Annual Environmental Report

2022

Cavan Town

D0020-01

CONTENTS

7 APPENDIX

7.1 SMALL STREAM RISK SCORE ASSESSMENT

1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2022 AER

This Annual Environmental Report has been prepared for D0020-01, Cavan Town, 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)

- Cavan WWTP with a Plant Capacity PE of 30000, 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
TPEFF0200D0020SW001	Cavan WWTP	Treated	Non-Compliant	Ammonia-Total (as N) mg/l BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l Total Nitrogen mg/l

1.4 LICENCE SPECIFIC REPORTING

Assessment / Report
Small Stream Risk Score Assessment

2 TREATMENT PLANT PERFORMANCE AND IMPACT SUMMARY

2.1 CAVAN WWTP - TREATED DISCHARGE

2.1.1 INFLUENT MONITORING SUMMARY - CAVAN 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
COD-Cr mg/l	13	3040	965
Total Nitrogen mg/l	13	187	72
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	13	1036	299
Total Phosphorus (as P) mg/l	13	38	11
Ammonia-Total (as N) mg/l	13	76	34
Suspended Solids mg/l	13	2015	506
Hydraulic Capacity	N/A	19642	6170

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’.

2.1.2 EFFLUENT MONITORING SUMMARY - TPEFF0200D0020SW001

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	35	Pass
Suspended Solids mg/l	35	87.5	N/A	13	N/A	N/A	7.34	Pass
Total Nitrogen mg/l	15	18	N/A	9	2	1	6.25	Fail
pH pH units	9	9	N/A	13	N/A	N/A	7.37	Pass
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	4.6	9.2	N/A	13	5	1	3.65	Fail
Total Phosphorus (as P) mg/l	2	2.4	N/A	12	N/A	N/A	0.228	Pass
Ammonia-Total (as N) mg/l	0.26	0.52	N/A	13	3	2	0.591	Fail
ortho-Phosphate (as P) - unspecified mg/l	0.13	0.26	N/A	13	1	N/A	0.057	Pass
Conductivity @20°C µS/cm	N/A	N/A	N/A	12	N/A	N/A	1231	

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 the Report

Significance of Results:

The WWTP is non complaint with the ELV's set in the Wastewater Discharge License. The impact on receiving waters is assessed further in Section 2.

2.1.3 AMBIENT MONITORING SUMMARY FOR THE TREATMENT PLANT DISCHARGE TPEFF0200D0020SW001

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	241610, 306189	RS36C020200	No	No	No	No	Poor
Downstream	241290, 306913	RS36C020300	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
Ammonia-Total (as N) mg/l	RS36C020200	0.072	RS36C020300	0.616	0.065	836.9
ortho-Phosphate (as P) - unspecified mg/l	RS36C020200	0.093	RS36C020300	0.094	0.035	1.9
Temperature °C	RS36C020200	6.44	RS36C020300	6.82	N/A	
Total Nitrogen mg/l	RS36C020200	3.26	RS36C020300	3.26	N/A	
Total Phosphorus (as P) mg/l	RS36C020200	0.222	RS36C020300	0.188	N/A	
pH pH units	RS36C020200	7.48	RS36C020300	7.48	N/A	
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	RS36C020200	1.88	RS36C020300	3.32	N/A	
Dissolved Oxygen % Saturation O2	RS36C020200	88	RS36C020300	87	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 Ammonia-Total (as N), BOD-5days with inhibition, 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 is or is not caused by the WWTP.

Other causes of deterioration in water quality in the area are: agriculture, urban runoff

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 - CAVAN WWTP

2.1.4.1 Treatment Efficiency Report - Cavan 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)
COD	1934278	75057	96
cBOD	599131	7772	99
TN	143315	13579	91
TP	22561	497	98
SS	1014117	15616	98

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

2.1.4.2 Treatment Capacity Report Summary - Cavan 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.

Cavan WWTP	
Peak Hydraulic Capacity (m^3/day) - As Constructed	20250
DWF to the Treatment Plant (m^3/day)	6750

Cavan WWTP	
Current Hydraulic Loading - annual max (m^3/day)	19642
Average Hydraulic loading to the Treatment Plant (m^3/day)	6170
Organic Capacity (PE) - As Constructed	30000
Organic Capacity (PE) - Collected Load (peak week)[Note1]	19490
Organic Capacity (PE) - Remaining	10510
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 - CAVAN 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)
Other	16800	Volume (m3)	30000	48	Yes	Yes	Yes
Other	4020	Volume (m3)	30000	11	Yes	Yes	Yes
Landfill Leachate (delivered by sewer network)	13499	Volume (m3)	30000	39	Yes	Yes	Yes

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)
Other	384	Volume (m3)	30000	1	Yes	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
There were no relevant environmental complaints in 2022.			

