Annual Environmental Report





Kilmacreannan

D0513-01

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7.1 SMALL STREAM RISK SCORE ASSESSMENT

1 EXECUTIVE SUMMARY AND INTRODUCTION TO THE 2019 AER

This Annual Environmental Report has been prepared for D0513-01, Kilmacreannan, in Donegal 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 was no major capital or operational changes undertaken in 2019.

1.2 TREATMENT SUMMARY

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

• Kilmacrennan WWTP with a Plant Capacity PE of 500, the treatment type is 2 - Secondary treatment

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
TPEFF0600D0513SW001	Kilmacrennan 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 Suspended Solids mg/l

1.4 LICENCE SPECIFIC REPORTING INCLUDED IN AER

Assessment / Report	Included in AER
Small Stream Risk Score Assessment	Yes

2 TREATMENT PLANT PERFORMANCE AND IMPACT SUMMARY

2.1 KILMACRENNAN WWTP - TREATED DISCHARGE

2.1.1 INFLUENT MONITORING SUMMARY - KILMACRENNAN 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
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	6	232	97.83
COD-Cr mg/l	6	582	231.17
Suspended Solids mg/l	6	268	96.33
Hydraulic Capacity	N/A	789.6	392.04

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 - TPEFF0600D0513SW001

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 with Condition 2 Interpretation included	Annual Mean	Overall Compliance (Pass/Fail)
COD-Cr mg/l	125	250	N/A	6	1	N/A	90.5	Pass
BOD, 5 days with Inhibition (Carbonaceous BOD) mg/l	10	20	N/A	6	5	3	30.33	Fail
Suspended Solids mg/l	10	25	N/A	6	6	2	41.17	Fail
pH pH units	9	9	N/A	6	N/A	N/A	7.32	Pass
Ammonia-Total (as N) mg/l	1	1.2	N/A	6	6	6	13.42	Fail
ortho-Phosphate (as P) - unspecified mg/l	0.5	0.6	N/A	6	6	6	1.23	Fail
Conductivity 20 C μS/cm	N/A	N/A	N/A	6	N/A	N/A	472.83	

Notes:

1 - This represents the Emission Limit Values after the Interpretation provided for under Condition 2 of the licence is applied

Cause of Exceedance(s):

See section 3.2

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 TPEFF0600D0513SW001

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 Status
Downstream	214159, 420482	RS39L020280	No	No	Yes	No	Good

The table below provides a summary of monitoring results for designated ambient monitoring points. The upstream and downstream annual mean values are shown (mg/l), and the difference between both monitoring stations is given as a percentage of the Environmental Quality Standard (EQS) where relevant.

Parameter Name	Upstream Monitoring Point Location	Upstream Monitoring Point Annual Mean	Downstream Monitoring Point Location	Downstream Monitoring Point Annual Mean	EQS	% of EQS
BOD - 5 days (Total) mg/l	RS39L020270	1.5	RS39L020280	1.5	1.5	100
Ammonia-Total (as N) mg/l	RS39L020270	0.035	RS39L020280	0.054	0.065	83.0
ortho-Phosphate (as P) - unspecified mg/l	RS39L020270	0.018	RS39L020280	0.055	0.035	157
pH pH units	RS39L020270	7.26	RS39L020280	7.24		

Parameter Name	Upstream Monitoring Point Location	Upstream Monitoring Point Annual Mean	Downstream Monitoring Point Location	Downstream Monitoring Point Annual Mean	EQS	% of EQS
Temperature °C	RS39L020270	9.38	RS39L020280	9.44		
Orthophosphate (MRP) filtered (As P) mg/l	RS39L020270	0.025	RS39L020280	0.037		
Dissolved Oxygen % Saturation	RS39L020270	98.8	RS39L020280	95.08		
Suspended Solids mg/l	RS39L020270	7.4	RS39L020280	7.8		
Conductivity 20 C µS/cm	RS39L020270	157.74	RS39L020280	162.14		

Significance of Results:

The WWTP discharge was not compliant with the ELV's set in the wastewater discharge licence.

The ambient monitoring results does not meet the required EQS. 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 Orthophosphate, 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 - KILMACRENNAN WWTP

2.1.4.1 Treatment Efficiency Report - Kilmacrennan 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
SS	6527	2789	57
ТР	N/A	N/A	N/A
cBOD	6629	2055	69
COD	15663	6132	61

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

2.1.4.2 Treatment Capacity Report Summary - Kilmacrennan 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.

Kilmacrennan WWTP	
Peak Hydraulic Capacity (m³/day) - As Constructed	330
DWF to the Treatment Plant (m³/day)	110
Current Hydraulic Loading - annual max (m³/day)	789.6
Average Hydraulic loading to the Treatment Plant (m ³ /day)	392.04
Organic Capacity (PE) - As Constructed	500
Organic Capacity (PE) - Collected Load (peak week) ^{Note1}	825
Organic Capacity (PE) - Remaining	0

Yes

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 - KILMACRENNAN 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 is included below.

Number of Complaints	Nature of Complaint	Number Open Complaints	Number Closed Complaints				
There were no relevant environmental complaints in 2019.							

