Annual Environmental Report

2023

BORRISOLEIGH

D0323-01

CONTENTS

7 APPENDIX

7.1 SMALL STREAM RISK SCORE ASSESSMENT

1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2023 AER

This Annual Environmental Report has been prepared for D0323-01, BORRISOLEIGH, in Tipperary in accordance with the requirements of the wastewater discharge licence for the agglomeration. Specified reports where relevant are included as an appendix to the AER.

1.1 ANNUAL STATEMENT OF MEASURES

A summary of any improvements undertaken is provided where applicable.

1.2 TREATMENT SUMMARY

The agglomeration is served by a wastewater treatment plant(s)

- Borrisoleigh WWTP with a Plant Capacity PE of 1550, the treatment type is 3P - Tertiary P removal .

1.3 ELV OVERVIEW

The overall compliance of the final effluent with the Emission Limit Values (ELVs) is shown below. More detailed information on the below ELV's can be found in Section 2.

Discharge Point Reference	Treatment Plant	Discharge Type	Compliance Status	Parameters failing if relevant
TPEFF2800D0323SW001	Borrisoleigh WWTP	Treated	Non-Compliant	Ammonia-Total (as N) mg/l

1.4 LICENCE SPECIFIC REPORTING

Assessment / Report
Small Stream Risk Score Assessment

2 TREATMENT PLANT PERFORMANCE AND IMPACT SUMMARY

2.1 BORRISOLEIGH WWTP - TREATED DISCHARGE

2.1.1 INFLUENT MONITORING SUMMARY - BORRISOLEIGH WWTP

A summary of influent monitoring for the treatment plant is presented below. This monitoring is primarily undertaken in order to determine the overall efficiency of the plant in removing pollutants from the raw wastewater.

Parameters	Number of Samples	Annual Max	Annual Mean
Ammonia-Total (as N) mg/l	11	32	13
Suspended Solids mg/l	11	2161	510
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	11	395	164
COD-Cr mg/l	11	1115	466
pH pH units	11	8.53	7.88
ortho-Phosphate (as P) - unspecified mg/l	11	3.10	1.65
Hydraulic Capacity	N/A	835	503

If other inputs in the form of sludge / leachate are added to the WWTP then these are included in Section 2.1.5 if applicable.

Significance of Results:

The annual mean hydraulic loading is less than the peak Treatment Plant Capacity. The annual maximum hydraulic loading is less than the peak Treatment Plant Capacity. Further details on the plant capacity and efficiency can be found under the sectional ‘Operational Performance Summary’. The design of the wastewater treatment plant allows for peak values and therefore the peak loads have not impacted on compliance with Emission Limit Values.

2.1.2 EFFLUENT MONITORING SUMMARY - TPEFF2800D0323SW001

Parameter	WWDL ELV (Schedule A)	ELV with Condition 2 Interpretation included Note 1	Interim % reduction from influent concentration	Number of sample results	Number of exceedances	Number of exceedances with Condition 2 Interpretation included	Annual Mean	Overall Compliance (Pass/Fail)
COD-Cr mg/l	125	250	N/A	12	N/A	N/A	23	Pass
Suspended Solids mg/l	35	87.5	N/A	12	N/A	N/A	8.79	Pass
pH pH units	9	9	N/A	12	N/A	N/A	7.54	Pass
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	8	16	N/A	12	2	N/A	5.09	Pass
Ammonia-Total (as N) mg/l	0.5	1	N/A	12	3	2	0.530	Fail
ortho-Phosphate (as P) - unspecified mg/l	0.25	0.5	N/A	12	N/A	N/A	0.108	Pass
Nitrate (as N) mg/l	N/A	N/A	N/A	12	N/A	N/A	13	
Nitrite (as N) mg/l	N/A	N/A	N/A	12	N/A	N/A	0.850	
Total Oxidised Nitrogen (as N) mg/l	N/A	N/A	N/A	12	N/A	N/A	14	

Notes:
1 – This represents the Emission Limit Values after the Interpretation provided for under Condition 2 of the licence is applied

2 – For pH the WWDA specifies a range of pH 6 - 9

Cause of Exceedance(s):

Refer to incident section of this report.

Significance of Results:

The WWTP is not in compliance with the ELV, as set out in the WWDL. The impact on receiving waters is assessed further in section 2.

