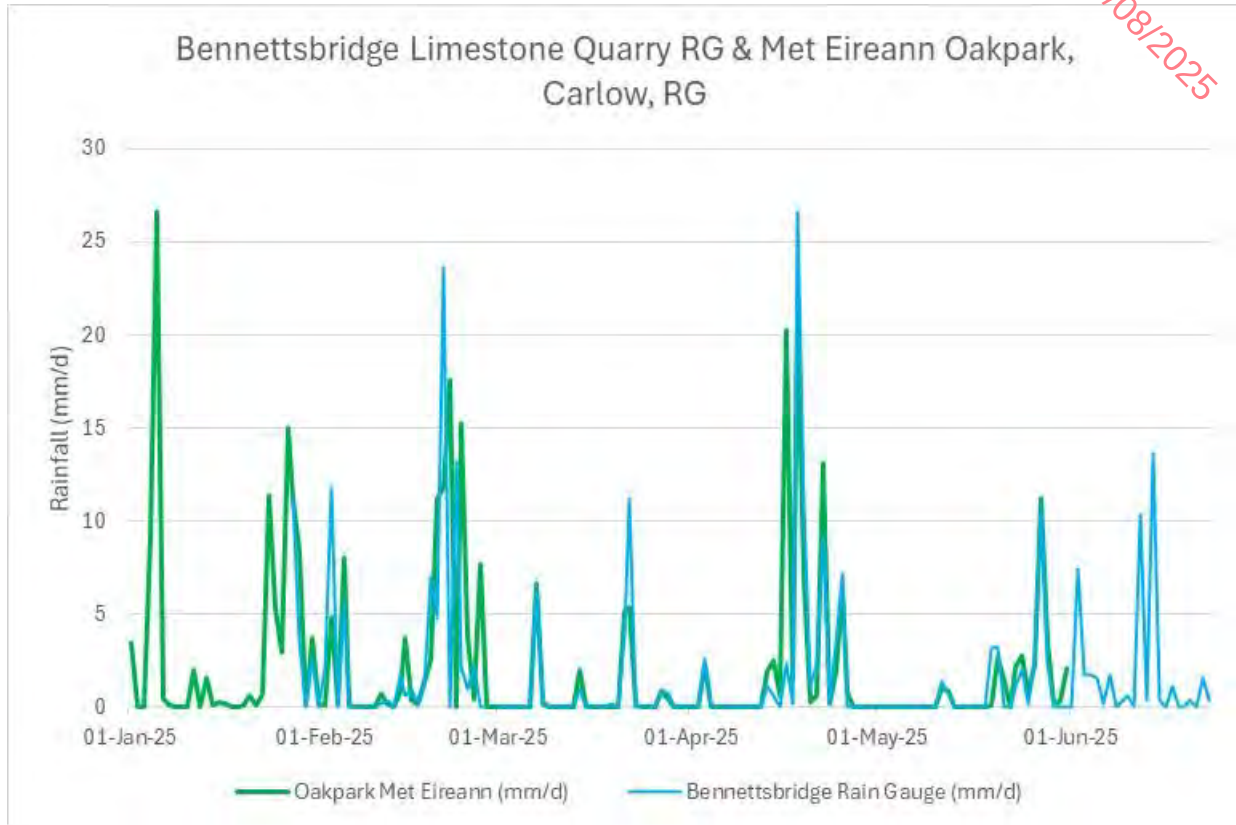
Results apply only to the sample tested and where the laboratory is not responsible for sampling, result apply to the sample as received.

Information identifying the 'Client', 'FTAO', 'Site', 'Client Ref', 'Order No' and 'Date Sampled' where BHP have not taken the sample has been supplied by the customer.

Sampling is outside the scope of accreditation

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8. Rain Gauge (RG) Data Bennettsbridge Limestone and Met Eireann Stn. @ Oakpark, Co. Carlow.



Graph 1 Comparing RG @ Bennettsbridge Limestone with Met Data RG @ Oakpark, Co. Carlow

Hydro-G Comments:

- Data compares reasonably well.
- Large Peaks in RF can be different.
- Stns. are c.36km apart.
- Some differences expected.
- Comparative Data Tables overleaf.
- The RG at Bennettsbridge was installed in January 2025.
- The significance of the comparative Graph 1, above, and the Table 1, over, is that the data for the Met Eireann Oakpark Stn. is now proven to be broadly similar to the rainfall pattern at the quarry.
- The Oakpark rainfall data can be used to graph water level responses in piezometers.

Table 1 Daily Rainfall @ RG @ Bennettsbridge Limestone & Met Data RG @ Oakpark, Co. Carlow (2025).

	Oakpark Met Eireann (mm/d)	Bennetts bridge Rain Gauge (mm/d)		Oakpark Met Eireann (mm/d)	Bennetts bridge Rain Gauge (mm/d)		Oakpark Met Eireann (mm/d)	Bennetts bridge Rain Gauge (mm/d)		Oakpark Met Eireann (mm/d)	Bennetts bridge Rain Gauge (mm/d)		Oakpark Met Eireann (mm/d)	Bennetts bridge Rain Gauge (mm/d)		Oakpark Met Eireann (mm/d)	Bennetts bridge Rain Gauge (mm/d)
01-Jan-25	3.5		01-Feb-25	0.1	2.2	01-Mar-25	0	0.0	01-Apr-25	0	0.0	01-May-25	0	0.0	01-Jun-25		0.0
02-Jan-25	0		02-Feb-25	4.9	11.8	02-Mar-25	0	0.0	02-Apr-25	0	0.0	02-May-25	0	0.0	02-Jun-25		7.4
03-Jan-25	0		03-Feb-25	0.2	0.0	03-Mar-25	0	0.0	03-Apr-25	2.4	2.6	03-May-25	0	0.0	03-Jun-25		1.8
04-Jan-25	9.2		04-Feb-25	8	5.6	04-Mar-25	0	0.0	04-Apr-25	0	0.0	04-May-25	0	0.0	04-Jun-25		1.8
05-Jan-25	26.6		05-Feb-25	0.1	0.0	05-Mar-25	0	0.0	05-Apr-25	0	0.0	05-May-25	0	0.0	05-Jun-25		1.6
06-Jan-25	0.5		06-Feb-25	0	0.0	06-Mar-25	0	0.0	06-Apr-25	0	0.0	06-May-25	0	0.0	06-Jun-25		0.2
07-Jan-25	0.1		07-Feb-25	0	0.0	07-Mar-25	6.7	6.2	07-Apr-25	0	0.0	07-May-25	0	0.0	07-Jun-25		1.8
08-Jan-25	0		08-Feb-25	0	0.0	08-Mar-25	0.2	0.4	08-Apr-25	0	0.0	08-May-25	0	0.0	08-Jun-25		0.0
09-Jan-25	0		09-Feb-25	0	0.0	09-Mar-25	0	0.0	09-Apr-25	0	0.0	09-May-25	0	0.0	09-Jun-25		0.4
10-Jan-25	0		10-Feb-25	0.7	0.2	10-Mar-25	0	0.0	10-Apr-25	0	0.0	10-May-25	0	0.0	10-Jun-25		0.6
11-Jan-25	2		11-Feb-25	0.2	0.4	11-Mar-25	0	0.0	11-Apr-25	0	0.0	11-May-25	1.1	1.4	11-Jun-25		0.0
12-Jan-25	0		12-Feb-25	0	0.0	12-Mar-25	0	0.0	12-Apr-25	0	0.0	12-May-25	0.9	0.8	12-Jun-25		10.4
13-Jan-25	1.6		13-Feb-25	0.9	1.8	13-Mar-25	0	0.0	13-Apr-25	1.9	1.2	13-May-25	0	0.0	13-Jun-25		0.4
14-Jan-25	0.1		14-Feb-25	3.7	0.6	14-Mar-25	2	1.0	14-Apr-25	2.5	0.6	14-May-25	0	0.0	14-Jun-25		13.6
15-Jan-25	0.3		15-Feb-25	0.4	1.0	15-Mar-25	0	0.0	15-Apr-25	0.6	0.0	15-May-25	0	0.0	15-Jun-25		0.4
16-Jan-25	0.2		16-Feb-25	0.2	0.2	16-Mar-25	0	0.0	16-Apr-25	20.3	2.4	16-May-25	0	0.0	16-Jun-25		0.0
17-Jan-25	0		17-Feb-25	1.4	1.2	17-Mar-25	0	0.0	17-Apr-25	1.5	0.2	17-May-25	0	0.0	17-Jun-25		1.2
18-Jan-25	0		18-Feb-25	2.5	7.0	18-Mar-25	0	0.0	18-Apr-25	21	26.6	18-May-25	0	0.0	18-Jun-25		0.0
19-Jan-25	0.1		19-Feb-25	11.2	4.8	19-Mar-25	0	0.2	19-Apr-25	6.9	10.8	19-May-25	0.1	3.2	19-Jun-25		0.0
20-Jan-25	0.6		20-Feb-25	11.8	23.6	20-Mar-25	0	0.0	20-Apr-25	0.3	1.2	20-May-25	2.7	3.2	20-Jun-25		0.4
21-Jan-25	0.1		21-Feb-25	17.6	0.0	21-Mar-25	5.2	4.0	21-Apr-25	0.6	2.4	21-May-25	1.4	0.0	21-Jun-25		0.0
22-Jan-25	0.7		22-Feb-25	0	13.2	22-Mar-25	5.4	11.2	22-Apr-25	13.1	9.2	22-May-25	0	0.0	22-Jun-25		1.6
23-Jan-25	11.4		23-Feb-25	15.3	2.2	23-Mar-25	0.1	0.0	23-Apr-25	0.2	0.2	23-May-25	2.2	1.2	23-Jun-25		0.4
24-Jan-25	5.3		24-Feb-25	3.8	1.0	24-Mar-25	0	0.0	24-Apr-25	1.9	3.6	24-May-25	2.8	2.0			
25-Jan-25	3		25-Feb-25	0.5	2.2	25-Mar-25	0	0.0	25-Apr-25	6.4	7.2	25-May-25	0.8	0.2			
26-Jan-25	15		26-Feb-25	7.7	0.0	26-Mar-25	0	0.0	26-Apr-25	0.8	0.0	26-May-25	2.3	2.6			
27-Jan-25	11.1	11.2	27-Feb-25	0	0.0	27-Mar-25	0.9	0.8	27-Apr-25	0	0.0	27-May-25	11.2	10.8			
28-Jan-25	8.4	3.6	28-Feb-25	0		28-Mar-25	0.5	0.8	28-Apr-25	0	0.0	28-May-25	3.6	2.4			
29-Jan-25	0.1	0.0				29-Mar-25	0	0.0	29-Apr-25	0	0.0	29-May-25	0.1	0.0			
30-Jan-25	3.7	2.6				30-Mar-25	0	0.0	30-Apr-25	0	0.0	30-May-25	0.4	0.0			
31-Jan-25	0.2	0.0				31-Mar-25	0	0.0				31-May-25	2.1	0.0			

Appendix 8.4

Site Wastewater Services

1. Hydro-G (2021) – Wastewater Infrastructure at the Quarry.
2. Anua Maintenance Reports 2022 – 2025.



Hydro-G

50 Henry St.
Galway H91 FA4X

pamela@hydro-g.com

087 8072744

16/3/21
Rev 4

To: Kilkenny County Council, County Hall, John Street, Kilkenny, R95 A39T

On Behalf of: Bennettsbridge Limestone Quarries, Kilree, Sheastown, Bennettsbridge, Co Kilkenny

Re: Kilkenny County Council PLANNING REGISTER NO: 20891: Further Information Request dated 15/02/2021.

Dear Planning @ Kilkenny County Council

The Further Information Request letter issued by your department dated 15/02/2021 is attached here for everyone's convenience (Appendix A).

I am a civil engineering hydrogeologist with wastewater expertise, and I shall address **all items relating to wastewater & stormwater**. I am a Fetac Certified Site Assessor and I have acted as both a Soils Instructor and Interviewer for the final interview of candidates for the Site Assessor Award. I have been an independent, field-based, water and wastewater engineer for over 20 years. Evidence of my qualifications, professional competency and Professional Insurances accompany this submission.

The Request for Further Information 8 Items are addressed as follows:

Item no. 1 relates to Roads and Signage and therefore has already been dealt with in Earth Science Partnership. The cover letter to the overall RFI response deals with Item 1 and precedes this hydrogeological report.

Item no. 2 Requests as follows:

"2. **The applicant is requested to clarify the proposed numbers of staff associated with the proposed new office building.**"

Hydro-G offers:

- Proposed New Office Building Staff Numbers = 7 = the same 7 that work there already = 7 staff @ 30l/p/d = 210 litres/d = 1.4 Population Equivalent (P.E.) = Population Served.
- Total staff numbers served by the overall Wastewater Infrastructure on the site = 20 people.
- 20 total staff = 13 quarry floor staff @ EPA (1999) loadings of 40 l/p/d industrial use (quarry excluding canteen) = 3.5 PE for the floor staff population served PLUS 7 management and administrative staff @ 30 l/p/d = 1.4 PE Office = 7300 litres/d @ 150 l/p/d = 5 Population Equivalent Total for the Site.

Item no. 3 Requests as follows:

- “3. **Please submit full details to demonstrate that the existing wastewater treatment system on site has the capacity to accommodate the proposed development.**”

Hydro-G offers:

- 3.1 The proposed development will load the existing wastewater treatment system in exactly the same way as presently loaded. There will be the same number of staff as works there now. The proposed development will replace the portacabin offices and toilets that currently support the administrative and management staff at the site.
- 3.2 There is a 4m³ working capacity septic tank in place that serves the site's portacabin office staff toilets. There is a second septic tank serving the quarry floor staff's toilets. Both septic tanks are the same size (Appendix B for Septic Tank dimensions & Capacity). While there are two septic tanks on site, one for the office staff and one for the floor staff, the floor staff have two toilet block units and the one at the 'Lagan' building has a primary pump forward tank to the Septic tank beside the second toilet block in the portacabins closer to the Puraflo units. Refer to Earth Science Partnership Plan and Cross Section drawings accompanying this response. Anua assesses and reports on the 'Lagan' pump sump tank and the two Septic tanks and all 3 pumps during their annual maintenance visit (Appendix D and details in Response Item 4.4, below).
- 3.3 The Septic Tank serving the offices is required to deal with 7 staff @ EPA (1999) 30 litres per person per day = 210 litres per day divided by 150 l/p/d = 1.4 PE.
- 3.4 EPA CoP (2009) Chapter 7, Section 7.1.1, outlines that the required tank capacity should be calculated as follows:

For the Office Staff Toilets

Required Capacity = (150 X P.E.) + 2000

Required Capacity = (150 * 1.4) + 2000

Required Capacity = 2,300 litres = 2.3m³

For the Quarry Floor's Staff Toilets

Required Capacity = (150 X P.E.) + 2000

Required Capacity = (150 * 3.5) + 2000

Required Capacity = 2,525 litres = 2.52m³

- 3.6 Given that the required tank capacity is 2.3m³ for the office staff toilets and the actual capacity is 4m³, we conclude that the septic tank is adequate. Similarly, the calculations demonstrate that the second septic tank for the quarry floor staff is also suitably sized. Therefore, the primary treatment infrastructure is suitable for the proposed and existing development. The proposed development will not have new staff, the proposed development is an upgrade of offices from portacabin to a fixed permanent structure. There is NEVER a smell from the Septic tank. It would be evident if there was. Given Covid protocols and advice re increased handwashing, the capacity of the staff office Septic Tank being more than is required under EPA 2009 is a good thing. There is no issue with septicity potential.
- 3.7 The existing wastewater infrastructure is that the staff toilets and kitchenette at the portacabins, which will be replaced by toilets and kitchenette in the proposed development, are served by a treatment train as follows:
- 3.7.1 Sewer network conveys office staff's wastewater from the two toilets and two urinals at the site's portacabin offices to an appropriately sized septic tank (working capacity 4m³) [Brochure attached as Appendix B, calculations above to demonstrate fit for purpose]. This sewer network will be retained as is.
- 3.7.2 The office's Septic Tank feeds to a Pump Station adjacent. [Refer to Site Photograph 1, Photo

Series at end].

- 3.7.3 From the pump station it is pumped to a 12 module Puraflo Secondary Treatment System (NGR of the Puraflo units 654,385E; 650,245N.). It is industry accepted that 8 no. Puraflo modules are specified for one domestic residence @ 4 PE for each home's loading. Therefore, 12 Modules = $12/3 = 4$ homes @ 4 PE each = 16 PE capacity. Given that the 7 staff for the proposed development equate to a ~ 1.4 PE and the 13 floor staff equates to 3.5 PE the total PE for the site is 4.9PE. The 12 modules are more than adequate. Therefore, the Puraflo system has the required capacity.
- 3.7.4 Clarified wastewater from the septic tank is distributed by a rotating pump feed to the top of the peat in each Peat module. It percolates through the peat in the peat modules. It is collected at the base of each module in a pipe network. From the Puraflo network of modules, the secondary treated wastewater flows, by gravity, through 1 no. 100mm diameter plain walled PVC sewer pipe to a splitter box that sends the treated wastewater to 2 no. distribution boxes:

3.7.4.1 The first distribution box sends wastewater to the north in 2-trenches and south in 2 trenches. Flow is by gravity flow in a percolation trench system of 4 lengths of 16m long, 100mm diameter smooth wall PVC drainage pipes with perforations at 4, 6, and 8 o'clock each that are set in percolation trenches @ 5m centre to centre.

