

# Annual Environmental Report

2023



Mullagh

D0252-01

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# 1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2023 AER

This Annual Environmental Report has been prepared for D0252-01, Mullagh, in Cavan 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)

- Mullagh WWTP with a Plant Capacity PE of 3000, 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
TPEFF0200D0252SW001	Mullagh WWTP	Treated	Non-Compliant	Ammonia-Total (as N) mg/l BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l ortho-Phosphate (as P) - unspecified mg/l

## 1.4 LICENCE SPECIFIC REPORTING

Assessment / Report

**There are no Licence Specific Reports included in this AER.**

## 2 TREATMENT PLANT PERFORMANCE AND IMPACT SUMMARY

### 2.1 MULLAGH WWTP - TREATED DISCHARGE

#### 2.1.1 INFLUENT MONITORING SUMMARY - MULLAGH 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	1	28	N/A
Total Phosphorus (as P) mg/l	1	4.14	N/A
Suspended Solids mg/l	13	200	95
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	13	222	89
COD-Cr mg/l	13	485	229
Hydraulic Capacity	N/A	3114	900

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 greater than the peak Treatment Plant Capacity. The annual maximum hydraulic loading is greater than the peak Treatment Plant Capacity. Further details on the plant capacity and efficiency can be found under the sectional 'Operational Performance Summary'.

## 2.1.2 EFFLUENT MONITORING SUMMARY - TPEFF0200D0252SW001

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	13	N/A	N/A	29	Pass
Suspended Solids mg/l	25	62.5	N/A	13	1	N/A	17	Pass
pH pH units	9	9	N/A	13	N/A	N/A	7.11	Pass
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	5	10	N/A	13	3	2	3.02	Fail
Ammonia-Total (as N) mg/l	0.3	0.6	N/A	13	9	5	2.00	Fail
ortho-Phosphate (as P) - unspecified mg/l	0.1	0.2	N/A	13	13	9	0.324	Fail

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):

ortho-Phosphate (as P), Ammonia - Total (as N) & BOD, 5 days with Inhibition

## Significance of Results:

The WWTP is non compliant with the ELVs set out in the Wastewater Discharge Licence.

### 2.1.3 AMBIENT MONITORING SUMMARY FOR THE TREATMENT PLANT DISCHARGE TPEFF0200D0252SW001

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
<b>Upstream</b>	268914, 285136	RS07M060340	No	No	No	No	Moderate
<b>Downstream</b>	270986, 284095	RS07M030500	No	No	No	No	Poor

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>BOD - 5 days (Total) mg/l</b>	RS07M060340	1.33	RS07M030500	0.855	1.50	-31.5
<b>Ammonia-Total (as N) mg/l</b>	RS07M060340	0.040	RS07M030500	0.025	0.065	-22.4
<b>ortho-Phosphate (as P) - unspecified mg/l</b>	RS07M060340	0.036	RS07M030500	0.043	0.035	20.4



Parameter Name	Upstream Monitoring Point Location	Upstream Monitoring Point Annual Mean	Downstream Monitoring Point Location	Downstream Monitoring Point Annual Mean	EQS	% of EQS
Suspended Solids mg/l	RS07M060340	13	RS07M030500	N/A	N/A	
Dissolved Oxygen % O2	RS07M060340	8.99	RS07M030500	N/A	N/A	
Temperature °C	RS07M060340	10	RS07M030500	11	N/A	
pH pH units	RS07M060340	7.45	RS07M030500	7.68	N/A	
Dissolved Oxygen mg/l	RS07M060340	84	RS07M030500	11	N/A	

### Significance of Results:

The WWTP discharge was not 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 ortho-Phosphate (as P), 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 have an observable negative impact on the Water Framework Directive status.

## 2.1.4 OPERATIONAL PERFORMANCE SUMMARY - MULLAGH WWTP

### 2.1.4.1 Treatment Efficiency Report - Mullagh 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)
TN	N/A	N/A	N/A
cBOD	29007	1122	96
TP	N/A	N/A	N/A
SS	30776	6298	80
COD	74292	10932	85

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

#### **2.1.4.2 Treatment Capacity Report Summary - Mullagh 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.

<b>Mullagh WWTP</b>	
<b>Peak Hydraulic Capacity (m<sup>3</sup>/day) - As Constructed</b>	675
<b>DWF to the Treatment Plant (m<sup>3</sup>/day)</b>	225
<b>Current Hydraulic Loading - annual max (m<sup>3</sup>/day)</b>	3114
<b>Average Hydraulic loading to the Treatment Plant (m<sup>3</sup>/day)</b>	899.61
<b>Organic Capacity (PE) - As Constructed</b>	3000
<b>Organic Capacity (PE) - Collected Load (peak week)<sup>Note1</sup></b>	1742
<b>Organic Capacity (PE) - Remaining</b>	1258
<b>Will the capacity be exceeded in the next three years? (Yes/No)</b>	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 - MULLAGH 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)
<b>There is no Sludge and Other Input data for the Treatment Plant included in the AER.</b>							

## 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>Breach of ELV</b>	WWTP upgrade required to meet ELV	Yes	No

### 3.2.2 SUMMARY OF OVERALL INCIDENTS

Question	Answer
Number of Incidents in 2023	1
Number of Incidents reported to the EPA via EDEN in 2023	1
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
<b>SW002</b>	270086,284632	Yes	Low Significance	Not 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)?	Unknown
Is each SWO identified as not meeting DoEHLG Guidance included in the Programme of Improvements?	No
The SWO Assessment included the requirements of relevant of WWDL schedules?	No
Have the EPA been advised of any additional SWOs / changes to Schedule C3 and A4 under Condition 1.7?	No