2.1.3 AMBIENT MONITORING SUMMARY FOR THE TREATMENT PLANT DISCHARGE TPEFF2800D0323SW001

A summary of monitoring from ambient monitoring points associated with the wastewater discharge is provided in the sections below. For discharges to rivers upstream (U/S) and downstream (D/S) location data is provided. For other ambient points in lakes, coastal or transitional waters, monitoring data from the most appropriate monitoring station is selected.

The table below provides details of ambient monitoring locations and details of any designations as sensitive areas.

Ambient Monitoring Point from WWDL (or as agreed with EPA)	Irish Grid Reference	River Station Code	Bathing Water	Drinking Water	FWPM	Shellfish	WFD Ecological Status
Upstream	203184, 166815	RS16B060510	No	No	No	No	Moderate
Downstream	203424, 166459	RS16B060540	No	No	No	No	Moderate

The table below provides a summary of monitoring results for designated ambient monitoring points. The upstream and downstream annual mean values are shown (mg/l), and the difference between both monitoring stations is given as a percentage of the Environmental Quality Standard (EQS) where relevant.

Parameter Name	Upstream Monitoring Point Location	Upstream Monitoring Point Annual Mean	Downstream Monitoring Point Location	Downstream Monitoring Point Annual Mean	EQS	% of EQS
BOD - 5 days (Total) mg/l	RS16B060510	1.61	RS16B060540	1.63	1.50	1.1
Ammonia-Total (as N) mg/l	RS16B060510	0.026	RS16B060540	0.028	0.065	3.1
ortho-Phosphate (as P) - unspecified mg/l	RS16B060510	0.017	RS16B060540	0.018	0.035	2.6
Dissolved Oxygen % O2	RS16B060510	100	RS16B060540	100	N/A	
Dissolved Oxygen mg/l	RS16B060510	11	RS16B060540	11	N/A	
Suspended Solids mg/l	RS16B060510	3.55	RS16B060540	3.39	N/A	
Temperature °C	RS16B060510	9.67	RS16B060540	9.72	N/A	
pH pH units	RS16B060510	8.14	RS16B060540	8.16	N/A	

Significance of Results:

The WWTP discharge was not compliant with the ELV's set in the wastewater discharge licence for the following: Ammonia-Total (as N) mg/l.

The ambient monitoring results do not meet the required EQS at the upstream and the downstream monitoring locations. The EQS relates to the Oxygenation and Nutrient Conditions set out in the Surface Water Regulations 2009.

Based on ambient monitoring results a deterioration in Ammonia, BOD & Ortho-phosphate, concentrations downstream of the effluent discharge is noted.

A deterioration in water quality has been identified, however it is not known if it or is not caused by the WWTP.

Other causes of deterioration in water quality in the area are unknown.

The discharge from the wastewater treatment plant does not have an observable negative impact on the Water Framework Directive status.

2.1.4 OPERATIONAL PERFORMANCE SUMMARY - BORRISOLEIGH WWTP

2.1.4.1 Treatment Efficiency Report - Borrisoleigh WWTP

Treatment efficiency is based on the removal of key pollutants from the influent wastewater by the treatment plant. In essence the calculation is based on the balance of load coming into the plant versus the load leaving the plant. The efficiency is presented as a percentage removal rate.

A summary presentation of the efficiency of the treatment process including information for all the parameters specified in the licence is included below:

Parameter	Influent mass loading (kg/year)	Effluent mass emission (kg/year)	Efficiency (% reduction of influent load)
SS	96999	1637	98
TN	N/A	N/A	N/A
TP	N/A	N/A	N/A
cBOD	31210	948	97
COD	88641	4310	95

Note: The above data is based on sample results for the number of dates reported

2.1.4.2 Treatment Capacity Report Summary - Borrisoleigh WWTP

Treatment capacity is an assessment of the hydraulic (flow) and organic (the amount of pollutants) load a treatment plant is designed to treat versus the current loading of that plant.

Borrisoleigh WWTP	
Peak Hydraulic Capacity (m^3/day) - As Constructed	1440
DWF to the Treatment Plant (m^3/day)	480
Current Hydraulic Loading - annual max (m^3/day)	835

Borrisoleigh WWTP	
Average Hydraulic loading to the Treatment Plant (m^3/day)	503.2
Organic Capacity (PE) - As Constructed	1550
Organic Capacity (PE) - Collected Load (peak week)[Note1]	722
Organic Capacity (PE) - Remaining	828
Will the capacity be exceeded in the next three years? (Yes/No)	No

Nominal design capacities can be based on conservative design principles. In some cases assessment of existing plants has shown organic capacities significantly higher than the nominal design capacity. Accordingly plants that appear to be overloaded when comparing a collected peak load with the nominal design capacity can be fully compliant due to the safety factors in the original design.

