Annual Environmental Report

2023

Kilmacthomas

D0275-01

CONTENTS

1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2023 AER

This Annual Environmental Report has been prepared for D0275-01, Kilmacthomas, in Waterford 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)

- Kilmacthomas with a Plant Capacity PE of 2110, 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
TPEFF3100D0275SW001	Kilmacthomas	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 KILMACTHOMAS - TREATED DISCHARGE

2.1.1 INFLUENT MONITORING SUMMARY - KILMACTHOMAS

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 Phosphorus (as P) mg/l	7	26	6.59
COD-Cr mg/l	12	4780	734
pH pH units	12	7.20	6.20
BOD, 5 days with Inhibition (Carbonaceo mg/l	12	359	163
ortho-Phosphate (as P) - unspecified mg/l	12	13	2.02
Ammonia-Total (as N) mg/l	12	52	9.58
Suspended Solids mg/l	12	1527	263
Hydraulic Capacity	N/A	1639	474

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 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 - TPEFF3100D0275SW000

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	13	Pass
Suspended Solids mg/l	35	87.5	N/A	12	N/A	N/A	3.94	Pass
BOD, 5 days with Inhibition (Carbonaceo mg/l	25	50	N/A	12	N/A	N/A	1.70	Pass
pH pH units	9	9	N/A	12	N/A	N/A	6.76	Pass
Ammonia-Total (as N) mg/l	5	6	N/A	12	N/A	N/A	0.300	Pass
ortho-Phosphate (as P) - unspecified mg/l	2	2.4	N/A	12	N/A	N/A	0.503	Pass
Faecal coliforms no./100mls	N/A	N/A	N/A	5	N/A	N/A	526	

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)
Total Phosphorus (as P) mg/l	N/A	N/A	N/A	8	N/A	N/A	0.506	
Total Oxidised Nitrogen (as N) mg/l	N/A	N/A	N/A	2	N/A	N/A	4.81	
E. Coli no./100mls	N/A	N/A	N/A	1	N/A	N/A	2421	

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 TPEFF3100D0275SW000

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	239406, 106142	RS17M010180	No	Yes	Yes	No	Moderate
Downstream	239724, 105581	RS17M010200	No	Yes	Yes	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
Ammonia-Total (as N) mg/l	RS17M010180	0.048	RS17M010200	0.085	0.065	57
ortho-Phosphate (as P) - unspecified mg/l	RS17M010180	0.011	RS17M010200	0.028	0.035	46.2
Dissolved Oxygen % O2	RS17M010180	93	RS17M010200	91	N/A	
Total Nitrogen mg/l	RS17M010180	4.00	RS17M010200	4.34	N/A	
BOD, 5 days with Inhibition (Carbonaceo mg/l	RS17M010180	0.707	RS17M010200	0.966	N/A	
Dissolved Oxygen mg/l	RS17M010180	9.92	RS17M010200	9.84	N/A	
pH pH units	RS17M010180	7.39	RS17M010200	7.32	N/A	
Temperature °C	RS17M010180	13	RS17M010200	12	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 downstream monitoring location. 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 - KILMACTHOMAS

2.1.4.1 Treatment Efficiency Report - Kilmacthomas

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
TP	2370	124	95
SS	71496	910	99
cBOD	44334	361	99
COD	199300	2716	99

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

2.1.4.2 Treatment Capacity Report Summary - Kilmacthomas

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.

Kilmacthomas	
Peak Hydraulic Capacity (m^3/day) - As Constructed	1424
DWF to the Treatment Plant (m^3/day)	475
Current Hydraulic Loading - annual max (m^3/day)	1639
Average Hydraulic loading to the Treatment Plant (m^3/day)	474
Organic Capacity (PE) - As Constructed	2110
Organic Capacity (PE) - Collected Load (peak week)[Note1]	1246
Organic Capacity (PE) - Remaining	864
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 - KILMACTHOMAS

'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)
Uncontrolled release	SWO exceptional rainfall and overflow expected	No	Yes
Uncontrolled release	SWO exceptional rainfall and overflow expected	No	Yes
Uncontrolled release	SWO exceptional rainfall and overflow expected	No	Yes