3.7.4.2 The second distribution box sends wastewater to the same configuration as above.

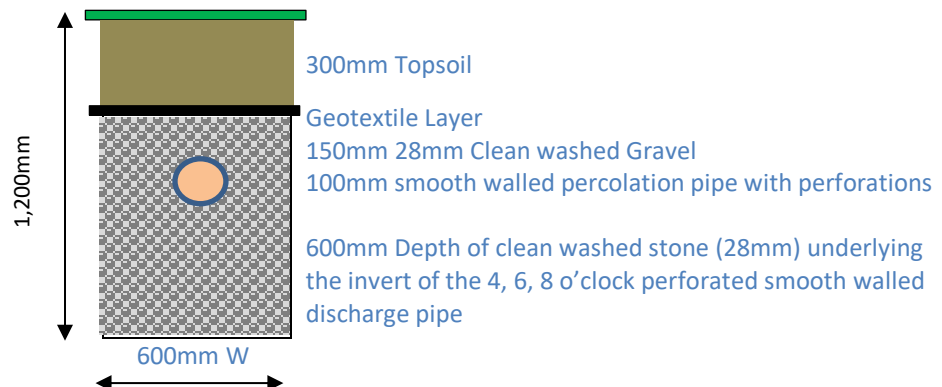
Trench Layouts shown in DWG accompanying.

- 3.8 Information obtained in 2021 interview with 2007's builder/installer, revealed the dimensions and spacing of the percolation trenches, as follows:

- 3.8.1 The trenches are spaced at 5m centre to centre spacing. EPA 2009 (Table 7.3) requires 2.5m as the Minimum centre to centre separation distance between percolation trenches. Therefore, twice the required spacing is provided at the site.
- 3.8.2 The cross section of the trenches conforms to the requirements of EPA (2009) even though the installation (2007) predates the Code of Practice. The CoP (EPA, 2009) requires 500mm wide trenches, but the site's trenches are 600mm wide. Therefore, the site provides more percolation space than EPA CoP (2009) specifies as the MINIMUM required. Refer to Site Layout Drawing and Plate A below:

3

Plate A Cross Section through Bennettsbridge Limestone's Percolation Trenches (8 no. @ 16m each): Information obtained in 2021 interview with 2007's builder/installer.



- 3.9 The Site's subsoil's Site Investigation was completed in 2007. Therefore, the Site Characterisation predates

the EPA (2009) CoP. The Site Characterisation was completed by F Hughes Engineering in 2007 and it is presented as Appendix C. It is irrelevant that the completed form is not as detailed as the 2009 CoP form: the percolation results are Pass with a "T value" reported as 2.775, which we always round up to the nearest round number = 3. T = 3 is a pass (Table 6.3, EPA 2009). Evaluation of the 3 x replication values recorded (Appendix C) suggest that the T is most probably 4 because the first ones are faster than the second two values. The Depth tested was 1.2 to 1.6 m bgl. The percolation trenches at the site have been constructed to sit on the soil that has been shown to pass. While this is slightly different than the EPA CoP (2009) convention, the aims of the CoP are to ensure it is treated and ensure it can get away. We have demonstrated that the Septic Tank is twice the required capacity and the Secondary WWTP is oversized. Therefore, treatment is assured. The site's fast percolation is ensuring the WW can get away. While there is no Trial Pit record to present unsaturated depth at the time of the 2007 assessment, neither was it required at that time. However, the site is a working quarry and the unsaturated depth of subsoil over bedrock exceeds the required minimum of the CoP (2009) depth to Bedrock, which is 1.2m. Inspection of the embankments on the perimeter of the field homing the percolation area present competent embankments with no evidence of breakthrough.

- 3.10 Specification in the Site Characterisation was for 128m Percolation Pipe (Hughes, 2007 Appendix C). The site inspection completed in February 2021 for this RFI confirmed 8 x 16 m lengths, i.e. 128m, of Percolation trench at the site. Table 7.2 of EPA 2009 suggests that for the total staff 5 PE loading at the site, 90m of trench are required IF the trenches are to receive Septic Tank Effluent. However, the WW at the site is treated in a Septic Tank and a Puraflo Secondary Wastewater treatment plant. Table 10.1 of EA 2009 suggests that for a T value of 3-20, which we have at the site, the trench length required is 30m. Therefore, the percolation trench infrastructure at the site is 4 times longer than it needs to be. Therefore, adequate capacity is demonstrated.
- 3.11 The entire layout of components of the WW infrastructure are presented on the attached site layout DWG. In addition, the Puraflo units and distribution boxes are visible in the 2010 ortho aerial photograph on the GSI website (Figure 1).
- 3.12 The clarity of the waters in the pipes of the distribution boxes is evident from visual assessment of the pipes completed on the 23/2/21 (Photograph, Photo Series at end of this communication). Clear wastewater and no smell = treated wastewater = effective Septic Tanks and effective Puraflo Secondary WWTP.

Item no. 4 Requests as follows:

"4. Where Point No. 3 above has been confirmed, the applicant should confirm that the existing wastewater treatment system has been satisfactorily installed in accordance with the EPA Wastewater Treatment Manuals, Treatment Systems for Small Communities, Business, Leisure Centres and Hotels 1999 and the Code of Practice, Wastewater Treatment and Disposal System Serving Single Houses, EPA, 2009. The certification should include a site specific 'as constructed' layout plan and cross-sectional drawing through the entire wastewater treatment system to include photographic evidence, where appropriate. A generic drawing / cross-section is not acceptable. The certificate must be completed by a suitably qualified and indemnified person with a copy of proof of indemnification insurance to be submitted with the certificate."

Hydro-G offers:

- 4.1 We have demonstrated above that the system is appropriately sized and configured. It is sized in accordance with the requirements for staff loadings as specified by EPA 1999. It has more than the required capacity and this is a good thing because people probably use more water now than EPA 1999 specified.

- 4.2 At the time of its commissioning in 2007, Bord Na Mona certified that it was supplied and installed by them to comply with the Standards specified in EPA 1999.
- 4.3 Given that the system was installed in 2007 by a company that is now gone, the documents held by them are not available.
- 4.4 BnM quit the scene and Anua took over the servicing and maintenance of their plants. Mr. Dan Kenny of Anua Environmental services this WWTP and an annual Maintenance agreement is in place (Appendix D). Hydro-G's consultation with Mr. Kenny for the purposes of this RFI concludes that the system continues to function correctly and therefore it is taken that it was installed correctly. The annual assessments completed for the site are presented in Appendix D, which contains 5 years of maintenance reports. The other years are on file if required. As previously notes, Anua refers to three tanks and pump sets in their Annual Maintenance reports: Two Septic Tanks and one 'Lagan' pump sump tank forward feeding the floor staff's toilets.
- 4.5 While the BnM Certification Report is no longer in existence, as a qualified, certified, indemnified, experienced wastewater practitioner, I can confidently assert that entire wastewater system (septic tank, pump station, Puraflo secondary WWTP, percolation trenches and discharge zone) is functioning with the achievement of the requirements of both EPA (1999 and 2009) guidance in as much as the conventional evaluation questions asked can be answered as follows:
- A. Is the primary treatment tank (Septic Tank) adequately sized and supplied by a reputable and certified practitioner = Answer is Yes, precast concrete septic tank is sized correctly and was supplied by Shay Murtagh.
 - B. Is the Primary Tank adequately sized = Yes, calculations provided above.
 - C. Is the WW being treated = Yes, primary and secondary WW treatment is afforded prior to discharge to percolation trenches in a suitable subsoil.
 - D. Is the WWTP certified: BNM Puraflo uses bio-fibrous peat to provide microbiological treatment of wastewater. It was accepted at the time as fit for purpose.
 - E. Can the treated wastewater get away = Yes. The subsoil has a Pass T value, the percolation pipe invert is set on the proven test zone depth in the subsurface. The percolation trench and pipe length is 128m, which is 4 times what it is supposed to be according to EPA 2009 (Table 10.1). The trenches are spaced at double the minimum spacing distance of EPA 2009's Table 7.3.
 - F. Does the 1.2 m depth of unsaturated suitable soil exist = Yes. Evident in the face of the quarry that the subsoil depth = >1.2m and the water table in the quarry is 30m below this land surface.
- 4.7 Given that the system is certified each year by the Anua maintenance team, we are taking that as the Certification and evidence required. I have assessed the site. It appears to have been installed correctly.
- 4.8 As constructed layouts and cross sections accompany this response.

Item no. 5 Requests as follows:

- "5. Where Point No. 3 above cannot be confirmed, please submit full details for an upgraded WWTS in accordance with the EPA Wastewater Treatment Manuals, Treatment Systems for Small Communities, Business, Leisure Centres and Hotels 1999 and the Code of Practice, Wastewater Treatment and Disposal

System Serving Single Houses , EPA, 2009, a New Design (layout plan and section) and Site Characterisation Form.”

Hydro-G offers:

Item 5 does not apply. It has been demonstrated that the systems in place have the required capacity. No upgrades are necessary.

Item no. 6 Requests as follows:

“6. Where Point No. 3 above has been confirmed, please submit a copy of the on-going maintenance contract for the upkeep of the existing wastewater treatment system.”

Hydro-G offers:

Appendix D presents the Maintenance Contract Agreements. A Maintenance Contract has been in place since the system was installed.

Item no. 7 Requests as follows:

“7. Please confirm in the revised site layout plan compliance with Table 6.1 and Annex B (Table B3) Minimum Separation Distances of the Code of Practice, Wastewater Treatment and Disposal System Serving Single Houses, EPA, 2009. Include and confirm separation distances and compliance with the on-site well and all adjoining wells.”

Hydro-G offers:

The accompanying drawing presents the Site Layout. Separation distances are evident in the Layout and also specifically annotated for required separation distances for wells (Annex B, Table B3) in the aerial photograph as Figure 2.

All separation distances are achieved for all components of the WW infrastructure at the site and all targets.

The separation distances required by EPA 2009 Table 6.1 and the actual site conditions at the Bennettsbridge Limestone Site are as follows:

- Surface water soak away: EPA requires 5m separation & downgradient of a polishing filter = ACHIEVED ON SITE. The surface water does not go to a soakaway. It goes to the wheel wash for use in dust suppression.
- Watercourse/stream: EPA requires 10m separation = Achieved, No Stream within 10m of any WW infrastructure.
- Open drain: EPA requires 10m separation = Achieved, as above, none within proximity of the WW infrastructure.
- Heritage areas NHA/SAC = the site is >500m from the River Nore SAC. The site has demonstrated no impact on the SAC in previous granted planning permissions.
- Lake of foreshore: EPA requires 50m = achieved because there is no lake or foreshore.
- Any dwelling house: EPA requires 7m separation distance from house to septic tank = Achieved because no houses on site. Nearest dwelling is to the SE and the nearest corner of the house is 63m from the most extreme SE corner of the percolation area, which is the part of the Septic Tank/WWTP/Percolation zone that is closest to the house. EPA requires 10m separation to the percolation area and, as above, = Achieved.

- Site Boundary: EPA requires 3m = achieved.
- Trees: EPA requires 3m = achieved. There are no trees in the field assigned to percolation.
- Roads: EPA requires 4m = achieved for public road separation distance. Some internal access routes pass alongside the septic tanks.
- Slope breaks/cuts: EPA requires 4m = achieved, actual distance to break in slope from end of percolation pipes is ~10m. The Puraflo system is at the top of the hill and is 10m distance from the change in slope to the west and 14m to the change in slope in both north and south directions, to the east of the Puraflo units is >100m from the change in slope.

With respect to Annex B (Table B3) separation distance required between a receptor and percolation area or polishing filter:

- The water supply well on site is 149m distance from the closest edge of the percolation area. The well is located to the NW of the percolation area. The well is upgradient in terms of groundwater flow direction, which is to the River Nore to the east of the site. EPA (2009) requires a maximum value of 60m for a T <10, 2m depth of subsoil and Public Supply Well. Therefore, twice the separation distance is afforded.
- For a domestic well alongside, the separation distance required is 25m and for a domestic well downgradient, the separation distance required is 60m. There are no houses within 25m and no residences within 60m downgradient. The nearest boundary of a domestic dwelling in the down gradient direction is 76m (Figure 2). Therefore, separation distance achievement is confirmed for all cases.

7

Item no. 8 Requests as follows:

“8. Please confirm how the clean stormwater for the proposed development will be managed and maintained within the curtilage of the site.”

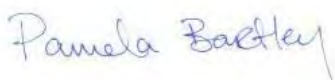
Hydro-G offers:

Stormwater from the roofs is conveyed directly by pipe, from the gulleys under the downpipes, to the wheelwash for dust suppression.

Stormwater from the hard pavings, footpaths and car parks, flows by gravity to the road gulleys adjacent to the offices and from the road gulleys it is conveyed down to the floor of the quarry. The quarry sump and settlement systems have previously been proven, in recent granted planning permissions, to have the capacity for stormwater management.

THE RFI ends with a note stating as follows: Note: Point No.'s 3 - 7 above shall be addressed by a Qualified Site Assessor. As stated in the introduction to this response, I am a Fetac Certified Site Assessor and I have acted as both a Soils Instructor and Interviewer for the final examination interview for candidates for the Site Assessor Fetac Certification. Evidence of my qualifications, professional competency and Professional Insurances accompany this submission.

Yours Sincerely



Dr. Pamela Bartley B.Eng, M.Sc., Ph.D., MIEI
FETAC SITE ASSESSOR No. 722383 Dated 9/12/2005

INFORMATION ACCOMPANYING Hydro-G's Response to KCC's Request for Clarification:

1. A copy of the RFI for ease of reference (Appendix A).
2. Septic Tank Details (Appendix B).
3. Site Characterisation: F Hughes Engineering in 2007 (Appendix C).
4. Appendix D ANUA Annual Maintenance Agreement & ANUA Maintenance Reports.
5. Dr. Pamela Bartley's evidence of qualifications, professional competency, and Professional Insurances.
6. As requested, DWGs for the plans, cross sections etc. for the septic tanks, WWTP and percolation area (Earth Science Partnership DWGs.)

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Figures

Figure 1 The Puraflo units and distribution boxes on the 2010 ortho aerial photograph on the GSI website.

Figure 2 Separation distances on a Hydro-G annotated aerial photograph [NOTE: also provided in the DWG Site Layout accompanying]

Photo Series Attached

Office Septic Tank feed to Pump Station adjacent. [Refer to Site Photograph 1].

The clarity of the waters in the pipes of the distribution boxes is evident from visual assessment of the pipes completed on the 23/2/21 (Photograph Photo Series at end of this communication).

Other site photos.

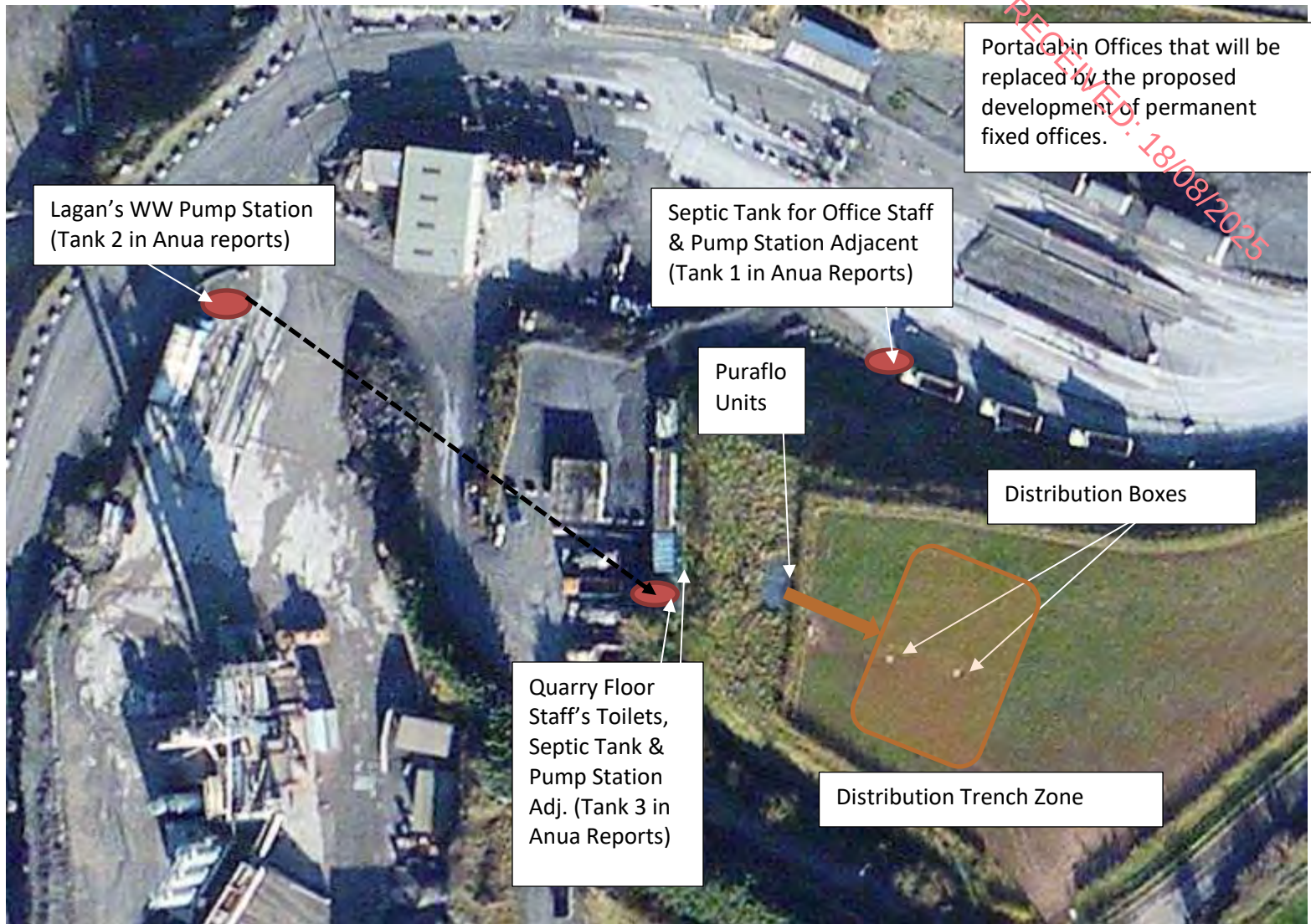


Figure 1 **Hydro-G labelled** Aerial Photo showing Puraflo units and distribution boxes (source, GSi ortho 2010). REFER TO DWG Site Layout for detail.



