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## Ballyogan Landfill and Recycling Facility Monitoring Report: Biological Surface Water Quality Assessment 2022

Waste Licence Ref. No. W0015-01

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Prepared for: Dun Laoghaire Rathdown County Council



**Date:** December 2022

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## Ballyogan Landfill and Recycling Facility

### Monitoring Report: Biological Surface Water Quality Assessment

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**Abstract:** This report details the results of the annual biological assessment 2022 for surface waters at Ballyogan Landfill, Carrickmines, Dublin 18.

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## 1. INTRODUCTION

The Environmental Protection Agency (EPA) issued Dun-Laoghaire Rathdown County Council (DLRCC) with waste licence Reg. No. W0015-01 for its landfill at Ballyogan, Carrickmines, Dublin 18 in 2000.

DLRCC retained Fehily Timoney and Company (FT) to carry out environmental monitoring services at Ballyogan Landfill under the conditions and schedules of the waste licence. The results of the annual biological water quality assessment 2022 are presented and discussed herein.

The facility is situated in south Dublin, approximately 7 km west of Dun-Laoghaire. The surrounding area is characterised by a mixture of agricultural, recreational, residential, commercial and industrial land use. The site is approximately 50 hectares, 43 of which were previously used for landfilling. The remaining area consists of the site entrance and service roads, site compound, wetland and other services. The Ballyogan Recycling Park occupies a further 9 hectares.

Ballyogan Landfill is situated in the northern section of the Shanganagh River catchment. The Shanganagh system is a listed fishery of the Dublin Angling Initiative and supports populations of otter and kingfisher.

The landfill location is between the Ballyogan Stream to the north and Glenamuck Stream to the east, which are tributaries of the Carrickmines River. The Carrickmines River joins the Shanganagh River downstream of the N11 Motorway. The Ballyogan Stream has been culverted in twin 1350mm diameter concrete pipes as part of the landfill development. A tributary of the Ballyogan Stream flows along the western side of the landfill and a tributary of the Glenamuck Stream has been piped under the landfill in a 600mm diameter pipe.

Biological assessment of surface waters was carried out at seven watercourse sites in and around Ballyogan Landfill by FT staff on 31<sup>st</sup> August 2022. Unless otherwise specified, monitoring was carried out at the locations as agreed with the Agency and in Drawing LW1411102\_001-A in Appendix I.



## 2. BIOLOGICAL ASSESSMENT

### 2.1 Macroinvertebrate Survey

Biological monitoring of surface water quality was undertaken by means of a macroinvertebrate 'kick sampling' survey in accordance with Schedule D.5 of the waste licence (W0015-01) on 31<sup>st</sup> August 2022 at seven locations. These monitoring locations are detailed in Table 2.1 and are shown in the Drawing LW1411102\_001-A in Appendix I.

**Table 2-1: Biological Monitoring Locations**

Sample	Location
Site T1	On western tributary, a tributary of the Ballyogan Stream, west of landfill
Site T2	On eastern boundary stream, a tributary of the Glenamuck stream, east of landfill
Site 3	On Ballyogan Stream, west of landfill and upstream of ESB station
Site 4	On Ballyogan Stream, west of landfill and upstream of fence and pipe culvert
Site 4A	On Ballyogan Stream, 10m downstream of confluence with eastern tributary
Site 5	Downstream of landfill culvert on Ballyogan Stream
Site 6A	Lower end of landfill site along Ballyogan Stream

No flowing water and dense in stream vegetation at monitoring location T2 rendered conditions at this site less than optimal for SSRS or Q-rating assessment in 2022.

#### 2.1.1 SSRS Methodology

Biological water quality assessment, or macroinvertebrate sampling, was carried out by means of the Small Stream Risk Score (SSRS) methodology. SSRS is a biological risk assessment system for detecting potential sources of pollution in 1<sup>st</sup> and 2<sup>nd</sup> order streams. It was developed by the Environmental Protection Agency (EPA) in association with the Western River Basin District (WRBD) with the primary aim of supporting the programme of measures for the Water Framework Directive (WFD).

SSRS methodology was carried out according to the training manual developed by White Young Green (2009) *SSRS Training Manual – a Pollution Investigation Tool for Use in the Field*<sup>1</sup>. Samples were collected from the seven stream sites by means of a two-minute kick sample, collecting all macroinvertebrates in a 1 mm pond net attached to a metal frame. Stone washes and weed sweeps were also carried out where possible. Macroinvertebrates were identified on the bankside or collected and preserved for later identification. A field sheet was filled in for each site, and a risk score was calculated (see attached field sheets in Appendix II).

The SSRS method is a rapid field methodology for risk assessment that is based solely on macroinvertebrate indicators of water quality and their well-understood response to pollution.

<sup>1</sup> Small Streams Risk Score (SSRS) Training Manual – A Pollution Investigation Tool for Use in the Field – White Young Green, February 2009



The SSRS method is used for defining streams that are 'at risk'. The method produces a continuous score and threshold values are used to decide on the degree of risk at a site. It is possible to compare 'before' and 'after' scores, which may be useful in assessing the potential impact of a development<sup>2</sup>.

Results of the SSRS place water bodies in to one of three categories:

- At risk (Score = <6.5)
- Probably at risk (Score = 6.5-7.25)
- Probably not at risk (Score = >7.25)

In addition to the presence and abundance of macroinvertebrates, physico-chemical characteristics of the environment are also recorded during the assessment, these include:

- modifications to the channel,
- stream flow conditions,
- substratum conditions,
  
- degree of bankside shading,
- presence of filamentous algae,
- presence of sewage fungus,
- colour, velocity and clarity of the water
- water temperature, DO, conductivity and pH (where required).

### 2.1.2 Q-Value System

Macro-invertebrates were also identified to the level required for the EPA Q-Value rating system<sup>3</sup>. Based on the relative abundance of indicator species, a biotic index (Q-rating) was determined for each site in accordance with the biological assessment procedure used by the EPA<sup>3</sup>. Table 2.2 below, describes the quality status associated with each Q-Value.

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<sup>2</sup> Guidance on Application and Use of the SSRS in Enforcement of Urban Wastewater Discharge Authorisations in Ireland, Environmental Protection Agency, April 2015.

<sup>3</sup> In Toner *et al.*, 2005. Water Quality in Ireland 2001–2003. Environmental Protection Agency.



**Table 2-2: Q-Values and Associated Water Quality Status**

Biotic Index	Water Framework Directive Ecological Status	Quality Status
Q5	High	Unpolluted Waters
Q4-5	High	
Q4	Good	
Q3-4	Moderate	Slightly Polluted Waters
Q3	Poor	Moderately Polluted Waters
Q2-3	Poor	
Q2	Bad	Seriously Polluted Waters
Q1-2	Bad	
Q1	Bad	



## 3. RESULTS

### 3.1.1 [Site 3](#)

This site is located just northwest of the landfill, on Ballyogan Stream. The wet width was 1.6 m and the average depth was 15cm. The water was of moderate flow and clear. The streambed consisted of cobble, gravel and sand. There was leaf litter and low levels of siltation present. Shading was moderate. The land use in the surrounding environment is urban / residential. Construction works were ongoing at the Clay Farm residential development upstream. This location was given a risk score of 6.4 or 'at risk'. The presence of freshwater mayflies (Group 1), higher taxa numbers of group 3 invertebrates and reduced abundance of Group 4 taxa accounted for the higher score than the 2021 survey score of 5.4. This site is shown on Figure 3.5, and the accompanying field sheet is available in Appendix 2.

### 3.1.2 [Site 5](#)

The site is downstream of the landfill culvert on Ballyogan Stream. The wet width was 1.7 m and the water depth was 15cm. The water flow was low, and the water was clear. The substrate was cobble, gravel and sand. There was leaf litter and low levels of siltation present. Construction works were ongoing upstream at the Clay Farm residential development. The stream shading was moderate. This location was given a risk score of 4 or 'at risk'. The presence of 'few' Asellus species within the invertebrate numbers accounted for a reduced score to the 2021 survey score of 4.8. This site is shown on Figure 3.8, and the accompanying field sheet is available in Appendix 2.

### 3.1.3 [Site T1](#)

The site is located along a tributary stream on the western site perimeter just upstream of the confluence with the Ballyogan Stream. The streambed at this location consisted of bedrock, boulder, cobble, gravel and silt. Leaf litter was present and stream shading was high. The stream wet width was 0.8 m and the average depth was approximately 10 cm. Flow velocity was low and clear. This location was given a risk score of 4.8 or 'at risk'. The higher abundance of group 4 taxa accounted for the lower score than the score of 5.6 achieved in 2021. This site is shown on Figure 3.3, and the accompanying field sheet is available in Appendix 2.

### 3.1.4 [Site 4](#)

This site is located immediately northwest and upstream of the landfill, on Ballyogan Stream and downstream of Site 3. The bank wet width was 1.2m and the depth was 20cm. The water was clear and flow velocity was moderate. The main land use surrounding the site is urban. There was a low degree of shading at the site and the substrate was boulder, cobble, gravel and silt. Leaf litter was present. This location was given a risk score of 4.8 which is 'at risk'. The lower abundance of group 4 taxa accounted for the similar score to the 2021 result of 4.8. This site is shown on Figure 3.6, and the accompanying field sheet is available in Appendix 2.



### 3.1.5 [Site 4a](#)

This site is located onsite within the north-western portion of the landfill, on the Ballyogan Stream and downstream of Sites 3, 4 and T1. The wet width was 1.2 m and the average depth was 20 cm. The flow velocity was low, and the water was clear. The substrate was boulder, cobble, gravel and sand. The level of shading was moderate. This location was given a risk score of 5.6 or 'at risk'. The presence of freshwater mayflies, higher taxa numbers of group 3 invertebrates, lower numbers of group 4 taxa (GOLD) and absence of Asellus (Group 5) accounted for the similar score to the 2021 survey of 5.6. This site is shown on Figure 3.7, and the accompanying field sheet is available in Appendix 2.

### 3.1.6 [Site 6a](#)

This site is located northeast and downstream of the landfill, on the Ballyogan Stream. The stream wet width was 1.2 m and the average water depth was 20 cm. The stream substrate was boulder, cobble, gravel and sand. There was a moderate level of siltation and the depth of mud was 1-5 cm. Leaf litter was present and stream shading was moderate. This location was given a risk score of 5.6 or 'at risk'. The presence of a higher numbers of Trichoptera (Group 3) and lower GOLD (Group 3) species abundance accounted for the higher score than the 2021 survey result of 4. This site is shown on Figure 3.9, and the accompanying field sheet is available in Appendix 2.