Incident Type	Cause	Recurring (Y/N)	Closed (Y/N)
Uncontrolled release	SWO exceptional rainfall and overflow expected	Yes	Yes
Uncontrolled release	SWO exceptional rainfall and overflow expected	No	Yes
Abatement equipment off-line	Plant or equipment breakdown at WWTP	No	No
Uncontrolled release	SWO exceptional rainfall and overflow expected	No	Yes
Uncontrolled release	SWO exceptional rainfall and overflow expected	Yes	Yes
Uncontrolled release	SWO exceptional rainfall and overflow expected	No	Yes
Uncontrolled release	SWO exceptional rainfall and overflow expected	No	Yes
Uncontrolled release	SWO exceptional rainfall and overflow expected	No	Yes
Uncontrolled release	SWO exceptional rainfall and overflow expected	No	Yes
Uncontrolled release	SWO exceptional rainfall and overflow expected	No	Yes
Uncontrolled release	SWO exceptional rainfall and overflow expected	No	Yes
Uncontrolled release	SWO exceptional rainfall and overflow expected	No	Yes
Uncontrolled release	SWO exceptional rainfall and overflow expected	No	Yes
Uncontrolled release	SWO exceptional rainfall and overflow expected	No	Yes
Uncontrolled release	SWO exceptional rainfall and overflow expected	No	Yes
Uncontrolled release	SWO exceptional rainfall and overflow expected	No	Yes
Uncontrolled release	Adverse Weather	No	No

3.2.2 SUMMARY OF OVERALL INCIDENTS

Question	Answer
Number of Incidents in 2023	20
Number of Incidents reported to the EPA via EDEN in 2023	20
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
SW002	239527,105779	Yes	Low Significance	Meeting Criteria	Unknown	9227	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)?	9227
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
D0275-SIP:01	SW1 (Primary discharge point until provision of secondary WWTP)	A	31/10/2014	Yes	Works Completed		
D0275-SIP:02	SW2 - Provision of Storm Water Overflows to comply with the criteria outlined in the DoEHLG "Procedures and Criteria in relation to Storm Water Overflows, 1995".	C	31/10/2014	Yes	Works Completed		
D0275-SIP:03	Waste Water treatment plant and ancillary works	C	31/10/2014	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	Included in this AER
D0275-01-Drinking Water Abstraction Point Risk Assessment	Yes	No
D0275-01-Pearl Mussel Report	Yes	No
D0275-01-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: 20/03/2024