Figure 2 Separation distances achieved. On Site water supply well  = 149m upgradient = adheres to EPA separation distance of 60m, which is the strictest distance i.e. we assign PWS status to the private well that supplies the staff of the site. Note: there are no domestic wells within required separation distances.



Septic Tank & Pump
Station pumping
waste up to the
Puraflo units (view
from the Puraflo units)

Photo 1 Offices and Toilet block portacabins that will be replaced by proposed development and the septic tank & pump station serving: View from Puraflo Units.



Photo 2 Offices and Toilet block septic tank & pump station: View from internal access route.



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Photo 3 Puraflo modules 2 no.



Photo 4 The Second septic tank on site serving the quarry floor's staff.

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Photo 5 Quarry Floor Staff Toilet & Septic Tank Vent adjacent (at the base of the hill that homes the PuraFlo modules).



Photo 6 Line of 100mm PVC plain walled sewer pipe conveying secondary treated WW from the Puraflo modules to the splitter box that feeds both distribution boxes, which in turn feed four percolation pipes and associated trenches.

Refer to Site Layout drawing for trench configuration.



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Photo 7 Splitter box view = clear treated wastewater.



Photo 8 One of 2 no. distribution boxes: clear treated wastewater.



Photo 9 Vent stack for end of distribution trenches.

Appendix A

Kilkenny County Council

RFI February 2021

RECEIVED: 18/06/2025



For your information

15/02/2021

Eoin O'Carroll of Bennettsbridge Limestone Quarries
Kilree
Sheastown
Bennettsbridge
Co Kilkenny

APPLICATION: PERMISSION for development. The development consists of a Planning Application for the removal of existing office cabins and the proposed erection of a new office structure, the erection of entrance walls and signage and all associated ancillary facilities within an existing quarry complex

PLANNING REGISTER NO: 20891

LOCATION: Kilree Sheastown Bennettsbridge

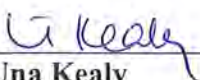
A Chara,

With reference to the above application in respect of the above proposed development, in accordance with Part 4, Article 33 of the Planning and Development Regulations, 2001 (as amended) you are requested to submit the further information as outlined on the attached schedule.

Your application will be held in abeyance pending receipt of the requested information.

Note: You are advised that in accordance with Article 33 of the Planning & Development Regulations 2001 (as amended), where the Planning Authority require further information –including any subsequent clarification request - on your application, responses to both the further information and clarification of further information must be received by the Planning Authority within 6 months from the date of issue of the initial further information request. **Where the required responses to the request for further information – including subsequent associated clarification response -are not received within 6 months of the date of issue of the original request for further information, the Planning Authority will declare your application to be withdrawn.**

Mise, le meas,


Una Kealy
Administrative Officer

With reference to your application and in accordance with Part 4, Article 33 of the Planning & Development Regulations, 2001-2020, you are requested to submit six copies of the following information:

1. The proposal to provide entrance walls and signage at the junction of the L26322 and the R700 has not been included within the planning unit as outlined in red. The L26322 does not form a primary entrance to the applicant's site but rather is a public road serving existing dwellings houses and agricultural lands in addition to serving Bennettsbridge Limestone Quarries Ltd site. In this regard it is not considered appropriate that this junction of 2 no. public roads should be formalised as an entrance to Bennettsbridge Limestone Quarries Ltd. Accordingly, the applicant is requested to consider the relocation of the proposed wing walls and signage to the junction of the L26322 and the private quarry access road.

Furthermore, as the proposed entrance walls and signage have not been included within the planning unit as outlined in red, it is considered that the development as proposed is misleading. The applicant is requested to submit a revised site layout drawing with all proposed works located within the planning unit as outlined in red. In this regard, where the site boundary is amended, the further information must be re-advertised as significant further information and revised public notices submitted accordingly.

2. The applicant is requested to clarify the proposed numbers of staff associated with the proposed new office building.
3. Please submit full details to demonstrate that the existing wastewater treatment system on site has the capacity to accommodate the proposed development.
4. Where Point No. 3 above has been confirmed, the applicant should confirm that the existing waste water treatment system has been satisfactorily installed in accordance with the EPA Wastewater Treatment Manuals, Treatment Systems for Small Communities, Business, Leisure Centres and Hotels 1999 and the Code of Practice, Wastewater Treatment and Disposal System Serving Single Houses, EPA, 2009. The certification should include a site specific 'as constructed' layout plan and cross-sectional drawing through the entire wastewater treatment system to include photographic evidence, where appropriate. A generic drawing / cross-section is not acceptable. The certificate must be completed by a suitably qualified and indemnified person with a copy of proof of indemnification insurance to be submitted with the certificate.
5. Where Point No. 3 above cannot be confirmed, please submit full details for an upgraded WWTS in accordance with the EPA Wastewater Treatment Manuals, Treatment Systems for Small Communities, Business, Leisure Centres and Hotels 1999 and the Code of Practice, Wastewater Treatment and Disposal System Serving Single Houses, EPA, 2009, a New Design (layout plan and section) and Site Characterisation Form.

6. Where Point No. 3 above has been confirmed, please submit a copy of the on-going maintenance contract for the up keep of the existing wastewater treatment system.
7. Please confirm in the revised site layout plan compliance with Table 6.1 and Annex B (Table B3) Minimum Separation Distances of the Code of Practice, Wastewater Treatment and Disposal System Serving Single Houses, EPA, 2009. Include and confirm separation distances and compliance with the on-site well and all adjoining wells.
8. Please confirm how the clean stormwater for the proposed development will be managed and maintained within the curtilage of the site.

Note: Point No.'s 3 – 7 above shall be addressed by a Qualified Site Assessor. A list of qualified Site Assessors is available on the Council website or on request from the Planning Department.

Your application will be held in abeyance pending receipt of the above.

Appendix B

Septic Tank Details

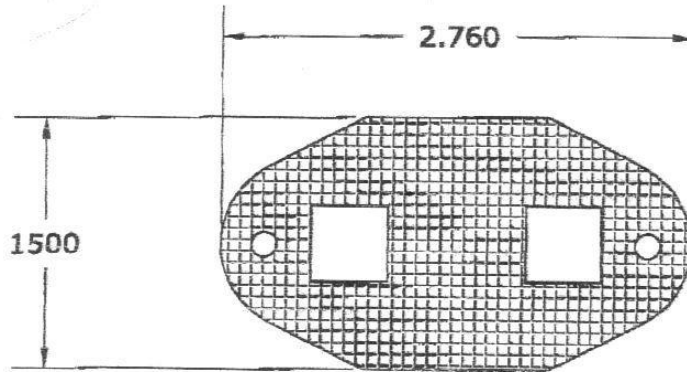
RECEIVED: 18/08/2025

CARLOW PRECAST TANKS LTD.

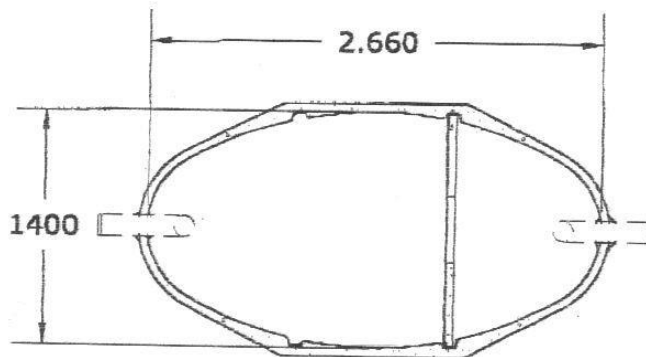
Kilknock, Ballon, Co. Carlow - Tel 0503 59100, Fax 0503 59202, e-mail sales@carlowprecasttanks.com
Manufacturers and Suppliers of Septic and Effluent Tanks Suitable for Sewage Treatment Systems.
Water Reservoirs, Pumping Chambers, Culverts, Beams and Special Products

June 2001

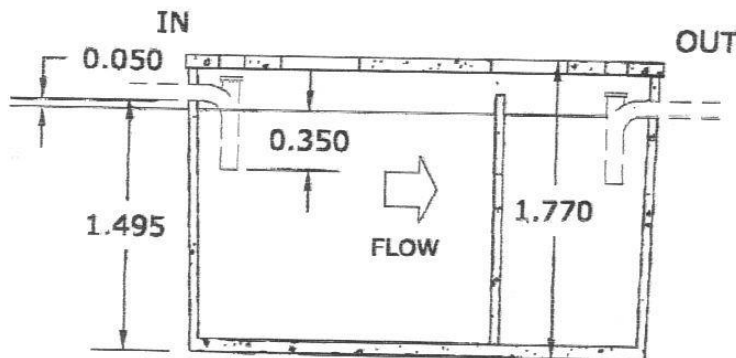
1000 Gallon (4.5 cubic metre) Septic Tank



Roof Plan



Floor Plan



Section

450mm x 450mm Access covers to each chamber.

Chequer plate patterned top surface to roof.

Wavin fittings (shown dotted) supplied by customer.

Standard tank weight 3.75 tonnes.

Working capacity 880 gallons (4.00 cubic metres).

Total enclosed volume 1040 gallons. (4.73 Cubic metres).

Surface Area 2.47 square metres.

Precast concrete distribution box available on request.

Pat Rooney
0872107971

Frank

4 for 2300
(575 per unit delivered.)
€100 per meter

Appendix C

F Hughes Site Characterisation (2007) & Trench Specification & BnM details

RECEIVED: 18/08/2015



F Hughes Engineering

Ennisnag, Co. Kilkenny

Mob: 086 8638648 • Tel: 056 7730994 • Fax: 056 7730995
fhugheseng@gmail.com

RECEIVED: 18/08/2025

Calculations for length of percolation pipe needed at Bennetsbridge Limestone Quarries.

Result of T-Test = 2.775

Design PE = 16

As per EPA Wastewater Treatment Manual, Treatment Systems for Single Houses, Chapter 4.11, Table 15

Length of 450mm percolation trench required = 128m

Construct trench as per EPA Wastewater Treatment Manual, Treatment Systems for Single Houses, Chapter 4.2, Figure 12, of 8 lengths each measuring 16m.

PERCOLATION TEST

Type of Test:

T-Test



or

P-Test



RECEIVED: 18/08/2025

Percolation Test Hole	1	2
Depth from ground surface to top of hole (mm) (A)	1250	1180
Depth from ground surface to base of hole (mm) (B)	1650	1580
Depth of hole (mm) [B-A]	400	400
Dimensions of hole [length x breadth (mm)]	300 x 300	300 x 300

Each hole must be pre-soaked twice before the test is carried out (from 10.00 a.m. to 5.00 p.m. and from 5.00 p.m. to the next morning)

Date of test	29/3/07	
Date pre-soaking started	28/3/07	
Time filled to 400mm		10.45
Time water level at 300mm		10.51

Percolation Test Hole No.	1	2
---------------------------	---	---

Fill No.	Start Time (at 300mm)	Finish Time (at 200mm)	Δt (min)	Start Time (at 300mm)	Finish Time (at 200mm)	Δt (min)	
1	10.02	10.07	5	10.51	10.58	7	
2	10.07	10.19	12	10.58	11.09	11	
3	10.19	10.34	15	11.09	11.26	17	
Average Δt			10.6	Average Δt			11.6

Average $\Delta t/4 = [\text{Hole No. 1}] \underline{2.65} (t_1)$ Average $\Delta t/4 = [\text{Hole No. 2}] \underline{2.9} (t_2)$

T-Value = $(t_1 + t_2)/2 = \underline{2.65 + 2.9} / 2$ (min/25mm)

Result of Test: T = 2.775

Comments: Pass

BORD NA MÓNA

BORD NA MÓNA ENVIRONMENTAL LIMITED

WASTEWATER TREATMENT PLANT QUOTATION

RECEIVED: 18/08/2025

DATE:	7 February 2007	QUOTE NUMBER:	77614 Rev 8
SITE OWNER:		CLIENT/CLIENT REPRESENTATIVE:	Eoin O'Carroll
SITE ADDRESS:	Limestone Quarry	ADDRESS:	Bennetsbridge Limestone Quarry
	Kilree		Kilree
	Sheastown		Sheastown
	Co Kilkenny		Co Kilkenny
PHONE / MOBILE		PHONE / MOBILE:	056-7727070/087-2678352
FAX:		FAX:	056-7727596
SCOPE OF SUPPLY	Bord na Móna Environmental Ltd. will supply, install and commission the following wastewater treatment plant detailed in the proposal reference Q77614 Rev 8 Puraflo 12 Modular Secondary Treatment Plant Client responsibilities are as per the attached proposal reference Q77614 Rev 8		
EXTRAS (If applicable)	Pump Stations (see detail attached)		
PRICE	Total Price: € 27,000.00+ vat @ 13.5% = € 30,645.00 30% Order Deposit to be paid when order is placed = € 9,193.50 <u>Balance to be paid on day of installation</u> (On arrival on site, prior to commencement of installation) = € 21,451.50 Order Deposit is payable on initial quotation price. Final price is subject to site evaluation by Bord na Móna Environmental Ltd. Technical support personnel. No builders / main contractors discount or retention is reflected in the quoted price.		
TO BE COMPLETED BY INVOICEE / CUSTOMER (PLEASE USE BLOCK CAPITALS)			
NAME: (Invoicee / Customer)	SIGNED: (Invoicee / Customer)		<u>Important, please read:</u> I have read, understand and accept the above Quotation & Conditions of Sale attached. This form when signed by both parties constitutes an official order and binding contract. Please retain a copy showing both signatures for your reference.
COMPANY NAME: (If applicable)	DATE: 22-Feb-07		
ADDRESS:	SIGNED:		
	(For Bord na Móna Environmental Ltd.)		
	DATE: 7 February 2007		
Phone:			
Mobile:			
Fax:			
WHAT TO DO NOW	Please return the signed quotation and order deposit cheque to: Wastewater Treatment Co-ordinator, Bord na Móna Environmental Ltd, Newbridge, Co. Kildare. Tel: 1850 381136 / 045 439000. Fax: 045 432312		

Appendix D

**Anua Service Agreement &
Maintenance Reports**

RECEIVED: 18/06/2025

Service Inspection Agreements – SCS Standard WWTP

SCS Wastewater Treatment Systems provide high performance effluent treatment. A regime of yearly inspection and maintenance is essential to ensure that your system continues to perform to the same high standards throughout its lifetime. Anua offer a range of Service Agreement options. Choose one to suit your needs and get the best from your system.

Job/Quotation Number		Date	
-----------------------------	--	-------------	--

Anua Environmental South ("the Company") enter this Aeration Wastewater Treatment System Inspection Agreement with the Customer named below:

Customer Details		Site Details * [See Important Note 1, Below]	
Name		Name	
Address		Address	
Telephone – H		Telephone – H	
Telephone – M		Telephone – M	
Email Address		Email Address	

Equipment:

SCS – Wastewater Treatment Plant	
- Tank – Sludge Levels in each section - Media condition - Air Diffused Arrangement (Where Applicable) - Air Blowers (Where Applicable) - Pumps	- Control Panel - Alarm Floats/Lights - Dosing Equipment (Where Applicable)

This SCS - Wastewater Treatment System Inspection Agreement includes the following:

- Inspection Visit by agreed arrangement with the customer.
- On the day of inspection a report will be provided to the customer indicating status of the mechanical and electrical components for each of the following tanks/sections, where applicable:

☐ Inlet Pump Station (where applicable) ☐ Primary Settlement Section ☐ Storage Section (where applicable) ☐ Anoxic Section (where applicable) ☐ Aeration Section (where applicable)	☐ P Reduction Equipment (where applicable) ☐ Recirculation Section (where applicable) ☐ Secondary Settlement Section ☐ Outlet Pump Section (where applicable) ☐ Control Panel
--	--
- Any obvious water infiltration into any part of the system (at the time of inspection)
☐ General appearance and condition of the system and the surrounding ground area
- Full inspection labour is covered (including any immediate minor system adjustment required). This Inspection Agreement does not cover the cost of any labour or materials for remedial works highlighted during inspection.
- Components replaced will be billed on the day of inspection

Free Sludge Level Assessment and Desludging Recommendation:

Anua Environmental South will assess the sludge level in your primary settlement tank free of charge when they carry out the system inspection. Based on this assessment we will then advise you when you should have your primary settlement tank desludged. The EPA guidelines on Treatment Systems for Small Community Systems recommend that you should desludge your primary settlement tank a minimum of once per year or as required.

Inspection Agreement renewal notices will be issued.