### 3.1.7 [All Sites](#)

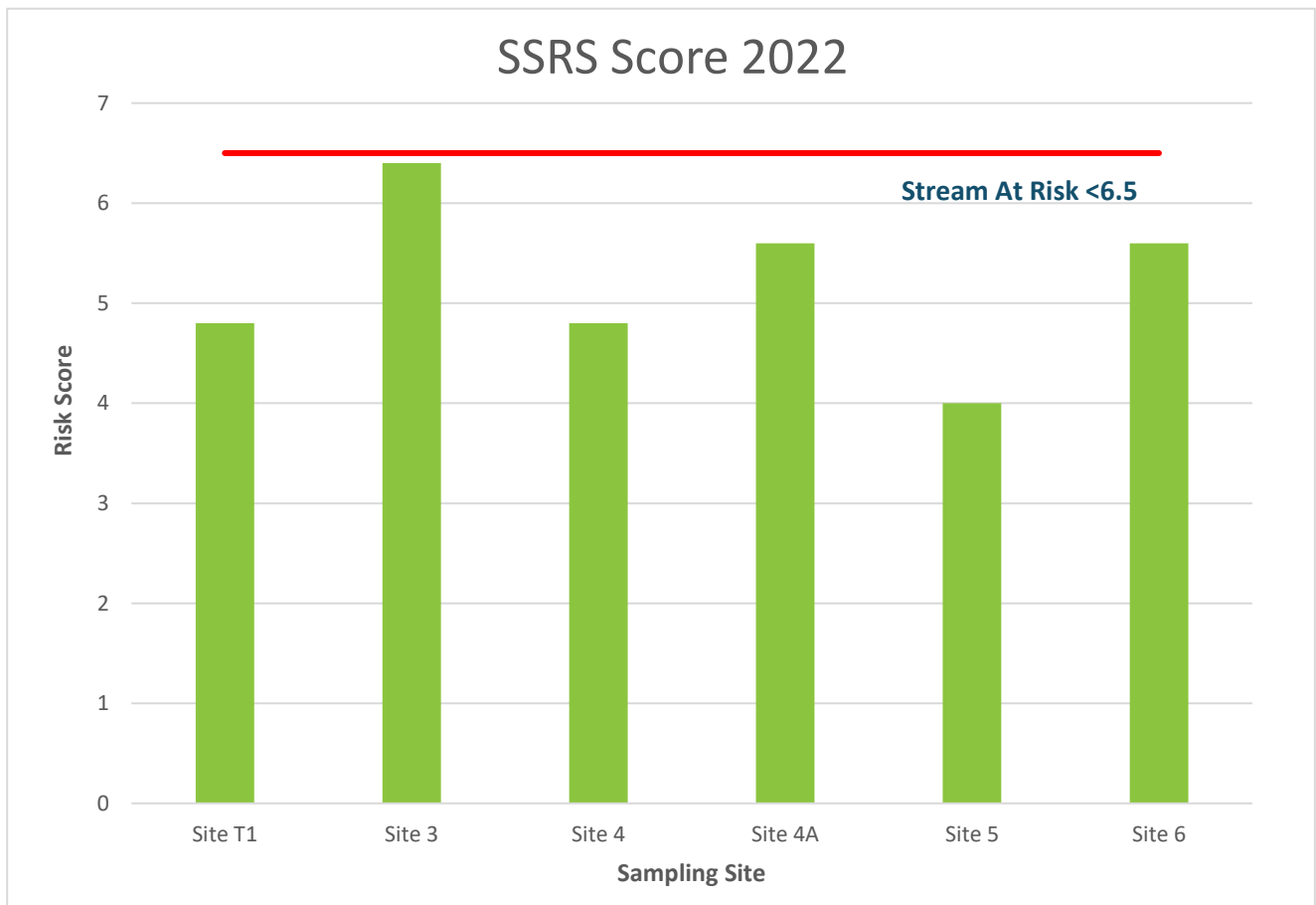
A summary of the scores for each site is available in Table 3.1 and in Figure 3.1 below. Table 3.2 and Figure 3.2 show the results for the 2021 and 2022 surveys. Tables 3.1 and 3.2 also include the equivalent Q-Value ratings, for comparability.



**Table 3-1: Summary of SSRS and Q-value Scores for the Sampling Sites at Ballyogan 2022**

Scores	Site T1 (Upstream)	Site 3 (Upstream)	Site 4 (Upstream)	Site 4A (Upstream)	Site 5 (Downstream)	Site 6a (Downstream)
SSRS Score	4.8	6.4	4.8	5.6	4	5.6
SSRS Score Category	<6.5 stream at risk	<6.5 stream at risk	<6.5 stream at risk	<6.5 stream at risk	<6.5 stream at risk	<6.5 stream at risk
Equivalent Q Value Rating	Q3-4	Q3-4	Q3	Q3-Q4	Q3	Q3-4
Q Score Category	Moderate status	Moderate status	Moderate status	Moderate status	Moderate status	Moderate status

ns – not sampled due to no flow at the monitoring site

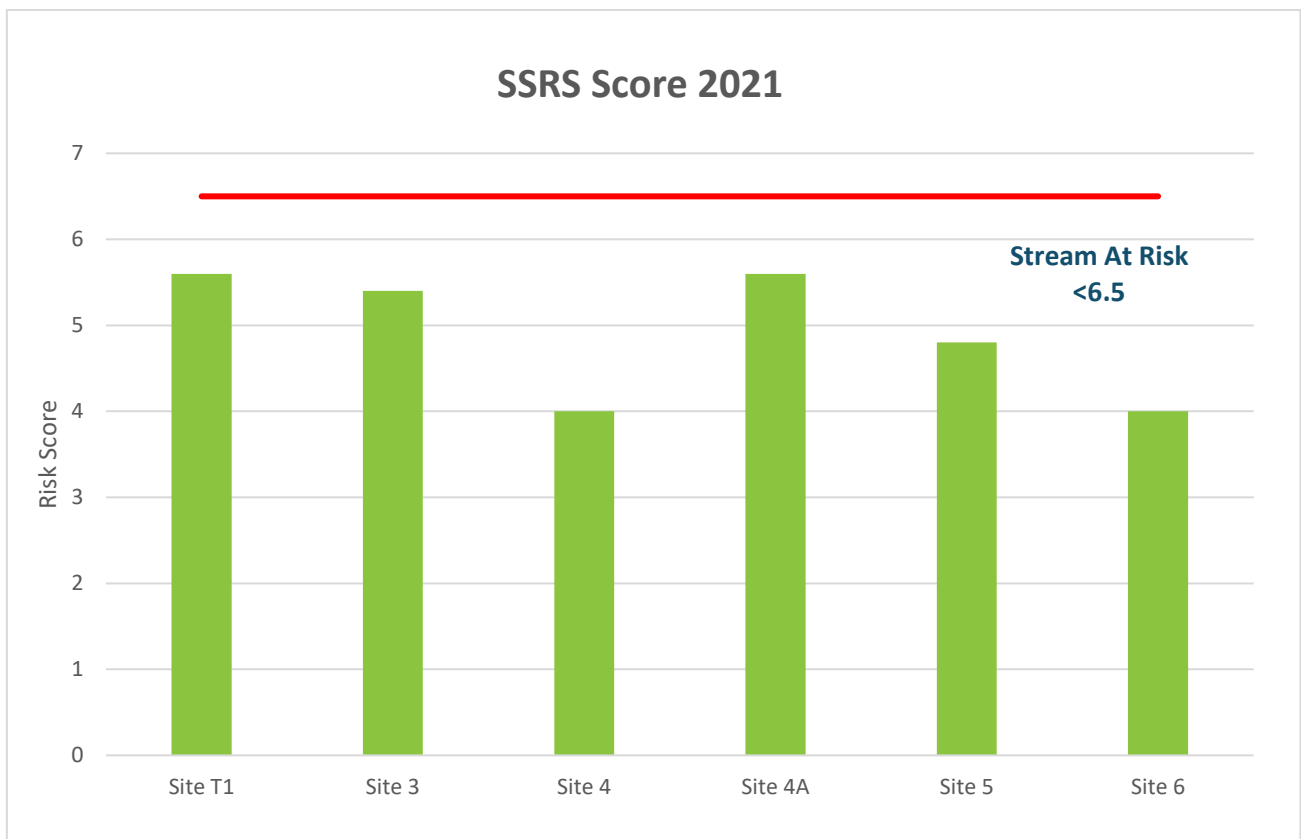


**Figure 3-1: Summary of SSRS Risk Scores for the Sampling Sites at Ballyogan in 2022**



**Table 3-2: Summary of SSRS and Q-Value Scores for the Sampling Sites at Ballyogan 2021**

Scores	Site T1 (Upstream)	Site 3 (Upstream)	Site 4 (Upstream)	Site 4A (Upstream)	Site 5 (Downstream)	Site 6 (Downstream)
SSRS Score	5.6	5.4	4	5.6	4.8	4
SSRS Category	<6.5 stream at risk	<6.5 stream at risk	<6.5 stream at risk	<6.5 stream at risk	<6.5 stream at risk	<6.5 stream at risk
Equivalent Value Rating	Q3-4	Q3-4	Q3	Q3-Q4	Q3	Q3-4
Q Score Category	Moderate status	Moderate status	Moderate status	Moderate status	Moderate status	Moderate status



**Figure 3-2: Summary of SSRS Risk Scores for the sampling sites at Ballyogan in 2021**

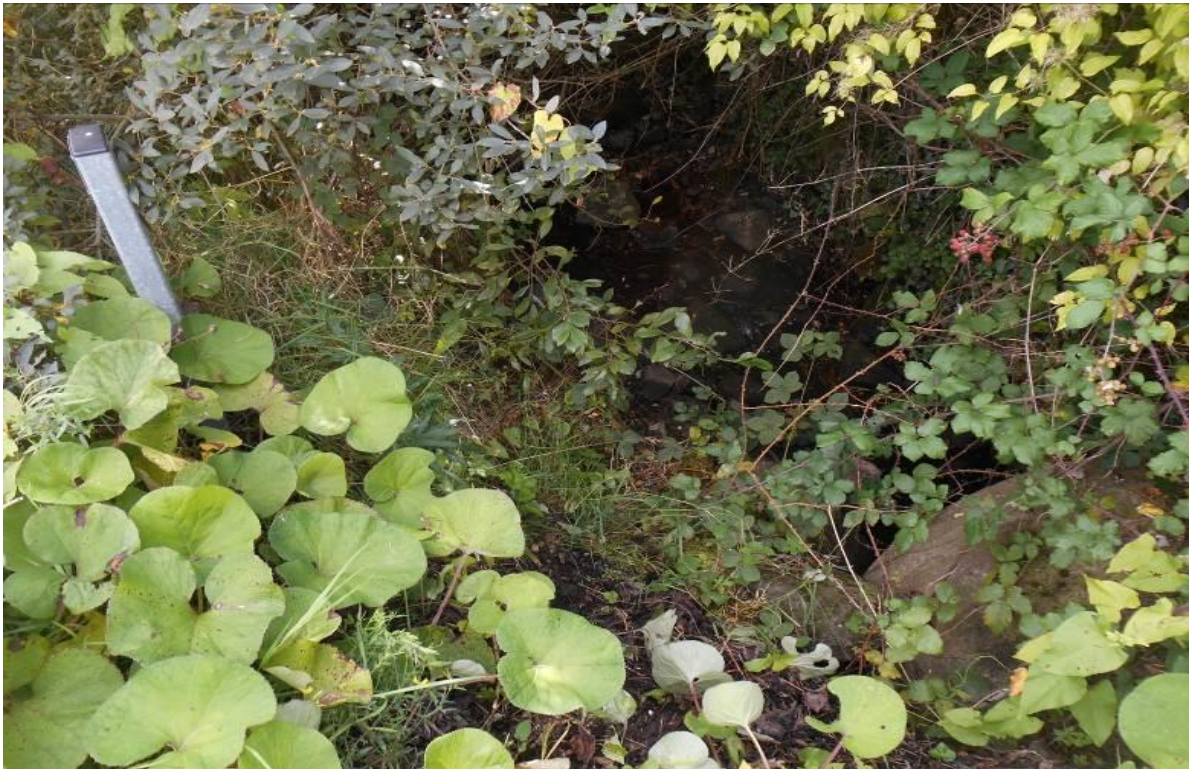


Figure 3-3: Site T1 Sampling Location Photo



Figure 3-4: Site T2 Sampling Location Photo



Figure 3-5: Site 3 Sampling Location Photo



Figure 3-6: Site 4 Sampling Location Photo



Figure 3-7: Site 4a Sampling Location Photo



Figure 3-8: Site 5 Sampling Location Photo



**Figure 3-9: Site 6a Sampling Location Photo**

### 3.1.8 Interpretation of Results

Previous surveys at these locations from 2007 to 2012 carried out biological monitoring by means of calculating EPA Q-Values or using the Q-Rating system. Q-Rating is generally more useful in larger rivers and less applicable to 1<sup>st</sup> and 2<sup>nd</sup> order streams and rivers such as Sites T1–6a surrounding Ballyogan Landfill.

