

Lobinstown Quarry

Environmental Impact Assessment Report

Appendix 7

Water

2024



Prepared by: J Sheils Planning & Environmental Ltd 31 Athlumney Castle, Navan, Co. Meath



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Appendix 7.1

Section 4 Discharge Licence (Ref 20/01)

and Associated Drawings

2024



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NOV 2020 CEILED. 7907, SQR LOCAL GOVERNMENT(WATER POLLUTION) ACTS, 1977 TO 2007, LOCAL **GOVERNMENT(WATER POLLUTION) REGULATIONS 1978 AND 1992**

LICENCE TO DISCHARGE TRADE EFFLUENT TO WATERS

Ref. No. In Register: 20/01

To:/ Lagan Materials Limited **Rosemount Business Park Ballycoolin Road** Dublin 11

Meath County Council in exercise of the powers conferred on it by the Local Government (Water Pollution) Acts 1977 and 2007 and the Local Government (Water Pollution) Regulations 1978 and 1992, hereby grants a licence to Lagan Materials Limited, for its quarry at Heronstown, Lobinstown, Navan, Co Meath in respect of discharge of trade effluent to waters subject to the following conditions:

1 **General Layout and Operations**

- 1.1. This Licence shall be in respect of the discharge to surface waters of treated effluent arising from quarry operations at Lagan Materials Ltd, Heronstown, Lobinstown, Navan, Co. Meath.
- 1.2. In the event of pollution of any waters arising from the Licensee's activities, whether due to accidental discharge or discharge other than in accordance with the terms and conditions of this licence, the Licensee shall make good all damage resulting from such pollution, including, if necessary:
 - (i) the replacement of fish stocks,
 - the restoration of spawning grounds, (ii)
 - the removal of polluting matter from waters (iii)
 - the modification of its discharge regime to prevent re-occurrence, (iv)
 - or such other measures as may be directed by the Licensing Authority. (v)
- 1.3 All effluent generated by quarry operations shall be directed through the treatment system, constructed as per details submitted to Meath County Council in the discharge licence application dated 03/06/2020, except where otherwise required by conditions in this licence. The treatment system shall comprise a main settlement pond of area 2000 m2, water depth 1.5m, a settlement pond of area 100 m2 at the western boundary which connects to the main settlement pond, a Class I hydrocarbon interceptor installed after the outlet of the main settlement pond. Each settlement pond shall be lined with impermeable material, either

compacted clay or other suitable liner. There shall be a single point of discharge to surface waters.

- 1.4 The treatment system shall be constructed and commissioned within 6 months of the date of grant of this licence, unless otherwise agreed in writing with the Licensing Authority.
- 1.5 The hydrocarbon interceptor installed on the discharge channel shall be a Class I oil interceptor of suitable capacity for the maximum discharge rate.
- 1.6 The settlement ponds shall be inspected regularly, maintained, and de-silted at a frequency required to maintain effective minimum volume for settlement treatment. The Licensee shall ensure that the oil interceptor is serviced regularly to ensure that its treatment efficacy is maintained. Records of all maintenance, servicing and de-silting on all parts of the treatment system shall be maintained on site for inspection by Officers of the Licensing Authority.
- 1.7 The Licensee shall ensure that the effluent treatment system is operated and maintained in such a manner as to ensure the discharge of effluent is in accordance with the volume and emission limit values set out in this licence.
- 1.8 The Licensee's site shall be laid out, operated and maintained in such a manner as to prevent the discharge of any quarry effluent to the receiving waters other than *via* the treatment system.
- 1.9 A visual examination of the discharge to surface waters shall be carried out during each day that effluent is being discharged from the site. A log of all such examinations shall be maintained for inspection by officers of the licensing authority.
- 1.10 In the event that any observations made on the quality or appearance of the surface water discharge should indicate that contamination has taken place, the Licensee shall:
 - (i) carry out an immediate investigation to identify and isolate the source of contamination,
 - (ii) put in place measures to prevent further contamination and to minimise the effects of any contamination on the environment, and
 - (iii) notify the Local Authority and Inland Fisheries Ireland as soon as practicable.
- 1.11 In the event of a prolonged period of heavy or sustained rainfall the Licensee shall cease to discharge water from the quarry site where it appears that the discharge from the quarry is causing or is likely to cause flooding of lands downstream of the quarry.
- 1.12 In the event of a prolonged period of heavy or sustained rainfall, the Licensing Authority shall so direct if required, that the discharge from the quarry shall cease and shall determine when the discharge can re-commence.
- 1.13 The Licensee shall ensure that the site is at all times stocked with suitable oil spill kits including booms and suitable absorbent materials and that staff are trained in the appropriate use and deployment of such equipment.
- 1.14 All fuel oil storage tanks and any chemical storage shall be provided with bunding. The capacity of the bunding shall be at least 110% of the capacity of the largest tank or 25% of the total volume which could be stored within the bunded area, whichever is greater.



- 1.15 The Licensee shall provide a discharge sampling and inspection point for the treated discharge and shall ensure that this is laid out, operated and maintained in such manner as to provide safe access for inspection and sampling.
- 1.16 The Licensee shall install an in-line flow-measuring device in order to measure discharge flow rate of the final treated effluent. The flow-measuring device shall be calibrated and maintained to ensure the accuracy of measurements. Evidence of flow measurement calibration shall be submitted to the Licensing Authority upon request. Records of daily flow rates (total volume discharged per day) shall be maintained and submitted to the Licensing Authority on a quarterly basis.
- 1.17 Where after 3 years from the date of grant of this discharge licence no discharge of the type authorised by the licence has been made, or where such a discharge has ceased for a period of 3 years, the licence shall cease to have effect.

2 Effluent Characteristics

2.1 The total volume of effluent to be discharged shall not exceed 72 m³ per hour and 1728 m³ per day.

Parameter:	Units:	Maximum Limit Value:
BOD5	mg/l	2
COD	mg/l	50
Suspended Solids	mg/l	20
pH	pH units	6.0 - 9.0
Ortho-phosphate, as P	mg/l	0.050
Nitrates, as N	mg/l	10
Ammonium, as N	mg/l	0.10
BTEX Compounds	μg/l	10
Total Petroleum Hydrocarbons	μg/l	50

2.2 Effluent as discharged shall comply with the quality standards set out hereunder in respect of the following determinants:

- 2.3 No substance shall be discharged in a manner which, or at a concentration which, following initial dilution, causes tainting of fish, interferes with normal patterns of fish migration, or which accumulates in sediments or biological tissues to the detriment of fish, wildlife or their predators.
- 2.4 Oils and grease shall not be present in the effluent in such quantities as to:



- (i)
- form visible films on the surface of the water; form coatings on the river bed, benthic biota or food resources; cause deleterious effects on aquatic life; or "http://www.international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/international.com/int (ii)
- (iii)
- (iv)

3 **Monitoring Regime**

- The Licensee shall arrange for quarterly sampling and analysis of the discharge for the 3.1 determinants listed in Condition 2.2 above, during all periods that discharges occur. The analysis shall be carried out by an independent laboratory which can demonstrate competence to undertake the relevant tests through accreditation and/or participation in relevant external proficiency testing schemes.
- 3.2 Records of daily flow rates (total volume of treated effluent discharged per day) shall be maintained and submitted to the Licensing Authority on a quarterly basis.
- 3.3 Copies of the results of monitoring and analysis in respect of Conditions 3.1 and 3.2 above shall be submitted to the Licensing Authority every quarter. The results shall be submitted within a month of the end of each quarterly period. A copy of the original Certificates of Analysis produced by the analysing laboratory shall be included in respect of results submitted under Conditions 3.1. The sample identification on the certificates of analysis shall clearly identify the origin, sampling date and sampling time of the samples. The records shall also be made available for inspection at the site office during normal working hours by Authorised Officers of the Licensing Authority, and any other person authorised under Section 28 of the Local Government (Water Pollution) Act 1977, as amended.
- 3.4 The Licensing Authority may direct that discharge sampling frequency is increased to monthly frequency, in the event of non-compliance with licence condition 2.2. The frequency of discharge sampling may revert to quarterly frequency, on the written agreement of the Licensing Authority, subject to satisfactory compliance with licence condition 2.2 in a 6 month period of continuous operation of the treatment system.
- 3.5 The Licensee shall arrange for a biological (macroinvertebrate) survey on the receiving waters (tributary of Killary River at Heronstown) u/s and d/s of the discharge location, in line with EPA methodology for kick sampling and biological assessment, at an annual frequency. The sampling and assessment shall be carried out by a suitably qualified ecologist. The biological survey report shall document sampling locations, sampling and assessment methodology, macro invertebrate sampling results and shall be submitted to the Licensing Authority within 1 month of sampling.

4 Access by Authorised Personnel

4.1 Details of emergency contact personnel, including addresses and telephone numbers, shall be made available to the Licensing Authority within one month of the date of grant of this licence.



At least one such person shall be available for contact at all reasonable times, having due authorisation from the Licensee to expedite emergency measures as may be required.

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4.2 Authorised Officers of the Licensing Authority, or its agents, or any other person authorised under Section 28 of the Local Government (Water Pollution) Act, 1977 shall have access to the site at all reasonable times, including if necessary, times other than normal working hours.

5 Change of Use of the Development

- 5.1 The Licensee shall notify the Licensing Authority of any proposed change in the operation of the premises, which would cause, or be likely to cause, a material alteration in the nature, or increase in the volume of effluent discharged.
- 5.2 No changes in relation to the discharge (flow rates, effluent concentrations) shall take place without the prior written agreement of the Licensing Authority.
- 5.3 The Licensing Authority shall interpret whether any such change is material or not, and whether a review of the Licence is required as a result.
- 5.4 Where the trade effluent discharge from the site has ceased permanently, the Licensee shall notify the Licensing Authority, within 3 months of cessation.

6 Contributions to the Licensing Authority

- 6.1 The Licensee shall pay to the Licensing Authority an annual contribution of € 1209 or such sum as the Licensing Authority from time to time determines, towards the costs incurred by the Licensing Authority of monitoring the discharge. For 2020, the Licensee shall pay a *pro rata* amount from the date of grant of this licence to the 31st of December 2020. This amount shall be paid to the Licensing Authority within one month of the date of grant of this licence. The Licensee shall in 2021 and subsequent years, pay to the Licensing Authority such revised annual contribution as the Licensing Authority determines for the monitoring of the discharge and all such payments shall be made within 1 month of the date upon which demanded.
- 6.2 In the event that the frequency or extent of monitoring, investigations or testing carried out by the Licensing Authority needs to be increased, the Licensee shall contribute such sums as determined by the Licensing Authority to defray its costs in relation to the additional monitoring, investigations or testing.



Dated this the

16/11/20

SIGNED:

Senior Executive Officer

12205/2020 **Environment Order No:**

See Schedule No. 1 (attached) for appeal procedure.



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SCALE 1:20



DETAIL 2 - FLOWMETER CHAMBER SCALE 1:50



DETAIL 3 - SAMPLING CHAMBER SCALE 1:50

SCALE 1:20

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100











Lobinstown Quarry

Environmental Impact Assessment Report

Appendix 7.2

Site Specific Flood Risk Assessment

2024



Prepared by:

J Sheils Planning & Environmental Ltd 31 Athlumney Castle, Navan, Co. Meath

INTRODUCTION

The following flood risk assessment has been prepared by Colin O'Reilly PhD (Hydrology) and in Moorhouse (BSc) of Envirologic Ltd. It is intended to assess potential flood risk to a proposed extension to an existing quarry operated by Lagan at Heronstown, Lobinstown.

In addition, sustainable quarry operation requires that the local natural surface water drainage network has adequate capacity to receive and safely transmit the maximum potential discharge rates. The ability of the natural watercourse system to receive the discharge in terms of hydraulic (flood potential) and hydrochemical (Surface Water Regulations compliance) perspectives is assessed below. The hydrological evaluations include an assessment as to whether quarry discharge has the potential to increase the risk of flooding in downstream receptors and adjoining lands.

As per the Flood Risk Management Guidelines (2009), where flood risk may be an issue for any proposed development, a flood risk assessment (FRA) should be carried out that is appropriate to the scale and nature of the development and the risks arising. The flood risk assessment outlined herein is intended to be sufficiently detailed to quantify the risks and effects of any flooding, necessary mitigation measures, together with recommendations on how to best manage any residual risks. As per the document 'The Planning System and Flood Risk Management (2009)' the flood risk assessment will consist of the following sections:

- 1. Site description;
- 2. Site layout;
- S-P-R model;
- 4. Sequential approach;
- 5. Justification test;
- 6. Determination of flood level;
- 7. Mitigation measures;
- 8. Conclusions.

Hydrological surveying was performed by Envirologic in November 2023.

1.1 APPLICATION AREA & EXISTING DISCHARGE

The proposed quarry extension adjoins the eastern perimeter of the existing quarry excavation. Existing ground levels across the proposed quarry extension range from 86 mOD on the northern boundary to 110 m close to the southern boundary. As quarrying progresses rainfall-runoff and groundwater ingress will collect in the existing quarry sump. From here it is pumped to settlement pond for removal of sediment before being released by gravity to the Killary Stream, approximately midway along the northern boundary of ownership.

Maximum discharge rates are limited to 1,728 m³/d (72 m³/hr) under the terms of an existing discharge license (Ref. 20/01).



Figure 1: Site Layout and Discharge Point

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FLOOD RISK

2.1 HISTORICAL OSI MAPS

The historical 6" OSI maps, dated c. 1830–1840 (Plate 1) and 25" OSI maps, dated c. 1888–1913 (Plate 2) show a high density of drainage channels and watercourses on low-lying lands, suggesting these areas are paorlydrained. In the earlier map a Corn Mill is indicated approximately 500 m east of the proposed extension area. The Mill Race appears to flow eastwards. The later 25" map shows that the Mill Race had been re-routed to flow westwards. There are no mapped watercourses within the application area.

Plate 1 – OSI historical 6" maps



Plate 2 – OSI historical 25" maps



2.2 OPW HISTORICAL FLOODING DATABASE

The OPW database contains historical records of flood events, typically over the last 30 years. The closest historical flood records to the site are as follows:

- Lobinstown, 1.6 km northwest of application site 'low-lying area floods every year after heavy gain'. This
 appears to be pluvial flooding and not sourced from the Killary Stream.
- Devinstown, 2.1 km north of application site 'river overflows its banks after exceptional heavy rain'. The watercourse referred to is the Footstown Great Stream which is in a different catchment to the application site.

2.3 BENEFITTING LAND MAPS

Plate 3 shows that all of the mapped watercourses in the area are maintained as part of the Glyde and Dee Arterial Drainage Scheme and that extensive areas of land have benefitted from these arterial drainage works. The watercourse that runs adjacent to the northern boundary of ownership, and receives discharge, is listed as segment C2(28F1).



Plate 3 - OPW Benefitting Lands Map (OPW)

2.4 CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT (CFRAM)

Detailed CFRAM modelling has not been performed on the Killary Stream or Killary Waters.

2.5 NATIONAL INDICATIVE FLOOD MAPPING (NIFM)

The OPW has generated National Indicative Flood Maps (NIFM) which utilise topographical data to indicate areas potentially at risk of flooding. These maps are not intended to be used for decision making at site-specific scale.

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The polygon presented in Plate 4 represents the low probability (i.e. 0.1% AEP or Q_{1000}) and moderate probability (i.e. 1% AEP or Q_{100}) fluvial extents under a Mid-Range Future Scenario (MRFS, i.e. 20% growth due to climate change). The proposed extension area is indicated to not be at risk of flooding.

Plate 4 – NIFM Low Probability (Grey) and Medium Probability (Purple) Mid-Range Future Scenario (MRFS) (OPW)

3 CATCHMENT FLOWS

The first step in hydraulic capacity assessment is to calculate the existing stream flows that arise during extreme return period events (Q_{100} and Q_{1000}). Calculations are first presented for flood flows in the Killary Stream to the discharge point. These rates will be input into a hydraulic model to predict flood levels at various locations along the drainage network.

In order to assess the impact posed by potential dewatering at the site, two separate flood risk scenarios have been considered:

- 1. Pre-development The channel was modelled in their existing form using natural catchment flood flows.
- Post-development The channel was modelled using the cross sections as per (1) plus the inclusion of an additional flow input to the model. This additional flow is intended to represent future proposed dewatering activities during development of the quarry and will be used to assess the remaining hydraulic capacity of the stream during a Q₁₀₀₀ flood event.