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	No. of incident occurrences	Recurring (Y/N)	Closed (Y/N)
Abatement Equipment offline	Screen not operating	1	No	Yes
Abatement Equipment offline	Plant or equipment breakdown at WWTP	1	No	No
Breach of ELV	Other	1	No	Yes

Incident Type	Cause	No. of incident occurrences	Recurring (Y/N)	Closed (Y/N)
Breach of ELV	Other	1	No	Yes
Breach of ELV		1	No	No
Other	Shock load to the WWTP	1	No	Yes
Other	Shock load to the WWTP	1	No	No
Uncontrolled release	EO caused by ragging or blocking	1	No	Yes
Uncontrolled release	Blocked Sewer	1	No	Yes

3.2.2 SUMMARY OF OVERALL INCIDENTS

Question	Answer
Number of Incidents in 2022	9
Number of Incidents reported to the EPA via EDEN in 2022	9
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 2022 (No. of events)	Total volume discharged in 2022 (m3)	Monitoring Status
SW012	242576,305219	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	Not Monitored
SW015	242481,303149	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	Not Monitored
SW011. James Connolly Street	241985,304543	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	Not Monitored
SW5	241531,306329	Yes	Low Significance	Meeting Criteria	Unknown	Unknown	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 sewage was discharged via monitored SWOs in the agglomeration in the year (m3)?	Unknown

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
D0020-SIP:01	Waste water sewer network improvements (including upgrade of pumping stations)	C	31/12/2014	Yes	Works Completed		
D0020-SIP:02	WWTP upgrade and ancillary works	C	31/12/2014	Yes	Works Completed		

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
D0020-SIP:03	Upgrade of SWO's to comply with criteria set out in DoEHLG Procedures and Criteria....	C	31/12/2014	Yes	Works Completed		
D0020-SIP:04	Upgrading of emergency overflows from pumping stations so that the overflows do not activate in response to rainfall events or lack of capacity in the sewer network.	C	31/12/2014	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
No additional improvements planned at this time.				

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	Year included in AER	Included in this AER
Priority Substances Assessment	Yes	2015	No
Small Stream Risk Score Assessment	Yes	2017	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	Yes

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

Signed: Date: 08/08/2023

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

Acting Head of Environmental Regulation.

7 APPENDIX

Appendix
Appendix 7.1 - Small Stream Risk Score Assessment

SSRS Compliance Monitoring: *Cavan* Waste Water Treatment Plant 2022

Report to Irish Water

Limnos Consultancy, Jan 2023

Contents

Cavan Town WWTP

Introduction

Small Streams Risk Score (SSRS) assessments on the Cavan River upstream and downstream of the Cavan Town waste water treatment plant (WWTP) are outlined in this report. The assessments were made in October 2022. 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.