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	WWTP upgrade required to meet ELV	1	Yes	No

3.2.2 SUMMARY OF OVERALL INCIDENTS

Question	Answer
Number of Incidents in 2019	1
Number of Incidents reported to the EPA via EDEN in 2019	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	Irish Grid Ref.	Included in Schedule A4 of the WWDL	Significance of the overflow(High / Medium / Low)	Assessed against DoEHLG Criteria	No. of times activated in 2019 (No. of events)	Total volume discharged in 2019 (m3)	Monitoring Status
SW002	214176, 420492	Yes	High	Not Meeting	Unknown	Unknown	Not Monitored

SWO Summary	
How much sewage was discharged via SWOs in the agglomeration in the year (m3)?	Unknown
Is each SWO identified as not meeting DoEHLG Guidance included in the Programme of Improvements?	Yes
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 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
D0513-SIP:01	Cessation or upgrade of storm water overflow (SW002) to comply with the criteria outlined in the DoECLG 'Procedures and Criteria in relation to Storm Water Overflows' (1995).	С	31/12/2019	No	At Planning Stage	31/12/2022	
D0513-SIP:03	Replacement of malfunctioning Rotating Biological Contactor	С	30/06/2014	Yes	Works Completed		
D0513-SIP:04	Upgrade of Kilmacrennan Waste Water Treatment Plant to provide tertiary treatment	С	31/12/2019	No	At Planning Stage	30/11/2022	
D0513-SIP:05	Upgrade of waste water collection network	С	31/12/2019	No	Work ongoing on- site	31/12/2022	

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
D0513-SIP:02	Infiltration programme - diversion of storm water from the collection network	С	31/12/2019	No	Not Started		The improvement programme will be reviewed by Irish Water to assess the works required to comply with the licence condition on a prioritised basis

A summary of the status of any improvements identified by under Condition 5.2 is included below.

4.2.2 IMPROVEMENT PROGRAMME SUMMARY

Improvement	Improvement Description / or any Operational	Improvement	Expected Completion	Comments
Identifier	Improvements	Source	Date	
There are no Improvem	nents Programme for this Agglomeration.			

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 Table.

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 list of the various reports required for this agglomeration and a brief summary of their recommendations.

5.a Licence Specific Reports Summary Table

Licence Specific Report	Required by licence	Year included in AER	Included in this AER	Reference to relevant section of AER
Priority Substances Assessment	Yes	2018	No	
Small Stream Risk Score Assessment	Yes	2019	Yes	5.2

5.1 PRIORITY SUBSTANCES ASSESSMENT

The Priority Substances Assessment Report has been included in the AER 2018

5.2 SMALL STREAM RISK SCORE ASSESSMENT

The Small Stream Risk Score Assessment Report is included in Appendix 7.1 - Small Stream Risk Score Assessment. A summary of the findings of this report is included below.

Parameter	Value
Does SSRS indicate discharges are posing a pollution risk?	Yes

Downstream SSRS Water Quality Risk	<6.5 Stream at Risk
SSRS Required?	Yes
Upstream SSRS Water Quality Risk	<6.5 Stream at Risk
What is Downstream SSRS?	0.8
What is Upstream SSRS?	2.4
Condition 5 Improvement Programme Reference	N/A
Does improvement programme include any procedural and/or infrastructal works?	N/A

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?	No
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	No
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: 07/07/2020

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 - Small Stream Risk Score Assessment

