Annual Environmental Report

2021

Edgeworthstown

D0098-01

CONTENTS

1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2021 AER

This Annual Environmental Report has been prepared for D0098-01, Edgeworthstown, in Longford 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.

There were no capital works, significant changes or operational improvements undertaken in 2021.

1.2 TREATMENT SUMMARY

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

- Edgeworthstown WWTP with a Plant Capacity PE of 2700, 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
TPEFF2000D0098SW001	Edgeworthstown WWTP	Treated	Non-Compliant	Ammonia-Total (as N) mg/l ortho-Phosphate (as P) - unspecified mg/l

1.4 LICENCE SPECIFIC REPORTING

Assessment / Report
Small Stream Risk Score Assessment

2 TREATMENT PLANT PERFORMANCE AND IMPACT SUMMARY

2.1 EDGEWORTHSTOWN WWTP - TREATED DISCHARGE

2.1.1 INFLUENT MONITORING SUMMARY - EDGEWORTHSTOWN 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
ortho-Phosphate (as P) - unspecified mg/l	12	10	3.97
Total Nitrogen mg/l	12	61	28
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	12	608	266
COD-Cr mg/l	12	1343	588.63
Suspended Solids mg/l	12	590	250.197
pH pH units	12	7.84	7.56
Total Phosphorus (as P) mg/l	12	18	7.88
Ammonia-Total (as N) mg/l	12	31	18
Hydraulic Capacity	N/A	5556	921

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 - TPEFF2000D0098SW001

Parameter	WWDL ELV (Schedule A)	ELV with Condition 2 Interpretation included Note 1	Interim % reduction from influent concentration	Number of sample results	Number of exceedances	Number of exceedances with Condition 2 Interpretation included	Annual Mean	Overall Compliance (Pass/Fail)
COD-Cr mg/l	125	250	N/A	12	N/A	N/A	23	Pass
Suspended Solids mg/l	35	87.5	N/A	12	N/A	N/A	6.99	Pass
Temperature °C	25	25	N/A	12	N/A	N/A	11	Pass
pH pH units	6.00	9.00	N/A	12	N/A	N/A	7.37	Pass
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	6.00	12	N/A	12	1	N/A	2.26	Pass
Total Phosphorus (as P) mg/l	2.00	2.40	N/A	12	N/A	N/A	0.252	Pass
Ammonia-Total (as N) mg/l	0.300	0.600	N/A	12	4	1	0.254	Fail

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)
ortho-Phosphate (as P) - unspecified mg/l	0.150	0.300	N/A	12	1	1	0.110	Fail
Total Nitrogen mg/l	N/A	N/A	N/A	12	N/A	N/A	14	
Conductivity @20°C µS/cm	N/A	N/A	N/A	12	N/A	N/A	1028	
Visual Inspection Descriptive	N/A	N/A	N/A	12	N/A	N/A	N/A	

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):

Inadequate Infrastructure.

Significance of Results:

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

2.1.3 AMBIENT MONITORING SUMMARY FOR THE TREATMENT PLANT DISCHARGE TPEFF2000D0098SW001

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	226006, 271139	RS26B050050	No	No	No	No	Poor
Downstream	226103, 270544	RS26B050080	No	No	No	No	Poor

The results for ambient results and / or additional monitoring data sets are included in the **Appendix 7.1 - Ambient monitoring summary.**

Significance of Results:

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

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

Based on ambient monitoring results a slight deterioration in BOD concentration downstream of the effluent discharge is noted.

A deterioration in water quality has been identified, based on the effluent compliance results and the 2021 SSRS assessment, the discharge may be contributing to the downstream water quality.

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. The WFD status is Poor both upstream and downstream of the WWTP.

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2.1.4 OPERATIONAL PERFORMANCE SUMMARY - EDGEWORTHSTOWN WWTP

2.1.4.1 Treatment Efficiency Report - Edgeworthstown 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	209551	6210	97
cBOD	94844	598	99
SS	89069	1849	98
TP	2804	67	98
TN	9864	3719	62

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

2.1.4.2 Treatment Capacity Report Summary - Edgeworthstown 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.

Edgeworthstown WWTP	
Peak Hydraulic Capacity (m^3/day) - As Constructed	1824
DWF to the Treatment Plant (m^3/day)	608
Current Hydraulic Loading - annual max (m^3/day)	5556

Edgeworthstown WWTP	
Average Hydraulic loading to the Treatment Plant (m^3/day)	920.7
Organic Capacity (PE) - As Constructed	2700
Organic Capacity (PE) - Collected Load (peak week)[Note1]	2644
Organic Capacity (PE) - Remaining	56
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 - EDGEWORTHSTOWN WWTP

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

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

3 COMPLAINTS AND INCIDENTS

3.1 COMPLAINTS SUMMARY

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

Number of Complaints	Nature of Complaint	Number Open Complaints	Number Closed Complaints
There were no relevant environmental complaints in 2021.			