2.1.5 SLUDGE / OTHER INPUTS - BORRISOLEIGH WWTP

'Other inputs' to the waste water treatment plant are summarised in table below

Input type	Quantity	Unit	P.E.	% of load to WWTP	Included in Influent Monitoring (Y/N)?	Is there a leachate/sludge acceptance procedure for the WWTP?	Is there a dedicated leachate/sludge acceptance facility for the WWTP? (Y/N)
There is no Sludge and Other Input data for the Treatment Plant included in the AER.							

3 COMPLAINTS AND INCIDENTS

3.1 COMPLAINTS SUMMARY

A summary of complaints of an environmental nature related to the discharge(s) to water from the WWTP and network is included below.

Number of Complaints	Nature of Complaint	Number Open Complaints	Number Closed Complaints
There were no relevant environmental complaints in 2023.			

3.2 REPORTED INCIDENTS SUMMARY

Environmental incidents that arise in an agglomeration are reported on an on-going basis in accordance with our waste water discharge licences. Where an incident occurs and it is reportable under the licence, it is reported to the Environmental Protection Agency through their Environmental Data Exchange Network, or in some instances by telephone. Some incidents which arise in the agglomeration are recorded by Uisce Éireann but may not be reportable under our licence for example where the incident does not have an impact on environmental performance.

A summary of reported incidents is included below.

3.2.1 SUMMARY OF INCIDENTS

Incident Type	Cause	Recurring (Y/N)	Closed (Y/N)
Breach of ELV	Plant or equipment maintenance at WWTP	Yes	Yes
Breach of ELV	Plant or equipment maintenance at WWTP	No	Yes
Abatement equipment off-line	Plant or equipment breakdown at WWTP	No	Yes

Incident Type	Cause	Recurring (Y/N)	Closed (Y/N)
Breach of ELV	WWTP biological sludge issue	No	Yes

3.2.2 SUMMARY OF OVERALL INCIDENTS

Question	Answer
Number of Incidents in 2023	4
Number of Incidents reported to the EPA via EDEN in 2023	4
Explanation of any discrepancies between the two numbers above	N/A

4 INFRASTRUCTURAL ASSESSMENTS AND PROGRAMME OF IMPROVEMENTS

4.1 STORM WATER OVERFLOW IDENTIFICATION AND INSPECTION REPORT

A summary of the operation of the storm water overflows and their significance where known is included below:

4.1.1 SWO IDENTIFICATION

WWDL Name / Code for Storm Water Overflow (chamber) where applicable	Irish Grid Ref. (outfall)	Included in Schedule of the WWDL	Significance of the overflow(High / Medium / Low)	Assessed against DoEHLG Criteria	No. of times activated in 2023 (No. of events)	Total volume discharged in 2023 (m3)	Monitoring Status
There are no Storm Water Overflows in this Agglomeration.							

Any TBC SWO(s) were identified as part of the on-going National SWO programme and will be updated in subsequent AER(s) once the information is confirmed.

SWO Summary	
How much wastewater discharge by metered SWOs during the year (m3)?	Unknown
Is each SWO identified as not meeting DoEHLG Guidance included in the Programme of Improvements?	N/A
The SWO Assessment included the requirements of relevant of WWDL schedules?	N/A
Have the EPA been advised of any additional SWOs / changes to Schedule C3 and A4 under Condition 1.7?	N/A

4.2 REPORT ON PROGRESS MADE AND PROPOSALS BEING DEVELOPED TO MEET THE IMPROVEMENT PROGRAMME REQUIREMENTS.

4.2.1 SPECIFIED IMPROVEMENT PROGRAMME SUMMARY

A wastewater discharge licence may require a number of reports on specific subject areas to be prepared for the agglomeration in question. These reports are submitted to the EPA as part of the Annual Environmental Report. This section provides a list of the various reports required for this agglomeration and a brief summary of their recommendations.

Specified Improvement Programmes (under Schedule A and C of WWDL)	Description	Licence Schedule	Licence Completion Date	Date Expired? (N/NA/Y)	Status of Works	Timeframe for Completing the Work	Comments
D0323-SIP:01	Any improvement works required to ensure compliance with the emission limit values as set out in Schedule A: Discharges & Discharge Monitoring	C	31/12/2019	Yes	Not Started		Borriosoleigh WWTP SIP requires improvement works required to ensure compliance with the emission limit values as set out in Schedule A: Discharges & Discharge Monitoring. No works started. Capital works not funded in RC3. Capital works funding post 2024 will be contingent on the project being included in the 2025-2029 investment period.