The Q-Value for the 2014 – 2022 surveys were also calculated for the Ballyogan sites and are shown on Table 3.3. In previous surveys the Q-values calculated were mostly Q2-3, Q3 which are classed as ‘Poor status’ according to the Water Framework Directive (WFD) (see Table 3.3). The 2018 to 2021 scores also indicated that all sites achieved ‘moderate status’ attaining scores of between Q3 and Q3-4. The presence of Group 1 species at all six sites (Site T1, Site 3, Site 4, Site 4A and Site 6A) indicate an improvement in water quality at these locations, which is reflected in the higher SSRS scores achieved in the 2022 survey compared to previous years.

The SSRS scores calculated in the current 2022 survey show sites T1–6a are all ‘at risk’. The 2022 results are similar to 2021 survey results and indicate improved quality at all sites compared to 2016, 2019 and 2020 results. None of the sites have moderate or good water quality that would be indicative of the ‘not at risk’ category in SSRS or Q4 ‘good status’ in Q-Value sampling. Thus, both methodologies of biological sampling have revealed poor - moderate water quality at all stream sites sampled in the vicinity of Ballyogan.



**Table 3-3: Biological Water Quality Results from 2007 – 2022 at Ballyogan Landfill**

Sampling Period	Site T1	Site T2	Site 3	Site 4	Site 4a	Site 5	Site 6a
2007 Q-value	3	3	3	3	3	3	3
2008 Q-value	3	3	3	3	3	3	3
2009 Q-value	3	2-3	3	3	3	3*	3
2010 Q-value	3-4	2-3	3	3	3	3	3
2011 Q-value	3-4	2-3	3	3	3	3-4	3-4
2012 Q-value	3	3	3	3	3	3	3
2014 SSR Score & (Q-value)	4 (2-3)	0.8 (2-3)	8 (3)	6.4 (2-3)	4.8 (2-3)	5.6 (2-3)	1.6 (2-3)
2015 SSR Score & (Q-value)	4 (2-3)	0.8 (2-3)	3.2 (3)	4 (2-3)	2.4 (3)	4.8 (2-3)	3.2 (2-3)
2016 SSR Score & (Q-value)	4 (3)	0.8 (3)	2.4(3)	2.4(3)	2.4(3)	4.8 (3)	3.2 (3)
2017 SSR Score & (Q-value)	4.8 (3-4)	0.8 (3)	4.8 (3-4)	3.2 (3)	4.8 (3-4)	5.2 (3-4)	3.2 (3)
2018 SSR Score & (Q-value)	4.8 (3)	0.8 (3)	3.2 (3)	4.8 (3)	4.8 (3)	5.6 (3-4)	2.4 (3)
2019 SSR Score & (Q-value)	2.4 (2-3)	--	3.2 (2-3)	4.0 (3)	3.2 (2-3)	3.2 (2-3)	4.0 (3)
2020 SSR Score & (Q-value)	1.6 (2)	2.4 (2)	4 (3-4)	4.8 (3-4)	3.2 (3)	4.8 (3-4)	4.8 (3-4)
2021 SSR Score & (Q-value)	5.6 (3-4)	-	5.4 (3-4)	4 (3-4)	5.6 (3-4)	4.8 (3-4)	4 (3-4)
2022 SSR Score & (Q-value)	4.8 (3-4)	-	6.4 (3-4)	4.8 (3-4)	5.6 (3-4)	4 (3-4)	5.6 (3-4)

### 3.1.9 Water Framework Directive Classification

The current Water Framework Directive Score for the Ballyogan Stream were checked through the EPA Envision map viewer (<http://gis.epa.ie/Envision/>). The current score classifies the stream as “at risk of not achieving good status”. Thus, the results at this location mirror those of the 2022 Ballyogan survey, which was also ‘at risk’ at all sites along the stream.



## 4. CONCLUSION

### 4.1.1 Ballyogan Stream

The biological data from 2022 indicate “stream at risk” or moderate status (Q3-4) conditions at all sites assessed on the Ballyogan Stream both upstream and downstream of the landfill. The results of the monitoring therefore indicate no adverse impact on the stream from the landfill.

### 4.1.2 Western Tributary and Ballyogan Stream (T1)

The 2022 biological results indicate “stream at risk” or moderate status (Q3-Q4) at the Western Tributary at Site T1, with an SSRS score of 4.8 recorded. As the Ballyogan Stream immediately upstream and downstream of its confluence with the western tributary has a moderate status Q-rating of Q3-Q4, it is clear that there is no biological impact from the landfill on the Ballyogan River via the Western Tributary.

### 4.1.3 Eastern Tributary and Glenamuck Stream (T2)

No flow and dense in stream vegetation rendered conditions at this site less than optimal for SSRS or Q-rating assessment.

### 4.1.4 Summary

As indicated in the EPA monitoring results (according to the Envision Map viewer), the stretch of the Ballyogan stream in Ballyogan landfill has been classed as “at risk of not achieving good status”.

The results of monitoring onsite in 2022 indicate biological water quality continues to improve along the Ballyogan Stream and remains similar to the 2021 findings.

As can be seen in Table 3.3, SSRS results for Site 3, Site 4 and Site 6 have improved, Site T1 and Site 5 shows water quality has slightly deteriorated and Site 4A remains the same.

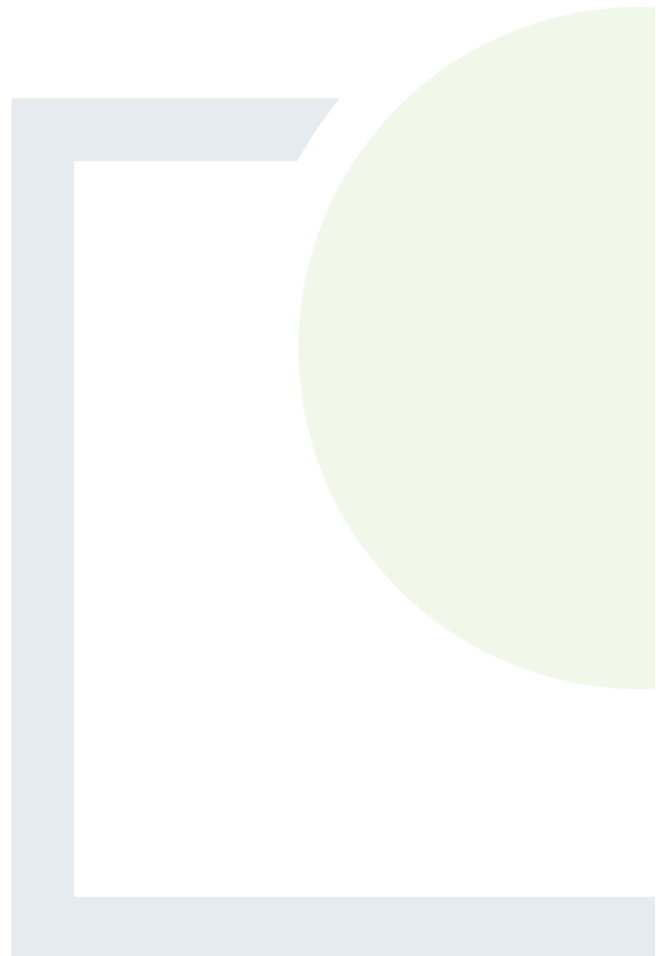


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# APPENDIX I

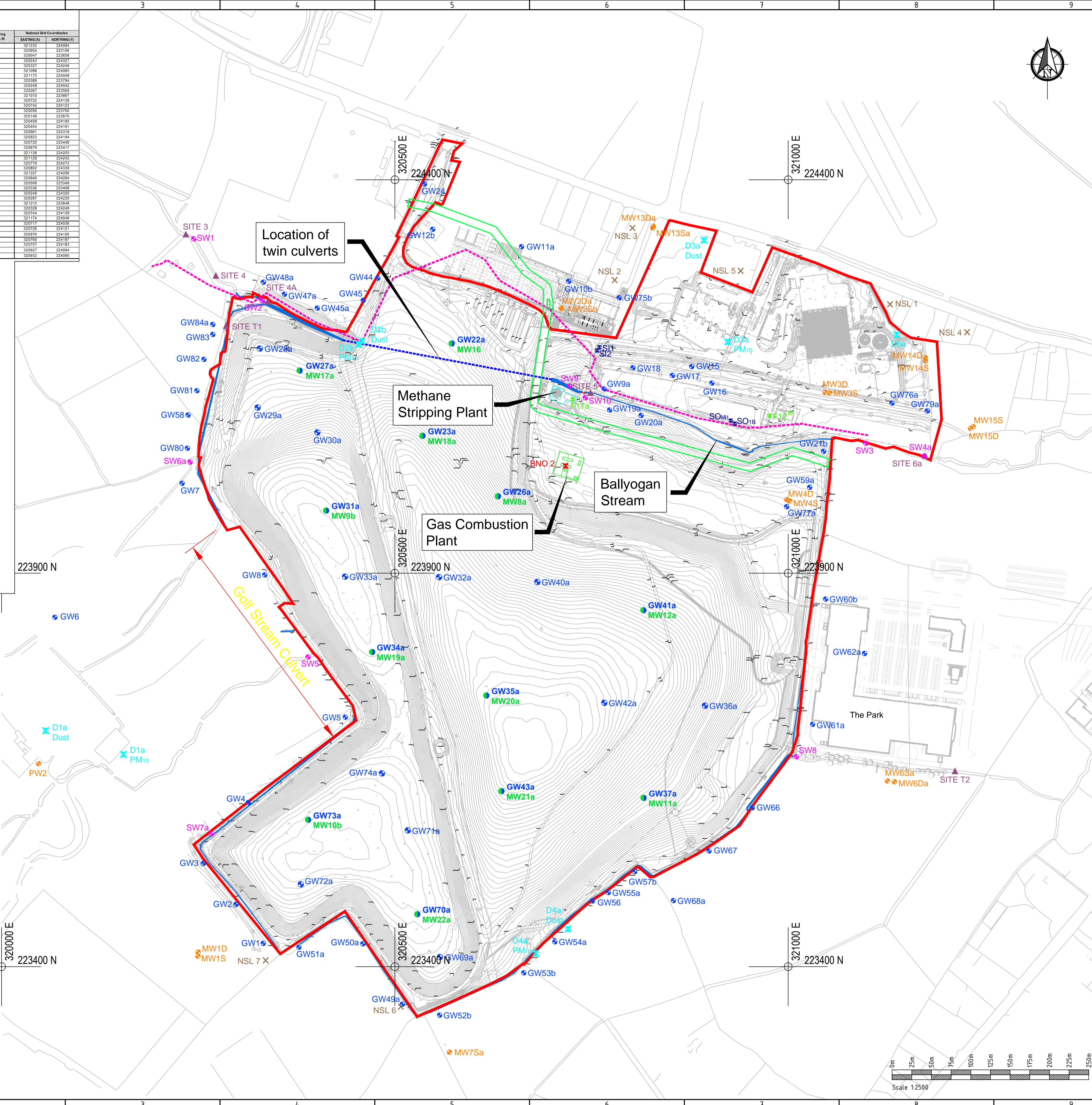
Monitoring Locations Map



**Ballyogan Landfill and Recycling Park: Waste Licence W0015-01  
National Grid Co-ordinates of Environmental Monitoring Stations**