3.1 CATCHMENT FLOWS

The contributing catchment area of the Killary Stream to the point at which the quarry discharge enters the waterbody has been calculated using the OPW Flood Studies Update Portal as approximately 6.63 km² (see Figure 2).

Extreme flood flows generated within the upstream catchment of the Brogheen Stream were calculated using suitable formulae. These rates were then input into the hydraulic model at the upgradient boundary. The model simulation returns predicted flood levels at various locations along the channel reach upstream and downstream of the discharge outfall.



Figure 2: Quarry Site Location and Killary Stream Catchment to Discharge Point

3.2 STREAM FLOOD FLOW ESTIMATION

The first step in hydraulic capacity assessment is to calculate Killary Stream flows that arise during extreme return period events (Q₁₀₀ and Q₁₀₀₀).

3.2.1 OPW Advice

In selecting appropriate formulae, reference has been made to an advisory response from OPW Hydrology Section and Work Package 4.2 (see Appendix A):

- 'For catchments between 5 km² and 25 km² the preferred equation is the 'FSU small catchments' equation. When using the small catchment equation we generally advocate not using a pivotal site adjustment seeing as there is a very small pool of other small catchments from which to source a pivotal site.
- 2. For catchments less than 25 km² we would always say that at least three methods should be explored and that the choice of the flow to be used is up to the practitioner.
- 3. The WP4.2 report is intended to provide a further methodology for small catchment flood estimation. As far as we are concerned, it is the preferred method.
- 4. For catchments less than 5 km² there is no FSU method applicable. For such 'small' catchments we would suggest that maybe the rational method or modified rational method could be used.'

Given the catchment size of 6.6 km² is relatively small options 1 and 2 above will be explored for selecting a suitable CEILED. flood flow rate.

3.2.1.1 OPW FSU – Standard 7 Variable Equation

The ungauged method can be used to determine flood flows at the site using catchment characteristics, which are then corrected using a correlation against descriptors for gauged catchments. The median annual maximum floor magnitude, QMED, as outlined in the Flood Studies Update (FSU) (Nicholson & Bree, 2013) is now preferred over the mean annual flood flow rate (Qbar) parameter described in the Flood Studies Report (FSR) (NERC, 1975). The preferred median is less sensitive to large extreme floods and to flood measurement error in general. The estimation method for ungauged locations is based on a regression analysis relating observed QMED to physical catchment descriptors (PCDs) at gauged locations in Ireland, given by the following equation:

 $QMED_{rural} = 1.237 \times 10^{-5} . AREA^{0.937} . BFI_{soil}^{-0.922} . SAAR^{1.306} . FARL^{2.217} . DRAIND^{0.341} . S^{0.185} . (1 + ARTDRAIN2)^{0.408} . (1 + ARTDRAIN2)^{$ The PCDs applicable to the subject site are shown in Table 1.

PCD	Description	Units	Value
AREA	Catchment area	km ²	6.63
SAAR	Average annual rainfall	mm	888
BFIsoil	Baseflow index derived from soils data		0.55
FARL	Flood attenuation from reservoirs and lakes		1
DRAIND	Ratio of river network to catchment area	km/km ²	0.72
S ₁₀₈₅	Slope of the main stream between the 10 and 85 percentiles	m/km ²	10.90
ARTDRAIN2	Proportion of river network included in drainage schemes		0.777
URBEXT			0
QMED		m ³ /s	1.578

Table 1 - Physical catchment descriptors applicable to quarry catchment (standard OPW FSU equation)

A principal of the FSU is the concept of a pivotal site, which is defined as the gauging station that is considered most relevant to a particular flood estimation problem at the subject site and is used to adjust the QMED rural estimate. In this case the gauging station at Burley (06025) shall be used. The procedure is to infer an adjustment factor to the QMED_{rural} estimate by examining the performance of the regression model at the pivotal site. This adjustment is derived from the ratio between QMED_{urban} at the gauging station, and the median annual maxima value and in this instance results in a 29% decrease to QMED:

QMED at gauging station = 18.69 m³/s

Median annual maxima at gauging station / QMED at gauging station = 26.145 / 18.69 = 0.713

QMED_{rural.adjusted} at site = 1.578 m³/s x 0.713 = 1.124 m³/s

The return-period flood flow (Q_T) is determined by an index flood method, whereby a growth factor as determined from an EV1 distribution plot is applied. In this case:

 $Q_T = QMED x gf$

$$Q_{100} = 3.03 \text{ m}^3/\text{s}$$

Finally, a climate change growth factor of 20 % is applied:

$$Q_{100} = 3.03 \times 1.2$$

 $Q_{100} = 3.63 \text{ m}^3/\text{s}$

Repeating the methodology for Q₁₀₀₀ yields the following:

$$Q_{1000} = 1.124 \text{ m}^3/\text{s x } 3.61$$

 $Q_{1000} = 4.06 \text{ m}^3/\text{s}$
 $Q_{1000} = 4.06 \text{ x } 1.2$
 $Q_{1000} = 4.87 \text{ m}^3/\text{s}$

3.2.2 OPW FSU - Small Catchments Equation

The updated Flood Studies Update (Nicholson & Bree 2013) presents a revised formula more suited to catchments less than 25 km²:

QMED_{rural} = 2.0951x10⁻⁵ . AREA^{0.9245} . BFI_{soil} ^{-0.9030} . SAAR^{1.2695} . FARL^{2.3163} . S^{0.2513}

This yields a $QMED_{rural}$ value of 0.628 m³/s.

As per the OPW Guidelines, a pivotal site adjustment factor is not applied to the outcome of the small catchments equation. The return-period flood flow (Q_T) is again determined by an index flood method, whereby a growth factor as determined from an EV1 distribution plot is applied. In this case:

$$Q_{T} = QMED \times 2.69$$

 $Q_{100} = 0.628 \text{ m}^{3}/\text{s} \times 2.69$
 $Q_{100} = 1.69 \text{ m}^{3}/\text{s}$

Finally, a climate change growth factor of 20 % is applied:

$$Q_{100} = 1.69 \times 1.2$$

 $Q_{100} = 2.03 \text{ m}^3/\text{s}$

Repeating the methodology for Q_{1000} yields a climate change adjusted flow of 2.25 m³/s.

3.2.3 OPW FSU - 3 Variable Method

The FSU 3-variable equation was developed as part of the FSU. It was developed as a 'short cut' equation for the estimation of flow in ungauged catchments.

QMED = 0.000302.AREA^{0.829}. SAAR^{0.898}. BFI^{1.539}

 $QMED = 0.255 \text{ m}^{3}/\text{s}$





ant. CEILED. 7907.2024 Application of the relevant growth factors as per above and 20% climate change adjustment factor results in:

$$Q_{100} = 0.824 \text{ m}^3/\text{s}$$

 $Q_{1000} = 0.928 \text{ m}^3/\text{s}$

3.2.4 Flood Studies Report, FSR (NERC 1974)

This is the original FSR method, with the regression coefficient for Ireland. Estimates from this equation should be treated with extreme caution. It is recommended that these equations should be used only for preliminary flood estimates.

QBAR =0.0172.AREA^{0.94}. STMFRQ^{0.27}. S1085^{0.16}. SOIL^{1.23}. RSMD^{1.03}. (1 + LAKE)^{-0.85}

Table 2 Calculations of Q₁₀₀ – FSR ungauged catchments

Area,	STMFRQ,	S1085,	90II	DeMD		$0 m^{3}/c$	Q _{BAR} x 1.96	Q ₁₀₀ x 1.47	Q ₁₀₀ x cc
km ²	jn/km²	m/km	SOIL	NSIND		Q_{BAR} , III /S	gf, m³/s	sfe m³/s	(1.2), m³/s
6.63	0.15	10.91	0.35	33.90	0.0	0.93	1.81	2.67	3.21

Using this approach the climate change adjusted Q_{1000} is equal to 4.25 m³/s.

3.2.5 Institute of Hydrology Report 124 (1994)

Report No. 124 derives an equation to estimate flood flows for small rural catchments (less than 25 km²). The equation has a standard factorial error (SFE) of 1.65.

$$Qbar_{rural} = 0.00108 (AREA^{0.89} x SAAR^{1.17} x SOIL^{2.17})$$

Table 3 Calculation of Q₁₀₀ using IH124

Area, km ²	SAAR	SOIL	Q_{BAR}	Q _{BAR} x 1.96 gf	Q ₁₀₀ x 1.65 sfe	Q ₁₀₀ x cc (1.2),
			m³/s	m³/s	m³/s	m³/s
6.63	888.01	0.35	1.68	3.29	5.42	6.51

This method was developed for small catchments (< 25 km²) in the UK. It's derivation did not include any Irish catchments. The equation tends to overestimate QBAR for the smallest of the UK catchments used.

Without implementing the SFE, the Q₁₀₀ rate plus 20 % climate change factor was reduced to 3.95 m³/s. This value is generally within a similar range to results derived from the FSU Standard Variable formulae.

Using this approach the climate change adjusted Q_{1000} is equal to 8.60 m³/s.

3.2.6 Modified IH 124 (Cawley & Cunnane 2003)

Qbar_{rural} = 0.000036 (AREA^{0.94} x SAAR^{1.58} x SOIL^{1.87})

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Table 4 Calculations of Q₁₀₀ using modified IH124

	J			TA.		
Area, km²	SAAR	SOIL	Q _{BAR} , m³/s	Q _{BAR} x 1.96 gf m³/s	Q ₁₀₀ x 1.65 sfe m³/s	Q ₁₀₀ x cc (22), m ³ /s
6.63	888.01	0.35	1.36	2.67	4.40	5.29
						9

Without implementing the SFE, the Q₁₀₀ rate plus 20 % climate change factor was reduced to 3.20 m³/s. Again, the unadjusted value is closer to the FSU Standard Variable formulae results above.

3.2.7 TRRL & ADAS

Agricultural Development and Advisory Service (ADAS), which is a precursor to **Transport and Road Research Laboratory (TRRL)**, is only applicable for catchments smaller than 0.4 km². This methodology shall not, therefore, be applied.

3.2.8 Summary of Flood Flow Calculations

Results from the OPW recommended methods are summarised below in Table 5. Q_{100} results were in the range 0.82 and 6.51 m³/s. This high range illustrates the difficulty in selecting a representative value. For example, it is clearly not appropriate here to apply the method recommended by the OPW for catchments between 5 and 25 km².

Hence for this site it is considered appropriate to apply the average from the 6 approaches.

Table 5 Summary of calculated flood flows (including 20% climate change factor), m³/s unless stated

Approach	Q ₁₀₀	Q ₁₀₀₀
FSU Standard	5.09	5.74
FSU small catchments	2.03	2.29
FSU – 3 variables	0.82	0.93
FSR 6 – including SFE	3.21	4.25
IH124 – including SFE	6.51	8.60
Modified IH124 – including SFE	5.29	6.98
Average	3.83	4.80

3.3 HYDRAULIC MODEL

3.3.1 Model Build

A site-specific hydraulic model was compiled using *Flood Modeller Pro* software, which was then used to simulate water levels at different points along the Killary Stream.

The model consists of 12 cross sections that were surveyed by Envirologic using Trimble RTK VRS technique. Cross section locations are shown in Figure 3 and extended upstream and downstream of the discharge point by

350 and 150 m, respectively. Surveying outside this reach was not feasible due to access permissions to third party lands.

Manning's coefficient of 0.03 was applied to open river channel bed sections and a value of 0.045 was applied to riverbanks. Examples of cross-sectional profiles are provided at CS004 (adjacent to the midpoint of the quarry extension area) and CS008 (immediately upstream of the existing discharge point) are shown in Plate and Plate 6 respectively, with the view looking through the upgradient to downgradient plane. All surveyed sections were unimpeded open channels, with the majority of these passing through a mixture of forestry and low-lying agricultural land.



Figure 3: Cross Sections as used to compile Hydraulic Model







3.3.2 Validation

A flow of 0.01 m³/s was adopted for the validation procedure and based on field work this is a reasonable estimate for validation of the simulation. Surface water levels as observed on 18th November 2023 are presented in Table



6 with the Envirologic Model outputs in the adjacent column. The model error is the difference between the predicted and observed water levels.

Under this flow scenario, the predicted river level error on the Killary Stream was up to 250 mm, with the error only this high where there was heavy canopy cover. Error at the discharge point was below 20 mm and for the purposes P O T PORK of this assessment the model is considered to be valid and accurate.

Table 6 Summary of Validation

Section	Gradient, m/m	Validation, 18/11/23, validation flow = 0.1 m³/s				
		Observed Surface water	Envirologic Model	Difference, m		
		level 18/11/23, mOD	Output, mOD			
CS001	0.0031	84.23	84.35	0.12		
CS002	0.0014	83.96	84.01	0.05		
CS003	0.0036	83.90	83.75	-0.15		
CS004	0.0063	83.78	83.53	-0.25		
CS005	0.0055	83.47	83.33	-0.14		
CS006	0.0055	83.16	83.14	-0.02		
CS007	0.0207	83.16	83.09	-0.07		
CS008	0.0021	83.02	83.03	0.01		
CS009	0.0085	83.00	83.02	0.02		
CS010	0.0085	82.73	82.98	0.25		
CS011	0.0031	nr	82.89	n/a		
CS012	0.0031	82.50	82.43	-0.07		

3.3.3 **Model Outputs**

The conveyance capacity of all surveyed cross sections along the stream were assessed for suitability to transmit Q100 and Q100 flows, with an allowance included for climate change. The predicted surface water elevations are presented in Table 7.

The final column of Table 7 presents the river elevation at each cross section when the conservative estimate of maximum quarry discharge rate (1,728 m³/d; 0.02 m³/s) is added to the Q1000 catchment based river flow flood flows, which includes a 20% climate change factor.

nary of Mo	del Flow Simul	ation Outputs		P _A	_
Section	on Greenfield Conditions		Greenfield Condi		
	Q ₁₀₀	Q ₁₀₀₀	Q ₁₀₀ plus max. discharge	Q ₁₀₀₀ plus max. discharge	
	(3.83 m³/s)	(4.80 m³/s)	(3.85 m³/s)	(4.82 m³/s)	7-
Quarry area	84.43	84.53	84.43	84.53	9.07.
CS002					
CS003	84.15	84.26	84.15	84.26	
CS004	83.98	84.10	83.98	84.10	
CS005	83.82	83.93	83.82	83.93	
CS006	83.63	83.74	83.63	83.74	
CS007	83.55	83.66	83.55	83.66	
CS008	83.46	83.57	83.46	83.57	
CS009	83.44	83.54	83.44	83.55	
CS010	83.37	83.47	83.37	83.48	
CS011	83.21	83.29	83.21	83.30	
CS012	82.73	82.81	82.73	82.81	

Table 7 Summary of Model Flow Simulation Output

Under pre-development conditions, a Q₁₀₀₀ flood event is maintained within the Killary Stream channel as surveyed. Flood waters naturally spill onto the lower-lying forestry lands which makes up the natural flood plain of the stream.

The longitudinal section along the discharge route for the climate change adjusted Q_{100} plus quarry discharge is included below as Plate 7.



Plate 7 – Cross Longitudinal profile of discharge route under Q1000 flood conditions

The quarry extension area passes adjacent to the Killary Stream between Sections CS001 to CS006. Maximum predicted flood elevations along this channel reach are in the range 83.74 to 84.90 mOD. Minimum ground elevations on the quarry extension area are 86 mOD. Hence the quarry extension area does not lie within the active floodplain serving the Killary Stream.

The discharge point is between CS008 and CS009. The maximum quarry discharge does not cause any perceptible increase in Q₁₀₀₀ flood levels downstream of the discharge point. Although the model did not extend far downstream it is unlikely that the discharge will cause perceptible increases in flood risk further downstream. Lands downstream are in agricultural/forestry use for 470 m downstream of the downgradient (western) boundary of ownership.

4 SUMMARY

With respect to an existing bedrock quarry at Heronstown, Lobinstown, Co. Meath, the two primary aims of the model and simulation runs were:

- 1. to quantify the capacity of the stream route to receive maximum permitted quarry discharge waters;
- to ascertain whether a proposed quarry extension area is within the active floodplain serving the Killary Stream.