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 Irish Water 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)
Breach of ELV	Inadequate Infrastructure	1	Yes	No
Uncontrolled release	EO caused by ragging or blocking	1	No	Yes
Uncontrolled release	Tank Overflow	1	No	Yes

Incident Type	Cause	No. of incident occurrences	Recurring (Y/N)	Closed (Y/N)
Uncontrolled release	Adverse Weather	1	No	Yes

3.2.2 SUMMARY OF OVERALL INCIDENTS

Question	Answer
Number of Incidents in 2021	4
Number of Incidents reported to the EPA via EDEN in 2021	4
Explanation of any discrepancies between the two numbers above	N/A

4 INFRASTRUCTURAL ASSESSMENTS AND PROGRAMME OF IMPROVEMENTS

4.1 STORM WATER OVERFLOW IDENTIFICATION AND INSPECTION REPORT

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

4.1.1 SWO IDENTIFICATION

WWDL Name / Code for Storm Water Overflow (chamber) where applicable	Irish Grid Ref. (outfall)	Included in Schedule of the WWDL	Significance of the overflow(High / Medium / Low)	Assessed against DoEHLG Criteria	No. of times activated in 2021 (No. of events)	Total volume discharged in 2021 (m^3)	Monitoring Status
SW003	226085, 270587	Yes	Medium	Not Meeting	Unknown	Unknown	Not Monitored

SWO Summary	
How much sewage was discharged via monitored SWOs in the agglomeration in the year (m^3)?	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?	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
D0098-SIP:01	SW2 Upgrading of Storm Water Overflows to comply with the criteria outlined in the DoEHLG "Procedures and Criteria in relation to Storm Water Overflows, 1995"	C	31/12/2016	Yes	Works Completed		
D0098-SIP:02	SW3 Upgrading of Storm Water Overflows to comply with the criteria outlined in the DoEHLG "Procedures and Criteria in relation to Storm Water Overflows, 1995"	C	31/12/2016	Yes	Works Completed		
D0098-SIP:03	Waste water treatment plant and ancillary works	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
Small Stream Risk Score Assessment	Yes	2018	Yes

5.1 SMALL STREAM RISK SCORE ASSESSMENT

The Small Stream Risk Score Assessment Report is included in Appendix 7.2 - Small Stream Risk Score Assessment. A summary of the findings of this report is included below.

Parameter	Value
Condition 5 Improvement Programme Reference	None
Does SSRS indicate discharges are posing a pollution risk?	Yes
Does improvement programme include any procedural and/or infrastructural works?	No
Downstream SSRS Water Quality Risk	At Risk
SSRS Required?	Yes
Upstream SSRS Water Quality Risk	At Risk
What is Downstream SSRS?	1.6
What is Upstream SSRS?	2.4

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
Has a Technical amendment/licence review application been submitted to the Agency by IW?	Yes
List reason e.g., additional SWO identified	Ambient monitoring located changes
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	No
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	N/A

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

Date: 18/02/2022

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

Katherine Walshe

Acting Head of Environmental Regulation.

7 APPENDIX

Appendix
Appendix 7.1 - Ambient Monitoring Summary
Appendix 7.2 - Small Stream Risk Score Assessment

Edgeworthstown 2021 Ambient Monitoring Summary

			Receiving Waters Designation (Yes/No)			
Ambient Monitoring Point from WWDL (or as agreed with EPA)	**Irish National Grid Reference (Easting, Northing)**	**EPA Feature Coding Tool code**	**Bathing Water**	**Drinking Water**	**FWPM**	**Shellfish**
Upstream Monitoring Point	226006, 271139	RS26B050050	No	No	No	No
Downstream Monitoring Point	226103, 270544	RS26B050080	No	No	No	No

		Mean (mg/l)		
Ambient Monitoring Point from WWDL (or as agreed with EPA)	**Current WFD Status**	**cBOD**	**o-Phosphate (as P)**	**Ammonia (as N)**
Upstream Monitoring Point	Poor	1.78	0.063	0.143
Downstream Monitoring Point	Poor	1.83	0.060	0.126
Difference		*0.052*	*-0.004*	*-0.017*
EQS		1.500	0.035	0.065
% of EQS		3.453%	-10.952%	-25.513%

