

# Annual Environmental Report

2023



Killmallock

D0106-01

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## 7.1 SMALL STREAM RISK SCORE ASSESSMENT

# 1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2023 AER

This Annual Environmental Report has been prepared for D0106-01, Killmallock, in Limerick 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)

- Killmallock WWTP with a Plant Capacity PE of 4000, 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
TPEFF1900D0106SW002	Killmallock WWTP	Treated	Compliant	N/A

## 1.4 LICENCE SPECIFIC REPORTING

Assessment / Report

**Small Stream Risk Score Assessment**

## 2 TREATMENT PLANT PERFORMANCE AND IMPACT SUMMARY

### 2.1 KILMALLOCK WWTP - TREATED DISCHARGE

#### 2.1.1 INFLUENT MONITORING SUMMARY - KILMALLOCK 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
Total Nitrogen mg/l	12	57	31
BOD, 5 days with Inhibition (Carbonaceo mg/l	12	236	137
Total Phosphorus (as P) mg/l	12	6.46	4.07
Suspended Solids mg/l	12	250	172
COD-Cr mg/l	12	536	339
Hydraulic Capacity	N/A	1752	768

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 - TPEFF1900D0106SW001

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)
<b>COD-Cr mg/l</b>	50	100	N/A	12	N/A	N/A	11	Pass
<b>BOD, 5 days with Inhibition (Carbonaceous) mg/l</b>	15	30	N/A	12	N/A	N/A	1.94	Pass
<b>Suspended Solids mg/l</b>	15	37.5	N/A	12	N/A	N/A	3.84	Pass
<b>pH pH units</b>	9	9	N/A	12	N/A	N/A	7.77	Pass
<b>Total Phosphorus (as P) mg/l</b>	1	1.2	N/A	12	N/A	N/A	0.173	Pass
<b>Ammonia-Total (as N) mg/l</b>	1	1.2	N/A	12	N/A	N/A	0.075	Pass
<b>ortho-Phosphate (as P) - unspecified mg/l</b>	0.3	0.36	N/A	12	1	N/A	0.119	Pass
<b>Total Nitrogen mg/l</b>	N/A	N/A	N/A	12	N/A	N/A	5.53	

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):

Not applicable

### Significance of Results:

The WWTP is compliant with the ELV's set in the Wastewater Discharge Licence.

## 2.1.3 AMBIENT MONITORING SUMMARY FOR THE TREATMENT PLANT DISCHARGE TPEFF1900D0106SW001

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	160645, 128426	RS24L010410	No	No	No	No	Moderate
Downstream	159232, 127480	RS24L010460	No	Yes	No	No	Good

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
<b>Ammonia-Total (as N) mg/l</b>	RS24L010410	0.036	RS24L010460	0.042	0.065	10.3
<b>ortho-Phosphate (as P) - unspecified mg/l</b>	RS24L010410	0.047	RS24L010460	0.060	0.035	37.1
<b>Dissolved Oxygen % O2</b>	RS24L010410	99	RS24L010460	98	N/A	
<b>BOD - 5 days (Total) mg/l</b>	RS24L010410	1.41	RS24L010460	1.41	N/A	
<b>Temperature °C</b>	RS24L010410	7.97	RS24L010460	7.87	N/A	
<b>pH pH units</b>	RS24L010410	8.03	RS24L010460	8.00	N/A	

### Significance of Results:

The WWTP discharge was compliant with the ELV's set in the wastewater discharge licence.

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 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 - KILMALLOCK WWTP

### 2.1.4.1 Treatment Efficiency Report - Kilmallock 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)
<b>COD</b>	93178	2752	97
<b>TN</b>	8594	1435	83
<b>SS</b>	47267	997	98
<b>TP</b>	1119	45	96
<b>cBOD</b>	37510	502	99

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

### 2.1.4.2 Treatment Capacity Report Summary - Kilmallock 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.

Kilmallock WWTP	
<b>Peak Hydraulic Capacity (m<sup>3</sup>/day) - As Constructed</b>	2220
<b>DWF to the Treatment Plant (m<sup>3</sup>/day)</b>	780
<b>Current Hydraulic Loading - annual max (m<sup>3</sup>/day)</b>	1752

Kilmallock WWTP	
Average Hydraulic loading to the Treatment Plant (m <sup>3</sup> /day)	767.5
Organic Capacity (PE) - As Constructed	4000
Organic Capacity (PE) - Collected Load (peak week) <sup>Note1</sup>	1812
Organic Capacity (PE) - Remaining	2188
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 - KILMALLOCK 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)
Waterworks Sludge	4631	Weight (Tonnes)		1.65	No	Yes	Yes