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 ,

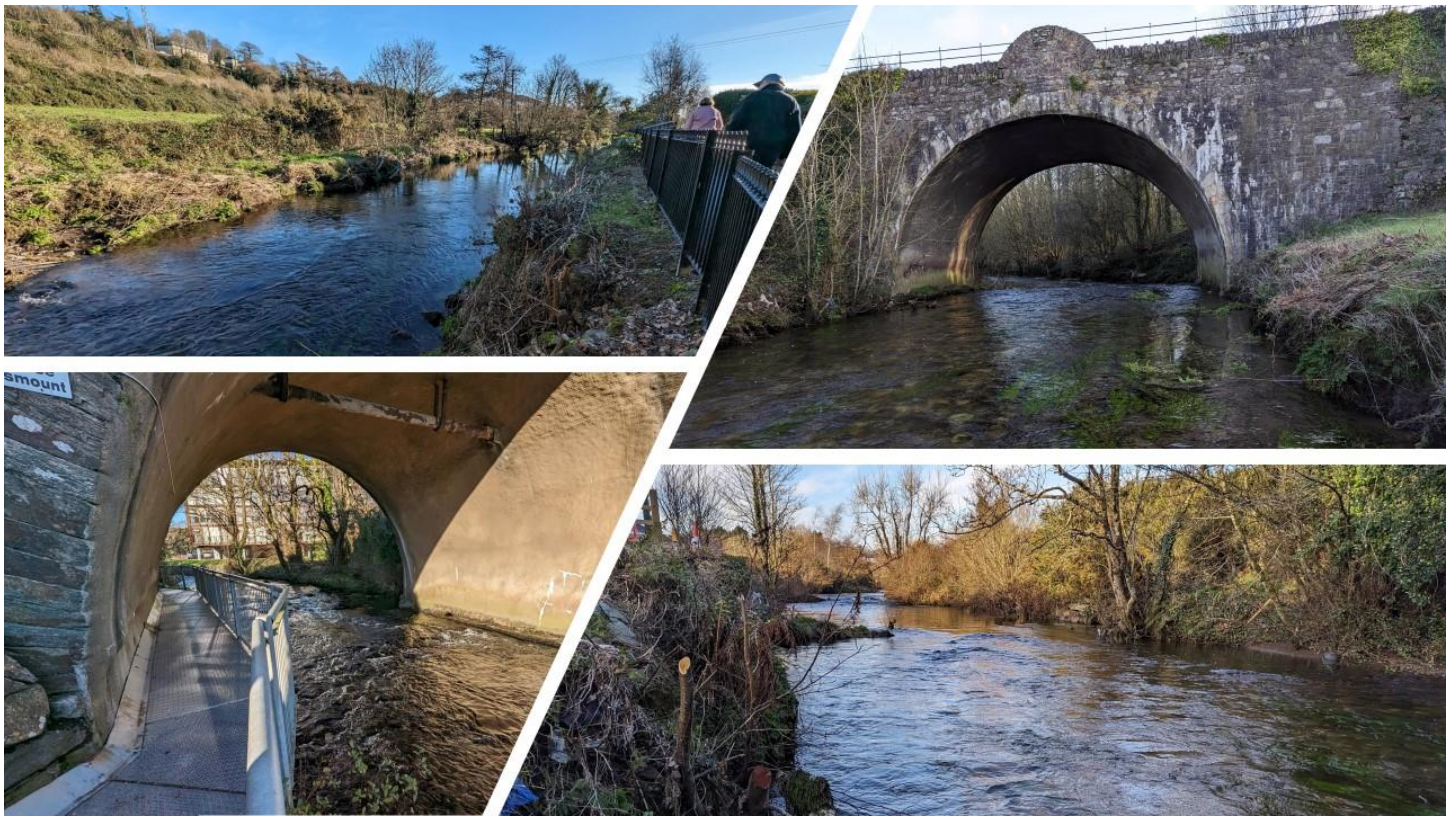
Eleanor Roche

Head of Environmental Regulation.

7 APPENDIX

Appendix
Appendix 7.1 - Small Stream Risk Score Assessment

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



Report to Uisce Éireann

Limnos Consultancy, January 2024

Contents

Kilmacthomas WWTP

Introduction

Small Streams Risk Score (SSRS) assessments on the Mahon River upstream and downstream of the Kilmacthomas waste water treatment plant (WWTP) are outlined in this report. The assessments were made 0n 5 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.