Edgeworthstown 2021 Ambient Monitoring Data

StationName	Sample Date	BOD	Total N	Ortho P	Ammonia	pH	DO %	DO
		mg/l	mg/l	mg/l	mg/l	pH Units	&Sat	mg/l
Upstream	06/01/2021	2.30	1.5	0.078	0.483	7.83	109.2	13.37
Upstream	10/02/2021	1.40	1.9	0.062	0.288	8.13	106.5	12.1
Upstream	10/03/2021	1.30	0.9	0.038	0.039	8.24	103.4	11.26
Upstream	14/04/2021	1.60	0.9	0.059	0.042	8.41	118.4	11.65
Upstream	12/05/2021	1.20	0.8	0.021	0.034	8.12	98.8	10.08
Upstream	09/06/2021	1.20	0.8	0.021	0.034	8.17	84.2	9.8
Upstream	14/07/2021	1.60	1.200	0.156	0.075	7.76	84.3	10.15
Upstream	11/08/2021	7.50	2.300	0.180	0.495	7.82	86.7	8.2
Upstream	08/09/2021	<1	<0.5	0.029	0.107	8.06	102.6	9.03
Upstream	14/10/2021	<1	0.800	0.047	0.034	8.09	106.3	10.17
Upstream	10/11/2021	<1	1.600	0.046	0.024	7.5	89.4	10.36
Upstream	01/12/2021	1.10	1.600	0.023	0.058	7.99	85.8	8.66
	Mean	**1.78**	**1.22**	**0.063**	**0.143**	**8.01**	**97.97**	**10.40**
	95%ile	**4.64**	**2.08**	**0.167**	**0.488**	**8.32**	**113.34**	**12.67**
Downstream	06/01/2021	2.40	1.300	0.071	0.391	7.82	107.6	13.29
Downstream	10/02/2021	<1	1.700	0.020	0.037	7.41	81.5	7.88
Downstream	10/03/2021	1.60	1.700	0.046	0.124	8.24	101.1	11.02
Downstream	14/04/2021	1.30	0.900	0.057	0.039	8.41	117.7	11.61
Downstream	12/05/2021	1.20	1.500	0.023	0.038	8.09	91	9.94
Downstream	09/06/2021	1.10	0.800	0.020	0.039	8.16	89.5	9.83
Downstream	14/07/2021	1.30	1.200	0.155	0.079	7.78	86.5	10.38
Downstream	11/08/2021	7.40	2.500	0.181	0.517	7.83	80.1	8.24
Downstream	08/09/2021	<1	<0.5	0.028	0.121	8.06	107.2	9.1
Downstream	14/10/2021	<1	0.900	0.046	0.028	8.15	106.2	10.15
Downstream	10/11/2021	1.40	1.700	0.044	0.043	7.48	88.7	10.02
Downstream	01/12/2021	1.00	1.600	0.023	0.058	7.94	84.3	8.52
	Mean	**1.83**	**1.35**	**0.060**	**0.126**	**7.95**	**95.12**	**10.00**
	95%ile	**4.90**	**2.06**	**0.167**	**0.448**	**8.32**	**112.15**	**12.37**

Note: Where the concentration in the result is less than the limit of detection (LOD), a value of LOD/sqrt(2) was used in calculating the mean and 95%ile concentrations.

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BIOLOGICAL WATER QUALITY ASSESSMENT OF THE RIVER BLACK, EDGEWORTHSTOWN, CO. LONGFORD

River Black at Tinnynarr

Water Services Department
Longford County Council
December 2021

TABLE OF CONTENTS

1 INTRODUCTION

1.1 BACKGROUND

In February 2011, the Environmental Protection Agency issued a Waste Water Discharge License in respect of the waste water treatment plant at Edgeworthstown, Co. Longford (License No. D0098-0). This treatment plant discharges into the River Black at Tinnynarr, Edgeworthstown, Co. Longford. As part of the requirements for this license, it is necessary to monitor the biological quality of the River Black, both upstream and downstream of the waste water treatment plant discharge on an annual basis.

Since 2011, Whitehill Environmental has been commissioned by Longford County Council to undertake the annual investigation of the biological water quality of the River Black close to the discharge point of the treatment plant. This report presents the results of the 2021 monitoring programme.

Q VALUE ASSESSMENT

Along with other parameters (fish, morphology, chemistry), the Q value is used to determine the ecological status of the waterbody, which is an action required under the obligations set out in the EU Water Framework Directive. Under this Directive, all water bodies are required to meet good status within a certain time period. Ireland is now in the second cycle of the Water Framework Directive and therefore good status should be achieved in all water bodies by the end of this current cycle, i.e., 2021. If a waterbody is unlikely to achieve this status, then it is deemed to be *At Risk.* Table 1 summaries the Q values in relation to Water Framework Directive status.