A summary of the status of any other improvements identified by under Condition 5 assessments- is included below.

4.2.2 IMPROVEMENT PROGRAMME SUMMARY

Improvement Identifier	Improvement Description / or any Operational Improvements	Improvement Source	Expected Completion Date	Comments
No additional improvements planned at this time.				

4.2.3 SEWER INTEGRITY RISK ASSESSMENT

N/A

5 LICENCE SPECIFIC REPORTS

A wastewater discharge licence may require a number of reports on specific subject areas to be prepared for the agglomeration in question. These reports are submitted to the EPA as part of the Annual Environmental Report. This section provides a list of the various reports required for this agglomeration and a brief summary of their recommendations.

Licence Specific Report	Required by licence	Included in this AER
D0323-01-Priority Substances Assessment	Yes	No
D0323-01-Small Stream Risk Score Assessment	Yes	Yes

6 CERTIFICATION AND SIGN OFF

6.1 SUMMARY OF AER CONTENTS

Parameter	Answer
Does the AER include an Executive Summary?	Yes
Does the AER include an assessment of the performance of the Waste Water Works (i.e. have the results of assessments been interpreted against WWDL requirements and or Environmental Quality Standards)?	Yes
Is there a need to advise the EPA for Consideration of a Technical Amendment/Review of the Licence?	N/A
List reason e.g. additional SWO identified	N/A
Is there a need to request/advise the EPA of any modification to the existing WWDL with respect to condition 4 changes to monitoring location, frequency etc	N/A
List reason e.g. changes to monitoring requirements	N/A
Have these processes commenced?	N/A
Are all outstanding reports and assessments from previous AERs included as an appendix to this AER	No

I certify that the information given in this Annual Environmental Report is truthful, accurate and complete:

Signed: Date: 04/04/2024

This AER has been produced by Uisce Éireann's Environmental Information System (EIMS) and has been electronically signed off in that system for and on behalf of ,

Eleanor Roche

Head of Environmental Regulation.

7 APPENDIX

Appendix
Appendix 7.1 - Small Stream Risk Score Assessment

SSRS Compliance Monitoring: *Borrisoleigh* Waste Water Treatment Plant 2023




Report to Tipperary County Council

Limnos Consultancy, January 2024

Contents

Borrisoleigh WWTP

Introduction

Small Streams Risk Score (SSRS) assessments on the Borrisoleigh Stream upstream and downstream of the Borrisoleigh waste water treatment plant (WWTP) are outlined in this report. The assessments were made in December 2023. Limnos Consultancy was contracted by Irish Water to undertake the surveys.

Methodology

Small Streams Risk Score (SSRS)

Samples were taken using an ISO compliant kick-sampling sampling method compatible with the Environmental Protection Agency (EPA) Standard Operating Procedure for sampling aquatic macroinvertebrates. Samples were taken upstream and downstream of the discharge from the WWTP. SSRS results were assigned based on the macroinvertebrate fauna.

The author was the main initiator of the SSRS system developed by the Western River Basin District and the EPA under his supervision in 2005–2006 (McGarrigle 2014). He has undertaken SSRS training of local authority and other professional staff at the Local Government Water Services Training Centres around the country for over 100 personnel.

The SSRS was calculated based on selected sub-groups of the macroinvertebrates recorded. The score is calculated based on the number of taxa and their relative abundance in four main invertebrate groups as follows:

Group 1: Ephemeroptera (excluding *Baetis rhodani*)
Group 2: Plecoptera
Group 3: Trichoptera
Group 4: GOlD (Gastropoda, Oligochaeta, Diptera)
Group 5: *Asellus*

The first three groups above, mayflies, stoneflies, and caddis flies, are regarded as pollution-sensitive whereas gastropods, oligochaetes, dipterans and *Asellus* are relatively pollution-tolerant. The maximum score that can be achieved is

11.2 and threshold scores deciding the degree of risk of not being at good ecological status are as follows:

> 7.25 Probably not at risk
- > 6.5 to 7.25 Indeterminate
< 6.5 Stream may be at risk.