Contract Type	Price (includes VAT @ 13.5%)	Please Tick the Required Options (Please tick at least one option)
1 Year Contract (1 visit / annum)	€340.50	RECEIVED: 18/08/2025
1 Year Contract (2 visits / annum)	€681.00	
1 Year Contract (3 visits / annum)	€1,000.00	
1 Year Contract (4 visits / annum)	€1,300.00	
1 Year Contract (6 visits / annum)	€1,890.00	
Effluent sampling on the day of the Service Check can be arranged for analysis of two constituents:	€150.00 per sample	
Effluent sampling only can be arranged for analysis of two constituents:	€200.00 per sample	

Payment By Credit/Laser Card	YES	NO
Please tick if you wish to pay for the agreement by card (a member of staff will phone you for your details)	☐	☐

Please tick Yes or No	YES	NO
Service Inspection Required A.S.A.P.	☐	☐
NOTE - In the event that no option is ticked, the inspection of systems will be scheduled within the last 3 months of each 12 month period of the agreement.		

Anua Environmental South agrees to provide the services listed on this Service Agreement subject to the terms and conditions below: Signed for the Company: Name: _____ Date: _____	Please supply the services listed on this Service Agreement subject to the terms and conditions below: Signed for the Customer: Name: _____ Date: _____
---	---

TERMS AND CONDITIONS:

SCS Wastewater Treatment System - SCS Service Inspection Agreement.

- The contract shall continue for period of the agreement only and is renewable upon expiration of that agreement.
- The Sewerage Treatment System Service Inspection Agreement will not extend to:
 - o Modifications or additions to the equipment;
 - o Items which in the Company's opinion can no longer be subject to economic maintenance;
 - o Defects resulting from misuse or neglect of or accident to the equipment or failure to follow the instructions/advice of the Company.
 - o Inspection of percolation area.
- The Service Inspection Agreement charge must be returned with the signed Service Inspection Agreement Form.
- If a customer requests an unscheduled maintenance visit prior to the service inspection being carried out on the system then the service inspection will also be carried out during this site visit. If the customer does not wish for the service inspection to be carried out during this visit or if subsequent unscheduled maintenance visits are required there will be a charge to the customer.
- Additional services (including visits additional to the number specified in the Service Inspection Agreement) and the cost of replacement parts will be the subject of extra charges in accordance with the Company's terms then in force.
- To facilitate the provision by the Company of this Service Inspection Agreement the Customer shall:
 - o Keep and operate the equipment in a proper and prudent manner and in accordance with the instructions and advice of the supplier as laid out in the Operation and Maintenance Manual given to each customer upon installation of their system.
 - o Not make any addition, modification or adjustment to the equipment without the Company's prior consent;
 - o Provide access to the equipment.
- The Company shall use its reasonable endeavours to keep the equipment in efficient operating conditions but shall have no liability for:
 - o Any loss or damage of any kind arising from any stoppage, breakdown or failure of the equipment;
 - o Any damage to the Customer's property unless occasioned by the Company's negligence;
 - o Any failure to perform the contract by reason of any circumstance beyond its control.
 - o Failure of percolation area.
- The Company shall renew the contract only on signing of new contract and payment of Service Inspection Agreement charge in full.
- The contract is personal to the Customer and may not be assigned without the Company being given prior written notice. The Company will accept no responsibility to a third party for any information given to the Customer.
- No variation or amendment of the contract shall be binding on the Company unless confirmed by it in writing

RECEIVED: 18/08/2025



Invoice No: 171
Date:18/02/16

Name: Frank Donnelly
Address: Kilree, Sheestown, Co. Kilkenny

VAT No: IE7565814K

RECEIVED: 18/08/2025

INVOICE

RECEIVED: 18/08/2025



Payment Acceptance

ANUA ENVIRONMENTAL SOUTH
1 KILBEG CLOSE
BANAGHER
TID: 27049574
MID: IE0000000007280
VISA (M)

Receipt no.: 000047

Valid until: /

SALE

AMOUNT 340,50 EUR

RECEIPT FOR CLIENT

CNP

Signature

Authorisation code: (1) 034953

DATE: 18.02.2016

TIME: 14:10:20
App. ver.: 0143

A division of EVO PAYMENTS
SOLUTIONS

ANUA
ENVIRONMENTAL SOUTH

No 1 Kilbeg Close
Banagher, Co. Wick
Tel: +353 86 3208498
Email: services@anuasouth.com

James Frank Donnelly
Address: Banagher, Co. Wick

ANUA ENVIRONMENTAL SOUTH	
1 KILBEG CLOSE	
BANAGHER	
TID: 27049574	
MID: IE0000000007280	
VISA (M)	
Receipt no.: 000047	
Valid until: /	
SALE	
AMOUNT 340,50 EUR	
RECEIPT FOR CLIENT	
CNP	
Signature	
Authorisation code: (1) 034953	
DATE: 18.02.2016	
TIME: 14:10:20	
App. ver.: 0143	
A division of EVO PAYMENTS SOLUTIONS	
ANUA ENVIRONMENTAL SOUTH	
1 KILBEG CLOSE	
BANAGHER	
TID: 27049574	
MID: IE0000000007280	
VISA (M)	
Receipt no.: 000047	
Valid until: /	
SALE	
AMOUNT 340,50 EUR	
RECEIPT FOR CLIENT	
CNP	
Signature	
Authorisation code: (1) 034953	
DATE: 18.02.2016	
TIME: 14:10:20	
App. ver.: 0143	
A division of EVO PAYMENTS SOLUTIONS	

ANUA ENVIRONMENTAL SOUTH

Customer Name	BENNETTSBRIDGE LIMESTONE	Job Number	G781	Report Date	22/03/2017
Site Address:	BENNETTSBRIDGE Co. KILKENNY	System Type:	12 MOD PuraFlo +		
Phone:	087 8187128	Site Contact:	FRANK		
		Date S.A Ends			
		Date System Installed			
		Next Service Due :	SEPTEMBER 2017		

Note: Use abbreviation N.V. where component is not visible.

Primary Settlement Tank (s): ACROSS FROM WEIGHBRIDGE				@ LAGANS OFFICE				ON Hill			
Primary Settlement Tank 1 Tank size m ³				Primary Settlement Tank 2 (where applicable) Tank size m ³				Primary Settlement Tank 3 (where applicable) Tank size m ³			
Needs Desludging	Yes	No		Needs Desludging	Yes	No		Needs Desludging	Yes	No	
Sludge Level (mm)	400			Sludge Level (mm)	400			Sludge Level (mm)	300		
Baffle Wall	Yes	No		Baffle Wall	Yes	No		Baffle Wall	Yes	No	
Scum Surface Depth (mm)	100			Scum Surface Depth (mm)	NIL			Scum Surface Depth (mm)	NIL		
Access Covers Secure	Yes	No		Access Covers Secure	Yes	No		Access Covers Secure	Yes	No	
Is Tank Vented	Yes	No		Is Tank Vented	Yes	No		Is Tank Vented	Yes	No	

Primary Tank Outlet Filter(s) number installed:				1			
Filters Installed in:		Primary Septic Tank 1		Primary Septic Tank 2		Primary Septic Tank 3	
Filter Present	Yes	No		Filter Accessible	Yes	No	
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)		Manhole Construction:		Block	Precast Risers	Cast on site
Constructed and Sealed by:	Client / Clients Contractor			Anua Environmental South			
Comments: ALL TANKS DIPPED FOR SLUDGE + DO NOT REQUIRE DE-SLUDGING. ALL FILTERS LIFTED + CLEANED							

Pump Chambers (tick as relevant):		Inlet Pump Chamber	Forward Feed Pump Chamber
Recirculation Pump Chamber		Pump to PuraFlo Pump Chamber	Outlet Pump Chamber

Pump to Puraflor Pump Chamber:	Pump Make	EPARA		Pump Model	BEST		Single Phase	☒	Three Phase	☒	
	Number of Pumps Fitted	2	Duty		Duty Standby	☒	Duty/Duty		Pumps Inspected & Operational	Yes	No
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes	☒	No	Control On/Off Float	Yes	☒	No	Pump Chamber Requires Desludging	Yes	No
	Access Covers Secure	Yes	☒	No	Is Tank Vented	Yes	☒	No			
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block			Precast Risers		Cast on site	
Constructed and Sealed by:	Client / Clients Contractor							Anua Environmental South			
Comments: RCBO RESET + PUMPS OPERATIONAL											

Clarifier Tank(s):											
Clarifier Tank 1				Clarifier Tank 2 (where applicable)							
Clarifier Tank 1 Size m ³				Clarifier Tank 2 Size m ³ (where applicable)							
Sludge Level (mm)				Sludge Level (mm)							
Needs Desludging				Yes	No	Needs Desludging				Yes	No
Surface Scum Depth (mm)				Surface Scum Depth (mm)							
Return Sludge Pump Make		Return Sludge Pump Model		Return Sludge Pump Make		Return Sludge Pump Model		Return Sludge Pump Make		Return Sludge Pump Model	
Single Phase		Three Phase		Single Phase		Three Phase		Single Phase		Three Phase	
Return Sludge Pump Operational				Yes	No	Return Sludge Pump Operational				Yes	No
Tank Vented				Yes	No	Tank Vented				Yes	No
Tank Free Draining at Outlet				Yes	No	Tank Free Draining at Outlet				Yes	No
Access Covers Secure				Yes	No	Access Covers Secure				Yes	No
Tank Manholes: (from F.G.L.)		Depth to top of tank (mm)		Manhole Construction:		Block		Precast Risers		Cast on site	
Constructed and Sealed by:		Client / Clients Contractor						Anua Environmental South			
Comments:											

Puraflor Treatment System:											
Secondary		☒	Tertiary		Number of Modules		12	Bed Size (m2)			

Puraflor Peat Bed:	Retaining Structure:	Block Wall		Mass Concrete		Earth Mound				
	Roof	Yes	No	Type of Roof:	Open	Slabs	T-Beam	Sheeting		
	Venting	Yes	No	Access	Yes	No				
	Base Floor:	Concrete		Liner		None				
	Condition of Fibre	TANK								
Grids Level	Yes	☒	No	Is Bed Free Draining at Outlet	Yes	☒	No			
Distributor Valve Fitted	Yes	No	Distributor Valve Location marked	Yes	☒	No	Distributor Valve Operational	Yes	No	
Comments: All ok.										

Phosphorus Removal:	Capacity of Chemical Storage Tank (litres)					
	Bunded Kiosk Fitted		Yes	No	Volume of Chemical Storage Tank (litres)	
	Dosing Pump Make			Dosing Pump Model		
	Is Chemical Top Up Required	Yes	No	System Dosing Pipework Inspected	Yes	No
	Dosing Pump Settings:		Frequency/Speed		%	Stroke
Comments:						

Control Panel:	Location of Control Panel		@ Pump Sumps		Indoor	Outdoor	✓
	Details: 230V SINGLE PHASE + 400V 3 PHASE						
	Power Supply Connected	Yes	✓ No	All Component Electrical Connections Complete	Yes	✓ No	
	Visual Alarm Tested	Yes	✓ No	Overloads Set and Recorded on Electrical Diagram	Yes	✓ No	
	Timers Set & Recorded on Electrical Diagram	Yes	✓ No	Overloads Reset & Recorded (if required)	Yes	✓ No	
	Timers Reset & Recorded (if required)	Yes	✓ No	Overload Trips Tested	Yes	✓ No	
	High Level Alarm Floats Tested	Yes	✓ No	Pump Sequence Timers Tested	Yes	✓ No	
Comments:							

Sampling:	Sampling Point	Yes	✓ No	Sampling Point Installed by:	Anua Env	Client	Other	✓
	Details of Sampling Point Location & Access: SAMPLE CHAMBER ON MODULES					Outlet Sample Taken	Yes	No
Submitted for Testing for the Following	B.O.D.	T.S.S.		NH3-N				
	Total N	Total Phosphorus		Orthophosphates				
N/A								

General Comments:	
ALL PRIMARY TANKS DIPPED FOR SLUDGE + DO NOT REQUIRE DE-SLUDGING. ALL PUMPS INSPECTED + OPERATIONAL. ALARM CIRCUITS CHECKED + OK.	
Client/ Client Representative Name (Block Capitals):	Client/ Client Representative Signature:
Anua Environmental Ltd Representative Name (Block Capitals):	Anua Environmental Ltd Representative Signature:
Date:	
22/03/2017	



RECEIVED: 18/08/2025

Service Inspection Agreements – SCS Standard WWTP

SCS Wastewater Treatment Systems provide high performance effluent treatment. A regime of yearly inspection and maintenance is essential to ensure that your system continues to perform to the same high standards throughout its lifetime. Anua offer a range of Service Agreement options. Choose one to suit your needs and get the best from your system.

Job/Quotation Number	G781	Date	22/03/2017
----------------------	------	------	------------

Anua Environmental Ltd ("the Company") enter this Aeration Wastewater Treatment System Inspection Agreement with the Customer named below:

Customer Details		Site Details * [See Important Note 1, Below]	
Name	BENNETTSBRIDGE LIMESTONE QUARRY	Name	
Address	BENNETTSBRIDGE CO. KICKENNY.	Address	
Telephone – H	FRANK 0878187128	Telephone – H	
Telephone – M		Telephone – M	
Email Address		Email Address	

Equipment:

SCS – Wastewater Treatment Plant

- | | |
|---|---|
| <ul style="list-style-type: none"> ▪ Tank – Sludge Levels in each section ▪ Media condition ▪ Air Diffused Arrangement (Where Applicable) ▪ Air Blowers (Where Applicable) ▪ Pumps | <ul style="list-style-type: none"> ▪ Control Panel ▪ Alarm Floats/Lights ▪ Dosing Equipment (Where Applicable) |
|---|---|

This SCS - Wastewater Treatment System Inspection Agreement includes the following:

- Inspection Visit by agreed arrangement with the customer.
- On the day of inspection a report will be provided to the customer indicating status of the mechanical and electrical components for each of the following tanks/sections, where applicable:

☐ Inlet Pump Station (where applicable) ☐ Primary Settlement Section ☐ Storage Section (where applicable) ☐ Anoxic Section (where applicable) ☐ Aeration Section (where applicable)	☐ P Reduction Equipment (where applicable) ☐ Recirculation Section (where applicable) ☐ Secondary Settlement Section ☐ Outlet Pump Section (where applicable) ☐ Control Panel
--	--
- Any obvious water infiltration into any part of the system (at the time of inspection)
 General appearance and condition of the system and the surrounding ground area
- Full inspection labour is covered (including any immediate minor system adjustment required). This Inspection Agreement does not cover the cost of any labour or materials for remedial works highlighted during inspection.
- Components replaced will be billed on the day of inspection

Free Sludge Level Assessment and Desludging Recommendation:

Anua Environmental Ltd. will assess the sludge level in your primary settlement tank free of charge when they carry out the system inspection. Based on this assessment we will then advise you when you should have your primary settlement tank desludged. The EPA guidelines on Treatment Systems for Small Community Systems recommend that you should desludge your primary settlement tank a minimum of once per year or as required.

Inspection Agreement renewal notices will be issued.

No 1 Kylebeg Close, Church Street, Banagher, Co Offaly

info@anuenv.com

www.anuenv.com

Contract Type	Price (includes VAT @ 13.5%)	Please Tick the Required Options (Please tick at least one option)
1 Year Contract (1 visit / annum)	€340.50	☒
1 Year Contract (2 visits / annum)	€681.00	☐
1 Year Contract (3 visits / annum)	€1,000.00	☐
1 Year Contract (4 visits / annum)	€1,300.00	☐
1 Year Contract (6 visits / annum)	€1,890.00	☐
Effluent sampling on the day of the Service Check can be arranged for analysis of two constituents:	€150.00 per sample	☐
Effluent sampling only can be arranged for analysis of two constituents:	€200.00 per sample	☐

Payment By Credit/Laser Card	YES	NO
Please tick if you wish to pay for the agreement by card (a member of staff will phone you for your details)	☐	☒

Please tick Yes or No	YES	NO
Service Inspection Required A.S.A.P.	☐	☒

NOTE - In the event that no option is ticked, the inspection of systems will be scheduled within the last 3 months of each 12 month period of the agreement.

Anua Environmental Ltd. agrees to provide the services listed on this Service Agreement subject to the terms and conditions below: Signed for the Company: Name: <u>Jan Kenny</u> Date: <u>22/03/2017</u>	Please supply the services listed on this Service Agreement subject to the terms and conditions below: Signed for the Customer: Name: <u>Frank Donnelly</u> Date: <u>22-03-17</u>
---	---

TERMS AND CONDITIONS:

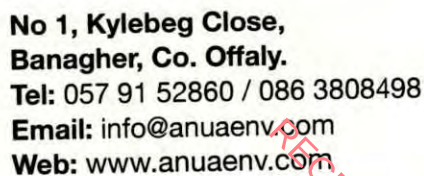
SCS Wastewater Treatment System - SCS Service Inspection Agreement.