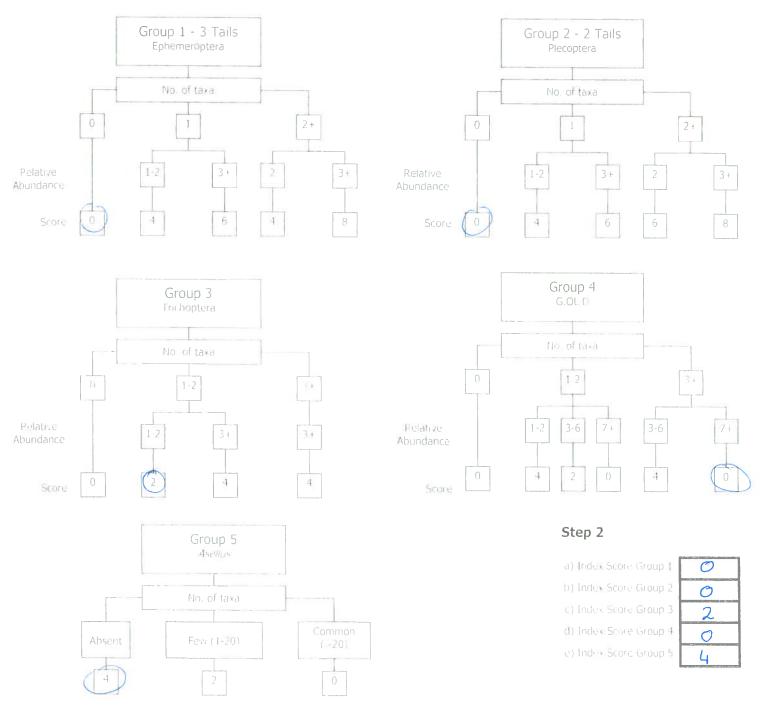
Station no.	maggie's Burn Milford		Grid (6 figure):
Station no. 19250	1388	Location: UpStream Stream Order:	Stream flow:
Field Ch	emistry	Modifications: Y(n)Canalised-wirdened bank ero	Ision Riffle/Glide
0% Ι\ριη ΟΟ	95.6	arterial drainage Dominant Types:	Slow flow
Temp (°C)	10.4	Bedrock	
Conductivity	271	Boulder (>128mm) Cobble (32-128mm)	
H	736	Gravel (8-32mm)	
Bank width (cm)	350	Fine Gravel (2-8mm)	
Vet width (cm)	250	- Sand (0.25-2mm) Silt (<0.25mm)	
vg Depth (cm)	70	Slope: Low (Hedium) High Very High	Arrest of the second
Staff gauge	10		Shading: High Moderate Low None
Velocity	Colour	Geology: Calcareous Siliceou -M x+d	
Torrential	None	Substratum Condition: Calcareous Compacted	Cattle access Y: upstream downstream o
Moderate	(Slight)	Loose - Normal Substratum:	
Slow	High	Stoney bottom Muddy bottom slud over stones	Photo: Y / N
Very slow		Degree of siltation: Clean Slight Moderate Hea	
Clarity	Discharge	Depth of mud: (Ione) - 1cm: 1-5cm - 5-10cm -	
Very clear	Flood	Litter: None Present Moderate Abundant	
Clear	Normal		Sources Fire Fire
Sightiy turbid	Low	Filamentous Algae: None Present Moderate Abundant	Sewage Fungus: None – Present – Moderate – Abundarit
Highly turbid	Very Low	Main land use u/s: Sample	Sampled in Minutes:
	Dry	Pasture Urhan retained	: Flond net x XIO
	Recent Flood	Bog Tillage (Y) N ' Forestry Other	Stork wash x ×10
			Weed stylep x
General Commen	its:		
The macroinvertebr	ates are divided int	Macroinvertebrate Composition	Relative Abundance
The macroinvertebr Group 1 = 1	ates are divided int Ephemeroptera (3-ti	o the following 5 specific groups: ails) – note that tails may be damaged during samp	Relative Abundance 1-5
The macroinvertebr Group 1 = 1	ates are divided int Ephemeroptera (3-ti Piecoptera (2-tails)	o the following 5 specific groups:	Relative Abundance
The macroinvertebr Group 1 = 1 Group 2 = 1 Group 3 = 1 Group 4 = 0	ates are divided int Ephemeroptera (3-ta Piecoptera (2-tails) Trichoptera G.OL D (Gastropoda	o the following 5 specific groups: ails) – note that tails may be damaged during samp	Pling 1-5 6-20 21-50 51-100
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The macroinvertebr Group 1 = 6 Group 2 = 7 Group 3 = 7 Group 4 = 0 Group 5 = 7 Calculate th	ates are divided int Ephemeroptera (3-t Piecoptera (2-tails) Trichoptera G.OL D (Gastropoda A <i>sallus</i>	o the following 5 specific groups: ails) – note that tails may be damaged during samp - note that tails may be damaged during sampling a Oligochaeta and Diptera) asa and relative abundance of each macroinvertebra	ate group below* (Abundance - Ab)
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The macroinvertebr Group 1 = E Group 2 = F Group 3 = C Group 4 = C Calculate th Ephemeroptera:	ates are divided int Ephemeroptera (3-t Plecoptera (2-tails) Trichoptera G.OL D (Gastropoda A <i>sellus</i> ne total number of h <i>F</i>	o the following 5 specific groups: ails) - note that tails may be damaged during sampling - note that tails may be damaged during sampling - note that tails may be damaged during sampling - note that tails may be damaged during sampling - note that tails may be damaged during sampling - note that tails may be damaged during sampling - note that tails may be damaged during sampling - note that tails may be damaged during sampling - note that tails may be damaged during sampling - note that tails may be damaged during sampling - note that tails may be damaged during sampling - note that tails may be damaged during sampling - note that tails may be damaged during sampling - Ridthat tails may be damaged during sampling - Ecdy onurus Ab - Plecoptera: - Rhithrogena Ab - Plecoptera: - Caenis Ab - Plecoptera - Other Ephem Ab - Plecoptera - Other Ephem Ab - Plecoptera - Other Ephem Ab - Other Ephem Ab - Other Ephem Ab - Other Ephem Ab	Abundance 1-5 6-20 21-50 51-100 101 + ate group belox. (Abundance - Ab) <i>Leuctra</i> Ab <i>Isoperla</i> Ab <i>Protonemura</i> Ab <i>Perla</i> Ab <i>Perla</i> Ab <i>Dinocras</i> Ab Other Plecop Ab Other Plecop Ab
The macroinvertebr Group 1 = E Group 2 = F Group 3 = C Group 4 = C Calculate th Ephemeroptera:	rates are divided int Ephemeroptera (3-t Plecoptera G.OL D (Gastropoda Asellus te total number of ta <i>E</i> E Xa C Total R Hydropsychi	o the following 5 specific groups: ails) – note that tails may be damaged during sampling - note that tails may be damaged during sampling - Oligochaeta and Dipteral axa and relative abundance of each macroinvertebra <i>Ecdy onurus</i> Ab <i>Ecdy onurus</i> Ab <i>Rhithrogena</i> Ab <i>Heptagenia</i> Ab <i>Caenis</i> Ab	Abundance 1-5 6-20 21-50 51-100 101+ Leuctra Ab Isoperia Ab Protonemura Ab Amphinemura Ab Peria Ab Dinocras Ab Other Piecop Ab Other Piecop Ab Other Piecop Ab Other Piecop Ab Chironomidae (D) Ab Simulidae (D) Ab 3 Few/Low