Q Value	WFD Status	Pollution Status	Condition
Q5, Q4-5	High	Unpolluted	Satisfactory
Q4	Good	Unpolluted	Satisfactory
Q3-4	Moderate	Slightly polluted	Unsatisfactory
Q3, Q2-3	Poor	Moderately polluted	Unsatisfactory
Q2, Q1-2, Q1	Bad	Seriously polluted	Unsatisfactory

Table 1 – Q Rating in Relation to WFD Status

SMALL STREAM RISK SCORE (SSRS)

The Small Stream Risk Score (SSRS) is a biological risk assessment system for detecting potential sources of pollution in streams. The main aim of the SSRS is to support the programme of measures for the Water Framework Directive. The main objective of this directive is to ensure the achievement of good ecological status in all water bodies in the EU within a specified time period.

SSRS surveys are designed to assist in the identification of diffuse sources of pollution and they are valuable in pinpointing the likely geographical location of the sources that are causing the main channel rivers in their failure to achieve good status. The SSRS will identify whether the water body in question is At Risk of not achieving good ecological status as required under the Water Framework Directive.

2 METHODOLOGY

2.1 PERSONNEL

This ecological assessment was carried out by Noreen McLoughlin, BA, MSc, MCIEEM, of Whitehill Environmental. Noreen has an honours degree in Zoology and an MSc in Freshwater Ecology from Trinity College, Dublin and she has been a full member of the Chartered Institute of Ecology and Environmental Managements for 16 years. Noreen has over 17 years experience as a professional ecologist in Ireland.

2.2 BIOLOGICAL ASSESSMENT

Biological water quality assessment was carried out at two separate locations on the River Black, both upstream and downstream of the effluent discharge point. These locations are summarised in Table 1 and illustrated in Figure 1.

Station No.	Location	NGR Location
1	~ 35m u/s of discharge	N 260517 70648
2	~35m d/s of discharge	N 26046 70574
	Discharge Point	N 26009 70652

Table 1 – Stations Sampled as Part of this Assessment

Fieldwork was carried out on 2nd December 2021.

At each station, the surrounding habitats were noted along with other parameters such as water flow, stream depth and the predominance of vegetation. All samples were taken with a Freshwater Biological Association approved hand held sweep net with a mesh diameter of 500µm. At both stations, a two minute kick and stone wash sample was taken at a suitable riffle site, if there was one present. The samples were retained in plastic containers at the sampling site and removed to the laboratory for further analysis. In the lab, any fine mud and debris were removed from each sample by sieving under running water through a 500 µm sieve. The samples were then sorted live in a white tray under a bench lamp. All macro-invertebrates were preserved in 70% methanol, before being counted and identified to the appropriate taxonomic level. This was generally to family level but where necessary to species level.

Based on the relative abundance of indicator species, a biotic index (Q rating) was determined for the sites in accordance with the biological assessment procedure used by the

Environmental Protection Agency. In addition, the Small Stream Risk Score (SSRS) was also calculated for the upstream and downstream stations. This assessment gives a quick overview of the risk status of the water body in question.