Monitoring Station ID	National Grid Co-ordinates EASTING (X)	NORTHING (Y)	Monitoring Station ID	National Grid Co-ordinates EASTING (X)	NORTHING (Y)	Monitoring Station ID	National Grid Co-ordinates EASTING (X)	NORTHING (Y)
GW1	320333	223470	GW26a	320577	223338	MW13b	321232	224084
GW2	320286	223478	GW26b	320664	223392	MW13c	320904	223758
GW3	320256	223531	GW26c	320703	223432	MW13d	320647	223658
GW4	320314	223609	GW26d	320711	223484	MW13e	320243	224227
GW5	320451	223717	GW26e	320751	223544	MW13f	320207	224249
GW6	320060	223889	GW26f	320805	223551	MW13g	321098	224085
GW7	320229	224074	GW26g	320837	224101	MW13h	321173	224049
GW8	320335	224088	GW26h	321027	224059	MW13i	320389	223794
GW9	320765	224174	GW26i	321048	224087	MW13j	320248	224042
GW10	320751	224270	GW26j	321057	223788	MW13k	320287	223569
GW11	320861	224315	GW26k	320854	223602	MW13l	321810	223687
GW12	320548	224337	GW26l	320899	223547	MW13m	320722	224138
GW13	320651	224343	GW26m	320558	223413	MW13n	320742	224120
GW14	320603	224142	GW26n	320558	223413	MW13o	320506	223750
GW15	320853	224151	GW26o	320579	223488	MW13p	320148	224270
GW16	320773	224163	GW26p	320518	223476	MW13q	320458	224198
GW17	320773	224107	GW26q	320381	223565	MW13r	320454	224191
GW18	320813	224107	GW26r	320390	223589	MW13s	320801	224319
GW19	321045	224055	GW26s	320483	223645	MW13t	320823	224184
GW20	320735	224192	GW26t	320786	224200	MW13u	320720	223448
GW21	320555	224074	GW26u	321132	224116	MW13v	320819	224117
GW22	320735	224095	GW26v	320888	223985	MW13w	321138	224203
GW23	320631	223999	GW26w	321177	224168	MW13x	321729	224242
GW24	320739	224168	GW26x	320556	224059	MW13y	320719	224212
GW25	320528	224186	GW26y	320248	224152	MW13z	320878	224272
GW26	320526	224111	GW26z	320289	224153	MW14	320802	224339
GW27	320473	223866	GW27a	320289	224153	MW14a	321227	224206
GW28	320473	223866	GW27b	320289	224153	MW14b	320940	224284
GW29	320473	223866	GW27c	320289	224153	MW14c	320508	223249
GW30	320473	223866	GW27d	320289	224153	MW14d	320336	223408
GW31	320473	223866	GW27e	320289	224153	MW14e	320288	224220
GW32	320473	223866	GW27f	320289	224153	MW14f	321212	223848
GW33	320473	223866	GW27g	320289	224153	MW14g	320878	224272
GW34	320473	223866	GW27h	320289	224153	MW14h	320744	224129
GW35	320473	223866	GW27i	320289	224153	MW14i	321174	224048
GW36	320473	223866	GW27j	320289	224153	MW14j	320717	224038
GW37	320473	223866	GW27k	320289	224153	MW14k	320726	224121
GW38	320473	223866	GW27l	320289	224153	MW14l	320878	224272
GW39	320473	223866	GW27m	320289	224153	MW14m	320744	224129
GW40	320473	223866	GW27n	320289	224153	MW14n	321174	224048
GW41	320473	223866	GW27o	320289	224153	MW14o	320717	224038
GW42	320473	223866	GW27p	320289	224153	MW14p	320726	224121
GW43	320473	223866	GW27q	320289	224153	MW14q	320878	224272
GW44	320473	223866	GW27r	320289	224153	MW14r	320744	224129
GW45	320473	223866	GW27s	320289	224153	MW14s	321174	224048
GW46	320473	223866	GW27t	320289	224153	MW14t	320717	224038
GW47	320473	223866	GW27u	320289	224153	MW14u	320726	224121
GW48	320473	223866	GW27v	320289	224153	MW14v	320878	224272
GW49	320473	223866	GW27w	320289	224153	MW14w	320744	224129
GW50	320473	223866	GW27x	320289	224153	MW14x	321174	224048
GW51	320473	223866	GW27y	320289	224153	MW14y	320717	224038
GW52	320473	223866	GW27z	320289	224153	MW14z	320726	224121
GW53	320473	223866	GW27aa	320289	224153	MW14aa	320878	224272
GW54	320473	223866	GW27ab	320289	224153	MW14ab	320744	224129
GW55	320473	223866	GW27ac	320289	224153	MW14ac	321174	224048
GW56	320473	223866	GW27ad	320289	224153	MW14ad	320717	224038
GW57	320473	223866	GW27ae	320289	224153	MW14ae	320726	224121
GW58	320473	223866	GW27af	320289	224153	MW14af	320878	224272
GW59	320473	223866	GW27ag	320289	224153	MW14ag	320744	224129
GW60	320473	223866	GW27ah	320289	224153	MW14ah	321174	224048
GW61	320473	223866	GW27ai	320289	224153	MW14ai	320717	224038
GW62	320473	223866	GW27aj	320289	224153	MW14aj	320726	224121
GW63	320473	223866	GW27ak	320289	224153	MW14ak	320878	224272
GW64	320473	223866	GW27al	320289	224153	MW14al	320744	224129
GW65	320473	223866	GW27am	320289	224153	MW14am	321174	224048
GW66	320473	223866	GW27an	320289	224153	MW14an	320717	224038
GW67	320473	223866	GW27ao	320289	224153	MW14ao	320726	224121
GW68	320473	223866	GW27ap	320289	224153	MW14ap	320878	224272
GW69	320473	223866	GW27aq	320289	224153	MW14aq	320744	224129
GW70	320473	223866	GW27ar	320289	224153	MW14ar	321174	224048
GW71	320473	223866	GW27as	320289	224153	MW14as	320717	224038
GW72	320473	223866	GW27at	320289	224153	MW14at	320726	224121
GW73	320473	223866	GW27au	320289	224153	MW14au	320878	224272
GW74	320473	223866	GW27av	320289	224153	MW14av	320744	224129
GW75	320473	223866	GW27aw	320289	224153	MW14aw	321174	224048
GW76	320473	223866	GW27ax	320289	224153	MW14ax	320717	224038
GW77	320473	223866	GW27ay	320289	224153	MW14ay	320726	224121
GW78	320473	223866	GW27az	320289	224153	MW14az	320878	224272
GW79	320473	223866	GW27ba	320289	224153	MW14ba	320744	224129
GW80	320473	223866	GW27bb	320289	224153	MW14bb	321174	224048
GW81	320473	223866	GW27bc	320289	224153	MW14bc	320717	224038
GW82	320473	223866	GW27bd	320289	224153	MW14bd	320726	224121
GW83	320473	223866	GW27be	320289	224153	MW14be	320878	224272
GW84	320473	223866	GW27bf	320289	224153	MW14bf	320744	224129
GW85	320473	223866	GW27bg	320289	224153	MW14bg	321174	224048
GW86	320473	223866	GW27bh	320289	224153	MW14bh	320717	224038
GW87	320473	223866	GW27bi	320289	224153	MW14bi	320726	224121
GW88	320473	223866	GW27bj	320289	224153	MW14bj	320878	224272
GW89	320473	223866	GW27bk	320289	224153	MW14bk	320744	224129
GW90	320473	223866	GW27bl	320289	224153	MW14bl	321174	224048
GW91	320473	223866	GW27bm	320289	224153	MW14bm	320717	224038
GW92	320473	223866	GW27bn	320289	224153	MW14bn	320726	224121
GW93	320473	223866	GW27bo	320289	224153	MW14bo	320878	224272
GW94	320473	223866	GW27bp	320289	224153	MW14bp	320744	224129
GW95	320473	223866	GW27bq	320289	224153	MW14bq	321174	224048
GW96	320473	223866	GW27br	320289	224153	MW14br	320717	224038
GW97	320473	223866	GW27bs	320289	224153	MW14bs	320726	224121
GW98	320473	223866	GW27bt	320289	224153	MW14bt	320878	224272
GW99	320473	223866	GW27bu	320289	224153	MW14bu	320744	224129
GW100	320473	223866	GW27bv	320289	224153	MW14bv	321174	224048

- LEGEND**
- OUTLINE OF SITE
  - TWIN CULVERTS
  - CARRICKMINES SEWER
  - BURIED ESB CABLES
  - GW14 ● GAS MONITORING WELL
  - sws ● SURFACE WATER MONITORING POINT
  - MW14D ● DEEP GROUNDWATER MONITORING WELL
  - MW14S ● SHALLOW GROUNDWATER MONITORING WELL
  - PW1 ● PRIVATE GROUNDWATER MONITORING WELL
  - MW9a ● LEACHATE MONITORING WELL
  - GW23a ● DUPLICATE GAS & LEACHATE MONITORING WELL
  - MW18a ●
  - D2 ✕ AIR QUALITY MONITORING POINT
  - NSL 5 ✕ NOISE MONITORING POINT
  - BNO 1 ✕ LFG COMBUSTION PLANT MONITORING POINT
  - F17a ✕ SEWER EMISSIONS MONITORING POINT
  - SITE 6a ▲ ECOLOGICAL MONITORING POINT
  - SI2 ■ STORMWATER INLET MONITORING POINT
  - SO ■ STORMWATER OUTLET MONITORING POINT



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Rev. No.	Drawn	SK	CHK'd	NM	App'd	Rev. Origin	App'd	Rev. Date	Description

Name of Client



Comhairle Contae County Council


Name of Job

**Ballyogan Landfill  
Environmental Monitoring**

Title of Drawing

**Environmental Monitoring  
Locations October 2013**

Scale Used	This Drawing was printed to
1:2500	A1.
Dwg. No.	Rev.
LW14-111-02-001	A



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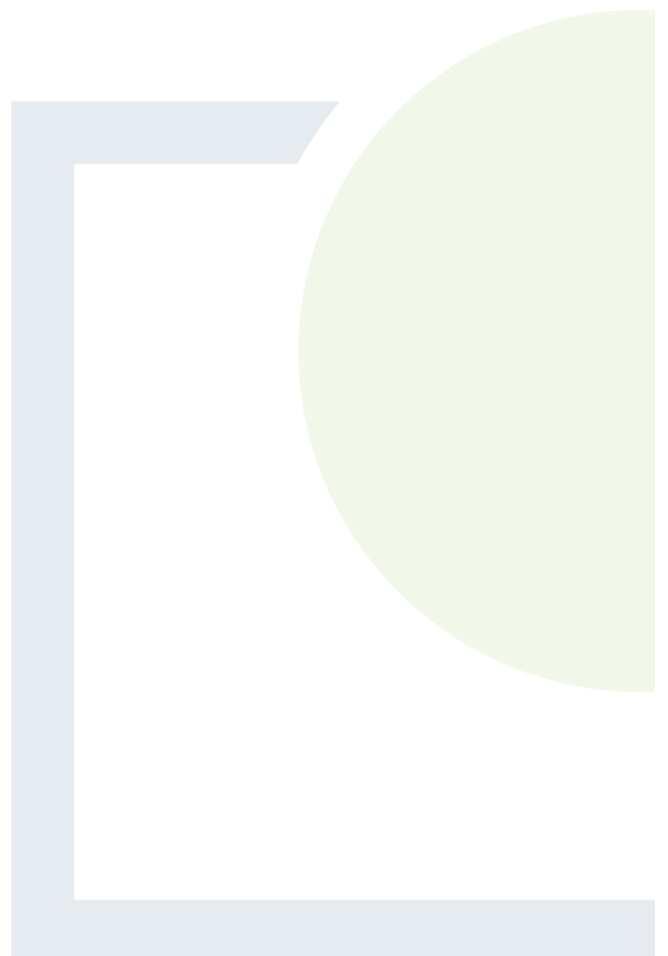


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ENVIRONMENTAL SCIENCE & PLANNING