Group 1 = F Group 2 = F Group 3 = 7 Group 4 = 0 Group 5 = 7 Calculate th	ates are divided int Ephemeroptera (3-ta Plecoptera (2-tals) Trichoptera G.OL D (Gastropod a Ase//us ne total number of b total number of b Ej xa o total R Hydropsychi Polycentropodi <i>Rhy acop</i> Philopotami	o the following 5 specific groups: ails) – note that tails may be damaged during sampling - note that tails may be damaged during sampling a Oligochaeta and Dipteral a cand relative abundance of each macroinvertebra <i>Ecdy onurus</i> Ab <i>Ecdy onurus</i> Ab <i>Rhithrogena</i> Ab <i>Heptagenia</i> Ab <i>Caenis</i> Ab	Ding Abundance 1.5 6.20 21-50 51-100 101 + ate group below (Abundance - Ab) <i>Leuctra</i> Ab <i>Isoperia</i> Ab <i>Protonemura</i> Ab <i>Protonemura</i> Ab <i>Peria</i> Ab <i>Dinocras</i> Ab Other Piecop Ab Chironomidae (D) Ab Simulidae (D) Ab Common/
The macroinvertebr Group 1 = E Group 2 = F Group 3 = C Group 4 = C Calculate th Ephemeroptera:	ates are divided int Ephemeroptera (3-t Plecoptera (2-tails) Trichoptera G.OL D (Gastropoda Ase//us total number of la total number of la Ej xa ST Total R Hydropsychir Polycentropodi <i>Rh</i>) acop Philopotami Limnephili	o the following 5 specific groups: ails) – note that tails may be damaged during sampling - note that tails may be damaged during sampling - Oligochaeta and Dipteral - Oligochaeta and Dipteral - Asa and relative abundance of each macromvertebra - Ecdy onurus Ab - Ecdy onurus Ab - Rhithrogena Ab - Heptagenia Ab - Ephemeralia Ab - Caenis Ab - Other Ephem Ab - elative Abundance - Other Ephem Ab - elative Abundance - Other Ephem Ab - elative Abundance - Other Ephem Ab - Potamopy rgus (G) Ab - Ab	Pling Relative Abundance 1-5 6-20 21-50 51-100 101 + 101 + ate group below (Abundance - Ab) Leuctra Ab Loger/a Ab Protonemura Ab Aniphinemura Ab Per/a Ab Dinocras Ab Other Plecop Ab Other Plecop Ab Other Plecop Ab Chironomidae (D) Ab Absent Simulidae (D) Ab Absent Simulidae (D) Ab Common, Dicranota (D) Ab Numerous
The macroinvertebr Group 1 = E Group 2 = F Group 3 = C Group 4 = C Calculate th Ephemeroptera:	rates are divided int Ephemeroptera (3-t Piecoptera (2-tails)) Trichoptera G.OL D (Gastropoda Aseilus ne total number of b total number of b <i>t</i> <i>t</i> <i>t</i> <i>t</i> <i>t</i> <i>t</i> <i>t</i> <i>t</i> <i>t</i> <i>t</i>	o the following 5 specific groups: ails) – note that tails may be damaged during sampling - note that tails may be damaged during sampling - Oligochaeta and Diptera) aka and relative abundance of each macromvertebra Ecdy onurus Ab Rhithrogena Ab Heptagenia Ab Caenis Ab Caenis Ab Other Ephem Ab elative Abundance dae Ab G.OL.D: Ly minaea (G) Ab planorbis (G) Ab Ab Caenis (G) Ab Ab Caenis (G) Ab Ab Caenis (G) Ab Ab Caenis (G) Ab Ab Caenis (G) Ab Caenis (C) Ab	Dling Abundance 1-5 6-20 21-50 51-100 101+ ate group below (Abundance – Ab) <i>Lauctra</i> Ab <i>Isoperla</i> Ab <i>Protonemura</i> Ab <i>Protonemura</i> Ab <i>Perla</i> Ab <i>Dinocras</i> Ab Other Plecop Ab Other Plecop Ab Other Plecop Ab Other Plecop Ab Other Plecop Ab Chironomidae (D) Ab <i>Simuliidae</i> (D) Ab <i>Simuliidae</i> (D) Ab <i>Simuliidae</i> (D) Ab <i>Simuliidae</i> (D) Ab <i>Ceratopogonidae</i> (D) Ab
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The macroinvertebr Group 1 = E Group 2 = F Group 3 = C Group 4 = C Calculate th Ephemeroptera:	rates are divided int Ephemeroptera (3-t Piecoptera (2-tails)) Trichoptera G.OL D (Gastropoda Aseilus ne total number of b total number of b <i>t</i> <i>t</i> <i>t</i> <i>t</i> <i>t</i> <i>t</i> <i>t</i> <i>t</i> <i>t</i> <i>t</i>	o the following 5 specific groups: ails) – note that tails may be damaged during sampling - note that tails may be damaged during sampling - Oligochaeta and Diptera) axa and relative abundance of each macromvertebra Ecdy onurus Ab Rhithrogena Ab Heptagenia Ab Ephemerella Ab Caenis Ab Plecoptera: Noter Ephem Ab elative Abundance dae Ab G.OL.D: Lymnaea (G) Ab dae Ab	Abundance 1.5 6.20 21-50 51-100 101 + ate group below (Abundance - Ab) <i>Leuctra</i> Ab <i>Isoperia</i> Ab <i>Protonemura</i> Ab <i>Protonemura</i> Ab <i>Protonemura</i> Ab <i>Peria</i> Ab <i>Dinocras</i> Ab Other Plecop Ab Other Plecop Ab Other Plecop Ab Chironomidae (D) Ab <i>Simulidae</i> (D) Ab