## 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
<b>There were no relevant environmental complaints in 2023.</b>			

### 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)
<b>There were no reportable incidents in 2023.</b>			

### 3.2.2 SUMMARY OF OVERALL INCIDENTS

Question	Answer
Number of Incidents in 2023	0
Number of Incidents reported to the EPA via EDEN in 2023	0
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
SW3	160256,128273	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	Not Monitored
TBC	161128,127735	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	Monitored
TBC	161308,127718	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	Monitored
TBC	159989,128256	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	Not Monitored

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)?	1381

SWO Summary	
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?	Yes
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
D0106-SIP:01	Discharges from SW1 must cease by 01/01/11 at the latest.	A	01/01/2011	Yes	Works Completed		
D0106-SIP:02	New WWTP and ancillary works	C	01/01/2011	Yes	Works Completed		

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
<b>No additional improvements planned at this time.</b>				

## 4.2.3 SEWER INTEGRITY RISK ASSESSMENT

The utilisation of multiple capital maintenance programmes and the outputs of the workshops with the Local Authority Operations Staff held under the programme can be used to satisfy the requirements of Condition 5 regarding network integrity. Improvement works identified by way of these programmes and workshops will be included in the Improvements Summary Tables 4.2.1 and 4.2.2.



## 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
<b>D0106-01-Small Stream Risk Score Assessment</b>	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?	Yes
List reason e.g. additional SWO identified	Additional SWOs
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?	No
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: 22/04/2024

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: *Kilmallock Waste Water Treatment Plant 2023***



**Report to Uisce Éireann**  
**Limnos Consultancy, January 2024**

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# Kilmallock WWTP

## Introduction

Small Streams Risk Score (SSRS) assessments on the Kilmallock Stream upstream and downstream of the Kilmallock 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.*

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

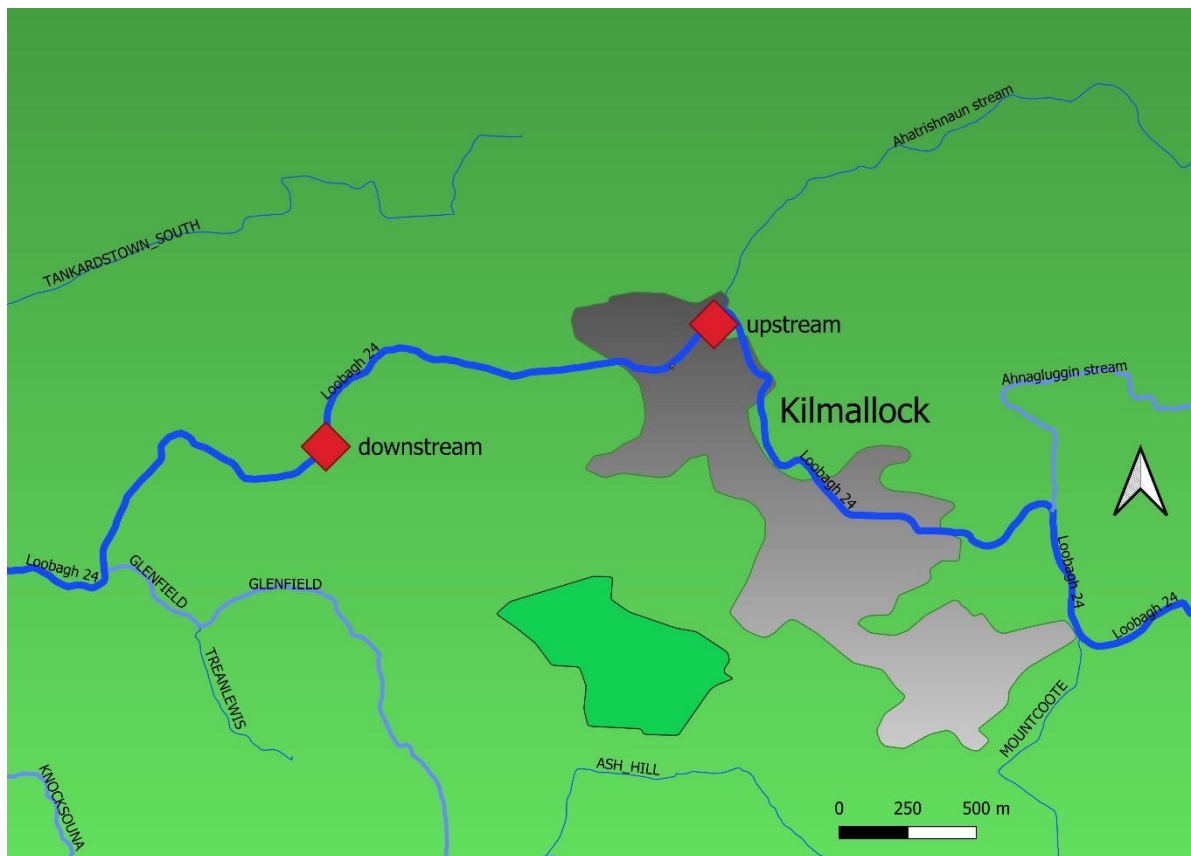
### Physico-Chemical Measurements

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 Kilmallock WWTP. The river flows to the West.**

**Table 2. Location of sites sampled upstream and downstream of Kilmallock WWTP.**

Location	Kilmallock WWTP Upstream	Kilmallock WWTP Downstream
<b>EPA Code</b>	24L010400	24L010460
<b>Station</b>	North Bridge Kilmallock	Glenfield bridge D/S Kilmallock WWTP
<b>River</b>	Loobagh	Loobagh
<b>Easting</b>	160650	159230
<b>Northing</b>	128429	127980

## Results

### Site Photographs

Figure 2 shows photographs for the upstream and downstream of the Kilmallock WWTP taken on 7 December 2023.