## 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
<b>D0252-SIP:01</b>	Complete improvements to comply with ELVs specified in Schedule A. Implement, in accordance with Condition 5.6.1, either (a) improvements to the existing waste water works to achieve compliance with the emission limit values specified in Schedule A.1: Primary Waste Water discharge & Monitoring of this licence, or (b) an alternative primary discharge point, or (c) connection to another agglomeration.	C	31/12/2019	Yes	At Planning Stage	2027	

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
D0252-01-Priority Substances Assessment	Yes	No
D0252-01-Small Stream Risk Score Assessment	Yes	No

## 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	Yes

# 7 APPENDIX

Appendix
Appendix 7.1 - Small Stream Risk Score Assessment

# **SSRS Compliance Monitoring: *Mullagh* Waste Water Treatment Plant 2023**



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

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# Mullagh WWTP

## Introduction

Small Streams Risk Score (SSRS) assessments on the Mullagh River upstream and downstream of the Mullagh waste water treatment plant (WWTP) are outlined in this report. The assessments were made on 26 October 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:

## SSRS Compliance Monitoring: Mullagh WWTP

- > 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 Mullagh WWTW. River flows North.**

**Table 2. Location of sites sampled upstream and downstream of Mullagh WWTW.**

Location	Mullagh WWTW Upstream	Mullagh WWTW Downstream
EPA Code	RS07M060340	RS07M030500
Station	Bridge at Brookfield	Ballintlieve Bridge
River	Mullagh Lough Stream	Moynalty
Easting	268914	271950
Northing	285136	283260



## Results

### Site Photographs

Figure 2 shows photographs taken when sampling at Site 1 and Site 2 upstream and downstream of the Mullagh WWTP on 26 October 2023.



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

## Macroinvertebrates – SSRS

**Table 3. Macroinvertebrates recorded upstream and downstream of Mullagh WWTP discharge point.**

		Mullagh Upstream	Mullagh Downstream
		Date of Sampling	
		26/10/2023	26/10/2023
SSRS Group	Taxon		
1, Ephem	<i>Ecdyonurus</i>	Few	-
3, Trich	Limnephilidae	Few	-
3, Trich	<i>Sericostoma personatum</i>	Few	Few
4, GOLD	Ancylidae	-	Few
4, GOLD	Ceratopogonidae	-	Few
4, GOLD	Chironomidae	Common	Few
4, GOLD	<i>Dicranota</i>	Few	Few
4, GOLD	Lumbriculidae	-	Few
4, GOLD	<i>Potamopyrgus antipodarum</i>	Few	Few
4, GOLD	Simuliidae	Numerous	Few
4, GOLD	Tubificidae	Common	Few
n/a	<i>Baetis rhodani</i>	Numerous	Dominant
n/a	<i>Elmis aenea</i>	-	Few
n/a	<i>Erpobdella octoculata</i>	-	Few
n/a	<i>Gammarus</i>	Dominant	-
n/a	<i>Limnius volckmari</i>	-	Few
	Number Taxa	<b>10</b>	<b>13</b>
	SSRS	<b>4</b>	<b>2.4</b>
	Q-Value	<b>Q3-4</b>	<b>Q3</b>

Table 3 shows the macroinvertebrate taxa recorded at both sites on 26 October 2023. The SSRS grouping to which they belong is shown where relevant – not all families or orders are included in the SSRS method. The taxa are ordered from top to bottom broadly in terms of their sensitivity to pollution with *Ecdyonurus* at the top being the most sensitive and Tubificidae at the bottom being the most tolerant. The upstream site on the smaller Mullagh Lough Stream had 10 types and there were 13 recorded at the

downstream site on the main Moynalty River. The results contrast somewhat with the results in October 2022 in that *Ecdyonurus* was recorded at the upstream site but not at the downstream site. As in 2022 there were two types belonging to SSRS Group 3 (Trichoptera), Limnephilidae and *Sericostoma*. *Sericostoma* was also found at the downstream site. The low SSRS value at the downstream site is due to the lack of Groups 1 and 2 and the high abundance of the tolerant Group 4, Gastropods, Oligochaetes and Diptera. The lack of *Gammarus* at the downstream site is somewhat unexpected as it was common in 2022. The other significant difference was that the downstream site lacked *Asellus* in 2023 – it was dominant there in 2022. The downstream site on the main Moynalty may be subject to other upstream pressures unrelated to the Mullagh WWTP. In the EPA WFD main monitoring programme the downstream site 07M030500 has not been sampled in recent years. In 2020 the bridge just upstream of the Mullagh Lough confluence (07M030300) was rated Q3-4, Moderate condition and the next monitored site downstream, 07M030600 (Moynalty Bridge), was rated Q3 in 2020 in the last published results (although it was due to be included in the 2023 programme) and these results should be available in early 2024.

Ideally, to give a more accurate assessment of the impact of the WWTP, the downstream site should be on the Mullagh Lough Stream but access to this is difficult especially in high flows in winter. It can be accessed in low flow by wading downstream from Mullagh Bridge and sampling just upstream of the confluence of the two water bodies.

### Physico-Chemical Results

**Table 4. Physico-chemical results for Mullagh River, 26 October 2023.**

Station	Dissolved Oxygen (DO) % Saturation	DO mg/l	Temp. °C	Conductivity µS/cm	pH
Upstream Mullagh WWTP	93.7	9.86	12.9	226	7.09
Downstream Mullagh WWTP	93.4	9.85	12.8	204	7.17

### Summary

The Mullagh River is in Moderate condition before it reaches the Mullagh WWTP possibly due to the influence of Mullagh Lough – a slight improvement on 2022 is noted. The Moynalty dropped to Poor condition at the sample site

at Ballintlieve Bridge downstream of the confluence with the Mullagh Stream and downstream of the WWTP discharge point.

## Reference

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