# APPENDIX II

SSRS Field Sheets



River: <u>Ballyogan Stream</u>	Code:	Date: <u>31/8/22</u>	Time: <u>11:45</u>
Station no. <u>Site 3</u>	Location: <u>Ballyogan Landfill</u>	Grid (6 figure):	
Field Chemistry		Stream Order: <u>Second</u>	Stream flow: <u>Riffle</u> <u>Riffle/Glide</u> <u>Slow flow</u>
DO%	Modifications: Y/N Canalised-widened-bank erosion-arterial drainage Dominant Types: Bedrock <u>Boulder (&gt;128mm)</u> <u>Cobble (32-128mm)</u> <u>Gravel (8-32mm)</u> <u>Fine Gravel (2-8mm)</u> <u>Sand (0.25-2mm)</u> <u>Silt (&lt;0.25mm)</u> Slope: <u>Low</u> - <u>Medium</u> - High - Very High Geology: <u>Calcareous</u> - Siliceous - Mixed Substratum Condition: <u>Calcareous-Compacted</u> <u>Loose</u> - Normal Substratum: <u>Stoney bottom</u> - Muddy bottom - Mud over stores Degree of siltation: Clean - Slight - Moderate - Heavy Depth of mud: <u>None</u> - <u>1cm</u> - 1-5cm - 5-10cm - >10cm Litter: <u>None</u> - Present - Moderate - Abundant	Shading: <u>High</u> - <u>Moderate</u> - Low - None	
DO mg/l		Cattle access Y: upstream - downstream <u>&amp; N</u>	
Temp (°C)		Photo: <u>Y</u> / N	
Conductivity		Sewage Fungus: <u>None</u> - Present - Moderate - Abundant	
pH		Sampled in Minutes: <u>Pond net x</u>	
Bank width (cm)		Stone wash x	
Wet width (cm)		Weed sweep x	
Avg Depth (cm)			
Staff gauge			
Velocity		Colour	
Torrential	<u>None</u>		
Fast	Slight		
<u>Moderate</u>	Moderate		
Slow	High		
Very slow			
Clarity	Discharge		
Very clear	Flood		
<u>Clear</u>	Normal		
Slightly turbid	Low		
Highly turbid	<u>Very Low</u>		
	Dry		
	Recent Flood		
		Urban <input checked="" type="checkbox"/>	Sample retained: Y/N
		Bog <input type="checkbox"/>	
		Tillage <input type="checkbox"/>	
		Other <input type="checkbox"/>	

General Comments:

Grammurus Present (~25)

Macroinvertebrate Composition

The macroinvertebrates are divided into the following 5 specific groups

- Group 1 = Ephemeroptera (3-tails) - note that tails may be damaged during sampling
- Group 2 = Plecoptera (2-tails) - note that tails may be damaged during sampling
- Group 3 = Trichoptera
- Group 4 = G.O.L.D (Gastropoda, Oligochaeta and Diptera)
- Group 5 = Asellus
- Calculate the total number of taxa and relative abundance of each macroinvertebrate group below: (Abundance - Ab)

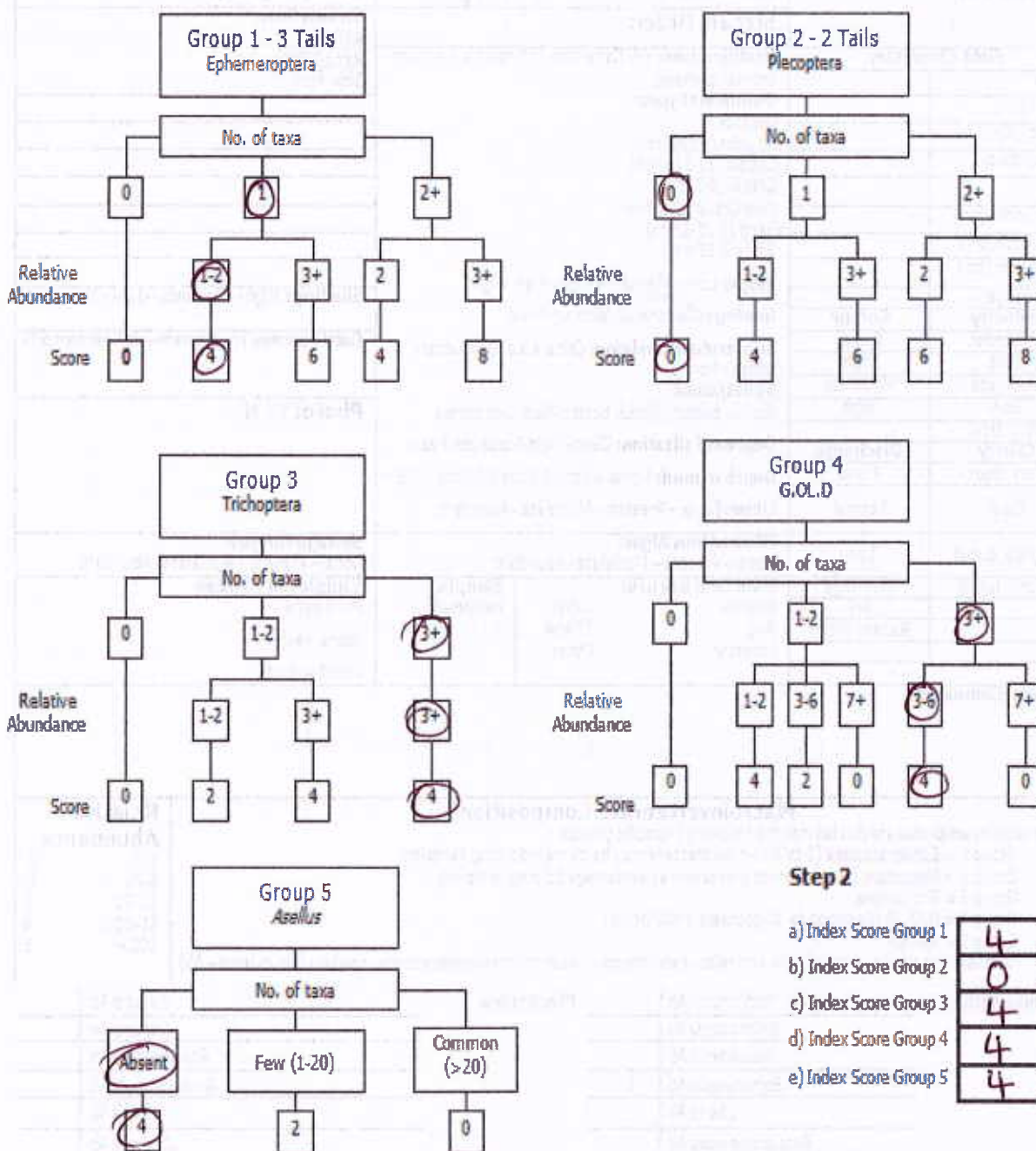
Relative Abundance

1-5	1
6-20	2
21-50	3
51-100	4
101+	5

Ephemeroptera:		Plecoptera:	
<u>Baetis</u> Ab		<u>Leuctra</u> Ab	
<u>Rhyacophila</u> Ab		<u>Isoperla</u> Ab	
<u>Hemiptera</u> Ab		<u>Protonemura</u> Ab	
<u>Ephemera</u> Ab	1	<u>Amphinemura</u> Ab	
<u>Cnephia</u> Ab		<u>Pala</u> Ab	
<u>Paraleptanobletia</u> Ab		<u>Dinocras</u> Ab	
<u>Ephemera danica</u> Ab		Other Plecop Ab	
Other Ephem Ab		Other Plecop Ab	
Total no. of taxa	1	Total no. of Taxa	0
Total Relative Abundance	1	Total Relative Abundance	0
Trichoptera:	G.O.L.D:	Chironomidae (D) Ab	2
<u>Hydropsychidae</u> Ab	<u>Lymnaea</u> (G) Ab	<u>Chironomus</u> (D) Ab	Absent ✓
<u>Polycentropodidae</u> Ab	<u>Procladius</u> (G) Ab	<u>Simuliidae</u> (D) Ab	1
<u>Rhyacophila</u> Ab	<u>Planorbis</u> (G) Ab	<u>Dicranota</u> (D) Ab	Common (>20)
<u>Phlebotamidae</u> Ab	<u>Anoxyus</u> (G) Ab	<u>Tipulidae</u> (D) Ab	
<u>Limnephilidae</u> Ab	<u>Physa</u> (G) Ab	<u>Ceratopogonidae</u> (D) Ab	
<u>Sericostomatidae</u> Ab	<u>Lumbriculus</u> (O) Ab	Other GOLD Ab	2
<u>Glossosomatidae</u> Ab	<u>Eiseniella</u> (O) Ab	<u>Hydraenidae</u>	
<u>Lepidostomatidae</u> Ab	<u>Tubificidae</u> (O) Ab		
Other Trichoptera Ab			
Total no. of Taxa	3	Total no. of Taxa	3
Total Relative Abundance	5	Total Relative Abundance	5

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.

**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 2**

- a) Index Score Group 1: 4
- b) Index Score Group 2: 0
- c) Index Score Group 3: 4
- d) Index Score Group 4: 4
- e) Index Score Group 5: 4

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

Total Index Score (TIS) sum (a+b+c+d+e) **16**

Average Index Score (AIS) TIS/5 (5 for 5 groups) **3.2**

SSR Score (AIS x 2) **6.4**

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

> 7.25  
Probably not at risk

> 6.5 - 7.25  
Indeterminate  
Stream may be at risk

< 6.5  
Stream at risk

Surveyor (signed): Dan Hayden Name (print): DAN HAYDEN Date: 31 / 8 / 22

River: <u>Ballyogan Stream</u>		Code:	Date: <u>31</u> / <u>8</u> / <u>22</u>	Time: <u>10:20</u>
Station no. <u>Site 4</u>		Location: <u>Ballyogan Landfill</u>		Grid (6 figure):
Field Chemistry		Stream Order: <u>Second</u>		Stream flow: <u>Riffle</u> <u>Riffle/Glide</u> <u>Slow flow</u>
DO%		Modifications: Y/N Canalised-widened-bank erosion-arterial drainage		
DO mg/l		Dominant Types:		
Temp (°C)		Bedrock:		
Conductivity		<u>Boulder (&gt;128mm)</u>		
pH		<u>Cobble (32-128mm)</u>		
Bank width (cm)		<u>Gravel (8-32mm)</u>		
Wet width (cm)		<u>Fine Gravel (2-8mm)</u>		
Avg Depth (cm)		Sand (0.25-2mm)		
Staff gauge		Silt (<0.25mm)		
Velocity	Colour	Slope: Low - Medium - High - Very High		Shading: High - Moderate - Low - None
Torrential	<u>None</u>	Geology: <u>Calcareous-Siliceous-Mixed</u>		Cattle access Y: upstream - downstream or N
Fast	<u>Slight</u>	Substratum Condition: Calcareous-Compacted-Loose ( <u>Normal</u> )		
Moderate	<u>Moderate</u>	Substratum:		Photo: <u>Y</u> / N
<u>Slow</u>	<u>High</u>	<u>Stoney bottom-Muddy bottom-Mud over stones</u>		
Very slow		Degree of siltation: Clean-Slight-Moderate-Heavy		
Clarity	Discharge	Depth of mud: None <1cm 1-5cm 5-10cm >10cm		
Very clear	<u>Flood</u>	Litter: None - Present - Moderate - Abundant		
<u>Clear</u>	<u>Normal</u>	Filamentous Algae: None - Present - Moderate - Abundant		Sewage Fungus: None - Present - Moderate - Abundant
Slightly turbid	<u>Low</u>	Main land use u/s:		Sample retained: Y / N
Highly turbid	<u>Very Low</u>	Pasture <u>Urban</u>		Sampled in Minutes: <u>Pond net x</u>
	<u>Dry</u>	Bog <u>Village</u>		Stone wash x
	<u>Recent Flood</u>	Forestry <u>Other</u>		Weed sweep x

General Comments:

Grammeus Present (n 20)

Macroinvertebrate Composition

The macroinvertebrates are divided into the following 5 specific groups

- Group 1 = Ephemeroptera (3-tails) - note that tails may be damaged during sampling
- Group 2 = Plecoptera (2-tails) - note that tails may be damaged during sampling
- Group 3 = Trichoptera
- Group 4 = G.O.L.D (Gastropoda, Oligochaeta and Diptera)
- Group 5 = Asellus
- Calculate the total number of taxa and relative abundance of each macroinvertebrate group below: (Abundance - Ab)