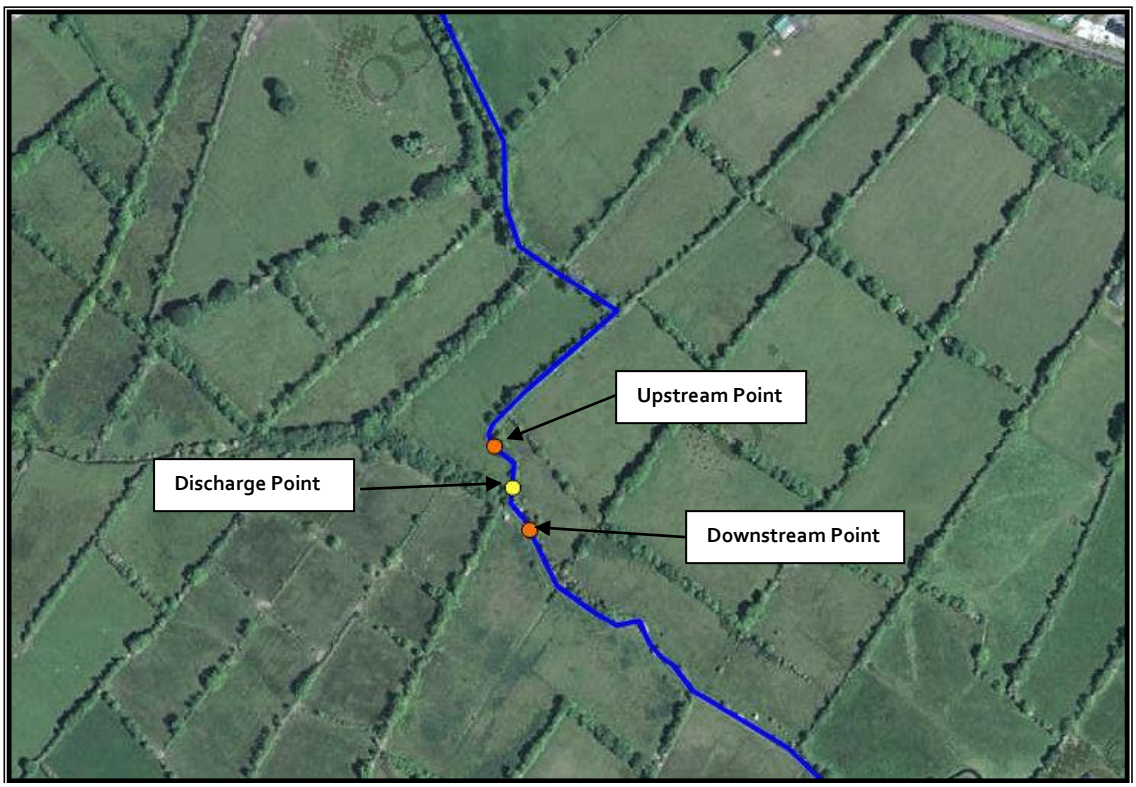

Figure 1 – Location of Sampling Points on the River Black

Q VALUE

Based on the relative abundance of indicator species, the Q value was determined for the sites in accordance with the biological assessment procedure used by the Environmental Protection Agency (Toner *et al.* 2005). The method categorises invertebrates into one of five different groups based on their sensitivity or tolerance to pollution. Group A are the most sensitive forms, Group B are less sensitive, Group C are tolerant, Group D are very tolerant and Group E are the most tolerant. Overall, the higher the biological diversity and the greater the abundance of invertebrate species that are sensitive to organic pollution, then the higher the water quality is assumed to be and the higher the Q value assigned to that sampling station.

The relative abundance of each group of invertebrates in the samples was assigned as follows:

- Present (1/2 individuals)
- Scarce/Few (<1%)
- Small Numbers (<5%)

- Fair Numbers (5-10%)
- Common (10-20%)
- Numerous (25-50%)
- Dominant (50-75%)
- Excessive (>75%)

SSRS

The SSRS methodology only uses certain biological indicators to calculate the risk. The taxa used have been placed into 5 groups:

Group 1 – Ephemeroptera (Mayflies)

Group 2 – Plecoptera (Stoneflies)

Group 3 – Trichoptera (Caddisflies)

Group 4 – G.Ol.D (Gastropods, Oligochaetes and Dipterns)

Group 5 – Asellus (Waterlouse)

The groupings are based on their sensitivity to organic pollution, e.g., mayflies and stoneflies are sensitive to pollution and are given a high score, whilst taxa within Group 4 are less sensitive and are given a lower score. The overall score for each river sample is based on the number of taxon present in each sample along with the relative abundance of each taxon. These scores are added together and divided by five to give an average index score (AIS). The final SSRS is achieved by multiplying the AIS by 2. Table 3 outlines the risk categories.

SSRS	Risk Category
<6.5	At Risk
6.5-7.25	Probably at Risk
>7.25	Not at Risk

Table 3 – SSRS Risk Categories

3 RECEIVING ENVIRONMENT

The Edgeworthstown waste water treatment plant is located in the townland of Tinnynarr, approximately 0.5km south of the town and just off the N4 Dublin – Sligo Road. It is surrounded mostly by agricultural / grazing land. The discharge from the treatment plant enters the River Black at a point approximately half a kilometre south of the treatment plant. A map showing the location of the treatment plant is shown in Figure 1.