NOTE *Baetis* is an Ephemeropteran and is the most commonly occurring invertebrate genus in streams in Ireland. It is vital that *Baetis* is not counted in SSRS. See Appendix B for more details on how to identify *Baetis*.

100

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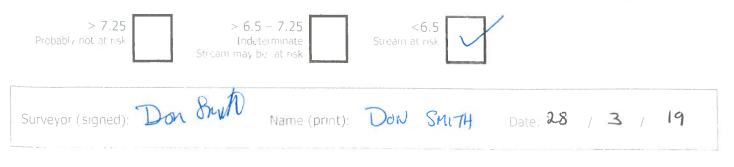
[2]]U 征 **Step 1.** Calculate the Index Score by circling the appropriate box representing the total number of taxa and the total abundance calculated from *each macroinvertebrate group* calculated from page 1 of the recording sheet and enter in to the boxes in Step 2.



Step 3. Calculate the Total Index Score, the Average Index Score and the SSR Score using the boxes below



Step 4. Assess the stream by comparing the final SSR score with the categories below and tick the appropriate box



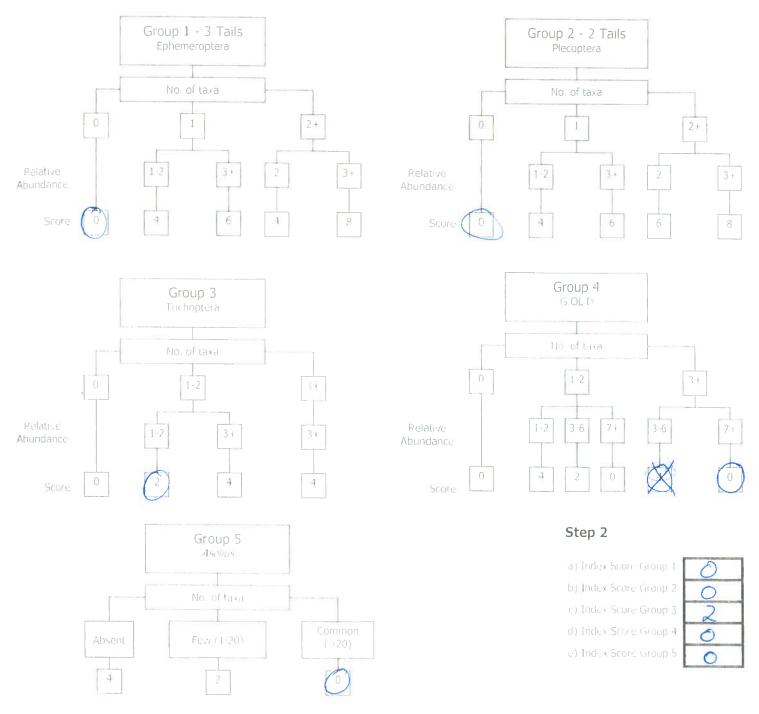
River: D/S Maggie's Burn Station no. 19250@ 1389 Field Chemistry		Code: Date: 28 3 19 Location: Down Stream Stream Order: Modifications: Y/N canalised Aldened bank erosion		Time: 12.15. Grid (6 figure): Stream flow: Riffie	
00 mg/l	021110	Dominant Types:		Pour nom	
emp (°C)	11°C	Bedrock			
Conductivity		Boulder (>128mm) Cobble (32-128mm)			
H	305	Gravel (8-32mm)		Anna an an anna an an an an an an an an a	
Bank width (cm)	7	Fine Gravel (2-8nim)			
	180	Sand (0.25-2mm)			
Vet width (cm)	120	(ilt)-0.25mm)			
Vg Depth (cm)	80	Slope: Low Mediur		Shading: High - Móderat	lov None
itaff gauge Velocity	Colour	Geology: Calcareous	Siliceou -Mix+d	Shaang, isgin - Joacha	
Torrential	None	Substratum Condit	ion: Calcareous-Compacted	Cattle access Y upstream	downstream o
Fast	Slight	Loose - Normal			
Hoderat	Moderate	Substratum:	y bottom Hud over stones		
Very slow	, High			Photo: Y (N)	
Very slow Clarity	Discharge	-	: Clean Slight-Moderate Heavy		
Very clear	Flood	Depth of mud: Non	e = 1cm (1-5cm) 5-10cm = 10 m		
Clear	Normal	Litter: None - Prese	nt (Inderate) Abundant		
Clabil to Du	Lot	Filamentous Algae		Sewage Fringus:	
Sighti, turby		None = Present = Mo		None - (resent) - Moderate	Abundant
Highly turbid	+ Very Low	Main_land use u/s:	Sample Urban retained:	Sampled in Minutes: Pond net x	
	Dry Recent Flood	Bog	Tillage SN	Stone wash x	
		Forestry	Othen	DUHE VADILA	
				Weed sweep x	
General Commen	its:	Magazinyortah	ato Composition		Polativa
General Commen The macroinverteb Group 1 = 1	rates are divided int	to the following 5 specifi	ate Composition c groups: ay be damaged during sampling		Relative Abundance
The macroinverteb Group 1 = Group 2 =	rates are divided int Ephemeroptera (3-t Plecoptera (2-tails)	to the following 5 specifically) = note that tails ma			Abundance 1-5 6-20
The macroinverteb Group 1 = Group 2 = Group 3	rates are divided int Ephemeroptera (3-t Plecoptera (2-tails) Trichoptera	to the following 5 specifi ails) – note that tails ma - note that tails may be	c groups: ay be damaged during sampling damaged during sampling		Abundance 1-5 6-20 21-50
The macroinverteb Group 1 = Group 2 = Group 3 Group 4 Group 5 =	rates are divided int Ephemeroptera (3-t Plecoptera (2-tails) Trichoptera G. OL.D. (Gastropock <i>Asellus</i>	to the following 5 specifi ails) – note that tails ma - note that tails may be s. Oligochaeta and Dipte	c groups: ay be damaged during sampling damaged during sampling ra)		Abundance 1-5 6-20 21-50 51-100 101+