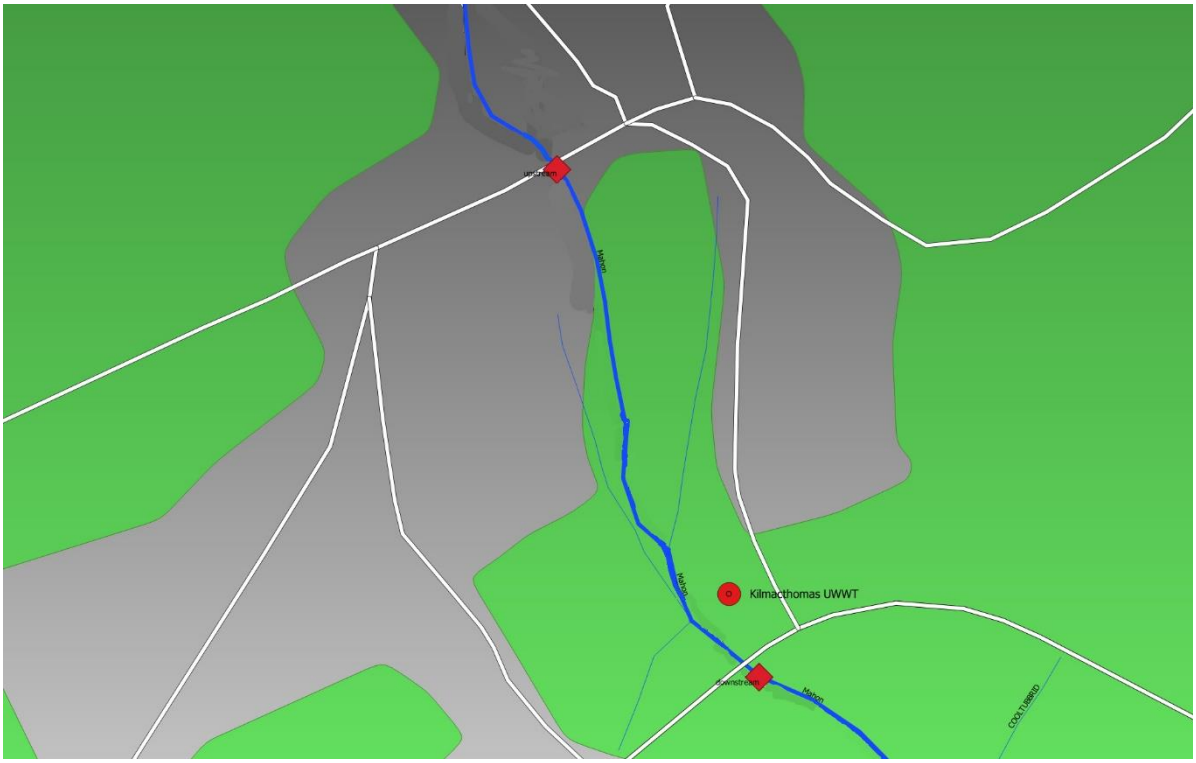


Figure 1. Location of upstream and downstream monitoring sites for Kilmacthomas WWTP. The river flows South.

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

Location	Kilmacthomas WWTP Upstream	Kilmacthomas WWTP Downstream
EPA Code	RS17M010180	RS17M010200
Station	Bridge in Kilmacthomas	Bridge just South of Kilmacthomas
River	Mahon	Mahon
Easting	239406	239593
Northing	106142	105673

Results

Site Photographs

Figure 2 shows photographs taken when sampling at Site 1 and Site 2 upstream and downstream of the Kilmacthomas WWTP on 5 December 2023.

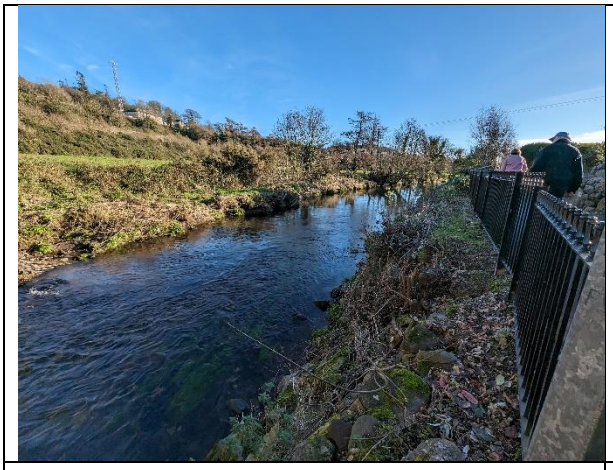
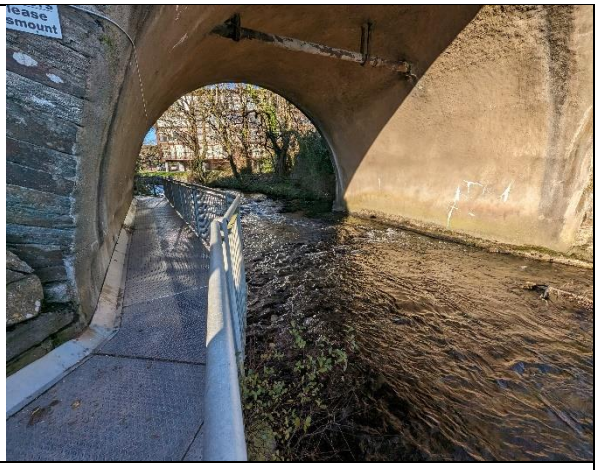
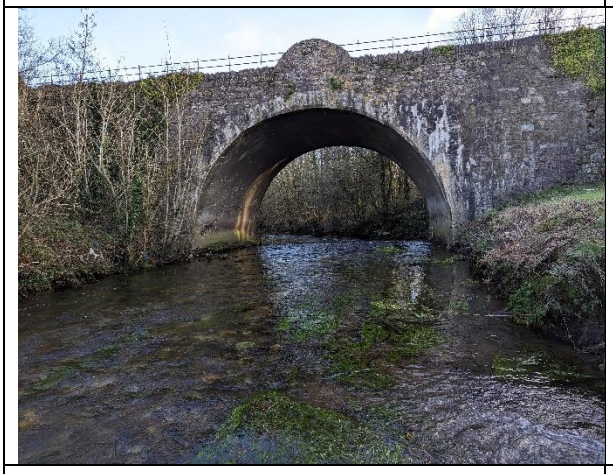
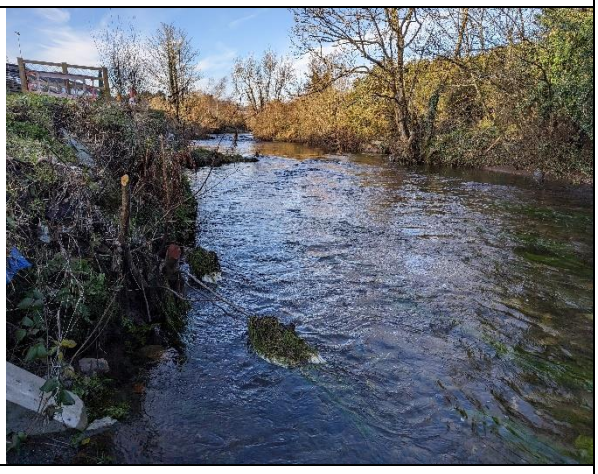
	