Samples were taken with a standard 1 mm mesh pond net. A 3-minute kick sample was combined with a 1-minute stonewash. Samples were placed on a white tray and, once cleaned of debris such as leaves and twigs and excessive sand or gravel by decanting and hand picking, the sample was examined carefully to identify the macroinvertebrates. At least 25 minutes were spent identifying and assigning each taxon found to a relative abundance category. Table 1 gives the definition of the relative abundance terms Few, Common, Numerous, Dominant and Excessive. The numeric code is used in the results tables below.

Table 1. Relative abundance table.

Abundance	Number of Individual Specimens	Relative abundance numeric code
Few:	1 to 5 individuals	1
Common:	6 to 20	2
Numerous:	21-50	3
Dominant:	51 to 100	4
Excessive:	>100	5

Physico-Chemical Measurements

Physico-chemical measurements were also made for dissolved oxygen, temperature and conductivity using a HACH HQ40d meter with appropriate compatible probes.

Location of Sites Sampled

Figure 1 maps the sampling sites and Table 2 gives the details of the locations sampled.

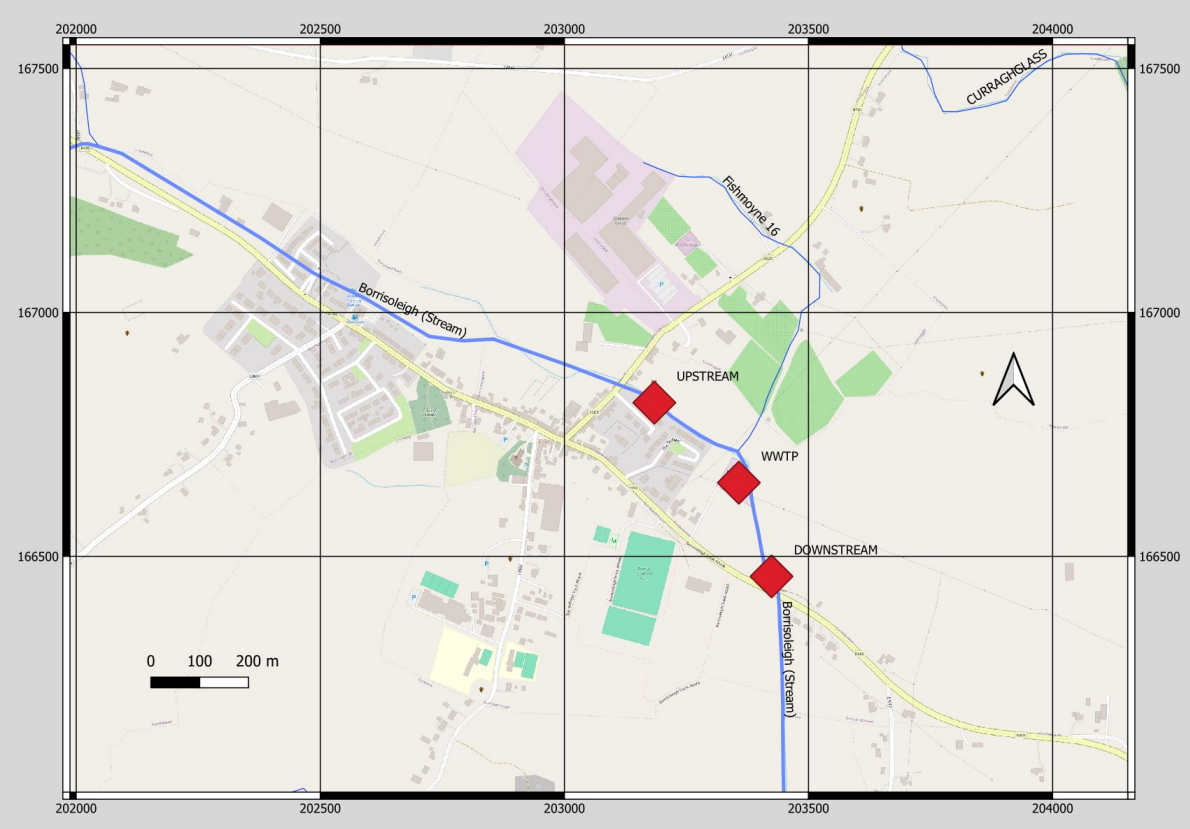

Figure 1. Location of upstream and downstream monitoring sites for Borrisoleigh WWTP. The river flows South.

Table 2. Location of sites sampled upstream and downstream of Borrisoleigh WWTP.