Hydraulic modelling was used predict river water levels under various flow regimes. Results of these simulations showed that during a Q₁₀₀₀ event the Killary Stream is not at risk of flooding. Addition of the maximum quarry discharge (0.02 m³/sec) to the river when it is under flood conditions does not cause any discernible increase in flood elevations downstream of the discharge point. The proposed discharge from the quarry will not cause any increase in flood risk to downstream receptors during flood conditions. Hence upgrade works are not deemed necessary on the route to facilitate the predicted discharge during a storm event. The input from the quarry discharge is small relative to the stormflows and will become smaller as the catchment size increases progressing downstream.

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Lobinstown Quarry

Environmental Impact Assessment Report

Appendix 7.3

Site Monitoring Data

2024



Prepared by:

J Sheils Planning & Environmental Ltd 31 Athlumney Castle, Navan, Co. Meath



			RELA
Date	Rainfall (mm)	Flow(m ³ /day)	Discharge Limit (1728m ³ /day)
04/05/2023	5.2	250.9	1728
05/05/2023	4.2	223.3	1728
06/05/2023	0.0	143.5	1728
07/05/2023	8.2	213.8	1728
08/05/2023	0.8	319.3	1728
09/05/2023	1.4	184.4	1728
10/05/2023	13.2	356.4	1728
11/05/2023	3.4	220.5	1728
12/05/2023	0.0	42.8	1728
13/05/2023	0.6	33.3	1728
14/05/2023	0.4	27.6	1728
15/05/2023	0.0	29.5	1728
16/05/2023	0.0	0.0	1728
17/05/2023	0.0	0.0	1728
18/05/2023	0.2	1.9	1728
19/05/2023	0.4	29.5	1728
20/05/2023	1.2	51.3	1728
21/05/2023	0.2	52.3	1728
22/05/2023	0.0	15.2	1728
23/05/2023	0.0	5.7	1728
24/05/2023	0.0	0.0	1728
25/05/2023	0.0	0.0	1728
26/05/2023	0.0	0.0	1728
27/05/2023	0.0	5.7	1728
28/05/2023	0.0	0.0	1728
29/05/2023	0.0	0.0	1728
30/05/2023	0.0	0.0	1728
31/05/2023	0.0	0.0	1728
01/06/2023	0.0	0.0	1728
02/06/2023	0.0	0.0	1728
03/06/2023	0.0	0.0	1728
04/06/2023	0.0	0.0	1728
05/06/2023	0.0	0.0	1728
06/06/2023	0.0	3.8	1728
07/06/2023	0.0	0.0	1728
08/06/2023	0.0	0.0	1728
09/06/2023	0.0	0.0	1728
10/06/2023	0.6	53.2	1728
11/06/2023	0.0	18.2	1728
12/06/2023	1.2	49.4	1728
13/06/2023	0.0	45.6	1728



			RECO
Date	Rainfall (mm)	Flow(m ³ /day)	Discharge Limit (1728m ³ /day)
14/06/2023	0.0	62.7	1728 9
15/06/2023	0.0	22.8	1728
16/06/2023	14.8	312.7	1728
17/06/2023	0.2	278.5	1728
18/06/2023	0.0	22.8	1728
19/06/2023	0.0	34.2	1728
20/06/2023	1.0	118.8	1728
21/06/2023	1.2	187.2	1728
22/06/2023	0.8	179.6	1728
23/06/2023	6.0	212.9	1728
24/06/2023	5.4	167.3	1728
25/06/2023	0.4	154.0	1728
26/06/2023	1.4	157.8	1728
27/06/2023	5.2	155.9	1728
28/06/2023	2.0	152.1	1728
29/06/2023	1.8	147.3	1728
30/06/2023	0.6	185.3	1728
01/07/2023	0.0	169.2	1728
02/07/2023	5.0	211.0	1728
03/07/2023	1.0	73.2	1728
04/07/2023	12.6	170.1	1728
05/07/2023	3.0	331.7	1728
06/07/2023	5.2	285.1	1728
07/07/2023	0.2	156.8	1728
08/07/2023	0.0	69.4	1728
09/07/2023	16.4	378.3	1728
10/07/2023	11.2	396.3	1728
11/07/2023	1.8	321.2	1728
12/07/2023	0.6	251.9	1728
13/07/2023	6.4	209.1	1728
14/07/2023	25.4	410.6	1728
15/07/2023	7.8	446.7	1728
16/07/2023	4.0	411.5	1728
17/07/2023	5.8	243.3	1728
18/07/2023	4.8	252.8	1728
19/07/2023	0.2	212.9	1728
20/07/2023	1.6	285.1	1728
21/07/2023	12.6	447.6	1728
22/07/2023	27.2	456.2	1728
23/07/2023	2.0	464.7	1728
24/07/2023	0.0	166.3	1728



			PE	
Date	Rainfall (mm)	Flow(m ³ /day)	Discharge Limit (1728m ³ /day)	
25/07/2023	0.2	178.7	1728	-
26/07/2023	11.0	303.2	1728	3
27/07/2023	0.2	336.4	1728	C
28/07/2023	0.4	171.1	1728	
29/07/2023	2.2	294.6	1728	
30/07/2023	8.2	344.0	1728	
31/07/2023	5.0	343.1	1728	
01/08/2023	22.6	404.9	1728	
02/08/2023	0.6	441.9	1728	
03/08/2023	1.4	162.5	1728	
04/08/2023	38.2	386.8	1728	
05/08/2023	3.4	453.3	1728	
06/08/2023	2.0	365.9	1728	
07/08/2023	0.2	270.9	1728	
08/08/2023	0.0	203.4	1728	
09/08/2023	0.0	29.5	1728	
10/08/2023	1.6	145.4	1728	
11/08/2023	1.6	151.1	1728	
12/08/2023	2.2	147.3	1728	
13/08/2023	1.0	32.3	1728	
14/08/2023	0.0	8.6	1728	
15/08/2023	0.0	20.9	1728	
16/08/2023	0.0	22.8	1728	
17/08/2023	0.0	4.8	1728	
18/08/2023	36.6	445.7	1728	
19/08/2023	0.8	424.8	1728	
20/08/2023	0.0	241.4	1728	
21/08/2023	0.2	180.6	1728	
22/08/2023	0.0	0.0	1728	
23/08/2023	0.0	0.0	1728	
24/08/2023	0.0	0.0	1728	
25/08/2023	2.4	99.8	1728	
26/08/2023	4.0	113.1	1728	
27/08/2023	2.4	52.3	1728	
28/08/2023	0.0	4.8	1728	
29/08/2023	0.0	0.0	1728	
30/08/2023	1.0	0.0	1728	
31/08/2023	1.8	151.1	1728	
01/09/2023	1.2	115.0	1728	
02/09/2023	0.2	161.6	1728	
03/09/2023	0.2	0.0	1728	



			P.C.	
Date	Rainfall (mm)	Flow(m ³ /day)	Discharge Limit (1728m ³ /day)	
04/09/2023	0.0	0.0	1728	_
05/09/2023	0.0	42.8	1728	2
06/09/2023	0.0	0.0	1728	.0
07/09/2023	0.2	52.3	1728	
08/09/2023	0.0	134.0	1728	
09/09/2023	0.0	0.0	1728	
10/09/2023	24.2	303.2	1728	
11/09/2023	3.4	368.8	1728	
12/09/2023	0.0	326.0	1728	
13/09/2023	2.4	260.4	1728	
14/09/2023	9.6	316.5	1728	
15/09/2023	8.6	295.6	1728	
16/09/2023	6.8	294.6	1728	
17/09/2023	10.4	351.6	1728	
18/09/2023	18.8	389.7	1728	
19/09/2023	13.2	389.7	1728	
20/09/2023	0.2	275.6	1728	
21/09/2023	0.0	104.5	1728	
22/09/2023	0.0	370.7	1728	
23/09/2023	3.6	361.2	1728	
24/09/2023	9.8	332.6	1728	
25/09/2023	4.0	313.6	1728	
26/09/2023	4.4	275.6	1728	
27/09/2023	24.2	361.2	1728	
28/09/2023	4.4	437.2	1728	
29/09/2023	0.0	361.2	1728	
30/09/2023	9.2	361.2	1728	
01/10/2023	0.0	380.2	1728	
02/10/2023	0.2	266.1	1728	
03/10/2023	0.6	133.1	1728	
04/10/2023	3.6	171.1	1728	
05/10/2023	5.4	209.1	1728	
06/10/2023	0.0	266.1	1728	
07/10/2023	0.0	247.1	1728	
08/10/2023	0.0	180.6	1728	
09/10/2023	0.0	152.1	1728	
10/10/2023	2.4	114.0	1728	
11/10/2023	0.2	76.0	1728	
12/10/2023	0.0	57.0	1728	
13/10/2023	0.4	76.0	1728	
14/10/2023	0.2	19.0	1728	
Discharge Licence Ref. 20/01 Daily Discharge Data



Date	Rainfall (mm)	Flow(m ³ /day)	Discharge Limit (1728m ³ /day)
15/10/2023	0.0	19.0	1728
16/10/2023	0.0	28.5	1728
17/10/2023	9.2	28.5	1728
18/10/2023	25.6	190.1	1728
19/10/2023	17.8	342.1	1728
20/10/2023	16.6	370.7	1728
21/10/2023	0.4	332.6	1728
22/10/2023	2.4	313.6	1728



exapital water systems ltd.	Document Reference: QM-SLS- 03	Rev No. 01	Author: Approved:	EB VB
	RAIN GAUGE INSTALLATION LOG SHEET			

				$^{\circ}C_{A}$
SURVEY:	Breedon		Date	02/05/23
RG Location:		Roof of site office		
Address:				
Contact Name:		John Fennell		2
Contact Tel. No:				1001
Installation Date/	Time	02/05/23	16:08 (1 GMT)	*
Site ID:		RG01		
Logger ID:		18778445		

RG Location:	
Address:	
Contact Name:	
Contact Tel. No:	
Installation Date/Time	
Site ID:	
Logger ID:	

RG Location:	
Address:	
Contact Name:	
Contact Tel. No:	
Installation Date/Time	
Site ID:	
Logger ID:	

Additional Checks				Yes / No
Site secure from Vandal	ism?			Yes
Site Safe to Access?				Yes
Site accessible each vis	it?			Yes
Site open to all weather	conditions?			Yes
RG overshadowed by tre	ee/building?			No
			-	
Crow Leader	MS .	Date & Time	02/05/23	

1st Rain Gauge Detail









Certificate of Analysis

	services lt	d.	IIIC	RECO
Report No.	23-29682 Rev 0			Page 1 of 5
		Certificate	e of Analysis	· 79/07
Customer:	Hydro-		Project:	Lobinstown - Ground Water
Address:	50 Henry Street Gal	50 Henry Street Galway H91 FA4X	Site	
			Date Received:	21/06/2023
			Condition of Sample:	Satisfactory
Report to:	Dr Pamela B	Bartley	Date Analysed:	21/06/2023 - 04/07/2023
Customer F	0		Issue Date:	05/07/2023
Quote No.	23P-09	0	BATCH NUMBER:	23-29682

0' South Brien

Sadhbh O Brien **Chemistry Team Lead**

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.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

- The results relate only to the items tested. ٠
- Opinions and interpretations expressed herein are outside the scope of INAB accreditation. ٠
- 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 [NO3]/50 + [NO2]/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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S S	outhern scie ervices ltd.	ent	111C	REC	×.
Report No. 23-2	9682 Rev 0				Page 2 of 5
Customer Sample	Ref: GW1		Customer Sample	e Code:	-0, 79/0-
Project:	Lobinstown - Ground W	ater	Sampled By:		Customer
Our Reference:	94620 (23-29682)		Sample Matrix:		Ground Water
Date Sampled	19/06/2023	F	· Time Sampled·		
Method:	Parameter:		Units	LOQ	Result
	Chemical Analysis: (F)				
SCP 052	Hydrogen Ion (pH)		pH units	4.0	6.9
SCP 052	Conductivity		μS/cm @ 20 ℃	15	283
SCP 010	Suspended Solids		mg/L	2	< 4
SCP 027A	Total Ammonia	R	mg/L N	0.02	0.02
SCP 027A	Ammonium		mg/L N	0.02	0.02
SCP 027G	Nitrate		mg/L N	0.25	< 0.25
SCP 027F	Nitrite		mg/L N	0.005	0.531
SCP 027C	Mol Reactive Phosphorus (MRP)		mg/L P	0.01	< 0.01
SCP 027B	Chloride		mg/L	0.5	22.2
SCP 027D	Sulphate		mg/L	0.5	13.0
SCP 027L	Cyanide Free		μg/L	10	< 10
SCP 053A/053D	Potassium (K)		mg/L	1.0	1.3
SCP 053A/053D	Sodium		mg/L	1	15
SCP 044	Total Phosphorus		mg/L P	0.04	0.04
SCP 068A	Fluoride		mg/L	0.1	0.2
SCP 065B	Total Organic Carbon (TOC)		mg/L	0.5	1.1
SCP 038/073	Aluminium		μg/L	10	< 10
SCP 038/073	Arsenic		μg/L	1	3
SCP 038/073	Chromium		μg/L	1	< 1
SCP 038/073	Copper		μg/L	1	1
SCP 038/073	Lead		μg/L	1	< 1
SCP 038/073	Nickel		µg/L	1	4
SCP 038/73	Zinc (Zn)		μg/L	8	9
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40) <u>BTEX (Water)</u>		μg/L	10.0	2108.1
	Chemical Analysis: (F)				
SCP 114A	Benzene		μg/L	0.1	< 0.1
SCP 114A	Toluene		μg/L	0.5	< 0.5
SCP 114A	Ethylbenzene		μg/L	0.5	< 0.5
SCP 114A	m,p Xylene		μg/L	0.5	< 0.5
SCP 114A	o Xylene		μg/L	0.5	< 0.5

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S S S	outhern scie ervices ltd.	ent	.111C	REC	Page 2 of 5
					Tage 3 01 3
Customer Sample	e Ref: GW2		Customer Sample	e Code:	7.9.0-
Project:	Lobinstown - Ground W	ater	Sampled By:		Customer
Our Reference:	94621 (23-29682)		Sample Matrix:		Ground Water
Date Sampled:	19/06/2023	F	Time Sampled:		:
Method:	Parameter:		Units	LOQ	Result
	Chemical Analysis: (F)				
SCP 052	Hydrogen Ion (pH)		pH units	4.0	7.8
SCP 052	Conductivity		µS/cm @ 20 ℃	15	462
SCP 010	Suspended Solids		mg/L	2	20
SCP 027A	Total Ammonia	R	mg/L N	0.02	0.07
SCP 027A	Ammonium		mg/L N	0.02	0.07
SCP 027G	Nitrate		mg/L N	0.25	2.71
SCP 027F	Nitrite		mg/L N	0.005	0.321
SCP 027C	Mol Reactive Phosphorus (MRP)		mg/L P	0.01	< 0.01
SCP 027B	Chloride		mg/L	0.5	12.2
SCP 027D	Sulphate		mg/L	0.5	23.5
SCP 027L	Cyanide Free		μg/L	10	< 10
SCP 053A/053D	Potassium (K)		mg/L	1.0	3.1
SCP 053A/053D	Sodium		mg/L	1	11
SCP 044	Total Phosphorus		mg/L P	0.04	< 0.04
SCP 068A	Fluoride		mg/L	0.1	< 0.1
SCP 065B	Total Organic Carbon (TOC)		mg/L	0.5	1.3
SCP 038/073	Aluminium		μg/L	10	56
SCP 038/073	Arsenic		μg/L	1	5
SCP 038/073	Chromium		μg/L	1	< 1
SCP 038/073	Copper		μg/L	1	< 1
SCP 038/073	Lead		μg/L	1	< 1
SCP 038/073	Nickel		μg/L	1	5
SCP 038/73	Zinc (Zn)		μg/L	8	< 8
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40) <u>BTEX (Water)</u>		µg/L	10.0	101.0
	Chemical Analysis: (F)				
SCP 114A	Benzene		μg/L	0.1	< 0.1
SCP 114A	Toluene		μg/L	0.5	< 0.5
SCP 114A	Ethylbenzene		μg/L	0.5	< 0.5
SCP 114A	m,p Xylene		μg/L	0.5	< 0.5
SCP 114A	o Xylene		μg/L	0.5	< 0.5