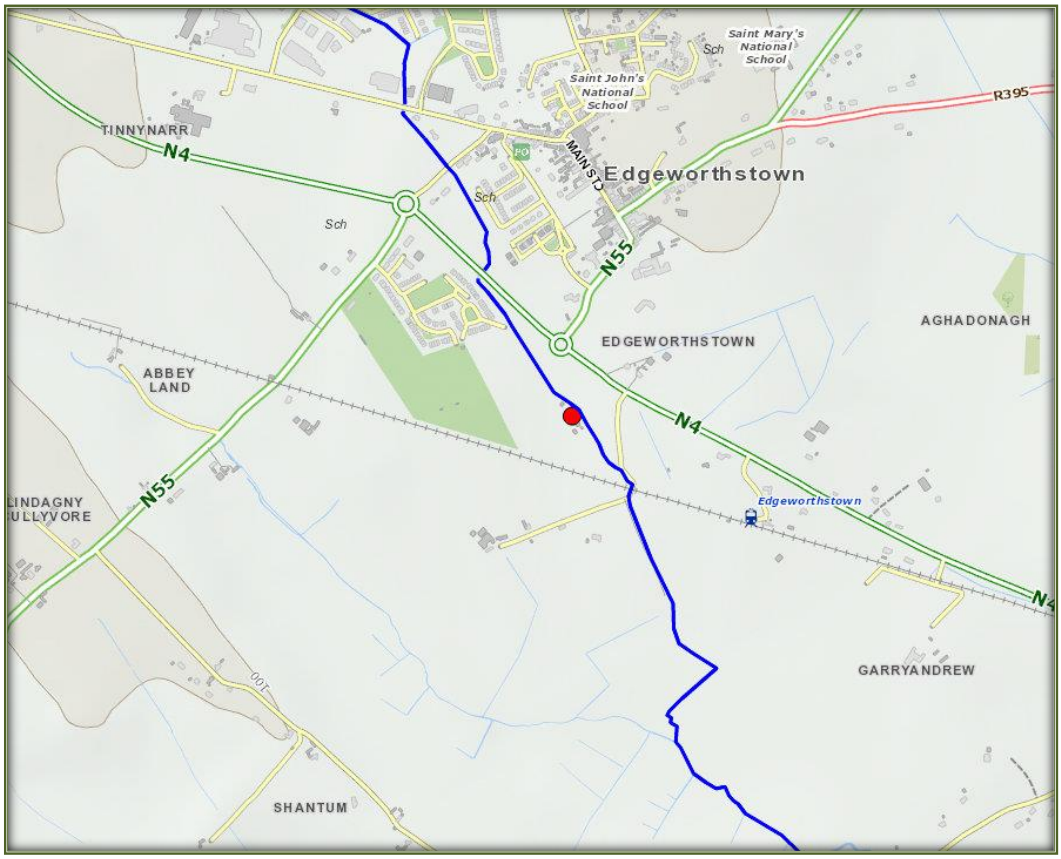

Figure 1 – Site Location Map. The Course of the River Black is Highlighted in Blue. The Location of the Treatment Plant is Shown with a Red Dot.

3.1 THE RIVER BLACK

The River Black rises in the townland of Lisnanagh, approximately 3km north-west of Edgeworthstown. It then flows through low lying agricultural land where it joined by a network of drainage ditches. On the western outskirts of the town if flows behind a pet food factory and through a housing estate. On the east side of the town it flows through agricultural land again and towards the Longford – Westmeath county boundary where it flows through an area of raised and cutover bog and a conifer plantation. Historically (old version OSI maps) the River Black flowed into and out of Glen Lough (prior to the drainage scheme that drained this lake) before it flowed north-east and then south-east towards the River Inny, where it joined it in the townland of Boltomy just downstream of Lough Iron.

However, since the lake was drained the flow of the river has been altered and it is now connected to the marsh area of Glen Lough by a drainage channel.

3.2 RECEIVING WATER QUALITY

EPA'S BIOLOGICAL WATER QUALITY MONITORING

Since the commencement of the EPA's Water Quality Monitoring Programme, the River Black has consistently failed to reach good ecological status, i.e., it has always been of poor – moderate water quality. The earliest information from the EPA comes from 1987, when a Q value of 1-2 (i.e., bad status / severe pollution) was assigned to the river at the sampling station at the Ballymahon Bridge in Edgeworthstown (upstream of the waste water treatment plant).

In 2020, the River Black at the Ballymahon Road Bridge received a Q3 (Poor Ecological Status). This is a slight improvement since 2017 when a Q2-3 was obtained. However, it is a deterioration since 2011, when a Q3-4 (moderate status) was obtained. Other points sampled by the EPA include the bridge at Ballinlaghta and the bridge at Lissanure. The latest EPA ratings (2017 and 2020) from the Ballinlaghta station is a Q3, i.e., moderate status. This is a deterioration from 2014, when a Q3-4 was obtained.

PREVIOUS MONITORING RESULTS

Tables 2 and 3 summarise the previous results obtained by Whitehill Environmental during the biological water quality monitoring studies on the River Black. The 2010 results were obtained as part of the Appropriate Assessment Screening for the original license application. Subsequent results were obtained upon condition of the granting of the license. The SSRS for the River Black only commenced in 2016.