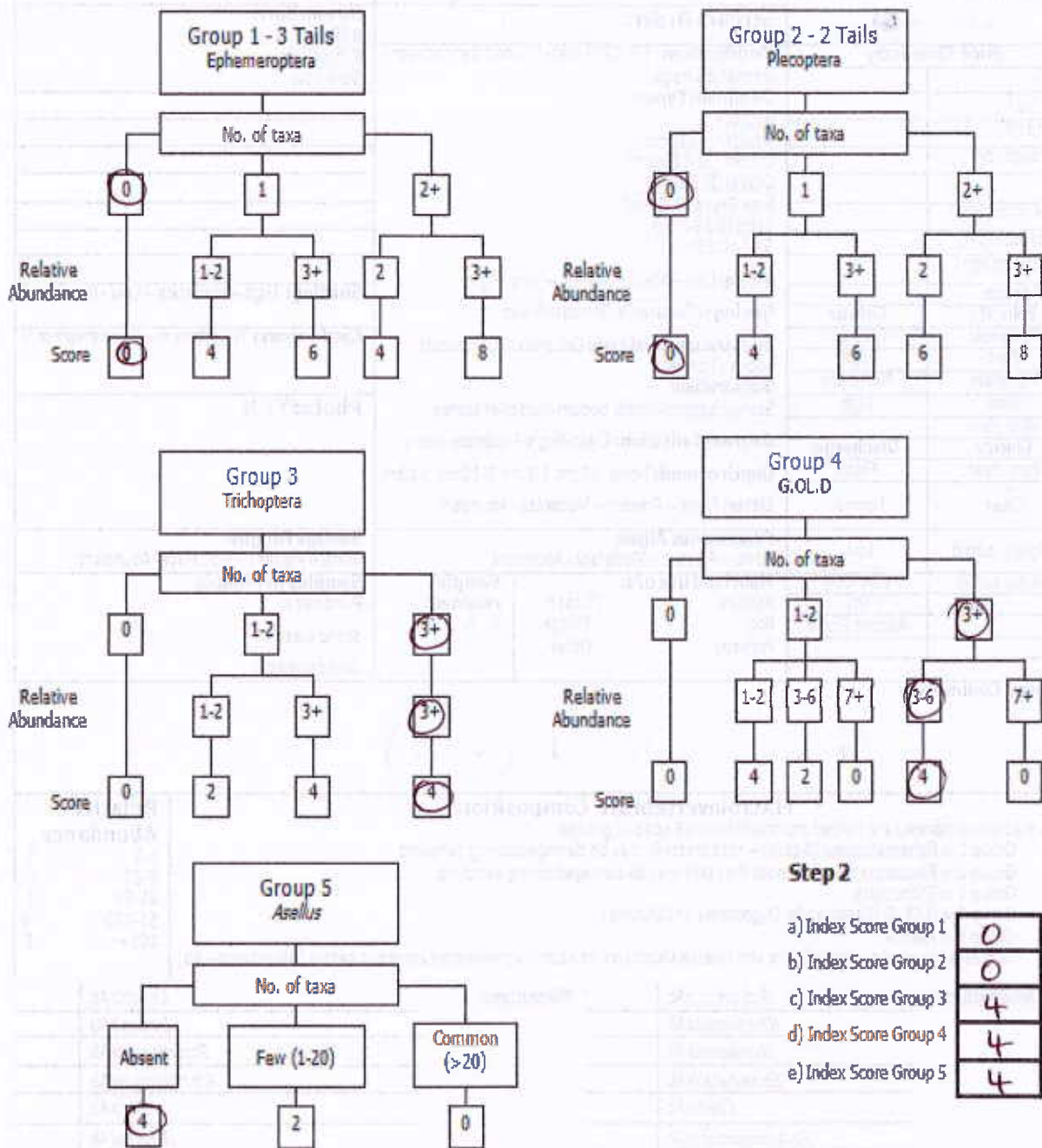
Relative Abundance

1-5	1
6-20	2
21-50	3
51-100	4
101+	5

Ephemeroptera:		Plecoptera:	
<u>Ecdyonurus</u> Ab		<u>Leuctra</u> Ab	
<u>Rhyacogenia</u> Ab		<u>Isoperla</u> Ab	
<u>Heptagenia</u> Ab		<u>Protonemura</u> Ab	
<u>Ephemera</u> Ab		<u>Amphinemura</u> Ab	
<u>Gaenis</u> Ab		<u>Baetis</u> Ab	
<u>Paraleptophlebia</u> Ab		<u>Dixocaris</u> Ab	
<u>Ephemera danica</u> Ab		Other Plecop Ab	
Other Ephem Ab		Other Plecop Ab	
Total no. of taxa <u>0</u>	Total Relative Abundance <u>0</u>	Total no. of Taxa <u>0</u>	Total Relative Abundance <u>0</u>
Trichoptera:		G.O.L.D:	
<u>Hydropsychidae</u> Ab	<u>1</u>	<u>Lymnaea</u> (G) Ab	<u>Chironomidae</u> (D) Ab
<u>Polycentropodidae</u> Ab		<u>Rotamplanis</u> (G) Ab	<u>Chironomus</u> (D) Ab
<u>Rhyacophila</u> Ab		<u>Plecoptis</u> (G) Ab	<u>Simuliidae</u> (D) Ab <u>1</u>
<u>Phlebotamidae</u> Ab		<u>Anolis</u> (G) Ab	<u>Dicranota</u> (D) Ab
<u>Limnephilidae</u> Ab	<u>3</u>	<u>Rhyss</u> (G) Ab	<u>Tipulidae</u> (D) Ab
<u>Sericostomatidae</u> Ab	<u>4</u>	<u>Lumbriculus</u> (O) Ab	<u>Ceratopogonidae</u> (O) Ab
<u>Glossosomatidae</u> Ab		<u>Eiseniella</u> (O) Ab	Other GOLD Ab <u>3</u>
<u>Lepidostomatidae</u> Ab		<u>Tubificidae</u> (O) Ab <u>2</u>	<u>Hydraenidae</u> ✓
Other Trichoptera Ab			
Total no. of Taxa <u>3</u>	Total Relative Abundance <u>8</u>	Total no. of Taxa <u>3</u>	Total Relative Abundance <u>6</u>

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.

**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

Total Index Score (TIS) sum (a+b+c+d+e) **12**

Average Index Score (AIS) TIS/5 (5 for 5 groups) **2.4**

SSR Score (AIS x 2) **4.8**

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

> 7.25  
Probably not at risk

> 6.5 - 7.25  
Indeterminate  
Stream may be at risk

< 6.5  
Stream at risk

Surveyor (signed): Dan Hayden Name (print): DAN HAYDEN Date: 31 / 8 / 22

River: West Tributary		Code:	Date: 31/8/22	Time: 09.15
Station no. Ballyogan Stream		Location: Ballyogan Landfill		Grid (6 figure):
Site T1		Stream Order:		Stream flow: Riffle Riffle/Glide Slow flow
Field Chemistry		Modifications: Y/N Canalised-widened-bank erosion-arterial drainage		
DO%		Dominant Types:		
DO mg/l		Bedrock		
Temp (°C)		Boulder (>128mm)		
Conductivity		Cobble (32-128mm)		
pH		Gravel (6-32mm)		
Bank width (cm)		Fine Gravel (2-8mm)		
Wet width (cm)		Sand (0.25-2mm)		
Avg Depth (cm)		Silt (<0.25mm)		
Staff gauge		Slope: Low - Medium - High - Very High		Shading: High - Moderate - Low - None
Velocity	Colour	Geology: Calcareous-Siliceous-Mixed		Cattle access Y: upstream - downstream (N)
Torrential	(None)	Substratum Condition: Calcareous-Compacted-		
Fast	Slight	Loose - Normal		
(Moderate)	Moderate	Substratum:		
Slow	High	Stoney bottom-Muddy bottom-Mud over stones		Photo (Y) / N
Very slow		Degree of siltation: Clean-Slight-Moderate-Heavy		
Clarity	Discharge	Depth of mud: None < 1cm 1-5cm 5-10cm > 10cm		
Very clear	Flood	Litter: None - Present - Moderate - Abundant		
(Clear)	Normal	Filamentous Algae:		Sewage Fungus:
Slightly turbid	(None)	None - Present - Moderate - Abundant		None - Present - Moderate - Abundant
Highly turbid	(Very Low)	Main land use u/s:		Sample retained: Y / N
	Dry	Pasture		Sampled in Minutes:
	Recent Flood	Urban		(Pond net) x
		Tillage		Stone wash x
		Other		Weed sweep x

General Comments:

1 x Leeches, Gammarus ~ 40, Very low flow

Macroinvertebrate Composition

The macroinvertebrates are divided into the following 5 specific groups

- Group 1 = Ephemeroptera (3-tails) - note that tails may be damaged during sampling
- Group 2 = Plecoptera (2-tails) - note that tails may be damaged during sampling
- Group 3 = Trichoptera
- Group 4 = G.O.L.D (Gastropoda, Oligochaeta and Diptera)
- Group 5 = Asellus
- Calculate the total number of taxa and relative abundance of each macroinvertebrate group below: (Abundance - Ab)