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Solution Sol	outhern scie ervices ltd.	ent	1T1C	REC	Page 4 of 5
Customer Sample	Ref: GW3		Customer Sample	Code:	7.9.0-
Project:	Lobinstown - Ground W	ater	Sampled By:		Customer
Our Reference:	94622 (23-29682)		Sample Matrix:		Ground Water
Date Sampled:	19/06/2023	F	Time Sampled:		:
·					
Method:	Parameter:		Units	LOQ	Result
	Chemical Analysis: (F)				
SCP 052	Hydrogen Ion (pH)		pH units	4.0	7.4
SCP 052	Conductivity		uS/cm @ 20 ℃	15	525
SCP 010	Suspended Solids		ma/l	2	7
SCP 027A	Total Ammonia	B	mg/L N	0.02	0.05
SCP 027A	Ammonium		mg/L N	0.02	0.05
SCP 027G	Nitrate		mg/L N	0.25	6.16
SCP 027F	Nitrite		mg/L N	0.005	0.474
SCP 027C	Mol Reactive Phosphorus (MRP)		mg/L P	0.01	< 0.01
SCP 027B	Chloride		mg/L	0.5	13.9
SCP 027D	Sulphate		mg/L	0.5	11.9
SCP 0271	Cvanide Free		ua/L	10	< 10
SCP 053A/053D	Potassium (K)		mg/L	1.0	2.6
SCP 053A/053D	Sodium		mg/L	1	11
SCP 044	Total Phosphorus		mg/L P	0.04	< 0.04
SCP 068A	Fluoride		mg/L	0.1	< 0.1
SCP 065B	Total Organic Carbon (TOC)		mg/L	0.5	3.0
SCP 038/073	Aluminium		ua/L	10	97
SCP 038/073	Arsenic		ua/L	1	<1
SCP 038/073	Chromium		ua/L	1	< 1
SCP 038/073	Copper		ug/L	1	2
SCP 038/073	Lead		ua/L	1	< 1
SCP 038/073	Nickel		µg/L	1	< 1
SCP 038/73	Zinc (Zn)		µg/L	8	< 8
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40) BTEX (Water)		µg/L	10.0	44.3
	Chemical Analysis: (F)				
SCP 114A	Benzene		μg/L	0.1	< 0.1
SCP 114A	Toluene		μg/L	0.5	< 0.5
SCP 114A	Ethylbenzene		μg/L	0.5	< 0.5
SCP 114A	m,p Xylene		μg/L	0.5	< 0.5
SCP 114A	o Xylene		μg/L	0.5	< 0.5

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Report No. 23-29682

Rev 0



Sample Deviation Key

Deviation Code	Deviation Description			
A	The handling of the sample within the laboratory did not compy with the laboratories policy on holding times / handling instructions. It is possible that the results may have been compromised.			
С	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.			
н	Sample received in vial with inappropriate headspace which may compromise results.			
Р	Preservative not used for critical parameters, which may compromise results.			
т	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

	services ltd.		REC
Report No. 2	3-29685 Rev 0		Page 1 of 5
	Certific	ate of Analysis	· 70/07/20
Customer:	Hydro-G	Project:	Lobinstown - Surface Water
Address:	50 Henry Street Galway H91 FA4X	Site	
		Date Received:	21/06/2023
		Condition of Sample:	Satisfactory
Report to:	Dr Pamela Bartley	Date Analysed:	21/06/2023 - 05/07/2023
Customer PC		Issue Date:	06/07/2023
Quote No.	23P-090	BATCH NUMBER:	23-29685

Ruth Lucphy

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 Dunrine Laboratory.
LÓQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

- The results relate only to the items tested. ٠
- 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 [NO3]/50 + [NO2]/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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Report No. 23-2	outhern scie ervices ltd.	en	τ1	TIC	RECE		Page 2 of 5
	P (<u></u>	<u> </u>	<u> </u>	
Customer Sample	e Ref: Upstream			Customer Sample	Code:	79/0-	
Project:	Lobinstown - Surface W	/ater		Sampled By:		Customer	
Our Reference:	94629 (23-29685)			Sample Matrix:		Surface Water	7
Date Sampled:	19/06/2023		R	Time Sampled:		:	
						· · ·	
Method:	Parameter:		Un	its	LOQ	Result	
	Chemical Analysis: (F)						
SCP 052	Hydrogen Ion (nH)		nH	units	4.0	82	
SCP 052	Conductivity		uS	/cm @ 20 ℃	15	373	
SCP 015	Biological Oxygen Demand (BOD)		mo	//	10	1.9	
SCP 010	Suspended Solids		mc	/L	2	17	
SCP 027A	Total Ammonia	В	mc	/L N	0.02	0.11	
SCP 027A	Ammonium		mc	/L N	0.02	0.11	
SCP 027G	Nitrate		mc	, I/L N	0.25	1.76	
SCP 027F	Nitrite		mc	, I/L N	0.005	0.038	
SCP 027C	Mol Reactive Phosphorus (MRP)		mc	ı/L P	0.01	0.08	
SCP 027B	Chloride		mç	ı/L	0.5	16.7	
SCP 027D	Sulphate		mg	ı/L	0.5	9.7	
SCP 027L	Cyanide Free		μg	/L	10	< 10	
SCP 016	Chemical Oxygen Demand (COD)		mg	ı/L	10	15	
SCP 044	Total Phosphorus		mg	J/L P	0.04	0.07	
SCP 068A	Fluoride		mg	J/L	0.1	< 0.1	
SCP 065B	Total Organic Carbon (TOC)		mg	ı/L	0.5	5.6	
SCP 038/073	Aluminium		μg	/L	10	81	
SCP 038/073	Arsenic		μg	/L	1	1	
SCP 038/073	Chromium		μg	/L	1	< 1	
SCP 038/073	Copper		μg	/L	1	1	
SCP 038/073	Lead		μg	/L	1	< 1	
SCP 038/073	Nickel		μg	/L	1	1	
SCP 038/73	Zinc (Zn)		μg	/L	8	< 8	
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40) <u>BTEX (Water)</u>		μg	/L	10.0	56.1	
	Chemical Analysis: (F)						
SCP 114A	Benzene		μg	/L	0.1	< 0.1	
SCP 114A	Toluene		μg	/L	0.5	< 0.5	
SCP 114A	Ethylbenzene		μġ	/L	0.5	< 0.5	
SCP 114A	m,p Xylene		μg	/L	0.5	< 0.5	
SCP 114A	o Xylene		μg	/L	0.5	< 0.5	

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southern scientific services ltd. 23-29685 Rev 0 Page 3 of 5 **Report No. Customer Sample Ref:** Downstream **Customer Sample Code:** Project: Lobinstown - Surface Water Sampled By: Surface Water **Our Reference:** 94630 (23-29685) Sample Matrix: Date Sampled: 19/06/2023 R Time Sampled: Method: Parameter: Units LOQ Result Chemical Analysis: (F) SCP 052 8.2 Hydrogen Ion (pH) pH units 4.0 SCP 052 Conductivity µS/cm @ 20 ℃ 15 375 SCP 015 Biological Oxygen Demand (BOD) mg/L 1.0 1.5 SCP 010 Suspended Solids mg/L 2 9 **SCP 027A Total Ammonia** R mg/L N 0.02 0.10 SCP 027A Ammonium mg/L N 0.02 0.10 SCP 027G Nitrate mg/L N 0.25 2.06 **SCP 027F** Nitrite mg/L N 0.005 0.038 SCP 027C Mol Reactive Phosphorus (MRP) mg/L P 0.01 0.07 **SCP 027B** Chloride mg/L 0.5 16.0 **SCP 027D** Sulphate mg/L 0.5 10.2 **SCP 027L** Cyanide Free μg/L 10 < 10 SCP 016 Chemical Oxygen Demand (COD) mg/L 10 16

SCP 038/073	Arsenic	μg/L	1	2
SCP 038/073	Chromium	μg/L	1	< 1
SCP 038/073	Copper	μg/L	1	1
SCP 038/073	Lead	μg/L	1	<1
SCP 038/073	Nickel	μg/L	1	1
SCP 038/73	Zinc (Zn)	μg/L	8	< 8
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40) <u>BTEX (Water)</u> Chemical Analysis: (F)	μg/L	10.0	< 10.0
SCP 114A	Benzene	ug/l	01	< 0.1
SCP 114A	Toluene	μg/L	0.5	< 0.5
SCP 114A	Ethylbenzene	μg/L	0.5	< 0.5
SCP 114A	m,p Xylene	μg/L	0.5	< 0.5
SCP 114A	o Xylene	μg/L	0.5	< 0.5

mg/L P

mg/L

mg/L

μg/L

0.04

0.1

0.5

10

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SCP 044

SCP 068A

SCP 065B

SCP 038/073

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0.23

< 0.1

5.3

77

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Total Phosphorus

Total Organic Carbon (TOC)

Fluoride

Aluminium

S S	outhern scie ervices ltd.	ent	LITIC	REC	<.
Report No. 23-2	29685 Rev 0				Page 4 of 5
Customer Sample	e Ref: Discharge		Customer Sample	e Code:	-0, -79 ₀₇
Project:	Lobinstown - Surface W	ater	Sampled By:		Customer
Our Reference:	94631 (23-29685)		Sample Matrix:		Surface Water
Date Sampled:	19/06/2023		R Time Sampled:		:
· · ·					
Method:	Parameter:		Units	LOQ	Result
	Chemical Analysis: (F)				
SCP 052	Hydrogen Ion (pH)		pH units	4.0	8.4
SCP 052	Conductivity		μS/cm @ 20 ℃	15	462
SCP 015	Biological Oxygen Demand (BOD)		mg/L	1.0	< 1.0
SCP 010	Suspended Solids		mg/L	2	< 2
SCP 027A	Total Ammonia	R	mg/L N	0.02	< 0.02
SCP 027A	Ammonium		mg/L N	0.02	< 0.02
SCP 027G	Nitrate		mg/L N	0.25	10.84
SCP 027F	Nitrite		mg/L N	0.005	0.014
SCP 027C	Mol Reactive Phosphorus (MRP)		mg/L P	0.01	< 0.01
SCP 027B	Chloride		mg/L	0.5	19.2
SCP 027D	Sulphate		mg/L	0.5	38.3
SCP 027L	Cyanide Free		μg/L	10	< 10
SCP 016	Chemical Oxygen Demand (COD)		mg/L	10	< 10
SCP 044	Total Phosphorus		mg/L P	0.04	< 0.04
SCP 068A	Fluoride		mg/L	0.1	0.2
SCP 065B	Total Organic Carbon (TOC)		mg/L	0.5	2.6
SCP 038/073	Aluminium		μg/L	10	47
SCP 038/073	Arsenic		µg/L	1	25
SCP 038/073	Chromium		μg/L	1	< 1
SCP 038/073	Copper		μg/L	1	< 1
SCP 038/073	Lead		μg/L	1	< 1
SCP 038/073	Nickel		μg/L	1	1
SCP 038/73	Zinc (Zn)		µg/L	8	< 8
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40) <u>BTEX (Water)</u>		μg/L	10.0	< 10.0
	Chemical Analysis: (F)				
SCP 114A	Benzene		μg/L	0.1	< 0.1
SCP 114A	Toluene		μg/L	0.5	< 0.5
SCP 114A	Ethylbenzene		μg/L	0.5	< 0.5
SCP 114A	m,p Xylene		μg/L	0.5	< 0.5
SCP 114A	o Xylene		μg/L	0.5	< 0.5

μg/L

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o Xylene



Report No. 23-29685

Rev 0



Sample Deviation Key

Deviation Code	Deviation Description			
A	The handling of the sample within the laboratory did not compy with the laboratories policy on holding times / handling instructions. It is possible that the results may have been compromised.			
С	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.			
Н	Sample received in vial with inappropriate headspace which may compromise results.			
Р	Preservative not used for critical parameters, which may compromise results.			
т	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

	services ltd.		RECO
Report No.	23-31309 Rev 0		Page 1 of 7
	Certifica	ate of Analysis	· 79/07/20
Customer:	Hydro-G	Project:	Lobinstown - Gound Water
Address:	50 Henry Street Galway H91 FA4X	Site	Lobinstown
		Date Received:	01/08/2023
		Condition of Sample:	Satisfactory
Report to:	Dr Pamela Bartley	Date Analysed:	01/08/2023 - 30/08/2023
Customer F	0	Issue Date:	31/08/2023
Quote No.	23P-090	BATCH NUMBER:	23-31309

Abife Monarty

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 Dunrine Laboratory.
LÓQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

- The results relate only to the items tested. ٠
- 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 [NO3]/50 + [NO2]/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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S S	ervices ltd.		REC	
Report No. 23-3	81309 Rev 0			Page 2 of 7
Customer Sample	e Ref: GW 1	Customer Sample	Code:	
Project:	Lobinstown - Gound Water	Sampled By:		Regan Phipps
Our Reference:	99134 (23-31309)	Sample Matrix:		Ground Water
Date Sampled:	31/07/2023	Time Sampled:		:
Method:	Parameter:	Units	LOQ	Result
	Chemical Analysia (E)			
000 050		al Lucita	10	7.0
SCP 052	Hydrogen Ion (pH)		4.0	7.0
SCP 052		μο/cm @ 20 C	15	200
SCP 010	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.02	< 0.02
SCP 027E	Nitrite	mg/L N	0.005	< 0.005
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.000	< 0.01
SCP 0278	Chloride	mg/L	0.5	19.0
SCP 027D	Sulphate	mg/L	0.5	14.0
SCP 027L	Cvanide Free	ua/L	10	< 10
SCP 053A/053D	Potassium (K)	mg/L	1.0	< 1.0
SCP 053A/053D	Sodium	mg/L	1	13
CALCULATION	* Ammonium	mg/L N	0.02	< 0.02
SCP 044	Total Phosphorus	mg/L P	0.04	0.07
SCP 068A	Fluoride	mg/L	0.1	0.2
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.0
SCP 038/073	Aluminium	μg/L	10	< 10
SCP 038/073	Arsenic	μg/L	1	14
SCP 038/073	Chromium	μg/L	1	< 1
SCP 038/073	Copper	μg/L	1	< 1
SCP 038/073	Lead	μg/L	1	< 1
SCP 038/073	Nickel	μg/L	1	2
SCP 038/73	Zinc (Zn)	μg/L	8	< 8
SCP 114A	Benzene	μg/L	0.1	< 0.1
SCP 114A	Total BTEX	µg/L	2.1	< 2.1
SCP 114A	Ethylbenzene	μg/L	0.5	< 0.5
SCP 114A	m,p Xylene	μg/L	0.5	< 0.5
SCP 114A	o Xylene	μg/L	0.5	< 0.5
SCP 114A	Toluene	μg/L	0.5	< 0.5
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	μg/L	10.0	< 10.0

L:L:

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Serv	vices ltd.		REC
Report No. 23-31309	Rev 0		Page 3 of 7
Customer Sample Ref:	GW 2	Customer Sample Code:	. 79
Project:	Lobinstown - Gound Water	Sampled By:	Regan Phipps
Our Reference:	99135 (23-31309)	Sample Matrix:	Ground Water
Date Sampled:	31/07/2023	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
	Chemical Analysis: (F)			
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.8
SCP 052	Conductivity	μS/cm @ 20 ℃	15	460
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	2.70
SCP 027F	Nitrite	mg/L N	0.005	0.046
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 027B	Chloride	mg/L	0.5	18.5
SCP 027D	Sulphate	mg/L	0.5	13.9
SCP 027L	Cyanide Free	μg/L	10	< 10
SCP 053A/053D	Potassium (K)	mg/L	1.0	2.5
SCP 053A/053D	Sodium	mg/L	1	11
CALCULATION	* Ammonium	mg/L N	0.02	0.04
SCP 044	Total Phosphorus	mg/L P	0.04	< 0.04
SCP 068A	Fluoride	mg/L	0.1	< 0.1
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.5
SCP 038/073	Aluminium	μg/L	10	87
SCP 038/073	Arsenic	μg/L	1	10
SCP 038/073	Chromium	μg/L	1	< 1
SCP 038/073	Copper	μg/L	1	< 1
SCP 038/073	Lead	μg/L	1	< 1
SCP 038/073	Nickel	μg/L	1	1
SCP 038/73	Zinc (Zn)	μg/L	8	15
SCP 114A	Benzene	μg/L	0.1	< 0.1
SCP 114A	Total BTEX	μg/L	2.1	< 2.1
SCP 114A	Ethylbenzene	μg/L	0.5	< 0.5
SCP 114A	m,p Xylene	μg/L	0.5	< 0.5
SCP 114A	o Xylene	μg/L	0.5	< 0.5
SCP 114A	Toluene	µg/L	0.5	< 0.5
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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serv	rices ltd.		P.C.
Report No. 23-31309	Rev 0		Page 4 of 7
Customer Sample Ref:	GW 3	Customer Sample Code:	
Project:	Lobinstown - Gound Water	Sampled By:	Regan Phipps
Our Reference:	99136 (23-31309)	Sample Matrix:	Ground Water
Date Sampled:	31/07/2023	Time Sampled:	:

Method:	Parameter:	er: Units LOQ		Result
	Chemical Analysis: (F)			
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.5
SCP 052	Conductivity	µS/cm @ 20 ℃	15	509
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	7.65
SCP 027F	Nitrite	mg/L N	0.005	0.038
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 027B	Chloride	mg/L	0.5	13.0
SCP 027D	Sulphate	mg/L	0.5	9.7
SCP 027L	Cyanide Free	μg/L	10	< 10
SCP 053A/053D	Potassium (K)	mg/L	1.0	2.5
SCP 053A/053D	Sodium	mg/L	1	9
CALCULATION	* Ammonium	mg/L N	0.02	< 0.02
SCP 044	Total Phosphorus	mg/L P	0.04	0.08
SCP 068A	Fluoride	mg/L	0.1	< 0.1
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.7
SCP 038/073	Aluminium	μg/L	10	84
SCP 038/073	Arsenic	μg/L	1	1
SCP 038/073	Chromium	μg/L	1	< 1
SCP 038/073	Copper	μg/L	1	< 1
SCP 038/073	Lead	μg/L	1	< 1
SCP 038/073	Nickel	μg/L	1	< 1
SCP 038/73	Zinc (Zn)	μg/L	8	< 8
SCP 114A	Benzene	μg/L	0.1	< 0.1
SCP 114A	Total BTEX	μg/L	2.1	< 2.1
SCP 114A	Ethylbenzene	μg/L	0.5	< 0.5
SCP 114A	m,p Xylene	μg/L	0.5	< 0.5
SCP 114A	o Xylene	μg/L	0.5	< 0.5
SCP 114A	Toluene	μg/L	0.5	< 0.5
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	μg/L	10.0	< 10.0

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RECEIVED . 79107 23-31309 Rev 0 Page 5 of 7 U/S SW **Customer Sample Ref: Customer Sample Code:**

Project:	Lobinstown - Gound Water	Sampled By:	Regan Phipps
Our Reference:	99137 (23-31309)	Sample Matrix:	Ground Water
Date Sampled:	31/07/2023	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
	Chemical Analysis: (F)			
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
SCP 052	Conductivity	µS/cm @ 20 ℃	15	302
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	1.8
SCP 010	Suspended Solids	mg/L	2	10
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	2.66
SCP 027F	Nitrite	mg/L N	0.005	0.014
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.10
SCP 027B	Chloride	mg/L	0.5	14.1
SCP 027D	Sulphate	mg/L	0.5	10.6
SCP 027L	Cyanide Free	μg/L	10	< 10
CALCULATION	* Ammonium	mg/L N	0.02	< 0.02
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	27
SCP 044	Total Phosphorus	mg/L P	0.04	0.23
SCP 068A	Fluoride	mg/L	0.1	< 0.1
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	9.6
SCP 038/073	Aluminium	μg/L	10	109
SCP 038/073	Arsenic	μg/L	1	< 1
SCP 038/073	Chromium	μg/L	1	< 1
SCP 038/073	Copper	μg/L	1	2
SCP 038/073	Lead	μg/L	1	< 1
SCP 038/073	Nickel	μg/L	1	2
SCP 038/73	Zinc (Zn)	μg/L	8	< 8
SCP 114A	Benzene	μg/L	0.1	< 0.1
SCP 114A	Total BTEX	μg/L	2.1	< 2.1
SCP 114A	Ethylbenzene	μg/L	0.5	< 0.5
SCP 114A	m,p Xylene	μg/L	0.5	< 0.5
SCP 114A	o Xylene	μg/L	0.5	< 0.5
SCP 114A	Toluene	μg/L	0.5	< 0.5
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Report No.

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99138 (23-31309)

31/07/2023

23-31309 Rev 0 Page 6 of 7 D/S SW **Customer Sample Ref: Customer Sample Code:** Lobinstown - Gound Water Sampled By: Regan Phipps

Sample Matrix:

Time Sampled:

Method:	Parameter:	Units	LOQ	Result
	Chemical Analysis: (F)			
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
SCP 052	Conductivity	μS/cm @ 20 ℃	15	303
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	1.6
SCP 010	Suspended Solids	mg/L	2	10
SCP 027A	Total Ammonia	mg/L N	0.02	< 0.02
SCP 027G	Nitrate	mg/L N	0.25	2.78
SCP 027F	Nitrite	mg/L N	0.005	0.013
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.09
SCP 027B	Chloride	mg/L	0.5	13.6
SCP 027D	Sulphate	mg/L	0.5	10.8
SCP 027L	Cyanide Free	μg/L	10	< 10
CALCULATION	* Ammonium	mg/L N	0.02	< 0.02
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	21
SCP 044	Total Phosphorus	mg/L P	0.04	0.23
SCP 068A	Fluoride	mg/L	0.1	< 0.1
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	8.9
SCP 038/073	Aluminium	μg/L	10	100
SCP 038/073	Arsenic	μg/L	1	< 1
SCP 038/073	Chromium	μg/L	1	< 1
SCP 038/073	Copper	μg/L	1	2
SCP 038/073	Lead	μg/L	1	< 1
SCP 038/073	Nickel	μg/L	1	2
SCP 038/73	Zinc (Zn)	μg/L	8	< 8
SCP 114A	Benzene	μg/L	0.1	< 0.1
SCP 114A	Total BTEX	μg/L	2.1	< 2.1
SCP 114A	Ethylbenzene	μg/L	0.5	< 0.5
SCP 114A	m,p Xylene	μg/L	0.5	< 0.5
SCP 114A	o Xylene	μg/L	0.5	< 0.5
SCP 114A	Toluene	μg/L	0.5	< 0.5
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	μg/L	10.0	< 10.0

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Report No.

Project:

Our Reference:

Date Sampled:

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Ground Water

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Rev 0

Report No. 23-31309

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			Solution and the second s
Customer Sample Ref:	Discharge	Customer Sample Code:	. 79
Project:	Lobinstown - Gound Water	Sampled By:	Regan Phipps
Our Reference:	99139 (23-31309)	Sample Matrix:	Ground Water
Date Sampled:	31/07/2023	Time Sampled:	:

Method:	Parameter:	Units	LOQ	Result
	Chemical Analysis: (F)			
SCP 052	Hydrogen Ion (pH)	pH units	4.0	8.3
SCP 052	Conductivity	µS/cm @ 20 ℃	15	432
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	16.98
SCP 027F	Nitrite	mg/L N	0.005	0.021
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 027B	Chloride	mg/L	0.5	12.1
SCP 027D	Sulphate	mg/L	0.5	43.6
SCP 027L	Cyanide Free	μg/L	10	10
CALCULATION	* Ammonium	mg/L N	0.02	0.03
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 044	Total Phosphorus	mg/L P	0.04	0.13
SCP 068A	Fluoride	mg/L	0.1	0.2
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.7
SCP 038/073	Aluminium	μg/L	10	29
SCP 038/073	Arsenic	μg/L	1	37
SCP 038/073	Chromium	μg/L	1	< 1
SCP 038/073	Copper	μg/L	1	< 1
SCP 038/073	Lead	μg/L	1	< 1
SCP 038/073	Nickel	μg/L	1	1
SCP 038/73	Zinc (Zn)	μg/L	8	< 8
SCP 114A	Benzene	μg/L	0.1	< 0.1
SCP 114A	Total BTEX	μg/L	2.1	< 2.1
SCP 114A	Ethylbenzene	μg/L	0.5	< 0.5
SCP 114A	m,p Xylene	μg/L	0.5	< 0.5
SCP 114A	o Xylene	μg/L	0.5	< 0.5
SCP 114A	Toluene	μg/L	0.5	< 0.5
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	μg/L	10.0	< 10.0

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Envirologic Ltd 78 St Peters Terrace

Howth Co Dublin Ireland Element Materials Technology Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA P: +44 (0) 1244 833780 F: +44 (0) 1244 833781



Attention :	Regan Phipps
Date :	11th August, 2023
Your reference :	3003
Our reference :	Test Report 23/12768 Batch 1
Location :	Lobinstown
Date samples received :	2nd August, 2023
Status :	Final Report
Issue :	1

Six samples were received for analysis on 2nd August, 2023 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

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

Authorised By:

planned.

Please include all sections of this report if it is reproduced

Element Material	s Tech	nology											
Client Name:	Envirologi	ic Ltd					Report :	Liquid					
Reference:	3003	(D)								<u>م</u>			
Contact:	Regan Ph	nipps					Liquids/pr	oducts: V=	40ml vial. G	alass bott	le. P=plastic	bottle	
EMT Job No:	23/12768						H=H ₂ SO ₄ ,	Z=ZnAc, N=	NaOH, HN=	=HN0 ₃	io, i piaono	Dotao	
EMT Sample No.	1	2	3	4	5	6					K >		
											·		
Sample ID	GW1	GW2	GW3	U/S SW	D/S SW	DISCHARGE					19	6	
												7/3	
Depth											Please se	e attached n	otes for all
COC No / misc											abbrevi	ations and a	ponyms
Containers	G	G	G	G	G	G							
Sample Date	31/07/2023 13:50	31/07/2023 12:00	31/07/2023 10:15	31/07/2023 12:30	31/07/2023 12:15	31/07/2023 12:30							
Sample Type	Ground Water	Ground Water	Ground Water	Surface Water	Surface Water	Surface Water							
Batch Number	1	1	1	1	1	1					100/100	1.1	Method
Date of Receipt	02/08/2023	02/08/2023	02/08/2023	02/08/2023	02/08/2023	02/08/2023					LOD/LOR	Units	No.
EPH >C10-C40	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM30

RECEILED. **Element Materials Technology Notification of Deviating Samples Client Name:** Envirologic Ltd **Reference:** 3003 Location: Lobinstown **Regan Phipps** Contact: Reason EMT EMT Sample ID Depth Sample Job Batch Analysis No. No. No deviating sample report results for job 23/12768

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 23/12768

SOILS and ASH

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

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

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

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

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

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

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

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

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

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

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

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

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

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

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

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

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

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

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

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Flease do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation. Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

r	
#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
со	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
ос	Outside Calibration Range

Element Materials Technology

Element Materials Technology					1	Method Code	Appendix
EMT Job No:	23/12768			SIL,			
Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			7,202	
						5	7



Certificate of Analysis

SE	ervices ltd.	IIIC	RECO
Report No. 23-328	77 Rev 0		Page 1 of 7
	Certificat	e of Analysis	7.0 7.0 7.2 7.2 7.2
Customer:	Hydro-G	Project:	Lobinstown - Gound Water
Address:	50 Henry Street Galway H91 FA4X	Site	Lobinstown
		Date Received:	13/09/2023
		Condition of Sample:	Satisfactory
Report to:	Dr Pamela Bartley	Date Analysed:	13/09/2023 - 05/10/2023
Customer PO		Issue Date:	09/10/2023
Quote No.	23P-090	BATCH NUMBER:	23-32877

Joste Conful

Jake Grunfield Laboratory Analyst

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.
LOQ	Parameter Limit of Quantification
Note 6	Subcontracted Parameter.

Notes

- The results relate only to the items tested. ٠
- 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 [NO3]/50 + [NO2]/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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S S	ervices ltd.		Rec	2
Report No. 23-3	32877 Rev 0			Page 2 of 7
Customer Sample	e Ref: GW 1	Customer Sample	Code:	· 79/0-
Project:	Lobinstown - Gound Water	Sampled By:		Regan Phipps
Our Reference:	103515 (23-32877)	Sample Matrix:		Ground Water
Date Sampled:	12/09/2023	Time Sampled:		12:40
Method:	Parameter:	Units	LOQ	Result
	Chemical Analysis: (F)			
SCP 052	Hydrogen Ion (nH)	nH units	40	6.9
SCP 052	Conductivity	uS/cm @ 20 ℃	15	283
SCP 010	Suspended Solids	ma/L	2	< 4
SCP 027A	Total Ammonia	mg/L N	0.02	0.02
SCP 027A	Ammonium	mg/L N	0.02	0.02
SCP 027G	Nitrate	mg/L N	0.25	< 0.25
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.01
SCP 027B	Chloride	mg/L	0.5	22.4
SCP 027D	Sulphate	mg/L	0.5	12.5
SCP 027L	Cyanide Free	μg/L	10	< 10
SCP 053A/053D	Potassium (K)	mg/L	1.0	1.3
SCP 053A/053D	Sodium	mg/L	1	12
SCP 044	Total Phosphorus	mg/L P	0.04	0.08
SCP 068A	Fluoride	mg/L	0.1	0.2
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	1.1
SCP 038/073	Aluminium	μg/L	10	< 10
SCP 038/073	Arsenic	μg/L	1	14
SCP 038/073	Chromium	μg/L	1	< 1
SCP 038/073	Copper	μg/L	1	< 1
SCP 038/073	Lead	μg/L	1	< 1
SCP 038/073	Nickel	μg/L	1	5
SCP 038/73	Zinc (Zn)	μg/L	8	10
SCP 114A	Benzene	μg/L	0.1	< 0.1
SCP 114A	Total BTEX	μg/L	2.1	< 2.1
SCP 114A	Ethylbenzene	μg/L	0.5	< 0.5
SCP 114A	m,p Xylene	μg/L	0.5	< 0.5
SCP 114A	o Xylene	μg/L	0.5	< 0.5
SCP 114A	Toluene	μg/L	0.5	< 0.5
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	μg/L	10.0	< 10.0

- **- : f**: -

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serv serv	vices ltd.		REC
Report No. 23-32877	Rev 0		Page 3 of 7
Customer Sample Ref:	GW 2	Customer Sample Code:	· 79/07
Project:	Lobinstown - Gound Water	Sampled By:	Regan Phipps
Our Reference:	103516 (23-32877)	Sample Matrix:	Ground Water
Date Sampled:	12/09/2023	Time Sampled:	15:45

Method:	Parameter:	Units	LOQ	Result
	Chemical Analysis: (F)			
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.5
SCP 052	Conductivity	µS/cm @ 20 ℃	15	307
SCP 010	Suspended Solids	mg/L	2	21
SCP 027A	Total Ammonia	mg/L N	0.02	1.42
SCP 027A	Ammonium	mg/L N	0.02	1.42
SCP 027G	Nitrate	mg/L N	0.25	< 0.25
SCP 027F	Nitrite	mg/L N	0.005	< 0.005
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 027B	Chloride	mg/L	0.5	10.7
SCP 027D	Sulphate	mg/L	0.5	20.1
SCP 027L	Cyanide Free	μg/L	10	< 10
SCP 053A/053D	Potassium (K)	mg/L	1.0	2.7
SCP 053A/053D	Sodium	mg/L	1	9
SCP 044	Total Phosphorus	mg/L P	0.04	0.35
SCP 068A	Fluoride	mg/L	0.1	< 0.1
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.9
SCP 038/073	Aluminium	μg/L	10	< 10
SCP 038/073	Arsenic	μg/L	1	< 1
SCP 038/073	Chromium	μg/L	1	< 1
SCP 038/073	Copper	μg/L	1	< 1
SCP 038/073	Lead	μg/L	1	< 1
SCP 038/073	Nickel	μg/L	1	1
SCP 038/73	Zinc (Zn)	μg/L	8	< 8
SCP 114A	Benzene	μg/L	0.1	< 0.1
SCP 114A	Total BTEX	μg/L	2.1	< 2.1
SCP 114A	Ethylbenzene	μg/L	0.5	< 0.5
SCP 114A	m,p Xylene	μg/L	0.5	< 0.5
SCP 114A	o Xylene	μg/L	0.5	< 0.5
SCP 114A	Toluene	μg/L	0.5	< 0.5
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	µg/L	10.0	< 10.0

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Report No. 23-32877	Rev 0		Page 4 of 7
Customer Sample Ref:	GW 3	Customer Sample Code:	· 79/02
Project:	Lobinstown - Gound Water	Sampled By:	Regan Phipps
Our Reference:	103517 (23-32877)	Sample Matrix:	Ground Water
Date Sampled:	12/09/2023	Time Sampled:	14:50