U/S Kilmacthomas WWTP looking downstream	U/S Kilmacthomas WWTP looking upstream
	
D/S Kilmacthomas WWTP looking downstream	D/S Kilmacthomas WWTP looking upstream

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

Macroinvertebrates – SSRS

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

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

		Kilmacthomas	**Kilmacthomas**
		Upstream WWTP	**Downstream WWTP**
		Date Sampled	
		05/12/2023	**05/12/2023**
SSRS Group	**Taxon**		
1, Ephem	*Ecdyonurus*	Common	Common
1, Ephem	*Rhithrogena*	Common	Common
2, Plec	*Leuctra*	Few	-
3, Trich	*Hydropsyche*	Few	Common
3, Trich	*Polycentropus*	-	Few
3, Trich	*Rhyacophila*	Few	Few
3, Trich	*Sericostoma personatum*	Few	-
4, GOlD	Chironomidae	Few	Common
4, GOlD	*Radix balthica*	Few	Few
4, GOlD	Simuliidae	Few	Numerous
4, GOlD	Tubificidae	-	Few
5, Asellus	*Asellus*	-	Few
n/a	*Baetis rhodani*	Dominant	Dominant
n/a	*Crangonyx*	-	Few
n/a	*Gammarus*	Few	Few
n/a	Gyrinidae	Few	-
n/a	Hydraenidae	Few	-
n/a	*Limnius volckmari*	Few	Few
	Number Taxa	**14**	**14**
	SSRS	**9.6**	**5.6**
	Q-Value	**Q4**	**Q3-4**

The taxa are ordered from top to bottom in terms of their SSRS Groupings and general sensitivity to pollution with *Ecdyonurus* at the top being the most

sensitive and Tubificidae and *Asellus* at the lower end of the table being the more tolerant. Note that not all recorded taxa are included in the SSRS system – e.g. gammarids, the mayfly, *B. rhodani* are omitted plus beetles, leeches and flatworms are not included either. Both samples contained 14 taxa. The Upstream site had an SSRS of 9.6 and the downstream site's score was 5.6. This is an improvement on the corresponding scores in 2022.

Both samples had two mayfly taxa in the SSRS Group 1 Ephemeroptera category, *Ecdyonurus* and *Rhithrogena* were common at both sites. The upstream site had one stonefly, *Leuctra*, but none were recorded at the downstream site. Both sites had three Trichoptera taxa. The GOlD taxa were more abundant at the downstream site and there were also some *Asellus* (Group 5) noted at the lower site. The occurrence of *Asellus* and greater abundance of GOlD taxa brought the SSRS score down compared with the upstream site putting it in the 'at risk' category.

Physico-Chemical Results

The physico-chemical measurements made in the field on the day of sampling (Table 4) once again had dissolved oxygen levels close to 100% saturation and a relatively low conductivity and pH due to the geological setting. There was no significant difference between the upstream and downstream sites.

Table 4. Physico-chemical results for Kilmacthomas River, 5 December 2023.

Station	Dissolved Oxygen (DO) % Saturation	DO mg/l	Temp. °C	Conductivity µS/cm	pH
Upstream Kilmacthomas WWTP	**99.6**	**11.65**	**8.4**	**151.1**	**6.88**
Downstream Kilmacthomas WWTP	**98.7**	**11.64**	**8.1**	**162.1**	**6.82**

Summary

The Mahon River appears to have improved at the upstream site compared with the 2022 results, before it reaches the Kilmacthomas WWTP discharge. A slight deterioration was noted downstream of the town and the WWTP discharge. But both sites scored higher than in October 2022, although this may be due to the somewhat later December sample date in 2023.

Reference

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