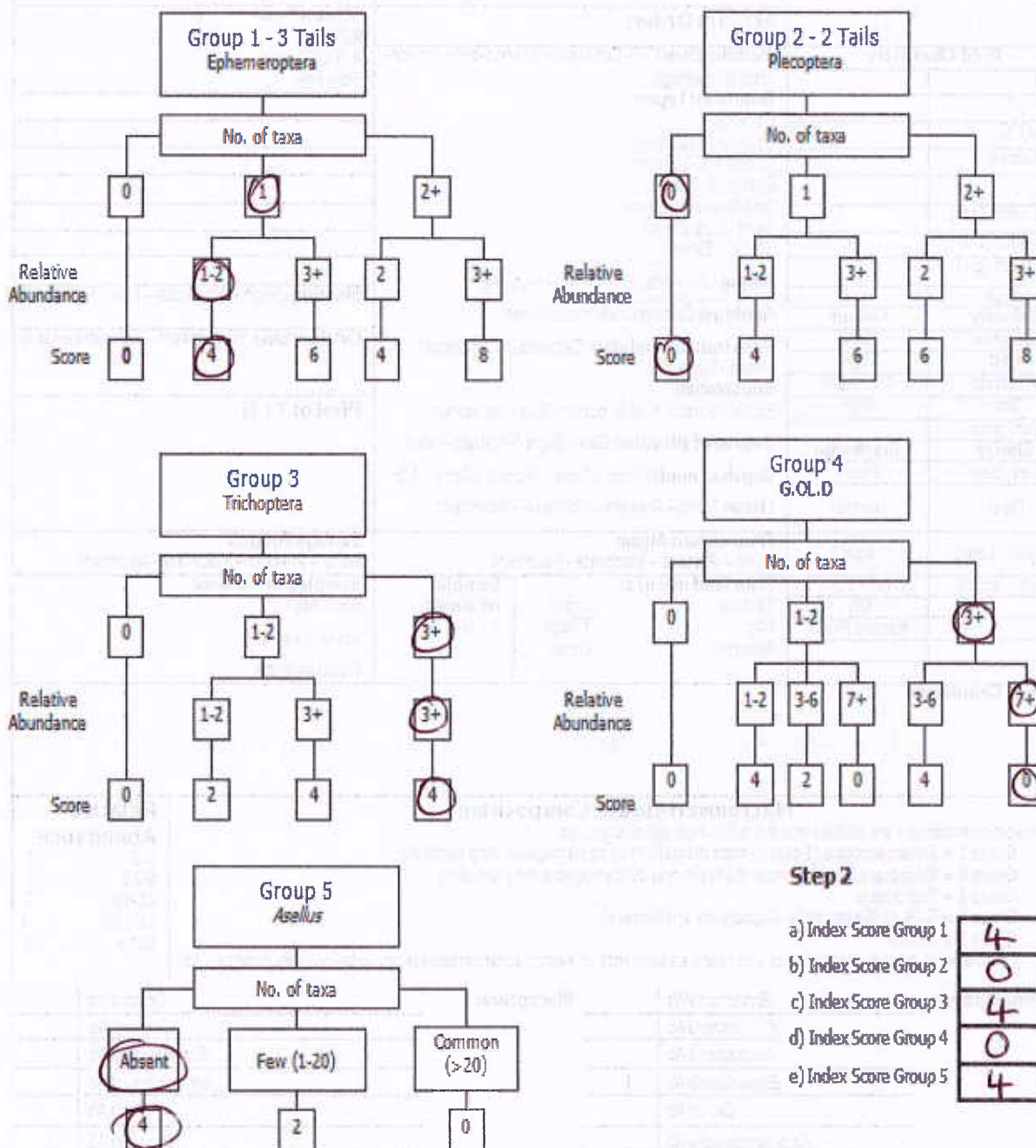
Relative Abundance

1-5	1
6-20	2
21-50	3
51-100	4
101+	5

Ephemeroptera:		Plecoptera:	
<i>Ectonurus</i> Ab		<i>Leuctra</i> Ab	
<i>Rhyacina</i> Ab		<i>Isoperla</i> Ab	
<i>Heptagenia</i> Ab		<i>Protonemura</i> Ab	
<i>Ephemerella</i> Ab	1	<i>Amphibaenura</i> Ab	
<i>Gaeta</i> Ab		<i>Baetis</i> Ab	
<i>Paraleptophlebia</i> Ab		<i>Dinocras</i> Ab	
<i>Ephemerella danica</i> Ab		Other Plecop Ab	
Other Ephem Ab		Other Plecop Ab	
Total no. of taxa	1	Total no. of Taxa	0
Total Relative Abundance	0	Total Relative Abundance	0
Trichoptera:	G.O.L.D:	Chironomidae (D) Ab	Asellus:
<i>Hydropsychidae</i> Ab	<i>Limnoria</i> (G) Ab	4	Absent ✓
<i>Polycentropodidae</i> Ab	<i>Botanomyza</i> (G) Ab		Few (1-20)
<i>Rhyacophila</i> Ab	<i>Planorbis</i> (G) Ab	4	Common (>20)
<i>Phlebotomidae</i> Ab	<i>Ancylus</i> (G) Ab		
<i>Limnephilidae</i> Ab	<i>Rhyza</i> (G) Ab		
<i>Senecostomatidae</i> Ab	<i>Lumbriculus</i> (O) Ab		
<i>Glossosomatidae</i> Ab	<i>Eiseniella</i> (D) Ab		
<i>Leucostomatidae</i> Ab	<i>Tubificidae</i> (O) Ab		
Other Trichoptera Ab			
Total no. of Taxa	3	Total no. of Taxa	3
Total Relative Abundance	8	Total Relative Abundance	11

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 SSR5. See Appendix B for more details on how to identify *Baetis*.

**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 2**

- a) Index Score Group 1 

4
---
- b) Index Score Group 2 

0
---
- c) Index Score Group 3 

4
---
- d) Index Score Group 4 

0
---
- e) Index Score Group 5 

4
---

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

Total Index Score (TIS) sum (a+b+c+d+e) 

12
----

Average Index Score (AIS) TIS/5 (5 for 5 groups) 

2.4
-----

SSR Score (AIS x 2) 

4.8
-----

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

- > 7.25 Probably not at risk
- > 6.5 - 7.25 Indeterminate Stream may be at risk
- < 6.5 Stream at risk

Surveyor (signed): [Signature] Name (print): DAN HAYDEN Date: 31 / 8 / 22

River: <u>Ballyoga Stream</u>	Code:	Date: <u>31/8/22</u>	Time:
Station no. <u>Site 4A</u>	Location: <u>Ballyoga landfill</u>	Grid (6 figure):	
Field Chemistry		Stream Order: <u>Second</u>	Stream flow: <u>Riffle</u> <u>Riffle/Glide</u> <u>Slow flow</u>
DO%		Modifications: Y/N Canalised-widened-bank erosion-arterial drainage	
DO mg/l		Dominant Types:	
Temp (°C)		<u>Bedrock</u>	
Conductivity		<u>Boulder (&gt;128mm)</u>	
pH		<u>Cobble (32-128mm)</u>	
Bank width (cm)		<u>Gravel (8-32mm)</u>	
Wet width (cm)		<u>Fine Gravel (2-8mm)</u>	
Avg Depth (cm)		<u>Sand (0.25-2mm)</u>	
Staff gauge		<u>Silt (&lt;0.25mm)</u>	
Velocity	Colour	Slope: <u>Low-Medium</u> - High - Very High	Shading: High - Moderate - Low - None
Torrential	<u>None</u>	Geology: <u>Calcareous-siliceous-Mixed</u>	Cattle access Y: upstream - downstream or N
Fast	Slight	Substratum Condition: <u>Calcareous-Compacted-Loose - Normal</u>	
Moderate	Moderate	Substratum:	
<u>Slow</u>	High	<u>Stoney bottom-Muddy bottom-Mud over stores</u>	Photo: <u>(Y) N</u>
Very slow		Degree of siltation: <u>Clean-Slight-Moderate-Heavy</u>	
Clarity	Discharge	Depth of mud: <u>None &lt;1cm 1-5cm 5-10cm &gt;10cm</u>	
Very clear	Flood	Litter: <u>None - Present - Moderate - Abundant</u>	
<u>Clear</u>	Normal	Filamentous Algae:	Sewage Fungus:
Slightly turbid	Low	<u>None - Present - Moderate - Abundant</u>	<u>None - Present - Moderate - Abundant</u>
Highly turbid	<u>Very Low</u>	Main land use u/s:	Sampled in Minutes:
	Dry	Pasture	<u>Pond net</u>
	Recent Flood	<u>Urban</u>	Stone wash x
		<u>Tillage</u>	Weed sweep x
		Other	
		Sample retained: <u>Y, N</u>	

General Comments:

Grammeus Present (n20), Sphaeriidae (x2)

Macroinvertebrate Composition

The macroinvertebrates are divided into the following 5 specific groups:

- Group 1 = Ephemeroptera (3-tails) - note that tails may be damaged during sampling
- Group 2 = Plecoptera (2-tails) - note that tails may be damaged during sampling
- Group 3 = Trichoptera
- Group 4 = G.O.L.D (Gastropoda, Oligochaeta and Diptera)
- Group 5 = Asellus
- Calculate the total number of taxa and relative abundance of each macroinvertebrate group below: (Abundance - Ab)

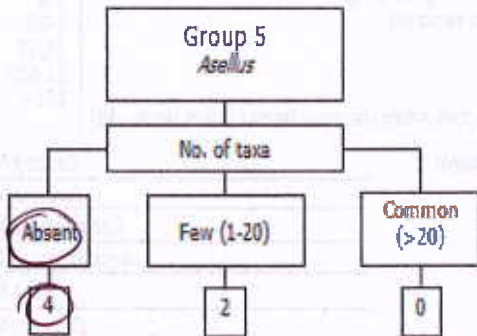
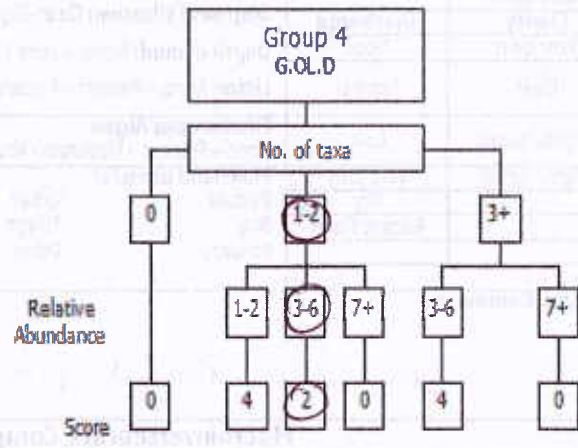
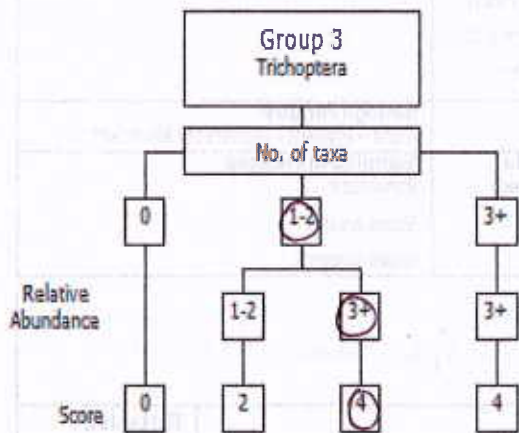
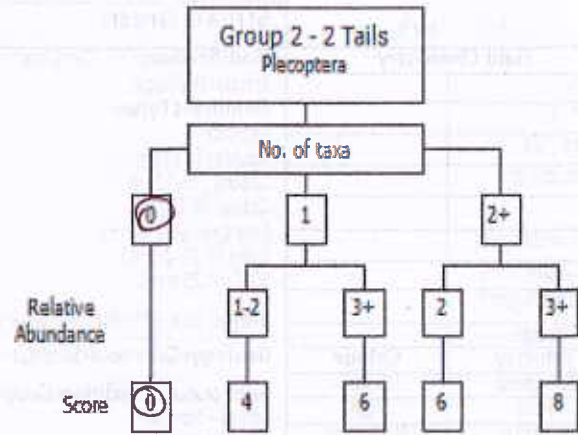
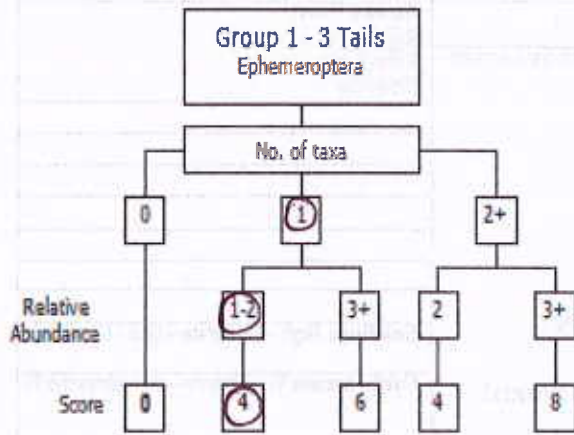
Relative Abundance

1-5	1
6-20	2
21-50	3
51-100	4
101+	5

<b>Ephemeroptera:</b>		<u>Ecdyonurus</u> Ab	<b>Plecoptera:</b>		<u>Leuctra</u> Ab
		<u>Rhyacoptera</u> Ab			<u>Isoperla</u> Ab
		<u>Heptagenia</u> Ab			<u>Protonemura</u> Ab
		<u>Ephemera</u> Ab			<u>Amphipemura</u> Ab
		<u>Caenis</u> Ab			<u>Baetis</u> Ab
		<u>Paraleptophlebia</u> Ab			<u>Dinocras</u> Ab
		<u>Ephemerella danica</u> Ab			Other Plecop Ab
		Other Ephem Ab			Other Plecop Ab
Total no. of taxa	<u>1</u>	Total Relative Abundance	<u>1</u>	Total no. of Taxa	<u>0</u>
<b>Trichoptera:</b>		<u>Hydropsychidae</u> Ab	<u>1</u>	<b>G.O.L.D:</b>	<u>Lymnaea</u> (G) Ab
		<u>Polycentropodidae</u> Ab			<u>Potamogeton</u> (G) Ab
		<u>Rhyacophila</u> Ab			<u>Planorbis</u> (G) Ab
		<u>Rhinoptamidae</u> Ab			<u>Anolis</u> (G) Ab
		<u>Limnephilidae</u> Ab			<u>Physa</u> (G) Ab
		<u>Sericostomatidae</u> Ab	<u>2</u>		<u>Lumbriculus</u> (O) Ab
		<u>Glossosomatidae</u> Ab			<u>Eiseniella</u> (O) Ab
		<u>Lepidostomatidae</u> Ab			<u>Tubificoides</u> (O) Ab
		Other Trichoptera Ab			
Total no. of Taxa	<u>2</u>	Total Relative Abundance	<u>3</u>	Total no. of Taxa	<u>2</u>
<b>Chironomidae (D) Ab</b>		<u>1</u>	<b>Asellus:</b>		<u>Asellus</u>
					Absent ✓
					Few (1-20)
					Common (>20)
					NOTE: Asellus must be recorded as absent if none are found
Total no. of Taxa	<u>2</u>	Total Relative Abundance	<u>3</u>	Total no. of Taxa	<u>2</u>

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.