The macroinverteb Group 1 = Group 2 = Group 3 Group 4 Group 5 =	rates are divided int Ephemeroptera (3-t Plecoptera (2-tails) Trichoptera G. OL.D. (Gastropock <i>Asellus</i>	to the following 5 specifi ails) – note that tails ma - note that tails may be s. Oligochaeta and Dipte	c groups: ay be damaged during sampling damaged during sampling	oup beloas (Abundance - Ap)	Abundance 1-5 6-20 21-50 51-100 101+
The macroinvertebi Group 1 = Group 2 = Group 3 Group 4 Group 5 Calculate th	rates are divided int Ephemeroptera (3-t Plecoptera (2-tails) Trichoptera G OL.D (Gastropode <i>Asellus</i>	to the following 5 specifi ails) – note that tails ma - note that tails may be - Oligochaeta and Dipte aka and relative abunda	c groups: ay be damaged during sampling damaged during sampling ra) nce of each macroin/ertebrate gro	bup belo∴* (Abundance – Ap)	Abundance 1-5 6-20 21-50 51-100 101+
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The macroinvertebi Group 1 = Group 2 = Group 3 Group 4 Group 5 Calculate th	rates are divided int Ephemeroptera (3-t Plecoptera (2-tails) Trichoptera G OL.D (Gastropode <i>Asellus</i>	to the following 5 specifi ails) – note that tails ma - note that tails may be - Oligochaeta and Dipte aka and relative abunda - Ecdyonurus Ab - Rhithrogena Ab - Haptagenia Ab	c groups: ay be damaged during sampling damaged during sampling ra) nce of each macroin/ertebrate gro	Pro	Abundance 1-5 6-20 21-50 51-100 101+ Leuctra Ab Isoperla Ab
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The macroinvertebi Group 1 = Group 2 = Group 3 Group 4 Group 5 Calculate th	rates are divided int Ephemeroptera (3-t Plecoptera (2-tails) Trichoptera G OL.D (Gastropode <i>Asellus</i> ne total number of t	to the following 5 specifi rails) – note that tails may be - note that tails may be - Oligochaeta and Dipte area and relative abunda - Ecdyonurus Ab - Rhithrogena Ab - Heptagenia Ab - Ephemerella Ab - Caenis Ab	c groups: ay be damaged during sampling damaged during sampling ra) nce of each macroin/ertebrate gro	Pro	Abundance 1-5 6-20 21-50 51-100 101+ Leuctra Ab Isoperla Ab tonemura Ab ph.nemura Ab Perla Ab
The macroinverteb Group 1 = Group 2 = Group 3 Group 4 Group 5 Calculate th	rates are divided int Ephemeroptera (3-t Plecoptera (2-tails) Trichoptera G OL.D (Gastropock Asellus ne total number of t	to the following 5 specifi ails) - note that tails may be - note that tails may be - Oligochaeta and Dipte axa and relative abunda - Ecdyonurus Ab - Rhithroğena Ab - Haptagenia Ab - Caenis Ab - Paraleptophlebia Ab	c groups: ay be damaged during sampling damaged during sampling ra) nce of each macroin/ertebrate gro	Pro 1715	Abundance 1-5 6-20 21-50 51-100 101+ Leuctra Ab Isoperla Ab Isoperla Ab oh.nemura Ab Perla Ab Dinocras Ab
The macroinverteb Group 1 = Group 2 = Group 3 Group 4 Group 5 Calculate th	rates are divided int Ephemeroptera (3-t Plecoptera (2-tails) Trichoptera G OL.D (Gastropock Asellus ne total number of t	to the following 5 specifi ails) - note that tails may be - note that tails may be s. Oligochaeta and Dipte aica and relative abunda - Ecdyonyrus Ab - Rhithrogena Ab - Haptagenia Ab - Caenis Ab - Paraleptophlebia Ab - Sphemera danica Ab	c groups: ay be damaged during sampling damaged during sampling ra) nce of each macroin/ertebrate gro	Pro 471f	Abundance 1-5 6-20 21-50 51-100 101+ Leuctra Ab Isoperla Ab tonentura Ab ohnemtura Ab Perla Ab Denocras Ab her Piecop Ab