Method:	Parameter:	Units	LOQ	Result
	Chemical Analysis: (F)			
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.4
SCP 052	Conductivity	µS/cm @ 20 ℃	15	531
SCP 010	Suspended Solids	mg/L	2	32
SCP 027A	Total Ammonia	mg/L N	0.02	0.06
SCP 027A	Ammonium	mg/L N	0.02	0.06
SCP 027G	Nitrate	mg/L N	0.25	7.84
SCP 027F	Nitrite	mg/L N	0.005	0.080
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01
SCP 027B	Chloride	mg/L	0.5	13.8
SCP 027D	Sulphate	mg/L	0.5	8.8
SCP 027L	Cyanide Free	μg/L	10	< 10
SCP 053A/053D	Potassium (K)	mg/L	1.0	3.2
SCP 053A/053D	Sodium	mg/L	1	9
SCP 044	Total Phosphorus	mg/L P	0.04	0.04
SCP 068A	Fluoride	mg/L	0.1	< 0.1
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	3.0
SCP 038/073	Aluminium	μg/L	10	208
SCP 038/073	Arsenic	μg/L	1	2
SCP 038/073	Chromium	μg/L	1	< 1
SCP 038/073	Copper	μg/L	1	4
SCP 038/073	Lead	μg/L	1	< 1
SCP 038/073	Nickel	μg/L	1	2
SCP 038/73	Zinc (Zn)	μg/L	8	< 8
SCP 114A	Benzene	μg/L	0.1	< 0.1
SCP 114A	Total BTEX	µg/L	2.1	< 2.1
SCP 114A	Ethylbenzene	μg/L	0.5	< 0.5
SCP 114A	m,p Xylene	μg/L	0.5	< 0.5
SCP 114A	o Xylene	μg/L	0.5	< 0.5
SCP 114A	Toluene	μg/L	0.5	< 0.5
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	μg/L	10.0	< 10.0

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Rev 0

Report No. 23-32877

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Customer Sample Ref:	U/S SW	Customer Sample Code:	· 7907
Project:	Lobinstown - Gound Water	Sampled By:	Regan Phipps
Our Reference:	103518 (23-32877)	Sample Matrix:	Ground Water
Date Sampled:	12/09/2023	Time Sampled:	10:00

Method:	Parameter:	Units	LOQ	Result
	Chemical Analysis: (F)			
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
SCP 052	Conductivity	µS/cm @ 20 ℃	15	378
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	1.5
SCP 010	Suspended Solids	mg/L	2	12
SCP 027A	Total Ammonia	mg/L N	0.02	0.03
SCP 027A	Ammonium	mg/L N	0.02	0.03
SCP 027G	Nitrate	mg/L N	0.25	2.76
SCP 027F	Nitrite	mg/L N	0.005	0.026
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.12
SCP 027B	Chloride	mg/L	0.5	17.2
SCP 027D	Sulphate	mg/L	0.5	11.2
SCP 027L	Cyanide Free	μg/L	10	< 10
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10
SCP 044	Total Phosphorus	mg/L P	0.04	0.19
SCP 068A	Fluoride	mg/L	0.1	< 0.1
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	7.1
SCP 038/073	Aluminium	μg/L	10	52
SCP 038/073	Arsenic	μg/L	1	5
SCP 038/073	Chromium	μg/L	1	< 1
SCP 038/073	Copper	μg/L	1	2
SCP 038/073	Lead	μg/L	1	< 1
SCP 038/073	Nickel	μg/L	1	1
SCP 038/73	Zinc (Zn)	μg/L	8	< 8
SCP 114A	Benzene	μg/L	0.1	< 0.1
SCP 114A	Total BTEX	μg/L	2.1	< 2.1
SCP 114A	Ethylbenzene	μg/L	0.5	< 0.5
SCP 114A	m,p Xylene	μg/L	0.5	< 0.5
SCP 114A	o Xylene	µg/L	0.5	< 0.5
SCP 114A	Toluene	µg/L	0.5	< 0.5
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	μg/L	10.0	< 10.0

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12/09/2023

23-32877 Rev 0 Page 6 of 7 **Report No.** D/S SW **Customer Sample Ref: Customer Sample Code:** Lobinstown - Gound Water Sampled By: Regan Phipps 103519 (23-32877) Ground Water **Our Reference:** Sample Matrix:

Time Sampled:

Method:	Parameter:	Units	LOQ	Result
	Chemical Analysis: (F)			
SCP 052	Hydrogen Ion (pH)	pH units	4.0	7.9
SCP 052	Conductivity	µS/cm @ 20 ℃	15	374
SCP 015	Biological Oxygen Demand (BOD)	mg/L	1.0	1.5
SCP 010	Suspended Solids	mg/L	2	10
SCP 027A	Total Ammonia	mg/L N	0.02	0.03
SCP 027A	Ammonium	mg/L N	0.02	0.03
SCP 027G	Nitrate	mg/L N	0.25	1.71
SCP 027F	Nitrite	mg/L N	0.005	0.023
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	0.12
SCP 027B	Chloride	mg/L	0.5	17.1
SCP 027D	Sulphate	mg/L	0.5	8.9
SCP 027L	Cyanide Free	μg/L	10	< 10
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	16
SCP 044	Total Phosphorus	mg/L P	0.04	0.21
SCP 068A	Fluoride	mg/L	0.1	0.1
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	7.8
SCP 038/073	Aluminium	μg/L	10	66
SCP 038/073	Arsenic	μg/L	1	2
SCP 038/073	Chromium	μg/L	1	< 1
SCP 038/073	Copper	μg/L	1	2
SCP 038/073	Lead	μg/L	1	< 1
SCP 038/073	Nickel	μg/L	1	2
SCP 038/73	Zinc (Zn)	μg/L	8	< 8
SCP 114A	Benzene	μg/L	0.1	< 0.1
SCP 114A	Total BTEX	μg/L	2.1	< 2.1
SCP 114A	Ethylbenzene	μg/L	0.5	< 0.5
SCP 114A	m,p Xylene	μg/L	0.5	< 0.5
SCP 114A	o Xylene	μg/L	0.5	< 0.5
SCP 114A	Toluene	μg/L	0.5	< 0.5
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	μg/L	10.0	< 10.0

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Project:

Date Sampled:

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10:50

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Report No. 23-32877	Rev 0		Page 7 of 7
Customer Sample Ref:	Discharge	Customer Sample Code:	· 79/07
Project:	Lobinstown - Gound Water	Sampled By:	Regan Phipps
Our Reference:	103520 (23-32877)	Sample Matrix:	Ground Water
Date Sampled:	12/09/2023	Time Sampled:	10:15

Method:	Parameter:	Units	LOQ	Result		
	Chemical Analysis: (F)					
SCP 052	Hydrogen Ion (pH)	pH units	4.0	8.0		
SCP 052	Conductivity	µS/cm @ 20 ℃	15	431		
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 027A	Ammonium	mg/L N	0.02	< 0.02		
SCP 027G	Nitrate	mg/L N	0.25	12.30		
SCP 027F	Nitrite	mg/L N	0.005	0.026		
SCP 027C	Mol Reactive Phosphorus (MRP)	mg/L P	0.01	< 0.01		
SCP 027B	Chloride	mg/L	0.5	14.4		
SCP 027D	Sulphate	mg/L	0.5	34.1		
SCP 027L	Cyanide Free	μg/L	10	< 10		
SCP 016	Chemical Oxygen Demand (COD)	mg/L	10	< 10		
SCP 044	Total Phosphorus	mg/L P	0.04	0.05		
SCP 068A	Fluoride	mg/L	0.1	0.2		
SCP 065B	Total Organic Carbon (TOC)	mg/L	0.5	2.4		
SCP 038/073	Aluminium	μg/L	10	35		
SCP 038/073	Arsenic	μg/L	1	42		
SCP 038/073	Chromium	μg/L	1	< 1		
SCP 038/073	Copper	μg/L	1	1		
SCP 038/073	Lead	μg/L	1	< 1		
SCP 038/073	Nickel	μg/L	1	< 1		
SCP 038/73	Zinc (Zn)	μg/L	8	< 8		
SCP 114A	Benzene	μg/L	0.1	< 0.1		
SCP 114A	Total BTEX	μg/L	2.1	< 2.1		
SCP 114A	Ethylbenzene	μg/L	0.5	< 0.5		
SCP 114A	m,p Xylene	μg/L	0.5	< 0.5		
SCP 114A	o Xylene	µg/L	0.5	< 0.5		
SCP 114A	Toluene	μg/L	0.5	< 0.5		
SCP 115A	Total Petroleum Hydrocarbons (C10 - C40)	μg/L	10.0	< 10.0		

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Envirologic Ltd 78 St Peters Terrace

Howth Co Dublin Ireland Element Materials Technology Unit 3 Deeside Point Zone 3 Deeside Industrial Park Deeside CH5 2UA P: +44 (0) 1244 833780 F: +44 (0) 1244 833781



Attention :	Regan Phipps
Date :	26th September, 2023
Your reference :	3003
Our reference :	Test Report 23/15172 Batch 1
Location :	Lobinstown
Date samples received :	14th September, 2023
Status :	Final Report
Issue :	1

Five samples were received for analysis on 14th September, 2023 of which five were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

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

The greenhouse gas emissions generated (in Carbon - Co2e) to obtain the results in this report are estimated as:

Scope 1&2 emissions - 1.448 kg of CO2

Scope 1&2&3 emissions - 3.422 kg of CO2

Authorised By:

6 June

Bruce Leslie Project Manager

Please include all sections of this report if it is reproduced

Element Material	s lech	nology										
Client Name:	Envirologi	ic Ltd				Report :	Liquid					
Reference:	3003								\diamond			
Location:	Lobinstow	/n										
Contact:	Regan Pn	iipps				Liquids/pr	oducts: V= 7-7nAc N-	40ml vial, G	Geglass bottl	le, P=plastic	bottle	
	23/13172	1		1		TI=T12504, 2	2-211AC, N-					
EMT Sample No.	1	2	3	4	5					<u>`</u> О		
										. 70)	
Sample ID	GW1	GW2	SW U/S	SW D/S	DISCHARGE					<u> </u>	0-	
											1/2	
Depth										Please se	e attached n	otes for all
COC No / misc										abbrevi	allons and a	a on yins
Containers	G	G	G	G	G							
Sample Date	12/09/2023 12:40	12/09/2023 15:45	12/09/2023 10:50	12/09/2023 10:00	12/09/2023 10:15							
Sample Type	Ground Water	Ground Water	Surface Water	Surface Water	Surface Water							
Botob Number	1	1	1	1	4							
Batch Number	1	1	I	1	1					LOD/LOR	Units	Method No.
Date of Receipt	14/09/2023	14/09/2023	14/09/2023	14/09/2023	14/09/2023	 						
EPH >C10-C40	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM30
Element Materials Technology		logy	今 。	Notification of Deviating Samples								
------------------------------------------	-----------------------------	------------------------------------------------	-------------------	-----------------------------------	-----------------------------------------------------	--------						
Client I Referen Locatio Contac	Name: nce: on: et:	Envirologic 3003 Lobinstowr Regan Phi	: Ltd n pps		۲ <u>۳۲</u>	NE LEO						
EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason						
					No deviating sample report results for job 23/15172	2						
						NO2						

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

It is a requirement under ISO 17025 that we inform clients if samples are deviating i.e. outside what is expected. A deviating sample indicates that the sample 'may' be compromised but not necessarily will be compromised. The result is still accredited and our analytical reports will still show accreditation on the relevant analytes.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 23/15172

SOILS and ASH

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

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

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

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. Asbestos samples are retained for 6 months.

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

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

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C. Ash samples are dried at 37°C ±5°C.

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

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

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

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

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

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

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

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

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

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

STACK EMISSIONS

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation for Dioxins and Furans and Dioxin like PCBs has been performed on XAD-2 Resin, only samples which use this resin will be within our MCERTS scope.

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

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

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

DILUTIONS

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

BLANKS

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

NOTE

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

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Flease do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation. Laboratory records are kept for a period of no less than 6 years.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

Customer Provided Information

Sample ID and depth is information provided by the customer.

r	
#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
В	Indicates analyte found in associated method blank.
DR	Dilution required.
М	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above quantitative calibration range. The result should be considered the minimum value and is indicative only. The actual result could be significantly higher.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
со	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
ТВ	Trip Blank Sample
ос	Outside Calibration Range

Element Materials Technology

Element	Materials Technology	PA			Method Code	Appendix	
EMT Job No:	23/15172			SIL,			
Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/S ANAS)	(UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.			7/20	
						15	7



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Mr Moorhouse Envirologic 78 St Peters Terrace Howth Dublin D13 HO08 South Dublin

07 December 2023

Test Report: COV/2571639/2023

Dear Mr Moorhouse

Analysis of your sample(s) submitted on 15 November 2023 is now complete and we have pleasure in enclosing the appropriate test report(s).

An invoice for the analysis carried out will be sent under separate cover.

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Yours Sincerely,

Signed:

Name:

A. Zunzunegui

Title:

Organics Chemistry Manager



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	db
Mr Eoin Moorhouse Envirologic 78 St Peters Terrace Howth Dublin South Dublin D13 HO08	TSTING 1314
ate of Issue: 30 November 2023	
	This issue replaces
Report Number: COV/25/163	19/2023 ISSUE 2 all previous issues
Job Description: Surface Waters	9/2023 ISSUE 2 all previous issues
Apport Number: COV/25/163 Job Description: Surface Waters Number of Samples included in this report 7	Job Received: 15 November 2023
Job Description: Surface Waters Number of Samples included in this report 7 Number of Test Results included in this report 77	Job Received: 15 November 2023 Analysis Commenced: 17 November 2023

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation. The results relate only to the items tested and where relevant sampled.

Tests marked 'Not UKAS Accredited' in this Report/Certificate are not included in the UKAS Accreditation Schedule for our laboratory. This test report is not a statement of conformity to any specification or standard.

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ANALYSED BY







Report Number: Laboratory Number:	COV/2571639/2023 23422721	
Sample Source:	Envirologic	
Sample Point Description:		
Sample Description:	SW U/S	
Sample Matrix:	Surface Water	
Sample Date/Time:	14 November 2023	12:00
Sample Received:	15 November 2023	
Analysis Complete:	30 November 2023	

Test Description	Result	Units	Completed	Accreditation	Method
Phosphate, Ortho as P LL	0.06	mg/l	18/11/2023	N Cov	WAS067
Alkalinity as CaCO3	105	mg/l	18/11/2023	Y Cov	WAS025
Ammonium as NH4, Low Level	<0.08	mg/l	18/11/2023	N Cov	WAS067
Ammoniacal Nitrogen as N (LL)	<0.06	mg/l	18/11/2023	N Cov	WAS067
Chloride as Cl	9.3	mg/l	17/11/2023	Y Cov	WAS036
Nitrite as N	<0.08	mg/l	17/11/2023	Y Cov	WAS036
Nitrate as N	2.5	mg/l	17/11/2023	Y Cov	WAS036
Total Suspended Solids	12.0	mg/l	29/11/2023	Y Cov	WAS006
Sodium, total as Na (mg/l)	7.7	mg/l	21/11/2023	Y Cov	WAS076
Potassium, total as K (mg/l)	3.2	mg/l	21/11/2023	Y Cov	WAS076
Calcium, total as Ca (mg/l)	41.3	mg/l	21/11/2023	Y Cov	WAS076

Analyst Comments for 23422721:

This sample has been analysed for Total Suspended Solids, Ammonium as NH4, Low Level outside recommended stability times. It is therefore possible that the results provided may be compromised.