- The contract shall continue for period of the agreement only and is renewable upon expiration of that agreement.
- The Sewerage Treatment System Service Inspection Agreement will not extend to:
 - Modifications or additions to the equipment;
 - Items which in the Company's opinion can no longer be subject to economic maintenance;
 - Defects resulting from misuse or neglect of or accident to the equipment or failure to follow the instructions/advice of the Company.
 - Inspection of percolation area.
- The Service Inspection Agreement charge must be returned with the signed Service Inspection Agreement Form.
- If a customer requests an unscheduled maintenance visit prior to the service inspection being carried out on the system then the service inspection will also be carried out during this site visit. If the customer does not wish for the service inspection to be carried out during this visit or if subsequent unscheduled maintenance visits are required there will be a charge to the customer.
- Additional services (including visits additional to the number specified in the Service Inspection Agreement) and the cost of replacement parts will be the subject of extra charges in accordance with the Company's terms then in force.
- To facilitate the provision by the Company of this Service Inspection Agreement the Customer shall:
 - Keep and operate the equipment in a proper and prudent manner and in accordance with the instructions and advice of the supplier as laid out in the Operation and Maintenance Manual given to each customer upon installation of their system.
 - Not make any addition, modification or adjustment to the equipment without the Company's prior consent;
 - Provide access to the equipment.
- The Company shall use its reasonable endeavours to keep the equipment in efficient operating conditions but shall have no liability for:
 - Any loss or damage of any kind arising from any stoppage, breakdown or failure of the equipment;
 - Any damage to the Customer's property unless occasioned by the Company's negligence;
 - Any failure to perform the contract by reason of any circumstance beyond its control.
 - Failure of percolation area.
- The Company shall renew the contract only on signing of new contract and payment of Service Inspection Agreement charge in full.
- The contract is personal to the Customer and may not be assigned without the Company being given prior written notice. The Company will accept no responsibility to a third party for any information given to the Customer.
- No variation or amendment of the contract shall be binding on the Company unless confirmed by it in writing

No 1 Kylebeg Close, Church Street, Banagher, Co. Offaly

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FRANK DONNELLY 087 8187128

2072

Vat No. 342624IDH

€340-50

[illegible]

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Customer Name	BENNETTS BRIDGE Limestone Quarry	Job Number	G781	Report Date	12/03/2018
Site Address:	BENNETTS BRIDGE CO. KILKENNY	System Type:	12 MOD PURAFLO + 3 PRIMARY TANKS		
		Date S.A Ends	N/A		
		Date System Installed			
Phone:	087 818 7128	Site Contact:	FRANK DOWNEY	Next Service Due	MARCH 2019

Note: Use abbreviation N.V. where component is not visible.

Primary Settlement Tank (s):											
Primary Settlement Tank 1				Primary Settlement Tank 2 @ CARANS (where applicable)				Primary Settlement Tank 3 ON HILL (where applicable)			
Tank size m ³ ACROSS FROM WEIGHBRIDGE				Tank size m ³				Tank size m ³			
Needs Desludging	Yes	No	X	Needs Desludging	Yes	No	X	Needs Desludging	Yes	No	X
Sludge Level (mm)	400			Sludge Level (mm)	500			Sludge Level (mm)	400		
Baffle Wall	Yes	X	No	Baffle Wall	Yes	No		Baffle Wall	Yes	X	No
Scum Surface Depth (mm)	NIL			Scum Surface Depth (mm)	NIL			Scum Surface Depth (mm)	NIL		
Access Covers Secure	Yes	No		Access Covers Secure	Yes	X	No	Access Covers Secure	Yes	X	No
Is Tank Vented	Yes	No		Is Tank Vented	Yes	X	No	Is Tank Vented	Yes	X	No

Primary Tank Outlet Filter(s) number installed:															
1															
Filters Installed in:				Primary Septic Tank 1				Primary Septic Tank 2				Primary Septic Tank 3			
				X				X				X			
Filter Present	Yes	X	No	Filter Accessible	Yes	X	No	Filter Cleaned	Yes	X	No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block			Precast Risers	Cast on site						
Constructed and Sealed by:	Client / Clients Contractor			X			Anua Environmental South								
Comments:															
ALL FILTERS CLEANED															

Pump Chambers (tick as relevant):		Inlet Pump Chamber		Forward Feed Pump Chamber	X
Recirculation Pump Chamber		Pump to Puraflo Pump Chamber	X	Outlet Pump Chamber	

Inlet Pump Chamber:	Pump Make		Pump Model		Single Phase		Three Phase		
	Number of Pumps Fitted		Duty		Duty Standby		Duty/Duty		
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes	No	N/A	Control On/Off Float	Yes	No		
	Access Covers Secure	Yes	No		Is Tank Vented	Yes	No		
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block			Precast Risers	Cast on site
Constructed and Sealed by:	Client / Clients Contractor			X			Anua Environmental South		
Comments:									

Forward Feed Pump Chamber:	Pump Make	EBARA		Pump Model	BEST		Single Phase	X		Three Phase		
	Number of Pumps Fitted	1	Duty	X	Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes	X	No
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes	X	No	Control On/Off Float	Yes	X	No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes	X	No	Is Tank Vented	Yes		No	X			
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block			Precast Risers		Cast on site		
Constructed and Sealed by:	Client / Clients Contractor								Anua Environmental South			
Comments:												

Recirculation Pump Chamber:	Pump Make			Pump Model			Single Phase			Three Phase		
	Number of Pumps Fitted		Duty		Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes		No
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes		No	Control On/Off Float	Yes		No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes		No	Is Tank Vented	Yes		No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block			Precast Risers		Cast on site		
Constructed and Sealed by:	Client / Clients Contractor								Anua Environmental South			
Comments:												

Pump to Puraflor Pump Chamber:	Pump Make	EBARA		Pump Model	BEST		Single Phase	X		Three Phase		
	Number of Pumps Fitted	2	Duty		Duty Standby	X	Duty/Duty		Pumps Inspected & Operational	Yes	X	No
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes	X	No	Control On/Off Float	Yes	X	No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes	X	No	Is Tank Vented	Yes	X	No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block			Precast Risers		Cast on site		
Constructed and Sealed by:	Client / Clients Contractor								Anua Environmental South			
Comments:												

Outlet Pump Chamber:	Pump Make			Pump Model			Single Phase			Three Phase		
	Number of Pumps Fitted		Duty		Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes		No
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes		No	Control On/Off Float	Yes		No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes		No	Is Tank Vented	Yes		No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block			Precast Risers		Cast on site		
Constructed and Sealed by:	Client / Clients Contractor								Anua Environmental South			
Comments:												

Puraflo Treatment System:			
Secondary	☒	Tertiary	Number of Modules
		Bed Size (m2)	

Puraflo Modules:	Base of Modules Relative to Finished Ground Level (mm)		A.G.L.		Condition of Fibre		Fibre					
	Modules Level	Yes	☒	No	Modules Free Draining at Outlet	Yes	☒	No				
	Distributor Valve Fitted	Yes		No	Distributor Valve Location marked	Yes		No				
				☒			N/A	Distributor Valve Operational	Yes	☒	No	
Comments:												

Puraflo Peat Bed:	Retaining Structure:		Block Wall		Mass Concrete		Earth Mound					
	Roof	Yes		No	Type of Roof:	Open	Slabs	T-Beam				
	Venting	Yes		No	Access	Yes	No	Sheeting				
	Base Floor:		Concrete		Liner	None						
	Condition of Fibre											
Grids Level	Yes		No	Is Bed Free Draining at Outlet	Yes		No					
Distributor Valve Fitted	Yes		No	Distributor Valve Location marked	Yes		No	Distributor Valve Operational	Yes		No	
Comments:												

Phosphorus Removal:	Capacity of Chemical Storage Tank (litres)						
	Bunded Kiosk Fitted	Yes		No	Volume of Chemical Storage Tank (litres)		
	Dosing Pump Make			Dosing Pump Model	Dosing Pump Operational		
	Is Chemical Top Up Required	Yes		No	System Dosing Pipework Inspected	Yes	No
	Dosing Pump Settings:		Frequency/Speed		%	Stroke	%
Comments:							

Flowmetre:	Location of Flowmetre:		Sensor Location		Display Location	
	Type of Flowmetre:		Mechanical		Electro-Magnetic	
	Size of Flowmetre		2 inch		3 inch	
	Flowmetre Inspected & Operational		Yes		No	
					Comments	

Telemetry:	Telemetry System Tested & Operational		Yes		No		Comments:

Composite Sampler:	Composite Sampler Make				Composite Sampler Tested & Operational		Yes		No
	Suction Discharge Pipe Clear		Yes		No	Peristaltic Pump Suction Pipe Replaced	Yes		No
	Comments:								

Control Panel:	Location of Control Panel		ACROSS FROM WEIGHBRIDGE		Indoor		Outdoor		X			
	Details:		230V SINGLE PHASE									
	Power Supply Connected	Yes	X	No		All Component Electrical Connections Complete	Yes	X	No			
	Visual Alarm Tested		Yes	X	No	Overloads Set and Recorded on Electrical Diagram		Yes	X	No		
	Timers Set & Recorded on Electrical Diagram		Yes	X	No	Overloads Reset & Recorded (if required)		Yes	X	No		
	Timers Reset & Recorded (if required)	Yes	X	No		Overload Trips Tested	Yes	X	No			
	High Level Alarm Floats Tested	Yes	X	No		Pump Sequence Timers Tested	Yes	X	No			
Control Floats Tested										Yes	X	No
Comments:												

Sampling:	Sampling Point	Yes	X	No		Sampling Point Installed by:	Anua Env South		Client		Other	X
	Details of Sampling Point Location & Access	SAMPLE CHAMBER ON MODULUS					Outlet Sample Taken	Yes		No		X
Submitted for Testing for the Following	B.O.D.			T.S.S.		NH3-N						
	Total N			Total Phosphorus		Orthophosphates						
N/A												

General Comments:	
ALL TANKS DIPPED FOR SLUDGE + OK.	
ALL FILTERS CLEANED.	
TRIP SWITCH ON CONTROL PANEL @ LAGAN'S RESET.	
Client/ Client Representative Name (Block Capitals):	Client/ Client Representative Signature: NOT AVAILABLE
Anua Environmental Ltd Representative Name (Block Capitals): D. KENNY	Anua Environmental Ltd Representative Signature: [Signature]
Date: 12/03/2018	



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Customer Name	BENNETTSBRIDGE LIMESTONE QUARRY	Job Number	G781	Report Date	25/04/2019
Site Address:	BENNETTSBRIDGE CO. KILKENNY	System Type:	12med Puraflo + 3 Primary Tanks		
Phone:	087 8157128	Date S.A Ends	MARCH 2020		
Site Contact:	FRANK	Date System Installed			
		Next Service Due	APRIL 2020		

Note: Use abbreviation N.V. where component is not visible.

Primary Settlement Tank (s):		@ LAGANS		ON HILL	
Primary Settlement Tank 1		Primary Settlement Tank 2		Primary Settlement Tank 3	
Tank size m ³ @ WEIGHBRIDGE		(where applicable) Tank size m ³		(where applicable) Tank size m ³	
Needs Desludging	Yes ☒ No ☒	Needs Desludging	Yes ☒ No ☒	Needs Desludging	Yes ☒ No ☒
Sludge Level (mm)	600	Sludge Level (mm)	600	Sludge Level (mm)	600
Baffle Wall	Yes ☒ No ☒	Baffle Wall	Yes ☒ No ☒	Baffle Wall	Yes ☒ No ☒
Scum Surface Depth (mm)	N.V.	Scum Surface Depth (mm)	N.V.	Scum Surface Depth (mm)	N.V.
Access Covers Secure	Yes ☒ No ☒	Access Covers Secure	Yes ☒ No ☒	Access Covers Secure	Yes ☒ No ☒
Is Tank Vented	Yes ☒ No ☒	Is Tank Vented	Yes ☒ No ☒	Is Tank Vented	Yes ☒ No ☒

Primary Tank Outlet Filter(s) number installed:		1	
Filters Installed in:		Primary Septic Tank 1	
Filter Present	Yes ☒ No ☒	Filter Accessible	Yes ☒ No ☒
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)	Manhole Construction:	Block
Constructed and Sealed by:	Client / Clients Contractor		Anua Environmental South
Comments:			
All FILTERS CLEANED			

Pump Chambers (tick as relevant):	Inlet Pump Chamber	Forward Feed Pump Chamber
Recirculation Pump Chamber	Pump to Puraflo Pump Chamber	Outlet Pump Chamber

Inlet Pump Chamber:	Pump Make	Pump Model	Single Phase	Three Phase
	Number of Pumps Fitted	Duty Standby	Duty/Duty	Pumps Inspected & Operational
Tank Size m ³ :	Alarm Float Inspected & Operational	Control On/Off Float	Is Tank Vented	Pump Chamber Requires Desludging
	Access Covers Secure			
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)	Manhole Construction:	Block	Precast Risers
Constructed and Sealed by:	Client / Clients Contractor			Cast on site
Comments:				

Forward Feed Pump Chamber:	Pump Make	EBARA		Pump Model	BEST		Single Phase	☒	Three Phase			
	Number of Pumps Fitted	1	Duty	☒	Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes	☒	No
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes	☒	No	Control On/Off Float	Yes	☒	No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes	☒	No	Is Tank Vented	Yes	☒	No				☒
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block			Precast Risers		Cast on site		
Constructed and Sealed by:	Client / Clients Contractor							Anua Environmental South				
Comments:												

Recirculation Pump Chamber:	Pump Make			Pump Model			Single Phase		Three Phase			
	Number of Pumps Fitted		Duty		Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes		No
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes	☒	No	Control On/Off Float	Yes		No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes	☒	No	Is Tank Vented	Yes		No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block			Precast Risers		Cast on site		
Constructed and Sealed by:	Client / Clients Contractor							Anua Environmental South				
Comments:												

Pump to Puraflor Pump Chamber:	Pump Make	EBARA		Pump Model	BEST		Single Phase	☒	Three Phase			
	Number of Pumps Fitted	2	Duty		Duty Standby		Duty/Duty	☒	Pumps Inspected & Operational	Yes	☒	No
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes	☒	No	Control On/Off Float	Yes	☒	No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes	☒	No	Is Tank Vented	Yes	☒	No				☒
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)		☒	Manhole Construction:	Block			Precast Risers		Cast on site		
Constructed and Sealed by:	Client / Clients Contractor							Anua Environmental South				
Comments:												

Outlet Pump Chamber:	Pump Make			Pump Model			Single Phase		Three Phase			
	Number of Pumps Fitted		Duty		Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes		No
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes	☒	No	Control On/Off Float	Yes		No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes	☒	No	Is Tank Vented	Yes		No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block			Precast Risers		Cast on site		
Constructed and Sealed by:	Client / Clients Contractor							Anua Environmental South				
Comments:												

Puraflo Treatment System:							
Secondary	☒	Tertiary	☐	Number of Modules	12	Bed Size (m2)	

Puraflo Modules:	Base of Modules Relative to Finished Ground Level (mm)		A.Q.C		Condition of Fibre		FAIR			
	Modules Level	Yes	☒	No	☐	Modules Free Draining at Outlet	Yes	☒	No	☐
	Distributor Valve Fitted	Yes	☐	No	☒	Distributor Valve Location marked	Yes	☒	No	☐
Comments:		Distributor Valve Operational								

RECEIVED: 18/08/2015

Puraflo Peat Bed:	Retaining Structure:		Block Wall		Mass Concrete		Earth Mound						
	Roof	Yes	☐	No	☐	Type of Roof:	Open	Slabs	T-Beam	Sheeting			
	Venting	Yes	☐	No	☐	Access	Yes	No	☐	☐			
	Base Floor:		Concrete		Liner		None						
	Condition of Fibre												
Grids Level	Yes	☐	No	☐	Is Bed Free Draining at Outlet	Yes	☐	No	☐				
Distributor Valve Fitted	Yes	☐	No	☐	Distributor Valve Location marked	Yes	☐	No	Distributor Valve Operational	Yes	☐	No	☐
Comments:													

N/A

Phosphorus Removal:	Capacity of Chemical Storage Tank (litres)								
	Bunded Kiosk Fitted		Yes	☐	No	Volume of Chemical Storage Tank (litres)			
	Dosing Pump Make			Dosing Pump Model					
	Is Chemical Top Up Required	Yes	☐	No	System Dosing Pipework Inspected	Yes	☐	No	Comments:
	Dosing Pump Settings:		Frequency/Speed		%	Stroke	%		
Comments:									

Flowmetre:						
	Location of Flowmetre:		Sensor Location		Display Location	
	Type of Flowmetre:		Mechanical		Electro-Magnetic	
	Size of Flowmetre		2 inch		3 inch	
	Flowmetre Inspected & Operational		Yes	☐	No	☐

Telemetry:				
	Telemetry System Tested & Operational	Yes	☐	No

Composite Sampler:								
	Composite Sampler Make			Composite Sampler Tested & Operational	Yes	☐	No	☐
	Suction Discharge Pipe Clear	Yes	☐	No	Peristaltic Pump Suction Pipe Replaced	Yes	☐	No
Comments:								

Control Panel:	Location of Control Panel	ACROSS FROM WEIGH BRIDGE		Indoor		Outdoor	✓
	Details:	230V SINGLE PHASE					
	Power Supply Connected	Yes	✓	No	All Component Electrical Connections Complete	Yes	✓
	Visual Alarm Tested	Yes	✓	No	Overloads Set and Recorded on Electrical Diagram	Yes	✓
	Timers Set & Recorded on Electrical Diagram	Yes	✓	No	Overloads Reset & Recorded (if required)	Yes	✓
	Timers Reset & Recorded (if required)	Yes	✓	No	Overload Trips Tested	Yes	✓
	High Level Alarm Floats Tested	Yes	✓	No	Pump Sequence Timers Tested	Yes	✓
Comments:							
CONTACTS CLEANED ON RELAYS							

Sampling:	Sampling Point	Yes	✓	No	Sampling Point Installed by:	Anua Env South	Client	Other	✓
	Details of Sampling Point Location & Access					Outlet Sample Taken	Yes	No	✓
Submitted for Testing for the Following	B.O.D.	T.S.S.		NH3-N					
	Total N	Total Phosphorus		Orthophosphates					
N/A									

General Comments:	
ALL TANKS DIPPED FOR SLUDGE + OK	
Client/ Client Representative Name (Block Capitals):	Client/ Client Representative Signature:
Anua Environmental Ltd Representative Name (Block Capitals):	Anua Environmental Ltd Representative Signature:
Date:	
25/04/2019	



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* PLEASE Email



Small Community System (G) Service Inspection Checklist

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Customer Name	BENNETTSBRIDGE QUARRY		Job Number	G781	Report Date	17/06/2020
Site Address:	BENNETTSBRIDGE CO. KILKENNY		System Type:	12 MOD PURAFLO		
			Date S.A Ends	MAY 2021		
			Date System Installed	-		
Phone:	Site Contact:		Next Service Due :			
	FRANK		JUNE 2021			

Note: Use abbreviation N.V. where component is not visible.