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

## Macroinvertebrates - SSRS

Table 3 gives the recorded macroinvertebrate taxa for the standard kick samples taken at these sites.

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

		Kilmallock	Kilmallock
		Upstream	Downstream
		Date of Sampling	
SSRS Group	Taxon	07/12/2023	07/12/2023
1, Ephem	<i>Caenis</i>	-	Few
1, Ephem	<i>Ecdyonurus</i>	Common	Few
1, Ephem	<i>Rhithrogena</i>	Few	Few
1, Ephem	<i>Serratella ignita</i>	Few	-
3, Trich	<i>Hydropsyche</i>	Few	Common
3, Trich	Limnephilidae	Common	-
3, Trich	<i>Polycentropus</i>	Few	Few
3, Trich	<i>Rhyacophila</i>	Few	-
4, GOLD	Ancyliidae	Few	Few
4, GOLD	Ceratopogonidae	-	Few
4, GOLD	Chironomidae	Common	-
4, GOLD	<i>Dicranota</i>	-	Few
4, GOLD	<i>Eiseniella</i>	Few	-
4, GOLD	Lumbriculidae	Few	-
4, GOLD	<i>Potamopyrgus antipodarum</i>	Few	Few
4, GOLD	Simuliidae	Few	-
4, GOLD	<i>Sphaerium</i>	-	Few
4, GOLD	Tipulidae	-	Few
5, Asellus	<i>Asellus</i>	Numerous	Few
n/a	<i>Baetis rhodani</i>	Numerous	Dominant
n/a	<i>Elmis aenea</i>	-	Few
n/a	<i>Gammarus</i>	Dominant	Numerous
n/a	Gyrinidae	Few	Common
n/a	Halipilidae	Few	Few
	<b>Number Taxa</b>	<b>18</b>	<b>17</b>
	<b>SSRS</b>	<b>4.8</b>	<b>7.2</b>
		<b>At risk!</b>	<b>Indeterminate</b>
	<b>Q-Value</b>	<b>Q3-4</b>	<b>Q4</b>

## SSRS Compliance Monitoring: Kilmallock WWTP

The taxa are ordered from top to bottom in terms of their SSRS Grouping. Groups 1 to 3 are sensitive to pollution while Groups 4 and 5 comprise more tolerant taxa. Note that not all taxa are included in the SSRS system.

The upstream site had 18 taxa and the downstream had 17 taxa.

The presence of three ephemeropteran taxa (Group 1) is positive, as is the occurrence of four trichopteran taxa. The lack of stoneflies and the relatively high abundance of Group 4 GOID taxa plus numerous *Asellus* brings the SSRS score down to an at risk 4.8. This ties in with the recent EPA surveys at this site which has been assigned Moderate Status (Q3-4) since 2017.

The downstream site is approximately 1.6 km downstream of the upstream site. It scores for four of the five SSRS Groups, the exception being Plecoptera, Group 2. The SSRS of 7.2 puts it in the indeterminate region but it suggests that the WWTP is not impacting this site in a significant way compared with the upstream conditions.

### Physico-Chemical Results

The physico-chemical measurements made in the field on the day of sampling in the Loobagh River (Table 4) showed both sites to be reasonably well-oxygenated. Conductivities and pH values are typical for the catchment geology.

**Table 4. Physico-chemical results for Loobagh River, Kilmallock, 7 December 2023.**

<b>Station</b>	<b>Dissolved Oxygen (DO) % Saturation</b>	<b>DO mg/l</b>	<b>Temp. °C</b>	<b>Conductivity μS/cm</b>	<b>pH</b>
Upstream Kilmallock WWTP	<b>93.6</b>	<b>10.36</b>	<b>10.7</b>	<b>519</b>	<b>7.18</b>
Downstream Kilmallock WWTP	<b>95.2</b>	<b>10.71</b>	<b>10.0</b>	<b>521</b>	<b>7.34</b>

### Summary

The Loobagh is not impacted by the Kilmallock WWTP in any significant way with the SSRS values and Q-Values improving at the downstream site

compared with the upstream site. It is possible that diffuse urban sources are impacting the upstream site before the main WWTP discharge reached the river.

## Reference

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