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The macroinvertebi Group 1 = Group 2 = Group 3 Group 4 Calculate th Ephemeroptera:	rates are divided int Ephemeroptera (3-t Plecoptera (2-tails) Tinchoptera G OL.D (Gastropock Asallus ne total number of t E xa O Total R Hydropsychi Polycentropodi	to the following 5 specifi ails) - note that tails may be - note that tails may be s. Oligochaeta and Dipte area and relative abunda <i>Ecdyonurus</i> Ab <i>Rhithrogena</i> Ab <i>Haptagenia</i> Ab <i>Caenis</i> Ab <i>Caenis</i> Ab <i>Caenis</i> Ab Other Ephem Ab Other Ephem Ab Relative Abundance idae Ab GOLD	c groups: ay be damaged during sampling damaged during sampling ra) nce of each macroinvertebrate gro Plecoptera: Total no. of Taxa Ly mnaea (G) Ab Potamopy rgus (G) Ab	Pro 4mp Oth Oth Chironomidae (D) Ab Chironomidae (D) Ab	Abundance 1-5 6-20 21-50 51-100 101 + Leuctra Ab Isoperla Ab tonentura Ab Perla Ab Perla Ab Denocras Ab er Piecop Ab er Piecop Ab Abundance Asellus: Absent
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The macroinvertebi Group 1 = Group 2 = Group 3 Group 4 Calculate th Ephemeroptera:	rates are divided int Ephemeroptera (3-t Plecoptera (2-tails) Trichoptera G OL.D (Gastropock <i>Asallus</i> ne total number of t E xa Total R Hydropsychi Polycentropodi <i>Rhyacop</i> Philopotam	to the following 5 specificalls) – note that tails may be a chigochaeta and Dipte area and relative abunda <i>Ecdyonurus</i> Ab <i>Ecdyonurus</i> Ab <i>Heptagenia</i> Ab <i>Ephemerella</i> Ab <i>Caenis</i> Ab <i>Paraleptophlebia</i> Ab Other Ephem Ab Caenis Ab Caelative Abundance idae Ab G.OL.D : idae Ab <i>Caelative</i> Ab	c groups: ay be damaged during sampling damaged during sampling (a) ince of each macroinvertebrate gro Plecoptera: Total no. of Taxa Ly mnaea (G) Ab Planorbis (G) Ab Planorbis (G) Ab	Pro -177 Oth Oth Chironomidae (D) Ab Chironomidae (D) Ab Simuliidae (D) Ab Dicranota (D) Ab	Abundance 1-5 6-20 21-50 51-100 101 + Leuctra Ab Isoperla Ab tonentura Ab Perla Ab Perla Ab Denocras Ab er Piecop Ab er Piecop Ab Abundance Asellus: Absent
The macroinvertebi Group 1 = Group 2 = Group 3 Group 4 Calculate th Ephemeroptera:	rates are divided int Ephemeroptera (3-t Plecoptera (2-tails) Trichoptera G OL.D (Gastropode <i>Asollus</i> ne total number of t E xa Total R Hydropsychi Polycentropode <i>Rhyacop</i> Philopotam Limnephi	to the following 5 specificalls) - note that tails may be a chigochaeta and Dipte area and relative abunda <i>Ecdyonurus</i> Ab <i>Ecdyonurus</i> Ab <i>Heptagenia</i> Ab <i>Ephemerella</i> Ab <i>Caenis</i> Ab <i>Caenis</i> Ab <i>Caenis</i> Ab <i>Cher Ephemera danica</i> Ab <i>Cher Ephem</i> Ab <i>Cher Ephem Cher Ephem <i>Cher Ep</i></i>	c groups: ay be damaged during sampling damaged during sampling ra) nce of each macroinvertebrate gro Plecoptera:	Pro 4772 Oth Oth Total Relative Chironomidae (D) Ab Chironomus (D) Ab Simuliidae (D) Ab Dicranota (D) Ab Tipulidae (D) Ab	Abundance 1-5 6-20 21-50 51-100 101+ Leuctra Ab Isoperla Ab tonemura Ab ohnemura Ab Perla Ab Dinocras Ab her Piecop Ab Abundance Asellus: Absent Few/Low Common, Numerous