Year	Q Value & Status Upstream	Q Value &Status Downstream
2010	Q3: Poor Status	Q3: Poor Status
2011	Q3: Poor Status	Q3: Poor Status
2012 (2013)	Q3: Poor Status	Q3-4: Moderate Status
2013	Q3: Poor Status	Q3: Poor Status
2015	Q3: Poor Status	Q3: Poor Status
2016	Q3: Poor Status	Q3: Poor Status
2017	Q3: Poor Status	Q3: Poor Status
2018	Q3: Poor Status	Q2-3: Poor Status
2019	Q3: Poor Status	Q2-3: Poor Status
2020	Q3: Poor Status	Q3: Poor Status

Table 2 – Summary of Findings of the Previous Biological Water Quality Assessment.

Year	SSRS & Risk Status Upstream	SSRS & Risk Status Downstream
2016	1.6	3.2
2017	1.6	4
2018	2.4	1.6
2019	1.6	1.6
2020	0.8	1.6

Table 3 – Summary of Findings of the Previous SSRS for the River Black

4 RESULTS OF THIS ASSESSMENT

Results from the current biological water quality monitoring are summarised in Table 3.

Station	Location	Q Value & Status	SSRS
1	~ 35m u/s of discharge	Q3 - *Poor Status*	2.4 - *At Risk*
2	~ 35m d/s of	Q2-3 - *Poor Status*	1.6 - *At Risk*

Table 3 – Summary of Findings of the 2021 Biological Water Quality Assessment

STATION ONE

The River Black at Station 1 (upstream) was taken from a location where the depth of the water was approximately 30-30cm. The stream width is less than 2m here and the substrate consists of cobbles and small boulders which were fairly compacted with calcium deposits in some locations. The level of silt in the stream was moderately low and confined to the stream bed underneath the stones and cobbles. The flow on the day was moderately fast. The water was clear, there was no turbidity or evidence of excessive algal growth. The sample was taken from suitable riffle and glide type habitats.

The sample from station 1 (upstream of discharge) was dominated by Group C taxa (58.4%). Group C macro-invertebrates are tolerant of moderate levels of organic pollution. The freshwater shrimp *Gammarus duebeni* was numerous in the sample (29%), as was the mayfly *Baetis rhodani.* Diptern larvae from the Simuliidae family were common, whilst diptern larvae from the Chironomidae family were noted in fair numbers. Group A taxa (most sensitive to organic pollution) were absent and Group B taxa (less sensitive) were present in small numbers and represented by cased caddis larvae from the Limnephilidae family, who are generally slightly more tolerant of organic pollution than other cased caddis families. Group D taxa were present in the sample in fair numbers and they were represented by the water louse *Asellus aquaticus* and leeches. Group D taxa are tolerant of organic pollution. Based on the relative abundance of these indicator groups with the dominance of Group C taxa and the presence of Group D taxa in fair numbers, this station was assigned a Q3, i.e., poor status. Under the requirements of the EU Water Framework Directive, this is unsatisfactory.

The SSRS obtained at Station 1 was also low (2.4), putting it within the At Risk category. The reason for this low score was due to the absence of Ephemeroptera and Plecoptera and the relatively high numbers of GOLD taxa (Gastopods, Oligochaetes, Dipterns) and *Asellus*.

STATION TWO

The River Black at Station 2 (downstream) was taken from a location where the depth of the water was approximately 30-40cm. The sample was taken downstream of the confluence of the River Black with another stream that joins it from the west. The stream width is less than 2m here and the substrate consists of pebbles and cobbles. There was a moderately high level of silt, the water from the stream downstream of the treatment plant discharge pipe was coloured and highly turbid compared to the water coming from the stream from the west. There was also a notable amount of sewage fungus suspended in the water and on the stones.

Station 2 (downstream of the discharge) was also dominated by Group C taxa and they comprised over 69% of the total faunal assemblage. *Gammarus duebeni, Baetis rhodani* and Chironomidae larvae were the most common taxa in the sample. The most sensitive Group A taxa were absent from this sample, whilst Group B taxa were scarce and represented entirely by cased caddis from the Limnephilidae family. Group D taxa were common in the sample and they were mostly represented by the water louse *Asellus aquaticus* and leeches from the Glossiphoniidae family. Group E taxa, which are extremely tolerant of pollution, were common in the sample and represented by the genus Chironomus.

Overall, based on the relative abundance of these indicator groups and the overall proportions of Groups C, D and E, this station was assigned a Q2-3, i.e., poor status.

The SSRS obtained at this station was 1.6, which puts this station in the At Risk category.