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I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: HINN

Name: A. Zunzunegui Date: 30 November 2023

ANALYSED BY







Report Number: Laboratory Number:	COV/2571639/2023 23422722	
Sample Source:	Envirologic	
Sample Point Description:		
Sample Description:	SW D/S	
Sample Matrix:	Surface Water	
Sample Date/Time:	14 November 2023	12:05
Sample Received:	15 November 2023	
Analysis Complete:	30 November 2023	

Test Description	Result	Units	Completed	Accreditation	Method
Phosphate, Ortho as P LL	0.06	mg/l	18/11/2023	N Cov	WAS067
Alkalinity as CaCO3	111	mg/l	20/11/2023	Y Cov	WAS025
Ammonium as NH4, Low Level	<0.08	mg/l	18/11/2023	N Cov	WAS067
Ammoniacal Nitrogen as N (LL)	<0.06	mg/l	18/11/2023	N Cov	WAS067
Chloride as Cl	9.0	mg/l	17/11/2023	Y Cov	WAS036
Nitrite as N	<0.08	mg/l	17/11/2023	Y Cov	WAS036
Nitrate as N	2.0	mg/l	17/11/2023	Y Cov	WAS036
Total Suspended Solids	12.0	mg/l	29/11/2023	Y Cov	WAS006
Sodium, total as Na (mg/l)	7.7	mg/l	21/11/2023	Y Cov	WAS076
Potassium, total as K (mg/l)	3.2	mg/l	21/11/2023	Y Cov	WAS076
Calcium, total as Ca (mg/l)	41.4	mg/l	21/11/2023	Y Cov	WAS076

Analyst Comments for 23422722:

This sample has been analysed for Total Suspended Solids, Ammonium as NH4, Low Level outside recommended stability times. It is therefore possible that the results provided may be compromised.

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I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: HINN

Name: A. Zunzunegui Date: 30 November 2023

ANALYSED BY







Report Number: Laboratory Number:	COV/2571639/2023 23422723	
Sample Source: Sample Point Description:	Envirologic	
Sample Description:	Ingress 1	
Sample Matrix:	Surface Water	
Sample Date/Time:	14 November 2023	15:20
Sample Received:	15 November 2023	
Analysis Complete:	30 November 2023	

Test Description	Result	Units	Completed	Accreditation	Method
Phosphate, Ortho as P LL	<0.02	mg/l	18/11/2023	N Cov	WAS067
Alkalinity as CaCO3	101	mg/l	20/11/2023	Y Cov	WAS025
Ammonium as NH4, Low Level	<0.08	mg/l	18/11/2023	N Cov	WAS067
Ammoniacal Nitrogen as N (LL)	<0.06	mg/l	18/11/2023	N Cov	WAS067
Chloride as Cl	13.0	mg/l	17/11/2023	Y Cov	WAS036
Nitrite as N	<0.08	mg/l	17/11/2023	Y Cov	WAS036
Nitrate as N	<0.7	mg/l	17/11/2023	Y Cov	WAS036
Total Suspended Solids	3.00	mg/l	29/11/2023	Y Cov	WAS006
Sodium, total as Na (mg/l)	8.5	mg/l	21/11/2023	Y Cov	WAS076
Potassium, total as K (mg/l)	3.4	mg/l	21/11/2023	Y Cov	WAS076
Calcium, total as Ca (mg/l)	34.5	mg/l	21/11/2023	Y Cov	WAS076

Analyst Comments for 23422723:

This sample has been analysed for Total Suspended Solids, Ammonium as NH4, Low Level outside recommended stability times. It is therefore possible that the results provided may be compromised.

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I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: HINN

Name: A. Zunzunegui Date: 30 November 2023

ANALYSED BY







Report Number:	COV/2571639/2023	
Laboratory Number:	23422724	
Sample Source:	Envirologic	
Sample Point Description:		
Sample Description:	Ingress 2	
Sample Matrix:	Surface Water	
Sample Date/Time:	14 November 2023	15:30
Sample Received:	15 November 2023	
Analysis Complete:	30 November 2023	

Test Description	Result	Units	Completed	Accreditation	Method
Phosphate, Ortho as P LL	<0.02	mg/l	18/11/2023	N Cov	WAS067
Alkalinity as CaCO3	145	mg/l	20/11/2023	Y Cov	WAS025
Ammonium as NH4, Low Level	<0.08	mg/l	18/11/2023	N Cov	WAS067
Ammoniacal Nitrogen as N (LL)	<0.06	mg/l	18/11/2023	N Cov	WAS067
Chloride as Cl	11.4	mg/l	17/11/2023	Y Cov	WAS036
Nitrite as N	<0.08	mg/l	17/11/2023	Y Cov	WAS036
Nitrate as N	<0.7	mg/l	17/11/2023	Y Cov	WAS036
Total Suspended Solids	2.00	mg/l	29/11/2023	Y Cov	WAS006
Sodium, total as Na (mg/l)	8.0	mg/l	24/11/2023	Y Cov	WAS076
Potassium, total as K (mg/l)	2.2	mg/l	24/11/2023	Y Cov	WAS076
Calcium, total as Ca (mg/l)	53.3	mg/l	24/11/2023	Y Cov	WAS076

Analyst Comments for 23422724:

This sample has been analysed for Total Suspended Solids, Ammonium as NH4, Low Level outside recommended stability times. It is therefore possible that the results provided may be compromised.

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I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: HINN

Name: A. Zunzunegui Date: 30 November 2023

ANALYSED BY







Report Number:	COV/2571639/2023	
Laboratory Number:	23422725	
Sample Source:	Envirologic	
Sample Point Description:		
Sample Description:	Discharge	
Sample Matrix:	Surface Water	
Sample Date/Time:	14 November 2023	11:55
Sample Received:	15 November 2023	
Analysis Complete:	30 November 2023	

Test Description	Result	Units	Completed	Accreditation	Method
Phosphate, Ortho as P LL	<0.02	mg/l	18/11/2023	N Cov	WAS067
Alkalinity as CaCO3	140	mg/l	20/11/2023	Y Cov	WAS025
Ammonium as NH4, Low Level	<0.08	mg/l	18/11/2023	N Cov	WAS067
Ammoniacal Nitrogen as N (LL)	<0.06	mg/l	18/11/2023	N Cov	WAS067
Chloride as Cl	13.1	mg/l	17/11/2023	Y Cov	WAS036
Nitrite as N	<0.08	mg/l	17/11/2023	Y Cov	WAS036
Nitrate as N	8.5	mg/l	17/11/2023	Y Cov	WAS036
Total Suspended Solids	3.00	mg/l	29/11/2023	Y Cov	WAS006
Sodium, total as Na (mg/l)	9.7	mg/l	24/11/2023	Y Cov	WAS076
Potassium, total as K (mg/l)	3.3	mg/l	24/11/2023	Y Cov	WAS076
Calcium, total as Ca (mg/l)	50.1	mg/l	24/11/2023	Y Cov	WAS076

Analyst Comments for 23422725:

This sample has been analysed for Total Suspended Solids, Ammonium as NH4, Low Level outside recommended stability times. It is therefore possible that the results provided may be compromised.

This issue replaces all previous issues Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS. Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), S = Subcontracted, THB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG). For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: HINN

Name: A. Zunzunegui Date: 30 November 2023

ANALYSED BY







Report Number: Laboratory Number:	COV/2571639/2023 23422726	
Sample Source:	Envirologic	
Sample Point Description:		
Sample Description:	Sump	
Sample Matrix:	Surface Water	
Sample Date/Time:	14 November 2023	15:05
Sample Received:	15 November 2023	
Analysis Complete:	30 November 2023	

Test Description	Result	Units	Completed	Accreditation	Method
Phosphate, Ortho as P LL	<0.02	mg/l	18/11/2023	N Cov	WAS067
Alkalinity as CaCO3	135	mg/l	29/11/2023	Y Cov	WAS025
Ammonium as NH4, Low Level	<0.08	mg/l	18/11/2023	N Cov	WAS067
Ammoniacal Nitrogen as N (LL)	<0.06	mg/l	18/11/2023	N Cov	WAS067
Chloride as Cl	11.4	mg/l	17/11/2023	Y Cov	WAS036
Nitrite as N	<0.08	mg/l	17/11/2023	Y Cov	WAS036
Nitrate as N	5.1	mg/l	17/11/2023	Y Cov	WAS036
Total Suspended Solids	12.0	mg/l	29/11/2023	Y Cov	WAS006
Sodium, total as Na (mg/l)	8.8	mg/l	21/11/2023	Y Cov	WAS076
Potassium, total as K (mg/l)	2.9	mg/l	21/11/2023	Y Cov	WAS076
Calcium, total as Ca (mg/l)	45.5	mg/l	21/11/2023	Y Cov	WAS076

Analyst Comments for 23422726:

This sample has been analysed for Total Suspended Solids, Ammonium as NH4, Low Level outside recommended stability times. It is therefore possible that the results provided may be compromised.

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I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: HINN

Name: A. Zunzunegui Date: 30 November 2023

ANALYSED BY







Report Number: Laboratory Number:	COV/2571639/2023 23422727	
Sample Source:	Envirologic	
Sample Point Description:		
Sample Description:	SS Tank 2	
Sample Matrix:	Surface Water	
Sample Date/Time:	14 November 2023	15:45
Sample Received:	15 November 2023	
Analysis Complete:	30 November 2023	

Test Description	Result	Units	Completed	Accreditation	Method
Phosphate, Ortho as P LL	<0.02	mg/l	18/11/2023	N Cov	WAS067
Alkalinity as CaCO3	56.0	mg/l	18/11/2023	Y Cov	WAS025
Ammonium as NH4, Low Level	<0.08	mg/l	18/11/2023	N Cov	WAS067
Ammoniacal Nitrogen as N (LL)	<0.06	mg/l	18/11/2023	N Cov	WAS067
Chloride as Cl	7.9	mg/l	17/11/2023	Y Cov	WAS036
Nitrite as N	<0.08	mg/l	17/11/2023	Y Cov	WAS036
Nitrate as N	<0.7	mg/l	17/11/2023	Y Cov	WAS036
Total Suspended Solids	152	mg/l	29/11/2023	Y Cov	WAS006
Sodium, total as Na (mg/l)	4.5	mg/l	24/11/2023	Y Cov	WAS076
Potassium, total as K (mg/l)	4.4	mg/l	24/11/2023	Y Cov	WAS076
Calcium, total as Ca (mg/l)	21.2	mg/l	24/11/2023	Y Cov	WAS076

Analyst Comments for 23422727:

This sample has been analysed for Total Suspended Solids, Ammonium as NH4, Low Level outside recommended stability times. It is therefore possible that the results provided may be compromised.

This issue replaces all previous issues Accreditation Codes: Y = UKAS / ISO17025 Accredited, N = Not UKAS / ISO17025 Accredited, M = MCERTS. Analysed at: CHE = Chester(CH5 3US), COV = Coventry(CV4 9GU), S = Subcontracted, THB = Subcontracted to Trowbridge(BA14 0XD), WAK = Wakefield(WF5 9TG). For Microbiological determinands 0 or ND=Not Detected, For Legionella ND=Not Detected in volume of sample filtered.

I/S=Insufficient sample For soil/sludge samples: AR=As received, DW=Dry weight.

Signed: HINN

Name: A. Zunzunegui Date: 30 November 2023



ANALYST COMMENTS FOR REPORT COV/2571639/2023

Issue

2

This issue replaces all previous issues

Date of Issue: 30 November 2023

Sample No	Analysis Comments
23422721	This sample has been analysed for Total Suspended Solids, Ammonium as NH4, Low Level outside recommended stability times. It is therefore possible that the results provided may be compromised.
23422722	This sample has been analysed for Total Suspended Solids, Ammonium as NH4, Low Level outside recommended stability times. It is therefore possible that the results provided may be compromised.
23422723	This sample has been analysed for Total Suspended Solids, Ammonium as NH4, Low Level outside recommended stability times. It is therefore possible that the results provided may be compromised.
23422724	This sample has been analysed for Total Suspended Solids, Ammonium as NH4, Low Level outside recommended stability times. It is therefore possible that the results provided may be compromised.
23422725	This sample has been analysed for Total Suspended Solids, Ammonium as NH4, Low Level outside recommended stability times. It is therefore possible that the results provided may be compromised.
23422726	This sample has been analysed for Total Suspended Solids, Ammonium as NH4, Low Level outside recommended stability times. It is therefore possible that the results provided may be compromised.
23422727	This sample has been analysed for Total Suspended Solids, Ammonium as NH4, Low Level outside recommended stability times. It is therefore possible that the results provided may be compromised.

Signed:

Name: A. Zunzunegui Date: 30 November 2023

Title: Organics Chemistry Manager





Specialists in laboratory analysis, monitoring and environmental consultancy

TMS Environment Ltd 53 Broomhill Drive Tallaght Dublin 24 Phone: +353-1-4626710 Fax: +353-1-4626714 Web: www.tmsenv.ie

BIOLOGICAL ASSESSMENT OF SURFACE WATER QUALITY

FOR

BREEDON MOUNTAIN HOUSE QUARRY LOBINSTOWN CO. MEATH

Report Ref. 31682 TMS Environment Ltd Issued: 13 June 2023

Prepared by: Nick Owen Senior Environmental Scientist

Approved by:

Imelob Sharahan

Dr. Imelda Shanahan Technical Director

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3.0	Resu	lts	5
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5.0	Conc	clusions	8
APP	ENDIC	ES	

Appendix I	Criteria for O-Value a	oplication
representation in the second s		ppnearion

1.0 Introduction

TMS Environment Ltd has been requested by Breedon to conduct a biological assessment of surface water quality in the vicinity of a discharge to surface water from the Mountain House quarry at Lobinstown, Co. Meath.

This survey was conducted on 15 May 2023 by TMS Environment Ltd personnel. Samples were taken from both upstream and downstream of the discharge in accordance with the EPA Q-Rating Methodology and European Communities Environmental Objectives (Surface Waters) Regulations 2009 S.I. No. 272 of 2009. The objectives of the survey are to assess the quality of the surface water at the two locations, and to determine if there is potential evidence of a negative impact on the quality of the water downstream of the discharge from the quarry.

2.0 Methodology

2.1 Monitoring Locations

Assessments were previously performed in the Keeran river, which runs along the north of the facility, flowing from east to west, at locations upstream and downstream of the effluent discharge. The locations of the previous macroinvertebrate survey locations are illustrated in Figure 1.



Figure 1: Location of former biological assessment locations (upstream and downstream) and the previous effluent discharge location (denoted by blue arrow).





Figure 2 illustrates the locations of the new assessment sites, relative to the new discharge location. The new assessment locations chosen were selected on the basis of providing suitable locations to provide an adequate amount of benthic invertebrate specimens for assessment, as well as having reasonably comparable physical characteristics (substrate type, flow regime) to enable as close as possible a direct comparison between the upstream and downstream assemblages.

2.2 Sampling & Assessment

The water quality assessment was undertaken using the benthic macroinvertebrates as bioindicators. These are an excellent tool for water quality assessment as they exhibit

differential responses to physical and chemical changes in their environment. Some macroinvertebrates are sensitive to pollution while others are tolerant. They provide a realistic record of the prevailing water quality conditions.

A range of physical (average depth and width, mesohabitat type and substrate composition) and chemical characteristics (dissolved oxygen, temperature, conductivity and pH) were determined on site using hand-held meters.

Three-minute kick samples and one minute stone wash samples were taken at each monitoring location. The sample nets were emptied and rinsed into a sorting tray for analysis. All macro-invertebrate specimens were isolated and identified to family or genus level in the field. Where individuals were not identifiable in the field, biological samples were taken and preserved in 70% alcohol solutions. These samples were brought to the laboratory of TMS Environment Ltd for analysis under a light microscope.

Identification of specimens was carried out to the level required for the EPA Q-Rating methodology (McGarrigle *et al.*, 2002). Based on the relative abundance of each indicator group, a biotic index (Q Value) was determined in accordance with Tables 2 to 5 and the biological assessment procedure used by the Environmental Protection Agency (McGarrigle *et al.*, 2002) and European Communities Environmental Objectives (Surface Waters) Regulations 2009 S.I. No. 272 of 2009.

3.0 Results

The sampling sites were relatively slow flowing, clean and with little in-stream vegetation and similar water chemistries were observed at both sites. These elements are summarised in Tables 1 and 2. The assemblages and Q-values applied are presented in Tables 3-5, with the basis for the Q-values applied included in Appendix I.

Location	Width (m)	Depth (cm)	Substrate	In-stream vegetation	Flow conditions
Upstream	2.7	0.19	Sand, gravel, silt	None	Shallow, moderate flow, riffle
Downstream	2.5	0.34	Sand, gravel, silt	None	Shallow, moderate flow, riffle

Table 1. Physical characteristics of the two monitoring locations at the time of sampling.

Location	Temp. (°C)	DO (mg/l)	рН	EC (µS/cm @25°c)	BOD (mg/l)	Orthophos- phate (mg/l P)	Total Phosphor- vs (mg/l P)	Ammo- nia (mg/l NH ₃)
Upstream	12.5	9.97	7.38	269	1.1	0.08	0.20	0.02
Downstream	12.4	10.19	7.50	320	1.1	0.04	0.48	0.02

Table 2. Chemical characteristics of the two monitoring locations at the time of sampling.