Primary Settlement Tank (s): ACROSS FROM WEIGHBRIDGE				LAGANS				CANTREEN ON HILL			
Primary Settlement Tank 1 Tank size m ³				Primary Settlement Tank 2 (where applicable) Tank size m ³				Primary Settlement Tank 3 (where applicable) Tank size m ³			
Needs Desludging	Yes	No	✓	Needs Desludging	Yes	No	✓	Needs Desludging	Yes	No	✓
Sludge Level (mm)	600			Sludge Level (mm)	400			Sludge Level (mm)	400		
Baffle Wall	Yes	No	✓	Baffle Wall	Yes	No	✓	Baffle Wall	Yes	No	✓
Scum Surface Depth (mm)	NIL			Scum Surface Depth (mm)	NIL			Scum Surface Depth (mm)	NIL		
Access Covers Secure	Yes	No	✓	Access Covers Secure	Yes	No	✓	Access Covers Secure	Yes	No	✓
Is Tank Vented	Yes	No	✓	Is Tank Vented	Yes	No	✓	Is Tank Vented	Yes	No	✓

Primary Tank Outlet Filter(s) number installed:				1			
Filters Installed in:		Primary Septic Tank 1		Primary Septic Tank 2		Primary Septic Tank 3	
Filter Present	Yes	No	✓	Filter Accessible	Yes	No	✓
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)		Manhole Construction:	Block	Precast Risers	Cast on site	
Constructed and Sealed by:	Client / Clients Contractor			Anua Environmental South			
Comments:							

Pump Chambers (tick as relevant):		Inlet Pump Chamber	Forward Feed Pump Chamber
Recirculation Pump Chamber		Pump to Puraflo Pump Chamber	✓
		Outlet Pump Chamber	

Pump to Puraflo Pump Chamber:	Pump Make	EBARA		Pump Model	BEST		Single Phase	✓		Three Phase		
	Number of Pumps Fitted	2	Duty		Duty Standby	✓	Duty/Duty		Pumps Inspected & Operational	Yes	✓	No
Tank Size m³:	Alarm Float Inspected & Operational	Yes	✓	No	Control On/Off Float	Yes	✓	No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes	✓	No	Is Tank Vented	Yes		No	✓			
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)	Nil		Manhole Construction:	Block			Precast Risers		Cast on site		
Constructed and Sealed by:	Client / Clients Contractor				✓		Anua Environmental South					
Comments:												

Clarifier Tank(s):																	
Clarifier Tank 1						Clarifier Tank 2 (where applicable)											
Clarifier Tank 1 Size m³						Clarifier Tank 2 Size m³ (where applicable)											
Sludge Level (mm)						Sludge Level (mm)											
Needs Desludging						Yes		No		Needs Desludging				Yes		No	
Surface Scum Depth (mm)						Surface Scum Depth (mm)											
Return Sludge Pump Make		Return Sludge Pump Model	N/A			Return Sludge Pump Make		Return Sludge Pump Model									
Single Phase		Three Phase				Single Phase		Three Phase									
Return Sludge Pump Operational						Yes		No		Return Sludge Pump Operational				Yes		No	
Tank Vented						Yes		No		Tank Vented				Yes		No	
Tank Free Draining at Outlet						Yes		No		Tank Free Draining at Outlet				Yes		No	
Access Covers Secure						Yes		No		Access Covers Secure				Yes		No	
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)				Manhole Construction:	Block			Precast Risers			Cast on site					
Constructed and Sealed by:	Client / Clients Contractor							Anua Environmental South									
Comments:																	

Puraflo Treatment System:												
Secondary	✓	Tertiary		Number of Modules	12	Bed Size (m2)						

Puraflo Peat Bed:	Retaining Structure:	Block Wall			Mass Concrete			Earth Mound				
	Roof	Yes		No	Type of Roof:	Open		Slabs		T-Beam		Sheeting
	Venting	Yes		No	Access	Yes		No				
	Base Floor:	Concrete			Liner			None				
	Condition of Fibre	FAIR										
Grids Level	Yes	✓	No	Is Bed Free Draining at Outlet	Yes	✓	No					
Distributor Valve Fitted	Yes		No	Distributor Valve Location marked	Yes	N/A	No		Distributor Valve Operational	Yes	N/A	No
Comments:												

Phosphorus Removal:	Capacity of Chemical Storage Tank (litres)					
	Bunded Kiosk Fitted		Yes	No	Volume of Chemical Storage Tank (litres)	
	Dosing Pump Make			Dosing Pump Model		
	Is Chemical Top Up Required	Yes	No	System Dosing Pipework Inspected	Yes	No
	Dosing Pump Settings:		Frequency/Speed		%	Stroke
Comments:						

Control Panel:	Location of Control Panel		@ Pumpstation		Indoor		Outdoor	
	Details:		230V SINGLE PHASE					
	Power Supply Connected	Yes	✓	No	All Component Electrical Connections Complete	Yes	✓	No
	Visual Alarm Tested	Yes	✓	No	Overloads Set and Recorded on Electrical Diagram	Yes	✓	No
	Timers Set & Recorded on Electrical Diagram	Yes	✓	No	Overloads Reset & Recorded (if required)	Yes	✓	No
	Timers Reset & Recorded (if required)	Yes	✓	No	Overload Trips Tested	Yes	✓	No
	High Level Alarm Floats Tested	Yes	✓	No	Pump Sequence Timers Tested	Yes	✓	No
Comments:								

Sampling:	Sampling Point	Yes	✓	No	Sampling Point Installed by:	Anua Env	Client	Other
	Details of Sampling Point Location & Access					Outlet Sample Taken	Yes	No
Submitted for Testing for the Following	B.O.D.		T.S.S.		NH3-N			
	Total N		Total Phosphorus		Orthophosphates			
N/A								

General Comments:	
All FILTERS CLEANED IN PRIMARY TANKS	
All IN GOOD WORKING ORDER.	
Client/ Client Representative Name (Block Capitals):	Client/ Client Representative Signature:
Anua Environmental Ltd Representative Name (Block Capitals):	Anua Environmental Ltd Representative Signature:
Date:	



Hydro-G

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087 8072744

Dr. Pamela Bartley

Supporting Documentation

Table of Contents

1. Statement of Experience
2. Full CV
3. Irish Water Letter of Appointment: Regional Hydrogeologist Panel
4. PSDP & PSCS Certificates
5. Academic Qualification Certificates
6. Professional Indemnity Insurance 2020 -2021
7. Public, Employers and Materials Insurance 2020 - 2021
8. Level 5 First Aider
9. Safe Pass
10. FETAC Qualification Site Assessor



National Skills Certificate

(FÁS)

Awarded to
Bronnta ar

Pamela Bartley

who has achieved the National Standards for
a bhain Caighdeán Náisiúnta amach maidir le

Site Suitability Assessment

Awarded on: 09/12/2005 722383

Seamus O'Connor

Chair, FETAC

Stan Ue Hrysh

Chief Executive, FETAC

EF082179

RECEIVED: 18/08/2025

Customer Name	BEANETS BRIDGE Limestone Quarry	Job Number	G781	Report Date	29/03/2022
Site Address	KILREE	System Type	12 mod Puraflo		
	SHEASTOWN Co. KILKENNY	Date S.A Ends	N/A		
	frank@bbl.ie	Date System Installed	2007		
Phone	084 818 7128	Site Contact	FRANK	Next Service Due	MARCH 2023

Note: Use abbreviation N.V. where component is not visible.

Primary Settlement Tank (s):				LAGANS				CANTEN ON HILL			
Primary Settlement Tank 1				Primary Settlement Tank 2				Primary Settlement Tank 3			
Tank size m ³				(where applicable) Tank size m ³				(where applicable) Tank size m ³			
Needs Desludging	Yes	No	✓	Needs Desludging	Yes	No	✓	Needs Desludging	Yes	No	✓
Sludge Level (mm)	500			Sludge Level (mm)	350			Sludge Level (mm)	400		
Baffle Wall	Yes	✓	No	Baffle Wall	Yes	✓	No	Baffle Wall	Yes	✓	No
Scum Surface Depth (mm)	50			Scum Surface Depth (mm)	50			Scum Surface Depth (mm)	100		
Access Covers Secure	Yes	✓	No	Access Covers Secure	Yes	✓	No	Access Covers Secure	Yes	✓	No
Is Tank Vented	Yes	✓	No	Is Tank Vented	Yes	✓	No	Is Tank Vented	Yes	✓	No

Primary Tank Outlet Filter(s) number installed:				1											
Filters Installed in:				Primary Septic Tank 1				Primary Septic Tank 2				Primary Septic Tank 3			
Filter Present	Yes	✓	No	Filter Accessible	Yes	✓	No	Filter Cleaned	Yes	✓	No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block			Precast Risers	Cast on site						
Constructed and Sealed by:	Client / Clients Contractor			Anua Environmental South											
Comments:															

Pump Chambers (tick as relevant):		Inlet Pump Chamber	Forward Feed Pump Chamber
Recirculation Pump Chamber		Pump to Puraflo Pump Chamber	Outlet Pump Chamber

Inlet Pump Chamber:	Pump Make	Pump Model	Single Phase	Three Phase
Number of Pumps Fitted	Duty	Duty Standby	Duty/Duty	Pumps Inspected & Operational
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes	No	Control On/Off Float
	Access Covers Secure	Yes	No	Is Tank Vented
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)	Manhole Construction:	Block	Precast Risers
Constructed and Sealed by:	Client / Clients Contractor		Anua Environmental South	
Comments:				

@ LAGANS + CANTEN ON HILL

Forward Feed Pump Chamber:	Pump Make	EBARA		Pump Model	BEST		Single Phase	✓		Three Phase		
	Number of Pumps Fitted	1	Duty	✓	Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes	✓	No
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes	✓	No	Control On/Off Float	Yes		No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes	✓	No	Is Tank Vented	Yes		No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)	Nil		Manhole Construction:	Block			Precast Risers		Cast on site		
Constructed and Sealed by:	Client / Clients Contractor				✓				Anua Environmental South			
Comments:												

Recirculation Pump Chamber:	Pump Make			Pump Model			Single Phase			Three Phase		
	Number of Pumps Fitted		Duty		Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes		No
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes		No	Control On/Off Float	Yes		No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes		No	Is Tank Vented	Yes		No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)	Nil		Manhole Construction:	Block			Precast Risers		Cast on site		
Constructed and Sealed by:	Client / Clients Contractor				✓				Anua Environmental South			
Comments:												

Pump to Purafo Pump Chamber:	Pump Make	EBARA		Pump Model	BEST		Single Phase	✓		Three Phase		
	Number of Pumps Fitted	2	Duty		Duty Standby		Duty/Duty	✓	Pumps Inspected & Operational	Yes	✓	No
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes	✓	No	Control On/Off Float	Yes	✓	No	Pump Chamber Requires Desludging	Yes	✓	No
	Access Covers Secure	Yes	✓	No	Is Tank Vented	Yes		No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)	Nil		Manhole Construction:	Block			Precast Risers		Cast on site		
Constructed and Sealed by:	Client / Clients Contractor				✓				Anua Environmental South			
Comments:												

Outlet Pump Chamber:	Pump Make			Pump Model			Single Phase			Three Phase		
	Number of Pumps Fitted		Duty		Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes		No
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes		No	Control On/Off Float	Yes		No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes		No	Is Tank Vented	Yes		No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)	Nil		Manhole Construction:	Block			Precast Risers		Cast on site		
Constructed and Sealed by:	Client / Clients Contractor				✓				Anua Environmental South			
Comments:												

Puraflo Treatment System:			
Secondary	☒	Tertiary	
Number of Modules		12	Bed Size (m2)

Puraflo Modules:	Base of Modules Relative to Finished Ground Level (mm)		A.G.	Condition of Fibre		Good	
	Modules Level	Yes	☒	No	Modules Free Draining at Outlet	Yes	☒
	Distributor Valve Fitted	Yes	☒	No	Distributor Valve Location marked	Yes	☒
					Distributor Valve Operational	Yes	☒
Comments:							

Puraflo Peat Bed:	Retaining Structure:		Block Wall		Mass Concrete		Earth Mound	
	Roof	Yes	☒	No	Type of Roof:	Open	Slabs	T-Beam
	Venting	Yes	☒	No	Access	Yes	No	
	Base Floor:		Concrete		Liner	None		
	Condition of Fibre		N/A					
Grids Level	Yes	☒	No	Is Bed Free Draining at Outlet	Yes	☒	No	
Distributor Valve Fitted	Yes	☒	No	Distributor Valve Location marked	Yes	☒	No	Distributor Valve Operational
Comments:								

Phosphorus Removal:	Capacity of Chemical Storage Tank (litres)						
	Bunded Kiosk Fitted	Yes	☒	No	Volume of Chemical Storage Tank (litres)		
	Dosing Pump Make			Dosing Pump Model			
	Is Chemical Top Up Required	Yes	☒	No	System Dosing Pipework Inspected	Yes	☒
	Dosing Pump Settings:		Frequency/Speed		%	Stroke	%
Comments:							

Flowmetre:	Location of Flowmetre:		Sensor Location		Display Location	
	Type of Flowmetre:	Mechanical		Electro-Magnetic		Flowmetre Make
	Size of Flowmetre	2 inch		3 inch		4 inch
	Flowmetre Inspected & Operational	Yes	☒	No	Comments	

Telemetry:	Telemetry System Tested & Operational		Yes	☒	No	Comments:
	N/A					

Composite Sampler:	Composite Sampler Make		Composite Sampler Tested & Operational		Yes	☒	No
	Suction Discharge Pipe Clear	Yes	☒	No	Peristaltic Pump Suction Pipe Replaced	Yes	☒
	Comments:						

Control Panel:	Location of Control Panel		① Pump Stations		Indoor		Outdoor	✓
	Details:		① 230V ② 400V ③ 230V					
	Power Supply Connected	Yes	✓	No	All Component Electrical Connections Complete	Yes	✓	No
	Visual Alarm Tested	Yes	✓	No	Overloads Set and Recorded on Electrical Diagram	Yes	✓	No
	Timers Set & Recorded on Electrical Diagram	Yes		No	Overloads Reset & Recorded (if required)	Yes	✓	No
	Timers Reset & Recorded (if required)	Yes	✓	No	Overload Trips Tested	Yes	✓	No
	High Level Alarm Floats Tested	Yes	✓	No	Pump Sequence Timers Tested	Yes	✓	No
Comments:								

Sampling:	Sampling Point	Yes	✓	No	Sampling Point Installed by:	Anua Env South	Client	Other	✓
	Details of Sampling Point Location & Access	① @ MODURES				Outlet Sample Taken	Yes	No	✓
Submitted for Testing for the Following	B.O.D.		T.S.S.		NH3-N				
	Total N		Total Phosphorus		Orthophosphates				
N/A									

General Comments:	
All IN GOOD WORKING ORDER. FILTERS CLEANED. Pump @ LAGANS INSPECTED + All OK, JUNCTION BOX INSPECTED + All GOOD.	
Client/ Client Representative Name (Block Capitals):	Client/ Client Representative Signature:
Anua Environmental Ltd Representative Name (Block Capitals):	Anua Environmental Ltd Representative Signature:
Date:	
29/03/2012	



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 Offaly

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Customer Name BENNETTSBRIDGE LIMESTONE Quarry		Job Number G781	Report Date 04/05/2023
Site Address: KILKEE SHEASTOWN CO KILKENNY		System Type: 12 MOD Puraflo	
		Date S.A Ends N/A	
		Date System Installed 2007	
Phone: 087 8187128	Site Contact: FRANK	Next Service Due MAY 2024	

Note: Use abbreviation N.V. where component is not visible.