5 DISCUSSION AND CONCLUSIONS

There has been no significant change in the ecological status of the River Black upstream of the discharge. It has maintained its Q3, which is the value it has received since the start of this monitoring programme. There has been a slight increase in the SSRS score, increasing from 0.8 to 2.6 which is the highest score since 2018. The river at this point remains within the At Risk category.

The downstream station is suffering from acute pollution arising from the discharge from the pipe. The discharge on the day was clearly visible in the water and the high levels of nutrients from this discharge has resulted in the growth of sewage fungus and the shift in fauna towards more tolerant species, e.g, in 2020 no Group E taxa were recorded here, now they comprise over 17% of the assemblage. Group D taxa have also increased from 1.8% in 2020 to 11% in 2021. The SSRS of the river at this point has remained consistent at 1.6 for the 4th year in a row.

6 APPENDIX I- RESULTS OF RIVER BLACK MONITORING

Station One (Upstream) – Q Value

Indicator Group	Taxon	Number	Abundance
Group A	**Absent**	**0**	**0**
(Very sensitive)			
Group B		**11**	**4.6**
(Moderately sensitive)	**Cased Trichoptera**		
	Limnephilidae	11	4.6
Group C		**139**	**58.4**
(Moderately tolerant)	**Ephemeroptera**		
	Baetis rhodani	76	31.9
	Amphipoda		
	Gammarus duebeni	70	29.4
	Diptera		
	Chironomidae	16	6.7
	Simuliidae	41	17.2
	Caseless Trichoptera		
	Rhyacophilidae	1	0.42
	Psychomyiidae	3	1.2
	Coleoptera		
	Elminthidae	1	0.4
	Gastropoda		
	Lymnaea	1	0.4
Group D		**17**	**7.1**
(Very tolerant)	**Isopoda**		
	Asellus aquaticus	14	5.8
	Hirudinae		
	Helobdella stagnalis	1	0.4
	Erpobdellidae	2	0.8
Group E	**Absent**	**0**	**0**
(Most tolerant)			
Not Assigned		**1**	**0.4**
	Oligochaeta		
	Lumbriculidae	1	0.4
Total Abundance		**238**	
Q Value	**Q3 – Poor Status**		

Results from the Biological Water Quality Monitoring of Station One (Upstream of Discharge)

Station Two (Downstream) – Q Value

Indicator Group	Taxon	Number	Abundance
Group A	**Absent**	**0**	**0**
(Very sensitive)			
Group B		**3**	**1.7**
(Moderately sensitive)	**Cased Trichoptera**		
	Limnephilidae	3	1.7
Group C		**121**	**69**
(Moderately tolerant)	**Ephemeroptera**		
	Baetis rhodani	40	22.9
	Amphipoda		
	Gammarus duebeni	40	22.9
	Diptera		
	Chironomidae	37	21.2
	Simuliidae	2	1.1
	Dicranota	2	1.1
Group D		**20**	**11.4**
(Very tolerant)	**Isopoda**		
	Asellus aquaticus	15	8.6
	Hirudinea		
	Erpobdellidae	2	1.1
	Helobdella stagnalis	2	1.1
	Glossiphoniidae	1	0.57
Group E		**30**	**17.24**
(Most tolerant)	**Diptera**		
	Chironomidae	30	17.24
Not Assigned		**0**	**0**
	Oligochaeta		
	Lumbriculidae	Excessive (not counted)	
Total Abundance		**174**	
Q Value	**Q2-3 Poor Status**		

Results from the Biological Water Quality Monitoring of Station Two (Downstream of Discharge)

Indicator Group	Taxon	No of Taxa	Total Relative Abundance *2	Score
Group 1	**Ephemeroptera**	0	0	0
Group 2	**Plecoptera**	0	0	0
Group 3	**Trichoptera**	3	4	4
Group 4	**G Ol D**	4	7	0
Group 5	*Asellus aquaticus*		Few	2
Total Index Score (TIS)				6
Average Index Score (AIS = TIS/5)				1.2
SSR Score (AIS x 2)				2.4
SSRS Category				*At Risk*

SSRS (Upstream)

Indicator Group	Taxon	No of Taxa	Total Relative Abundance *2	Score
Group 1	**Ephemeroptera**	0	0	0
Group 2	**Plecoptera**	0	0	0
Group 3	**Trichoptera**	1	1	2
Group 4	**G Ol D**	5	13	0
Group 5	*Asellus aquaticus*		Few	2
Total Index Score (TIS)				4
Average Index Score (AIS = TIS/5)				0.8
SSR Score (AIS x 2)				1.6
SSRS Category				*At Risk*

SSRS (Downstream)