The macroinvertebi Group 1 = Group 2 = Group 3 Group 4 Calculate th Ephemeroptera:	rates are divided int Ephemeroptera (3-t Plecoptera (2-tails) Trichoptera G OL.D (Gastropock <i>Asallus</i> ne total number of t E xa Total R Hydropsychi Polycentropodi <i>Rhyacop</i> Philopotam	to the following 5 specificalls) - note that tails may be a child tails may be child tails tai	c groups: ay be damaged during sampling damaged during sampling ra) ince of each macroinvertebrate gro Plecoptera:	Pro -177 Oth Oth Chironomidae (D) Ab Chironomidae (D) Ab Simuliidae (D) Ab Dicranota (D) Ab	Abundance 1-5 6-20 21-50 51-100 101+ <i>Leuctra</i> Ab <i>Isoperla</i> Ab <i>tonemura</i> Ab <i>conemura</i> Ab <i>Perla</i> Ab <i>Dinocras</i> Ab her Piecop Ab Abundance Asellus: Absent Few/Low Common, Numerous NOTE: Asel
The macroinvertebi Group 1 = Group 2 = Group 3 Group 4 Calculate th Ephemeroptera:	rates are divided int Ephemeroptera (3-t Plecoptera (2-tails) Trichoptera G OL.D (Gastropode Ascilus ne total number of t E Xa O Total R Hydropsychi Polycentropode Rhyacop Philopotam Limnephil Sericostomat	to the following 5 specificalls) - note that tails may be a cligochaeta and Dipte area and relative abunda <i>Ecdyonurus</i> Ab <i>Ecdyonurus</i> Ab <i>Haptagania</i> Ab <i>Caenis</i> Ab <i>Caen</i>	c groups: ay be damaged during sampling damaged during sampling ra) nce of each macroinvertebrate gro Plecoptera:	Pro 4mp Oth Oth Chironomidae (D) Ab Chironomus (D) Ab Simuliidae (D) Ab Dicranota (D) Ab Tipulidae (D) Ab Ceratopogonidae (D) Ab	Abundance 1-5 6-20 21-50 51-100 101+ Leuctra Ab Isoperla Ab tonemura Ab Perla Ab Perla Ab Dinocras Ab her Piecop Ab Abundance Absent Few/Low Common/ Numerous NOTE: Asel must be
The macroinvertebi Group 1 = Group 2 = Group 3 Group 4 Calculate th Ephemeroptera:	rates are divided int Ephemeroptera (3-t Plecoptera (2-tails) Trichoptera G OL.D (Gastropode Ascilus ne total number of t E Xa O Total R Hydropsychi Polycentropode Rhyacop Philopotam Limnephil Sericostomat Giossosomat	to the following 5 specificals) - note that tails may be a cligochaeta and Dipte area and relative abunda <i>Ecdyonurus</i> Ab <i>Ecdyonurus</i> Ab <i>Heptagenia</i> Ab <i>Caenis</i> Ab <i>Caeni</i>	c groups: ay be damaged during sampling damaged during sampling ita) ince of each macroinvertebrate gro Plecoptera: Plecoptera: Total no, of Taxa Ly mnaea (G) Ab Potamopy rgus (G) Ab Pianorbis (G) Ab Physa (G) Ab Lumbriculus (OI) Ab Eiseniella (OI) Ab	Pro 4mp Oth Oth Chironomidae (D) Ab Chironomus (D) Ab Simuliidae (D) Ab Dicranota (D) Ab Tipulidae (D) Ab Ceratopogonidae (D) Ab	Abundance 1-5 6-20 21-50 51-100 101+ <i>Leuctra</i> Ab <i>Isoperla</i> Ab <i>tonemura</i> Ab <i>conemura</i> Ab <i>Perla</i> Ab <i>Dinocras</i> Ab her Piecop Ab Abundance Asellus: Absent Few/Low Common, Numerous NOTE: Asel
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Step 1. Calculate the Index Score by circling the appropriate box representing the total number of taxa and the total abundance calculated from *each macroinvertebrate group* calculated from page 1 of the recording sheet and enter in to the boxes in Step 2.



Step 3. Calculate the Total Index Score, the Average Index Score and the SSR Score using the boxes below



SSR Score (AIS:x 2) O·8

Step 4. Assess the stream by comparing the final SSR score with the categories below and tick the appropriate box

04

> 7.25 Prebably not at risk	> 6.5 – 7.25 Indeterminate Stream may bellatirisk	< 6.5 Stream at risk	
Surveyor (signed):	Name (print):	Date:	1