Primary Settlement Tank (s):				LAGANS				CANTEEN			
Primary Settlement Tank 1 Tank size m ³ WEIGHTBRIDGE				Primary Settlement Tank 2 (where applicable) Tank size m ³				Primary Settlement Tank 3 (where applicable) Tank size m ³			
Needs Desludging	Yes	No		Needs Desludging	Yes	No		Needs Desludging	Yes	No	
Sludge Level (mm)	800			Sludge Level (mm)	900			Sludge Level (mm)	600		
Baffle Wall	Yes	No		Baffle Wall	Yes	No		Baffle Wall	Yes	No	
Scum Surface Depth (mm)	100			Scum Surface Depth (mm)	NIL			Scum Surface Depth (mm)	NIL		
Access Covers Secure	Yes	No		Access Covers Secure	Yes	No		Access Covers Secure	Yes	No	
Is Tank Vented	Yes	No		Is Tank Vented	Yes	No		Is Tank Vented	Yes	No	

Primary Tank Outlet Filter(s) number installed:				1			
Filters Installed in:				Primary Septic Tank 1			
Filter Present	Yes	No		Filter Accessible	Yes	No	
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)		NIL	Manhole Construction:	Block		
Constructed and Sealed by:	Client / Clients Contractor			Precast Risers		Cast on site	
Comments:							

Pump Chambers (tick as relevant):		Inlet Pump Chamber		Forward Feed Pump Chamber	☒
Recirculation Pump Chamber		Pump to Puraflo Pump Chamber	☒	Outlet Pump Chamber	

Inlet Pump Chamber:	Pump Make			Pump Model			Single Phase			Three Phase		
	Number of Pumps Fitted	Duty		Duty Standby	Duty/Duty		Pumps Inspected & Operational	Yes	No			
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes	No	Control On/Off Float	Yes	No	Pump Chamber Requires Desludging	Yes	No			
	Access Covers Secure	Yes	No	Is Tank Vented	Yes	No						
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block		Precast Risers	Cast on site				
Constructed and Sealed by:	Client / Clients Contractor			Anua Environmental South								
Comments:												

@ LAGANS + CANTEEN

Forward Feed Pump Pump Number:	Pump Make IBARA	Pump Model BEST	Single Phase		✓		Three Phase			
	Number of Pumps Fitted 1	Duty		Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes	No ✓
Tank Size m³:	Alarm Float Inspected & Operational	Yes	No ✓	Control On/Off Float	Yes	No ✓		Pump Chamber Requires Desludging	Yes	No ✓
	Access Covers Secure	Yes	No ✓	Is Tank Vented	Yes	No ✓				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block			Precast Risers		Cast on site
Constructed and Sealed by:	Client / Clients Contractor							Anua Environmental South		
Comments:										

Recirculation Pump Chamber:	Pump Make	Pump Model	Single Phase				Three Phase			
	Number of Pumps Fitted	Duty		Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes	No
Tank Size m³:	Alarm Float Inspected & Operational	Yes	No	Control On/Off Float	Yes	No		Pump Chamber Requires Desludging	Yes	No
	Access Covers Secure	Yes	No	Is Tank Vented	Yes	No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block			Precast Risers		Cast on site
Constructed and Sealed by:	Client / Clients Contractor							Anua Environmental South		
Comments:										

@ WEIGHBRIDGE

Pump to Puraflow Pump Chamber:	Pump Make IBARA	Pump Model BEST	Single Phase		✓		Three Phase			
	Number of Pumps Fitted 2	Duty		Duty Standby	✓	Duty/Duty		Pumps Inspected & Operational	Yes	No ✓
Tank Size m³:	Alarm Float Inspected & Operational	Yes	No ✓	Control On/Off Float	Yes	No ✓		Pump Chamber Requires Desludging	Yes	No ✓
	Access Covers Secure	Yes	No ✓	Is Tank Vented	Yes	No ✓				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block			Precast Risers		Cast on site
Constructed and Sealed by:	Client / Clients Contractor							Anua Environmental South		
Comments: Pump N°1 REPLACED										

Outlet Pump Chamber:	Pump Make	Pump Model	Single Phase				Three Phase			
	Number of Pumps Fitted	Duty		Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes	No
Tank Size m³:	Alarm Float Inspected & Operational	Yes	No	Control On/Off Float	Yes	No		Pump Chamber Requires Desludging	Yes	No
	Access Covers Secure	Yes	No	Is Tank Vented	Yes	No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block			Precast Risers		Cast on site
Constructed and Sealed by:	Client / Clients Contractor							Anua Environmental South		
Comments:										

Puraflo Treatment System:					
Secondary	☒	Tertiary		Number of Modules	12
			Bed Size (m2)		

Puraflo Modules:	Base of Modules Relative to Finished Ground Level (mm)		A.G.C.	Condition of Fibre		OK.	
	Modules Level	Yes	☒	No	Modules Free Draining at Outlet	Yes	☒
	Distributor Valve Fitted	Yes	☒	No	Distributor Valve Location marked	Yes	☒
							Distributor Valve Operational
Comments:							

Puraflo Peat Bed:	Retaining Structure:		Block Wall		Mass Concrete		Earth Mound	
	Roof	Yes	☐	No	Type of Roof:	Open	Slabs	T-Beam
	Venting	Yes	☐	No	Access	Yes	No	Sheeting
	Base Floor:		Concrete		Liner	None		
	Condition of Fibre							
Grids Level	Yes	☐	No	Is Bed Free Draining at Outlet	Yes	☐	No	
Distributor Valve Fitted	Yes	☐	No	Distributor Valve Location marked	Yes	☐	No	Distributor Valve Operational
Comments:								

Phosphorus Removal:	Capacity of Chemical Storage Tank (litres)			
	Bunded Kiosk Fitted		Yes	No
	Dosing Pump Make		Dosing Pump Model	
	Is Chemical Top Up Required		Yes	No
	Dosing Pump Settings:		Frequency/Speed	
		Stroke		%
Comments:				

Flowmetre:	Location of Flowmetre:		Sensor Location		Display Location	
	Type of Flowmetre:		Mechanical		Electro-Magnetic	
	Size of Flowmetre		2 inch		3 inch	
	Flowmetre Inspected & Operational		Yes	No	Comments	

Telemetry:	Telemetry System Tested & Operational		Yes	No	Comments:

Composite Sampler:	Composite Sampler Make		Composite Sampler Tested & Operational		Yes	No
	Suction Discharge Pipe Clear		Yes	No	Peristaltic Pump Suction Pipe Replaced	Yes
	Comments:					

Control Panel:	Location of Control Panel		@ Plant		Indoor		Outdoor	☒
	Details:		230V SINGLE PHASE					
	Power Supply Connected	Yes	☒	No	All Component Electrical Connections Complete	Yes	☒	No
	Visual Alarm Tested	Yes	☒	No	Overloads Set and Recorded on Electrical Diagram	Yes	☒	No
	Timers Set & Recorded on Electrical Diagram	Yes	☒	No	Overloads Reset & Recorded (if required)	Yes	☒	No
	Timers Reset & Recorded (if required)	Yes	☒	No	Overload Trips Tested	Yes	☒	No
	High Level Alarm Floats Tested	Yes	☒	No	Pump Sequence Timers Tested	Yes	☒	No
Comments:								

Sampling:	Sampling Point	Yes	☒	No	Sampling Point Installed by:	Anua Env South	Client	Other	☒
	Details of Sampling Point Location & Access	SAMPLE CHAMBER ON MODULES				Outlet Sample Taken	Yes	No	☒
Submitted for Testing for the Following	B.O.D.		T.S.S.			NH3-N			
	Total N		Total Phosphorus			Orthophosphates			
N/A									

General Comments:	
PUMP TO PURAFLO NO 1 REPLACED.	
PUMP @ LAGANS HAD TRIPPED, RESET + ALL OK.	
Client/ Client Representative Name (Block Capitals):	Client/ Client Representative Signature: NOT AVAILABLE
Anua Environmental Ltd Representative Name (Block Capitals): D. KENNY	Anua Environmental Ltd Representative Signature: [Signature]
Date: 04/05/2023	



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Customer Name	BENNETTSBRIDGE LIMESTONE QUARRY		Job Number	6781	Report Date	09/05/2024
Site Address:	KILREE SHEASTOWN		System Type:	12 mod PURAFLO		
	BENNETTSBRIDGE G. KILKENNY		Date S.A Ends	N/A		
	frank@bbl.ie		Date System Installed	2021		
Phone:	084857128	Site Contact:	Next Service Due	MAY 2025		
	FRANK					

Note: Use abbreviation N.V. where component is not visible.

Primary Settlement Tank (s):				Primary Settlement Tank 2 @ LAGANS				Primary Settlement Tank 3 @ CALTEEN			
Primary Settlement Tank 1 @ WEIGHBRIDGE				(where applicable) Tank size m ³				(where applicable) Tank size m ³			
Needs Desludging	Yes	No	☒	Needs Desludging	Yes	No	☒	Needs Desludging	Yes	No	☒
Sludge Level (mm)	830			Sludge Level (mm)	900			Sludge Level (mm)	600		
Baffle Wall	Yes	No	☒	Baffle Wall	Yes	No	☒	Baffle Wall	Yes	No	☒
Scum Surface Depth (mm)	100			Scum Surface Depth (mm)	N/A			Scum Surface Depth (mm)	N/A		
Access Covers Secure	Yes	No	☒	Access Covers Secure	Yes	No	☒	Access Covers Secure	Yes	No	☒
Is Tank Vented	Yes	No	☒	Is Tank Vented	Yes	No	☒	Is Tank Vented	Yes	No	☒

Primary Tank Outlet Filter(s) number installed:				1											
Filters Installed in:				Primary Septic Tank 1				Primary Septic Tank 2				Primary Septic Tank 3			
Filter Present	Yes	No	☒	Filter Accessible	Yes	No	☒	Filter Cleaned	Yes	No	☒				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block			Precast Risers	Cast on site						
Constructed and Sealed by:	Client / Clients Contractor			☒			Anua Environmental South								
Comments:															

Pump Chambers (tick as relevant):	Inlet Pump Chamber	Forward Feed Pump Chamber	☒
Recirculation Pump Chamber	Pump to Puraflo Pump Chamber	Outlet Pump Chamber	☒

Inlet Pump Chamber:	Pump Make	Duty		Pump Model	Duty Standby		Duty/Duty		Single Phase	Three Phase	
	Number of Pumps Fitted										
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes	No	Control On/Off Float	Yes	No			Pumps Inspected & Operational	Yes	No
	Access Covers Secure	Yes	No	Is Tank Vented	Yes	No			Pump Chamber Requires Desludging	Yes	No
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block			Precast Risers	Cast on site		
Constructed and Sealed by:	Client / Clients Contractor			☒			Anua Environmental South				
Comments:											

LAGANS + CANTEN

Forward Feed Pump Chamber:	Pump Make	EBARA		Pump Model	BEST		Single Phase	✓		Three Phase		
	Number of Pumps Fitted	1	Duty		Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes	✓	No
Tank Size m³:	Alarm Float Inspected & Operational	Yes	✓	No	Control On/Off Float	Yes	✓	No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes	✓	No	Is Tank Vented	Yes	✓	No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)	✓		Manhole Construction:	Block			Precast Risers		Cast on site		
Constructed and Sealed by:	Client / Clients Contractor				✓		Anua Environmental South					
Comments:												

Recirculation Pump Chamber:	Pump Make			Pump Model			Single Phase			Three Phase		
	Number of Pumps Fitted		Duty		Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes		No
Tank Size m³:	Alarm Float Inspected & Operational	Yes	No	✓	Control On/Off Float	Yes	✓	No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes	No	✓	Is Tank Vented	Yes	✓	No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)	✓		Manhole Construction:	Block			Precast Risers		Cast on site		
Constructed and Sealed by:	Client / Clients Contractor				✓		Anua Environmental South					
Comments:												

Pump to Puraflo Pump Chamber:	Pump Make	EBARA		Pump Model	BEST		Single Phase	✓		Three Phase		
	Number of Pumps Fitted	2	Duty		Duty Standby	✓	Duty/Duty		Pumps Inspected & Operational	Yes	✓	No
Tank Size m³:	Alarm Float Inspected & Operational	Yes	✓	No	Control On/Off Float	Yes	✓	No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes	✓	No	Is Tank Vented	Yes	✓	No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)	✓		Manhole Construction:	Block			Precast Risers		Cast on site		
Constructed and Sealed by:	Client / Clients Contractor				✓		Anua Environmental South					
Comments:												

Outlet Pump Chamber:	Pump Make			Pump Model			Single Phase			Three Phase		
	Number of Pumps Fitted		Duty		Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes		No
Tank Size m³:	Alarm Float Inspected & Operational	Yes	No	✓	Control On/Off Float	Yes	✓	No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes	No	✓	Is Tank Vented	Yes	✓	No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)	✓		Manhole Construction:	Block			Precast Risers		Cast on site		
Constructed and Sealed by:	Client / Clients Contractor				✓		Anua Environmental South					
Comments:												

Puraflo Treatment System:							
Secondary	12	Tertiary		Number of Modules	12	Bed Size (m2)	

Puraflo Modules:	Base of Modules Relative to Finished Ground Level (mm)		A.G.		Condition of Fibre		OK							
	Modules Level	Yes	☒	No		Modules Free Draining at Outlet	Yes	☒	No					
	Distributor Valve Fitted	Yes		No	☒	Distributor Valve Location marked	Yes		No	N/A	Distributor Valve Operational	Yes		No
Comments:														

Puraflo Peat Bed:	Retaining Structure:		Block Wall		Mass Concrete		Earth Mound							
	Roof	Yes		No		Type of Roof:	Open		Slabs		T-Beam		Sheeting	
	Venting	Yes		No		Access	Yes		No					
	Base Floor:		Concrete		Liner		None							
	Condition of Fibre													
Grids Level	Yes		No		Is Bed Free Draining at Outlet	Yes		No						
Distributor Valve Fitted	Yes		No		Distributor Valve Location marked	Yes		No		Distributor Valve Operational	Yes		No	
Comments:														

Phosphorus Removal:	Capacity of Chemical Storage Tank (litres)										
	Bunded Kiosk Fitted		Yes		No		Volume of Chemical Storage Tank (litres)				
	Dosing Pump Make			Dosing Pump Model			Dosing Pump Operational	Yes		No	
	Is Chemical Top Up Required	Yes		No		System Dosing Pipework Inspected	Yes		No		Comments:
	Dosing Pump Settings:		Frequency/Speed		%		Stroke	%			
Comments:											

Flowmetre:											
	Location of Flowmetre:		Sensor Location				Display Location				
	Type of Flowmetre:		Mechanical		Electro-Magnetic		Flowmetre Make				
	Size of Flowmetre		2 inch		3 inch		4 inch				
	Flowmetre Inspected & Operational	Yes		No		Comments					

Telemetry:											
	Telemetry System Tested & Operational	Yes		No		Comments:					

Composite Sampler:											
	Composite Sampler Make				Composite Sampler Tested & Operational		Yes		No		
	Suction Discharge Pipe Clear	Yes		No		Peristaltic Pump Suction Pipe Replaced	Yes		No		
Comments:											

Control Panel:	Location of Control Panel	@ WEAGROVE		Indoor		Outdoor	☒
	Details:	230V SINGLE PHASE					
	Power Supply Connected	Yes	☒ No	All Component Electrical Connections Complete	Yes	☒ No	
	Visual Alarm Tested	Yes	☒ No	Overloads Set and Recorded on Electrical Diagram	Yes	☒ No	
	Timers Set & Recorded on Electrical Diagram	Yes	☒ No	Overloads Reset & Recorded (if required)	Yes	☒ No	
	Timers Reset & Recorded (if required)	Yes	☒ No	Overload Trips Tested	Yes	☒ No	
	High Level Alarm Floats Tested	Yes	☒ No	Pump Sequence Timers Tested	Yes	☒ No	
Comments:							

Sampling:	Sampling Point	Yes	☒ No	Sampling Point Installed by:	Anua Env South	Client	Other	☒
	Details of Sampling Point Location & Access	@ MODRES				Outlet Sample Taken	Yes	No
Submitted for Testing for the Following	B.O.D.		T.S.S.		NH3-N			
	Total N		Total Phosphorus		Orthophosphates			
N/A								

General Comments:	
All in good working order.	
Client/ Client Representative Name (Block Capitals):	Client/ Client Representative Signature: NOT AVAILABLE
Anua Environmental Ltd Representative Name (Block Capitals): D. KENNY	Anua Environmental Ltd Representative Signature: [Signature]
Date: 09/05/2024	



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Customer Name	BENNETTSBRIDGE LIMESTONE QUARRY		Job Number	G781	Report Date	19/02/2025
Site Address:	KILREE SHEASTOWN		System Type:	12 MOD PURAFLO + 30 PUMPSTATIONS		
BENNETTSBRIDGE CO KILKENNY			Date S.A Ends	N/A		
frank@bbl.ie			Date System Installed	2007		
Phone:	0848187128	Site Contact:	FRANK	Next Service Due	FEB 2026	

Note: Use abbreviation N.V. where component is not visible.