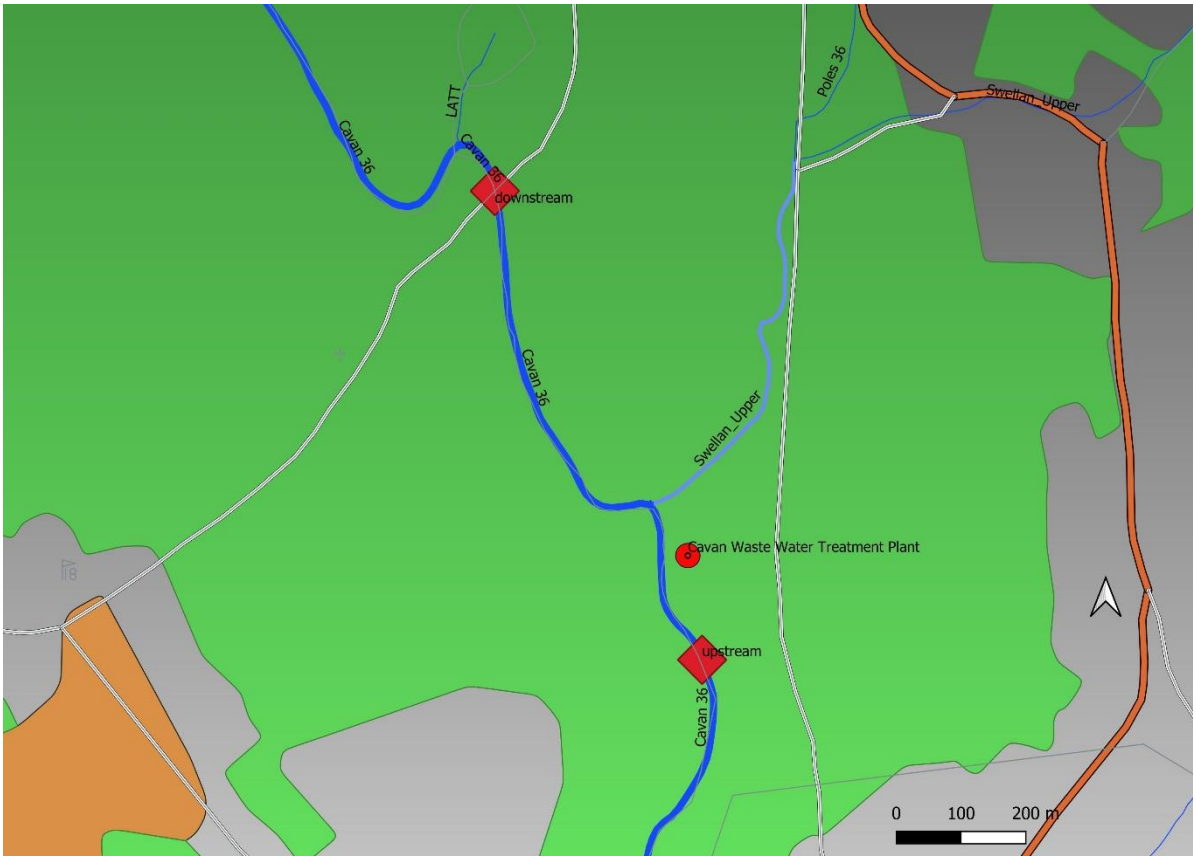

Figure 1. Location of upstream and downstream monitoring sites for Cavan WWTP - green triangles. River flows North. ©OpenStreetMap contributors.

Table 2. Location of sites sampled upstream and downstream of Cavan Town WWTP.

Location	Cavan Town WWTP Upstream	Cavan Town WWTP Downstream
EPA Code	RS36C020200	RS36C020300
Station	Bridge next to WWTP site	Br SSE Loretto College
River	Cavan	Cavan
Easting	241530	241290
Northing	306426	306914

Results

Site Photographs

Figure 2 shows photographs taken at Site 1 and Site 2 upstream and downstream of the Cavan WWTP in October 2022 when sampling. Note that the downstream location is further downstream than the site used in 2021 – the site immediately downstream of the WWTP is now fenced off and inaccessible.

	
U/S Cavan WWTP looking downstream	U/S Cavan WWTP looking upstream
	
D/S Cavan WWTP looking downstream	D/S Cavan WWTP looking upstream

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

Macroinvertebrates - SSRS

Table 3. Macroinvertebrates recorded upstream and downstream of Cavan Town WWTP discharge point.

	Upstream Cavan Town WWTP	**Downstream Cavan Town WWTP**
	Date of Surveys	
Taxon	**10/10/2022**	**21/10/2022**
Ecdyonurus	1	-
Alainites muticus	-	1
Limnephilidae	1	1
Ancylidae	1	1
Baetis rhodani	3	3
Chironomidae	1	1
Elmis aenea	1	2
Gammarus	4	5
Rhyacophila	-	1
Serratella ignita	-	1
Simuliidae	1	2
Erpobdella octoculata	1	1
Sphaerium	1	-
Tubificidae	2	1
Number Taxa	11	12
SSRS	5.6	5.6
	At Risk	At Risk
Q-Value	Q3-4	Q3

Table 3 gives the recorded macroinvertebrate taxa for the standard kick samples taken at these sites. The taxa are ordered from top to bottom 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 samples contained 11 and 12 taxa, upstream and downstream, respectively. This is a relatively low number of taxa for a 4- to 5 m-wide stream in October. Winter diversity is generally higher than in summer with more stonefly species present plus some mayfly species such as *Rhithrogena*. The upstream site had the mayfly, *Ecdyonurus* and the downstream site had *Seratella*. This improved the

upstream SSRS from 3.2 in 2021 to 5.6 in 2022 and from 2.4 to 5.6 at the downstream site. The downstream location sampled in 2022 probably provides a better indication of the WWTP impact on the Cavan River than the site used previously, which was very close to the discharge point. The most recent (2019) EPA monitoring at this site places the river in Poor status (Q3) at this downstream station. The results in Table 3 also give an estimated Q-Value that would be most likely for a summer sample at these locations. The upstream site is potentially a Q3-4 (Moderate), and the downstream site is likely to be a Q3 indicating Poor condition or Poor ecological status. The physico-chemical measurements made in the field on the day of sampling (Table 4) are unremarkable with reasonably high dissolved oxygen saturation (DO) > 90% and conductivity in the 300s.

Physico-Chemical Results

Table 4. Physico-chemical results for Cavan River, October 2022.

Station	Dissolved Oxygen (DO) % Saturation	DO mg/l	Temp. °C	Conductivity µS/cm
Upstream Cavan WWTP	93.5	10.0	12.2	307
Downstream Cavan WWTP	91.5	9.5	13.3	324

Summary

The Cavan River is in Moderate or Poor condition before it reaches the Cavan Town WWTP. While both sites score the same SSRS of 5.6, there appears to be a slight further deterioration at the site sampled downstream of the works.

Reference

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