Order / Group	Family	Genus	Q	Up-	Down-
			rating	stream	stream
Crustacea	Gammaridae	Gammarus	C	236	268
	Asellidae	Asellus	D	32	31
Trichoptera	Hydropsychidae	Indet.	C	52	58
	Rhyacophylidae	Indet.	C	24	29
Ephemeroptera	Baetidae	Indet.	В	4	3
	Heptageniidae	Indet.	Α	3	3
Gastropoda	Hyrobiidae	Potamopyrgus	C	127	101
	Lymnaeidae	Indet.	C	68	72
Lamellibranchiata	Unionidae	Anodonta	C	29	19
	Sphaeriidae	Indet.	D	10	11
Coleoptera	Indet.	Indet.	C	6	4
Diptera	Simuliidae	Indet.	C	2	4
Oligochaeta	Tubificidae	Indet.	E	40	20

Table 3. Benthic invertebrate specimens determined for each sampling location.Indet. denotes indetermined.

Q-Value grouping	Upstream	Downstream
Total abundance	633	623
Α	3	3
В	4	3
С	544	555 7
D	42	42 07
Ε	40	20
Percentage		Ţ
Α	0.5	0.5
В	0.6	0.5
С	86.0	89.1
D	6.6	6.7
E	6.3	3.2
Number of Taxa		
Α	1	1
В	1	1
С	8	8
D	2	2
E	1	1
Q-Rating	3-4	3-4

Table 4. The representation of each invertebrate group as separated by the Q-value system in each of the sampling sites, with assigned Q-rating at the bottom.

Biotic Index	Quality Status
Q5	
Q4-5	Unpolluted Waters
Q4	
Q3-4	Slightly Polluted Waters
Q3	Moderately Polluted Waters
Q2-3	
Q2	
Q1-2	Seriously Polluted Waters
Q1	

Table 5. Quality Standards for Rivers.

4.0 Discussion

Both of the substrates were relatively clean with coarse gravel available for invertebrates. The sites did have accumulations of fine sand and silts and very few boulders were present. Flow velocity was slightly higher at the downstream location relative to the upstream site. Oxygen levels were within normal ranges (>8mg/l) for both locations. Water chemistry parameters suggested that water quality was similar at both locations.

The results of the macroinvertebrate surveys indicate a Q Value of 3-4, slightly polluted water (Table 5) at the upstream location. The assemblage upstream has a similar level of diversity and abundance to that found downstream. Specimens of the class Crustacea (*Gammarus* and *Asellus*) dominate the faunal assemblage, followed by Gastropoda (*Potamopyrgus* and Limnaeiidae) and Trichopterids. Ephemeroptera, which have a low tolerance for pollution, were present in small numbers.

The results of the macroinvertebrate survey at the downstream location indicates a Q Value of 3-4, slightly polluted water (Table 5). Specimens of the class Crustacea (*Gammarus* and *Asellus*) dominate the faunal assemblage, followed by Gastropoda (*Potamopyrgus* and Limnaeiidae) and Trichopterids The presence of Ephemeropterids, which are pollution intolerant, suggests that the water quality is similar downstream compared to upstream.

The Q Value is the same upstream as compared to downstream of the effluent discharge, therefore it can be inferred that the emissions from the quarry are not having a deleterious effect on the macroinvertebrate fauna in the stream.

The values obtained this year cannot be directly compared to previous years, as the discharge is into a different stream.

5.0 Conclusions

- The results of the macroinvertebrate survey for this year (May 2023) indicate a Q Value of 3-4 for the upstream and 3-4 for the downstream monitoring locations;
- As the Q Value is identical downstream of the quarry discharge relative to upstream, it can be inferred that the discharge from the quarry at Lobinstown is not having a deleterious effect on the biological quality of the stream.
- The results cannot be directly compared to previous years, as the discharge is into a different stream. Further assessments of the faunal assemblage in subsequent years will determine if the effluent discharge is having any medium to long term impacts on the biological quality of the stream.



APPENDIX I

CRITERIA FOR Q-VALUE APPLICATION

		t								р.							°<́(CEILED.
	Group E	Most Toleran								Chironomus sp Eristalis sp.						Tubificidae		· 79/07/2024
anic pollution	Group D	Very Tolerant					Sialidae					<i>Asellus</i> spp. <i>Crangonyx</i> spp.	Lymnaea peregra Physa sp.	Sphaenidae	All except Piscicola sp.			
to their sensitivity to org	Group C	Tolerant		<i>Baetis modani</i> Caenidae Ephemerellidae	Uncased spp.			All except A. aestivalis	Coleoptera	Chironomidae (excl. <i>Chironomus</i> spp.) Simuliklae, Tipulidae	Hydracarina	Gammarus spp. Austropotamobius pallipes	Gastropoda (exd. <i>Lymnaea peregra</i> & <i>Physa</i> sp.)	Anodonta spp.	Piscicala sp.		All	
rates grouped according	Group B	Less Sensitive	Leuctra spp.	Baetidae (excl. <i>Baetis modan</i>) Leptophlebidae	Cased spp.	All taxa		Aphelocheirus aestivalis										
Macroinverteb	Group A	Sensitive	All except Leucina spp.	Heptageniidae Siphlonuriidae <i>Ephemera danica</i>										Margaritifera margaritifera				
	TAXA		Plecoptera	Ephemeropt <i>e</i> ra	Trichoptera	Odonata	Megaloptera	Hemiptera	Coleoptera	Diptera	Hydracarina	Crustacea	Gastropoda	Lamellibranchiata	Hirudinea	Olig ochaeta	Platyhelminthes	

	Biological Assess	ment of Water Quality i	in Eroding Reaches (Riffles & Glides) of I	Rivers and Streams ⁴		
Biotic	Indices (Q Values) and I	typical associated macroin	vertebrate community:	structure. See overleaf	for details of the Faur	nal Groups.	
Macroinvertebrate Faunal Groups**	Q5	Q4	Q3-4	03 0	Q2	Q1	
Group A	At least 3 taxa well represented	At least 1 taxon in reasonable numbers	At least 1 taxon Few - Common	Absent	Absent	Absent	
Group B	Few to Numerous	Few to Numerous	Few/Absent to Numerous	Few/Absent	Absent	Absent	
Group C	Few	Common to Numerous Baetis rhodani often Abundant Others: never Excessive	Common to Excessive (usually Dominant or Excessive)	Dominant to Excessive	Few or Absent	Absent	
Group D	Few or Absent	Few or Absent	Few/Absent to Common	Few/Absent to Common	Dominant to Excessive	Few or Absent	
Group E	Few or Absent	Few or Absent	Few or Absent	Few or Absent	Few / Absent to Common	Dominant	
Additional Qualifyin	ng Criteria						
Cladophora spp. Abundance	Trace only or None	Moderate growths (If present)	May be Abundant to Excessive growths	May be Excessive growths	Few or Absent	None	
Macrophytes (Typical abundance)	Normal growths or absent	Enhanced growths	May be Luxuriant growths	May be Excessive growths	Absent to Abundant	Present/Absent	
Slime Growths (Sewage Fungus)	Never	Never	Trace or None	May be Abundant	May be Abundant	None	
Dissolved Oxygen Saturation	Close to 100% at all times	80% - 120%	Fluctuates from < 80% to >120%	Very unstable. Potential fish-kills	Low (but > 20%)	Very low, sometimes zero	
Substratum Siltation	None	May be light	May be light	May be considerable	Usually heavy	Usually very heavy and anaerobic	
Note occurrence/abun in virtually all circumst	dance of groups in abor tances. Single specimen	ve table refers to some bu s may be ignored. Season	t not necessarily <u>all</u> of t al and other relevant fa	the constituents of the ictors (i.e., drought, fk	group. The Additional bods) must be taken in	Qualifying Criteria apply to account.	PA
those affected by sign ** See Further Observ	ficant ground water inp ations overleaf.	but, excessive calcification,	drainage, canalisation,	culverting, marked st	ading etc.		
						*D. . 79-1	
						DI RODA	



Web: www.tmsenv.ie

SURFACE WATER QUALITY ASSESSMENT

AT

LAGAN, LOBINSTOWN, CO. MEATH.

Quarter 1, 2023

Report Ref: 31218 Issued: 30 January 2023

Report by:

Marian Brady

Marian Brady Consultancy Manager 30 January 2023

1.0 Scope

This report presents the results of a surface water monitoring survey, which was carried out at the Lagan quarry in Lobinstown, Co. Meath. Sampling was carried out to in order to satisfy the surface water monitoring requirements as specified in the Trade Effluent Discharge Licence for the site (Reference No. 20/01).

2.0 Methodology

A surface water sample was collected at the site on the 11 January 2023. A grab sample was collected from one monitoring location (surface water discharge) as per the monitoring location map shown below. The surface water discharge sample was analysed for the suite of parameters as described in Condition 2.2 of Trade Effluent Discharge Licence (Reference No. 20/01).



3.0 Results

The detailed measurement results are presented in Appendix I – Laboratory Test Results. The results have been compared with the Maximum Limit Values (MLVs) set out in Condition 2.2 of Trade Effluent Discharge Licence (Reference No. 20/01). Condition 2.2 is presented below for reference.

2.2 Effluent as discharged shall comply with the quality standards set out hereunder in respect of the following determinants:

Parameter:	Units:	Maximum Limit Value:
BOD5	mg/l	2
COD	mg/l	50
Suspended Solids	mg/l	20
рН	pH units	6.0 - 9.0
Ortho-phosphate, as P	mg/l	0.050
Nitrates, as N	mg/l	10
Ammonium, as N	mg/l	0.10
BTEX Compounds	μg/l	10
otal Petroleum Hydrocarbons	μg/l	50

The measurement results presented in Appendix I show that the surface water discharge sample is in compliance with the MLVs set out in Condition 2.2 of the Trade Effluent Discharge Licence as shown above with the exception of BOD with a result of 3.2 mg/l and Ammonium with a result of 0.14 mg/l was recorded.



APPENDIX I

LABORATORY TEST REPORT

tms environment ltd

TMS Environment Ltd 53 Broomhill Drive Tallaght Dublin 24

Phone: +353-1-4626710 Fax: +353-1-4626714 Web: www.tmsenv.ie



Confidential Laboratory Test Report

Client: Lagan Lobinstown Co. Meath F.T.A.O: James Butler Commencement Date: 11 January 2023 Completion Date: 27 January 2023 Report Date: 30 January 2023 Page Number: 1 of 2

TMS Environment Ref: 31218

Sample Type: Surface Water

		IESI	RESULI		
Parameter	31218-1 SW 1	31218-2 Discharge 2	Units	Methodology	Test Procedure Ref
pH*	7.6	8.0	pH units	pH Meter	QP-MEAS-2011
Suspended Solids*	8.0	31	mg/l SS	Gravimetry	QP-CHEM-2002
BOD*	3.2	3.0	mg/l cBOD5	5 Day incubation/DO probe	QP-CHEM-2016
COD*	7	20	mg/l O2	Digestion Spectrophotometry	QP-CHEM-2065
Ammonium as N (NH4)	0.14	< 0.02	mg/l N	Auto Analyser	QP-CHEM-2037
Nitrate as N (NO3-N)	6.58	3.24	mg/l N	Auto Analyser	QP-CHEM-2043
ТРН	< 10	< 20	ug/l	Note 1	Note 1
Benzene	< 1	< 1	ug/l	Note 1	Note 1
Toluene	< 1	< 1	ug/l	Note 1	Note 1
Ethylbenzene	< 1	< 1	ug/l	Note 1	Note 1
m&p - Xylene	< 1	< 1	ug/l	Note 1	Note 1
o-Xylene	< 1	< 1	ug/l	Note 1	Note 1
Ortho-phosphate (as P)	< 0.02	0.04	mg/l P	Auto Analyser	QP-CHEM-2040

TEST RESULT

*In-house Accredited Test

Note 1: Analysis subcontracted to ALS

Note 2: The sampling methodology employed by TMS Environment Ltd. To obtain the samples analysed for this report is accredited to EN ISO/IEC 17025:2017

Kell Prepared By: Aine Kelly Laboratory Analyst

Prethibbe

Approved By:

Dr. Prathibha Ganesh Nair Laboratory Manager

Date: 30 Jan 2023 This. 1907 ros

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SURFACE WATER QUALITY ASSESSMENT

AT

BREEDON IRELAND, LOBINSTOWN, CO. MEATH.

Quarter 2, 2023

Report Ref: 31560 Issued: 20 July 2023

Report by:

Marian Brady

Marian Brady Consultancy Manager 20 July 2023

1.0 Scope

This report presents the results of a surface water monitoring survey, which was carried out at the Breedon Ireland quarry in Lobinstown, Co. Meath. Sampling was carried out to in order to satisfy the surface water monitoring requirements as specified in the Trade Effluent Discharge Licence for the site (Reference No. 20/01).

2.0 Methodology

A surface water sample was collected at the site on the 11 April 2023. A grab sample was collected from one monitoring location (surface water discharge) as per the monitoring location map shown below. The surface water discharge sample was analysed for the suite of parameters as described in Condition 2.2 of Trade Effluent Discharge Licence (Reference No. 20/01).



3.0 Results

The detailed measurement results are presented in Appendix I – Laboratory Test Results. The results have been compared with the Maximum Limit Values (MLVs) set out in Condition 2.2 of Trade Effluent Discharge Licence (Reference No. 20/01). Condition 2.2 is presented below for reference.

2.2 Effluent as discharged shall comply with the quality standards set out hereunder in respect of the following determinants:

Parameter:	Units:	Maximum Limit Value:
BOD5	mg/l	2
COD	mg/l	50
Suspended Solids	mg/l	20
pH	pH units	6.0 - 9.0
Ortho-phosphate, as P	mg/l	0.050
Nitrates, as N	mg/l	10
Ammonium, as N	mg/l	0.10
BTEX Compounds	μg/l	10
Total Petroleum Hydrocarbons	μg/l	50

The measurement results presented in Appendix I show that the surface water discharge sample is in compliance with the MLVs set out in Condition 2.2 of the Trade Effluent Discharge Licence as shown above with the exception of BOD with a result of 3.5 mg/l recorded.


APPENDIX I

LABORATORY TEST REPORT

environment ltd

tms

TMS Environment Ltd 53 Broomhill Drive Tallaght Dublin 24

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Confidential Laboratory Test Report

Client: Lagan Lobinstown Co. Meath

F.T.A.O: James Butler Commencement Date: 11 April 2023 Completion Date: 21 April 2023 Report Date: 25 April 2023 Page Number: 1 of 2

TMS Environment Ref: 31560

Sample Type: Surface Water

Parameter	31560-1 SW Discharge	Units	Methodology	Test Procedure Ref
pH**	6.5	pH units	pH Meter	QP-MEAS-2011
Suspended Solids*	< 3	mg/l SS	Gravimetry	QP-CHEM-2002
BOD*	3.5	mg/l cBOD5	5 Day incubation/DO probe	QP-CHEM-2016
COD*	11	mg/l O ₂	Digestion Spectrophotometry	QP-CHEM-2065
Ammonium as N (NH4)	0.04	mg/l N	Auto Analyser	QP-CHEM-2037
Nitrate as N (NO3-N)	9.78	mg/l N	Auto Analyser	QP-CHEM-2045
ТРН	< 10	ug/l	Note 1	Note 1
Benzene	< 1	ug/l	Note 1	Note 1
Toluene	< 1	ug/l	Note 1	Note 1
Ethylbenzene	< 1	ug/l	Note 1	Note 1
m&p - Xylene	< 1	ug/l	Note 1	Note 1
o-Xylene	< 1	ug/l	Note 1	Note 1
Ortho-phosphate (as P)	< 0.02	mg/l P	Auto Analyser	QP-CHEM-2040

TEST RESULT

Ortho-phosphate (as P) *In-House Accredited Test

** On-Site Accredited Test

Note 1: Analysis subcontracted to ALS

Note 2: The sampling methodology employed by TMS Environment Ltd. To obtain the samples analysed for this report is accredited to EN ISO/IEC 17025:2017

Prepared By: <u>Ane Kelly</u> Aine Kelly 0 Laboratory Analyst

Laboratory Manager

Date: 25 Apr 2023 ED. 1907 - Rosa

Date: 25 Apo 23

Approved By:

Preethillible Dr. Prathibha Ganesh Nair

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