Location	Borrisoleigh WWTP Upstream	Borrisoleigh WWTP Downstream
EPA Code	RS16B0060500	RS16B060600
Station	Bridge in Borrisoleigh	Br 0.5 km d/s Borrisoleigh
River	Borrisoleigh Stream	Borrisoleigh Stream
Easting	203122	203439
Northing	166847	166405

Results

Site Photographs

Figure 2 shows photographs taken when sampling upstream and downstream of the Borrisoleigh WWTP on 6 December 2023.

U/S Borrisoleigh WWTP looking downstream

U/S Borrisoleigh WWTP looking upstream

D/S Borrisoleigh WWTP looking downstream

D/S Borrisoleigh WWTP looking upstream

Figure 2. Upstream (U/S) and downstream (D/S) of Borrisoleigh WWTP.

Macroinvertebrates - SSRS

Table 3 gives the recorded macroinvertebrate taxa for the standard kick samples taken at these sites. The taxa are ordered from top to bottom by their SSRS group, noting that not all taxa belong to an SSRS group.

Table 3. Relative abundances of macroinvertebrates recorded upstream and downstream of Borrisoleigh WWTP discharge point.

	River Name	**Borrisoleigh**	**Borrisoleigh**
	Station Code	**Upstream**	**Downstream**
	Station Name	**Date of Sampling**	
SSRS Group	**Taxon**	**06/12/2023**	**06/12/2023**
1, Ephem	*Ecdyonurus*	Few	Few
1, Ephem	*Rhithrogena*	Common	Common
1, Ephem	*Serratella ignita*	Few	-
2, Plec	*Isoperla*	-	Few
3, Trich	*Hydropsyche*	Few	Few
3, Trich	Limnephilidae	-	Few
3, Trich	*Polycentropus*	-	Few
3, Trich	*Rhyacophila*	Few	Few
4, GOlD	Chironomidae	Few	-
4, GOlD	*Potamopyrgus antipodarum*	-	Few
4, GOlD	Simuliidae	Few	Dominant
n/a	*Baetis rhodani*	Dominant	Numerous
n/a	*Elmis aenea*	Few	-
n/a	*Erpobdella octoculata*	Few	Few
n/a	*Gammarus*	Few	Few
n/a	Gyrinidae	-	Few
n/a	Hydraenidae	Few	-
	Number Taxa	**12**	**13**
	SSRS	**7.2**	**8.8**
		INDETERMINATE Stream may be at risk	Stream probably not at risk
	Q-Value	**Q4**	**Q3-4**

The upstream site had an SSRS value of 7.2 which is down on the 10.4 score in October 2022. This decline is mainly due to the lack of stoneflies in the December 2023 sample. The bloodworm *Chironomus,* found there in 2022, was not recorded at the upstream site in 2023 – and this is taken as a positive sign as it is one of the most tolerant species. The turbidity noted in 2022 was once again very noticeable following overnight rain and suggests that there are ongoing land use issues in the upper catchment.

The downstream site scored better than in 2022 with an SSRS of 8.8 compared with 7.2 in October 2022. The difference is mainly due to the presence of the stonefly, *Isoperla,* in 2023 and the absence of the water hog louse, *Asellus,* in 2023. The reason for assigning a Q-Value of Q3-4 is due to the dominance of the blackfly larvae Simuliidae at the downstream site. These are filter feeders and high abundances indicate significant amounts of particulate matter in the water column. In a summer sample both *Rhithrogena* and *Isoperla* would be missing due to life cycle strategies leaving a small number of *Ecdyonurus* belonging to the Group A Q-Value category.

Physico-Chemical Results

Table 4 gives the physico-chemical measurements made on the day of sampling. The stream was well oxygenated at both sites. As noted above, the water was highly turbid due to heavy rain the previous night washing sediment into the stream upstream of the two sites sampled on 6 December 2023.

Table 4. Physico-chemical results for Borrisoleigh River, 6 December 2023.

Station	Dissolved Oxygen (DO) % Saturation	DO mg/l	Temp. °C	Conductivity µS/cm	pH
Upstream Borrisoleigh WWTP	**96.7**	**11.01**	**9.5**	**389**	**7.82**
Downstream Borrisoleigh WWTP	**94.4**	**11.22**	**7.8**	**452**	**7.95**

Summary

The Borrisoleigh Stream was well oxygenated at both sites. A slight deterioration was noted at the upstream site but an improvement at the downstream site compared with 2022.

Reference

McGarrigle, M. 2014. “Assessment of Small Water Bodies in Ireland.” *Biology and Environment* 114B(3). doi: 10.3318/BIOE.2014.15.