Primary Settlement Tank (s):				@ LAGANS				@ CANTEN ON HILL			
Primary Settlement Tank 1 Tank size m ³				Primary Settlement Tank 2 (where applicable) Tank size m ³				Primary Settlement Tank 3 (where applicable) Tank size m ³			
Needs Desludging	Yes	No		Needs Desludging	Yes	No		Needs Desludging	Yes	No	
Sludge Level (mm)	900			Sludge Level (mm)	900			Sludge Level (mm)	700		
Baffle Wall	Yes	No		Baffle Wall	Yes	No		Baffle Wall	Yes	No	
Scum Surface Depth (mm)	N/A			Scum Surface Depth (mm)	100			Scum Surface Depth (mm)	100		
Access Covers Secure	Yes	No		Access Covers Secure	Yes	No		Access Covers Secure	Yes	No	
Is Tank Vented	Yes	No		Is Tank Vented	Yes	No		Is Tank Vented	Yes	No	

Primary Tank Outlet Filter(s) number installed:				1			
Filters Installed in:		Primary Septic Tank 1		Primary Septic Tank 2		Primary Septic Tank 3	
Filter Present	Yes	No		Filter Accessible	Yes	No	
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block	Precast Risers	Cast on site
Constructed and Sealed by:	Client / Clients Contractor			Anua Environmental South			
Comments:							

Pump Chambers (tick as relevant):	Inlet Pump Chamber	Forward Feed Pump Chamber
Recirculation Pump Chamber	Pump to Puraflo Pump Chamber	Outlet Pump Chamber

Inlet Pump Chamber:	Pump Make	Duty		Pump Model	Duty/Standby		Single Phase	Three Phase	Pumps Inspected & Operational	Yes	No
	Number of Pumps Fitted										
Tank Size m ³ :	Alarm Float Inspected & Operational	Yes	No	Control On/Off Float	Yes	No	Pump Chamber Requires Desludging	Yes	No		
	Access Covers Secure	Yes	No	Is Tank Vented	Yes	No					
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block		Precast Risers	Cast on site			
Constructed and Sealed by:	Client / Clients Contractor			Anua Environmental South							
Comments:											

② LAGANS + CANTEEN

Forward Feed Pump Chamber:	Pump Make	IBARA		Pump Model	BEST		Single Phase	☒	Three Phase			
	Number of Pumps Fitted	1	Duty	☒	Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes	☒	No
Tank Size m³:	Alarm Float Inspected & Operational	Yes	☒	No	Control On/Off Float	Yes	☒	No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes	☒	No	Is Tank Vented	Yes		No	☒			☒
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)	NIL		Manhole Construction:	Block				Precast Risers		Cast on site	
Constructed and Sealed by:	Client / Clients Contractor						☒	Anua Environmental South				
Comments:												
Both Pumps were tripped - RESET + ALL OK												

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Recirculation Pump Chamber:	Pump Make			Pump Model			Single Phase		Three Phase			
	Number of Pumps Fitted		Duty		Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes		No
Tank Size m³:	Alarm Float Inspected & Operational	Yes		No	Control On/Off Float	Yes		No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes		No	Is Tank Vented	Yes		No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block				Precast Risers		Cast on site	
Constructed and Sealed by:	Client / Clients Contractor							Anua Environmental South				
Comments:												

Pump to Puraflo Pump Chamber:	Pump Make	IBARA		Pump Model	BEST		Single Phase	☒	Three Phase			
	Number of Pumps Fitted	2	Duty		Duty Standby		Duty/Duty	☒	Pumps Inspected & Operational	Yes	☒	No
Tank Size m³:	Alarm Float Inspected & Operational	Yes	☒	No	Control On/Off Float	Yes	☒	No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes	☒	No	Is Tank Vented	Yes		No	☒			☒
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)	NIL		Manhole Construction:	Block				Precast Risers		Cast on site	
Constructed and Sealed by:	Client / Clients Contractor						☒	Anua Environmental South				
Comments:												

Outlet Pump Chamber:	Pump Make			Pump Model			Single Phase		Three Phase			
	Number of Pumps Fitted		Duty		Duty Standby		Duty/Duty		Pumps Inspected & Operational	Yes		No
Tank Size m³:	Alarm Float Inspected & Operational	Yes		No	Control On/Off Float	Yes		No	Pump Chamber Requires Desludging	Yes		No
	Access Covers Secure	Yes		No	Is Tank Vented	Yes		No				
Tank Manholes: (from F.G.L.)	Depth to top of tank (mm)			Manhole Construction:	Block				Precast Risers		Cast on site	
Constructed and Sealed by:	Client / Clients Contractor							Anua Environmental South				
Comments:												

Puraflo Treatment System:							
Secondary	☒	Tertiary		Number of Modules	12	Bed Size (m2)	

Puraflo Modules:	Base of Modules Relative to Finished Ground Level (mm)		A.G.C.		Condition of Fibre		OK	
	Modules Level	Yes	☒	No	Modules Free Draining at Outlet	Yes	☒	No
	Distributor Valve Fitted	Yes		No	Distributor Valve Location marked	Yes	☒	No
Comments:								

RECEIVED: 18/08/2025

Puraflo Peat Bed:	Retaining Structure:		Block Wall		Mass Concrete		Earth Mound	
	Roof	Yes		No	Type of Roof:	Open	Slabs	T-Beam
	Venting	Yes		No	Access	Yes	No	Sheeting
	Base Floor:		Concrete		Liner		None	
	Condition of Fibre							
Grids Level	Yes		No	Is Bed Free Draining at Outlet	Yes		No	
Distributor Valve Fitted	Yes		No	Distributor Valve Location marked	Yes		No	Distributor Valve Operational
Comments:								

N/A

Phosphorus Removal:	Capacity of Chemical Storage Tank (litres)				Volume of Chemical Storage Tank (litres)			
	Bunded Kiosk Fitted		Yes		No			
	Dosing Pump Make			Dosing Pump Model			Dosing Pump Operational	Yes
	Is Chemical Top Up Required	Yes		No	System Dosing Pipework Inspected	Yes	No	Comments:
	Dosing Pump Settings:		Frequency/Speed		%	Stroke	%	
Comments:								

Flowmetre:	Location of Flowmetre:		Sensor Location		Display Location	
	Type of Flowmetre:		Mechanical		Electro-Magnetic	
	Size of Flowmetre		2 inch		3 inch	
	Flowmetre Inspected & Operational		Yes		No	Comments

Telemetry:				
	Telemetry System Tested & Operational	Yes		No

Composite Sampler:	Composite Sampler Make				Composite Sampler Tested & Operational		Yes		No
	Suction Discharge Pipe Clear		Yes		No	Peristaltic Pump Suction Pipe Replaced	Yes		No
	Comments:								

Control Panel:	Location of Control Panel		@ PLANT		Indoor		Outdoor	☒
	Details:		230V SINGLE PHASE					
	Power Supply Connected	Yes	☒	No	All Component Electrical Connections Complete	Yes	☒	No
	Visual Alarm Tested	Yes	☒	No	Overloads Set and Recorded on Electrical Diagram	Yes	☒	No
	Timers Set & Recorded on Electrical Diagram	Yes	☒	No	Overloads Reset & Recorded (if required)	Yes	☒	No
	Timers Reset & Recorded (if required)	Yes	☒	No	Overload Trips Tested	Yes	☒	No
	High Level Alarm Floats Tested	Yes	☒	No	Pump Sequence Timers Tested	Yes	☒	No
Comments:								

Sampling:	Sampling Point	Yes	☒	No	Sampling Point Installed by:	Anua Env South	Client		Other	☒
	Details of Sampling Point Location & Access	SAMPLE CHAMBER ON MODULUS				Outlet Sample Taken	Yes		No	☒
Submitted for Testing for the Following	B.O.D.		T.S.S.		NH3-N					
	Total N		Total Phosphorus		Orthophosphates					
N/A										

General Comments:	
All in working order.	
Client/ Client Representative Name (Block Capitals):	Client/ Client Representative Signature: NOT AVAILABLE
Anua Environmental Ltd Representative Name (Block Capitals): D. KENNY	Anua Environmental Ltd Representative Signature: [Signature]
Date: 19/02/2025	



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Appendix 8.5 Guidance Documents & Legislative Instruments

1. DEHLG (2004) Quarries and Ancillary Activities -Guidelines for Planning Authorities. Department of Environment, Heritage and Local Government
2. Department of Housing, Planning and Local Government (2013) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment.
3. Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. Official Journal L 327, 22.12.2000, p. 1–73.
4. Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (EIA Directive).
5. EPA (1999) WWT systems for small communities and businesses.
6. EPA (2006) Environmental Management Guidelines for the Extractive Industry (Non-Scheduled Minerals).
7. EPA (2009) Code of Practice WW treatment for single houses.
8. EPA (2011) Guidance on the Authorisation of Discharges to Groundwater. Version 1 - December 2011.
9. EPA (2017) Environmental Flow Assessment for Irish Rivers. Report 203. ISBN: 978-1-84095-693-1. Authors: Katherine E. Webster, Katie Tedd, Catherine Coxon and Ian Donohue. Trinity College Dublin.
10. EPA (2021) Code of Practice Domestic Waste Water Treatment Systems (Population Equivalent ≤ 10). Published by the Environmental Protection Agency, Ireland. March 2021.
11. EPA (2022) Guidelines on the information to be contained in Environmental Impact Statements. ISBN 978-1-80009-005-7. May 2022.
12. EPA (2025a) Public Consultation on the Proposed Methodology to Assess the Impact of Abstractions on Waterbodies and Identify Significant Abstractions in Ireland. 10th March 2025.
13. European Communities (Quality of Salmonid Waters) Regulations, 1988. S.I. No. 293/1988.
14. European Communities Environmental Objectives (Surface Waters) Regulations 2009 Statutory Instruments S.I. No. 272 of 2009, as amended 2012 (S.I. No. 327 of 2012), 2015 (S.I. No. 386 of 2015) and 2019 (S.I. No. 77 of 2019).
15. European Communities (Birds and Natural Habitats) Regulations, 2011. S.I. No. 477 of 2011.
16. European Communities Environmental Objectives (Groundwater) Regulations, S.I. No. 9 of 2010, as amended 2019 as S.I. No. 366 of 2019, as amended 2011 (S.I. No. 389 of 2011), 2012 (S.I. No. 149 of 2012), 2016 (S.I. No. 366 of 2016).
17. EUROPEAN COMMUNITIES (CONSERVATION OF WILD BIRDS (RIVER NORE SPECIAL PROTECTION AREA 004233) REGULATIONS 2012. SI 193 of 2012.
18. European Communities (Birds and Natural Habitats) (AMENDMENT) Regulations, 2021. S.I. No. 293 of 2021.
19. European Union (2017) Environmental Impact, Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU). Accessed through the Europa server (<http://ec.europa.eu>). Paper ISBN 978-92-7974373-3.

19. European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018. S.I. No. 296/2018.
20. European Union (Environmental Impact Assessment) (Environmental Protection Agency Act 1992) (Amendment) Regulations 2020. S.I. No. 191/2020.
21. European Union (Drinking Water) Regulations 2023 (S.I. No. 99 of 2023).
22. European Union Habitats (Thomastown Quarry Special Area of Conservation 002252) Regulations 2016. S.I. No. 199/2016.
23. European Union Habitats (RIVER BARROW AND RIVER NORE SPECIAL AREA OF CONSERVATION 002162) REGULATIONS 2024. S.I. No. 648 of 2024.
24. Ferguson & Leask (1988) The export of nutrients from surface coal mines. Environment Canada conservation and protection environmental protection pacific and Yukon region west Vancouver, British Columbia.
25. Institute of Geologists of Ireland (IGI, 2002) Geology in Environmental Impact Statements: A Guide
26. Institute of Geologists of Ireland (IGI, 2013). Guidelines for the Preparation of Soils, Geology & Hydrogeology Chapters of Environmental Impact Statements.
27. Moe, H. (2024). *Streamflow Depletion - Framework for Technical Assessment*, unpublished draft report prepared for the EPA by MKO, CDM Smith and the Geological Survey of Ireland.
28. Natural Heritage Area (Coan Bogs NHA 002382) Order 2005. S.I. No. 471/2005.
29. NRA (2008) Environmental Impact Assessment of National Road Schemes – A Practical Guide.
30. NRA (2009) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes. @ <https://www.tii.ie/technical-services/environment/planning/Guidelines-on-Procedures-for-Assessment-and-Treatment-of-Geology-Hydrology-and-Hydrogeology-for-National-Road-Schemes.pdf>.
31. Office of Public Works and Department of Environment, Heritage and Local Government (2009) The Planning System and Flood Risk Management: Guidelines for Planning Authorities.
32. ONEMA (2014). *The ICE protocol for ecological continuity - Assessing the passage of obstacles by fish. Concepts, design and application*. May 2014, 202 p., ISBN print 979-10-91047-29-6, Available at: <https://professionnels.ofb.fr/en/node/731>
33. Quinn, C. and Quinlan, R. (2018) – Characterising environmental flows in Ireland and what this means for water resource management in Ireland. Hydrometric and Groundwater Unit, Environmental Protection Agency, Richview, Dublin. Irish National Hydrology Conference. Pp 59 – 67. <https://assets.gov.ie/static/documents/characterising-environmental-flows-in-ireland-and-what-this-means-for-water-resource-m.pdf>
34. SNIFFER (2006). *Development of Environmental Standards (Water Resources). Stage 3: Environmental Standards*. Project WFD48. 158 p. Available at: https://nora.nerc.ac.uk/id/eprint/3287/1/Stage3AcremanWFD48_2%5B1%5D.pdf
35. SNIFFER (2007). *Guidance on Environmental Flow Releases from Impoundments to Implement the Water Framework Directive*. Project WFD82. 38 p.

37. SNH (2018) Scottish National Heritage A handbook on environmental impact assessment: Guidance for Competent Authorities, Consultees and others involved in the Environmental Impact Assessment Process in Scotland, Scottish Natural Heritage, 5th Edition, 2018. Section C8.
38. UKTAG (2007). *Recommendations on Surface Water Classification Schemes for the purposes of the Water Framework Directive*. Prepared by the United Kingdom Technical Advisory Group on the Water Framework Directive. December 2007. Available at: https://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Recommendations%20on%20surface%20water%20status%20classification_Final_010609.pdf
39. Water Environment (Abstractions and Associated Impoundments) Act 2022 (No. 48 of 2022).
40. Water Environment (Abstractions and Associated Impoundments) Regulations 2024 (S.I. No. 419 of 2024).
41. WFD Working Group (2004a) Guidance document no. GW3: THE CALCAREOUS/ NON-CALCAREOUS ("SILICEOUS") CLASSIFICATION OF BEDROCK AQUIFERS IN The Republic of Ireland.
42. WFD Working Group (2004b) Guidance Document no. GW5: Guidance on the Assessment of the Impact of Groundwater Abstractions.
43. Water Framework Directive (Classification, Priority Substances and Shellfish Waters) Regulations (Northern Ireland) 2015 (legislation.gov.uk).

Appendix 8.6

Desk Study Resources, Data & Maps

Desk Study Resources, Data & Mapping information used in the compilation of this assessment:

- AOS Planning (2014) "EIS Substitute Consent Bennettsbridge Limestone Quarry, Kilree, Sheastown, Bennettsbridge, Co. Kilkenny." ABP reference 10.QV.0244. Sept. 2014.
- AOS Planning (2015) "EIS Planning Permission Bennettsbridge Limestone Quarry, Kilree, Sheastown, Bennettsbridge, Co. Kilkenny." S37L Planning and Development Act, 2000 (as amended). Sept. 2015.
- Apex Reports on the Geophysical Investigation at Bennettsbridge Quarry:
 - (2018a) Extension Phase 1. 31ST MAY 2018. AGL18010_01_PHASE 1.
 - (2018b) Extension Phase 2.
 - (2025) Extension Update Survey. 4TH FEBRUARY 2025. AGP24120.
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- DAHG (2014) Dept. of Arts, Heritage and Gaeltacht. SY. Thomastown Quarry SAC. Site Code: 002252
- Daly (1984) Nore River Basin. Geological Survey of Ireland.
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- DCHG (2020) Dept. of Culture, Heritage & the Gaeltacht. Map of *Margaritifera* Sensitive Areas. June 2020.
- DHLGH (2010) Dept. of Housing, Local Government and Heritage. Freshwater Pearl Mussel, River Nore Sub- Basin, Management Plan. March 2010.
- DHLGH (2011) Dept. of Housing, Local Government and Heritage. SITE SYNOPSIS: Site Name: River Nore SPA. Site Code: 004233. Version date 13.9.2011.
- DHLGH (2020) Dept. of Housing, Local Government and Heritage. Map of *Margaritifera* Sensitive Areas Version 10, June 2020.

- DHLGH (2024) Dept. of Housing, Local Government and Heritage. SITE SYNOPSIS: Site Name: River Barrow and River Nore SAC. Site Code: 002162. Version date: 03.04.2024 7 of 7 002162_rev24.docx.
- DHLGH (2024) Dept. of Housing, Local Government and Heritage Water Action Plan 2024: A River Basin Management Plan for Ireland. Plus associated Appendices: *e.g.*, Appendix 2: Programme of Measures -List of Measures; <https://www.gov.ie/en/policy-information/8da54-river-basin-management-plan-2022-2027/>.
- Earth Science Partnership (2018) Planning Application EIAR to Kilkenny County Council. PL18/858.
- EDA (2002) "Surface Water & Groundwater Monitoring Regime for Bennettsbridge Quarry, Kilree, Sheastown, County Kilkenny. Eugene Daly Associates. Job No. E0211A1. Final Draft. 28/6/02.
- EPA (2010) Establishment of Groundwater Source Protection Zones Cuffesgrange Water Supply Scheme Cuffesgrange Borehole May 2010. Tobins, CDM, GSI, Kilkenny County Council.
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- EPA (2018a) WFD Cycle 2 Catchment Nore Subcatchment 15_6 Nore_SC_090.
- EPA (2019) WFD Cycle 2 Catchment Nore Subcatchment 15_4 Nore_SC_100.
- EPA (2018b) Nore Catchment Assessment 2010-2015 (HA 15).
- EPA (2024a) WFD Cycle 3 HA 15 Nore Catchment Report, May 2024. Catchment Science & Management Unit Environmental Protection Agency. May 2024.
- EPA (2024b) WFD Cycle HA 14 Barrow Catchment Report, May 2024. Catchment Science & Management Unit Environmental Protection Agency. May 2024.
- EPA (2024c) WFD Cycle 3 HA 13 Ballyteigue-Bannow Report, May 2024. Catchment Science & Management Unit Environmental Protection Agency. May 2024.
- EPA (2025a) River Quality Survey Biological, Report, Hydrometric Area 15.
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- GSI (2002b) County Kilkenny Groundwater Protection Scheme Volume I Main Body & Volume II Source Protection Zones and Groundwater Quality. July 2002. Kilkenny County Council & GSI.
- GSI (2004a) 1st Draft Kilkenny GWB Description June. Summary of Initial Characterisation.
- GSI (2004b) 1st Draft Stoneyford Gravels GWB Description June. Summary of Initial Characterisation.
- GSI Online Groundwater database. Aquifer Classification, Aquifer Vulnerability, Teagasc Soil Classification, Subsoils, Karst features, groundwater recharge.– online mapping resources (www.gsi.ie).
- GWP Consultants and David Jarvis Associates Limited, UK (2014) A Quarry Design Handbook. 2014 Edition.
- Kilkenny County Council (2021a) Kilkenny City and County Development Plan. Volume 1 County 2021-2027. Comhairle Chontae Chill Chainnigh. Kilkenny City and County Development Plan 2021 3rd September 2021, came into effect on the 15th October 2021. Revision 3.11.2021.

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