**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 2**

- a) Index Score Group 1 

4
---
- b) Index Score Group 2 

0
---
- c) Index Score Group 3 

4
---
- d) Index Score Group 4 

2
---
- e) Index Score Group 5 

4
---

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

Total Index Score (TIS)  
sum (a+b+c+d+e) 

14
----

Average Index Score (AIS)  
TIS/5 (5 for 5 groups) 

2.8
-----

SSR Score  
(AIS x 2) 

5.6
-----

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

> 7.25  
Probably not at risk

> 6.5 - 7.25  
Indeterminate  
Stream may be at risk

< 6.5  
Stream at risk

Surveyor (signed): Dan Hayden Name (print): DAN HAYDEN Date: 31 / 8 / 22

River: <u>Ballyogan Stream</u>	Code:	Date: <u>31</u>   <u>8</u>   <u>22</u>	Time: <u>10:30</u>
Station no. <u>Site 5</u>	Location: <u>Ballyogan Landfill</u>	Grid (6 figure):	
Field Chemistry		Stream Order:	Stream flow: <u>Riffle</u> <u>Riffle/Glide</u> <u>Slow flow</u>
DO%		Modifications: <u>Y/N</u> Canalised-widened-bank erosion-arterial drainage	
DO mg/l		Dominant Types:	
Temp (°C)		Bedrock	
Conductivity		<u>Boulder (&gt;125mm)</u>	
pH		<u>Cobble (32-125mm)</u>	
Bank width (cm)		<u>Gravel (8-32mm)</u>	
Wet width (cm)		<u>Fine Gravel (2-8mm)</u>	
Avg Depth (cm)		<u>Sand (0.25-2mm)</u>	
Staff gauge		Silt (<0.25mm)	
Velocity	Colour	Slope: <u>Low</u> - <u>Medium</u> - High - Very High	Shading: High - Moderate - <u>Low</u> - None
Torrential	<u>None</u>	Geology: <u>Calcareous-Siliceous-Mixed</u>	Cattle access Y: upstream - downstream <u>or N</u>
Fast	Slight	Substratum Conditions: <u>Calcareous-Compacted</u>	
<u>Moderate</u>	Moderate	<u>Loose</u> - Normal	
Slow	High	Substratum:	
Very slow		<u>Stony bottom</u> - Muddy bottom - Mud over stores	Photo: <u>Y</u> / N
Clarity	Discharge	Degree of siltation: <u>Clear</u> - <u>Slight</u> - Moderate - Heavy	
Very clear	Flood	Depth of mud: <u>None</u> < 1cm   <u>1-5cm</u>   5-10cm   > 10cm	
<u>Clear</u>	Normal	Litter: <u>None</u> - Present - Moderate - Abundant	
Slightly turbid	Low	Filamentous Algae:	Sewage Fungus:
Highly turbid	<u>Very Low</u>	<u>None</u> - Present - Moderate - Abundant	<u>None</u> - Present - Moderate - Abundant
	Dry	Main land use u/s:	Sample retained: <u>Y</u> / <u>N</u>
	Recent Flood	Pasture	<u>Pond net</u>
		Bog	Stone wash x
		Forestry	Weed sweep x

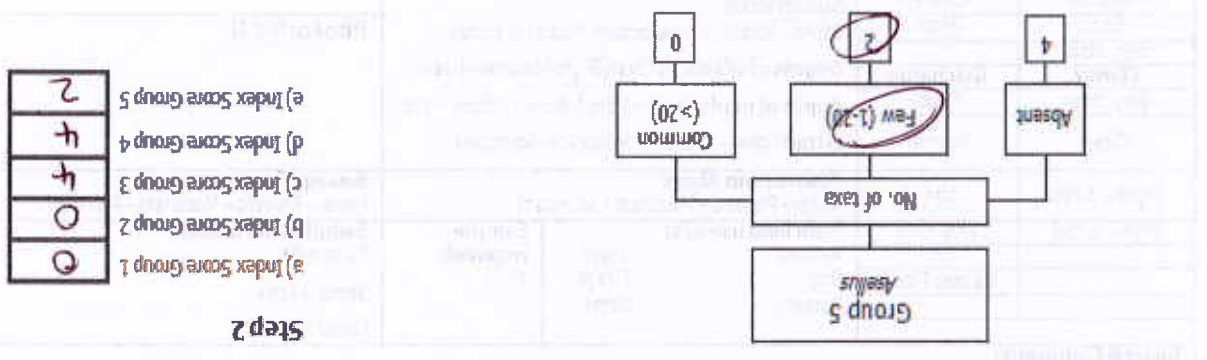
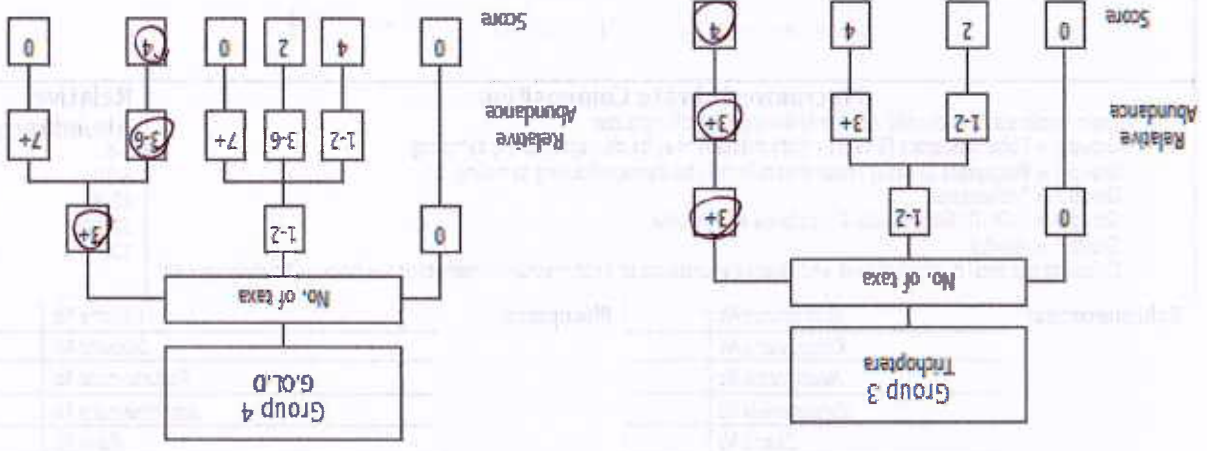
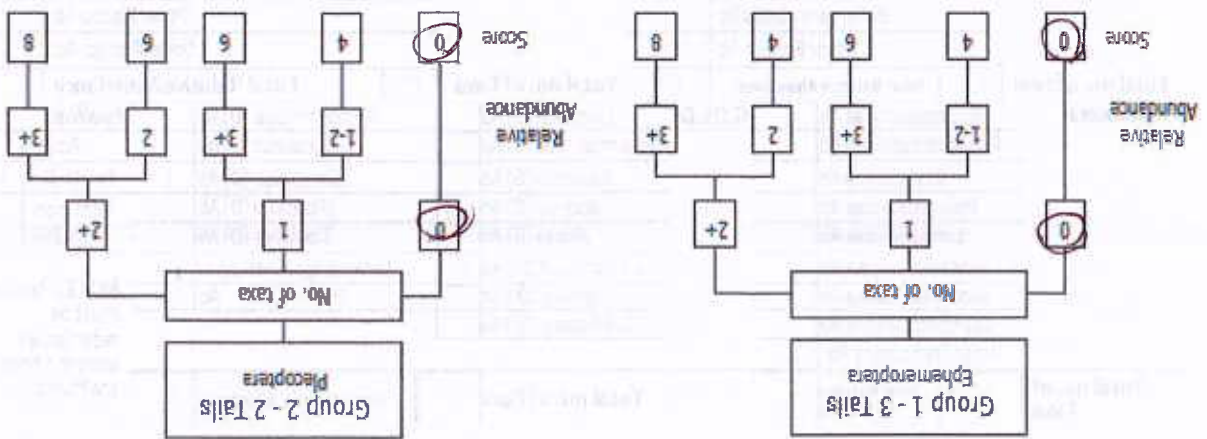
General Comments:

Gammarus Resent (~25)

Macroinvertebrate Composition				Relative Abundance	
The macroinvertebrates are divided into the following 5 specific groups				1-5	1
• Group 1 = Ephemeroptera (3-tails) - note that tails may be damaged during sampling				6-20	2
• Group 2 = Plecoptera (2-tails) - note that tails may be damaged during sampling				21-50	3
• Group 3 = Trichoptera				51-100	4
• Group 4 = G.O.L.D (Gastropoda, Oligochaeta and Diptera)				101+	5
• Group 5 = Asellus					
• Calculate the total number of taxa and relative abundance of each macroinvertebrate group below: (Abundance - Ab)					
Ephemeroptera:		Plecoptera:			
<u>Ectocarus</u> Ab		<u>Leuctra</u> Ab			
<u>Rhyacoptera</u> Ab		<u>Isoneta</u> Ab			
<u>Heptagenia</u> Ab		<u>Protonemura</u> Ab			
<u>Ephemera</u> Ab		<u>Amphinemura</u> Ab			
<u>Gaeta</u> Ab		<u>Baetis</u> Ab			
<u>Paraleptanobletia</u> Ab		<u>Dinocras</u> Ab			
<u>Ephemera danica</u> Ab		Other Plecop Ab			
Other Ephem Ab		Other Plecop Ab			
Total no. of taxa	<u>0</u>	Total Relative Abundance	<u>0</u>	Total no. of Taxa	<u>0</u>
Trichoptera:		G.O.L.D:		Asellus:	
<u>Hydropsychidae</u> Ab		<u>Lymnaea</u> (G) Ab		<u>Chironomidae</u> (D) Ab	
<u>Polycentropodidae</u> Ab		<u>Batamomyzus</u> (G) Ab		<u>Chironomus</u> (D) Ab	
<u>Rhyacophila</u> Ab		<u>Planorbis</u> (G) Ab		<u>Simuliidae</u> (D) Ab	
<u>Philopotamidae</u> Ab		<u>Anodis</u> (G) Ab		1	
<u>Limnephilidae</u> Ab		<u>Physa</u> (G) Ab		<u>Dicranota</u> (D) Ab	
<u>Sericostomatidae</u> Ab		<u>Lumbriculus</u> (O) Ab		<u>Tipulidae</u> (D) Ab	
<u>Glossosomatidae</u> Ab		1		<u>Ceratopogonidae</u> (O) Ab	
<u>Leptostomatidae</u> Ab		<u>Eisenella</u> (O) Ab		1	
Other Trichoptera Ab		<u>Tubificidae</u> (O) Ab		Other GOLD Ab	
Total no. of Taxa	<u>3</u>	Total Relative Abundance	<u>5</u>	Total no. of Taxa	<u>3</u>
				Total Relative Abundance	<u>3</u>
				NOTE: Asellus must be recorded as absent if none are found	

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.

**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 2**

a) Index Score Group 1	0
b) Index Score Group 2	0
c) Index Score Group 3	4
d) Index Score Group 4	4
e) Index Score Group 5	2

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

Total Index Score (TIS) sum (attributed) **10**  
 Average Index Score (AIS) TIS/5 (5 for 5 groups) **2**  
 SSR Score (AIS x 2) **4**

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

Probably not at risk > 7.25

> 6.5 - 7.25 Indeterminate

> 6.5 Stream at risk

Surveyor (signed): *[Signature]* Name (print): *BAN WAHGEN* Date: *31/8/22*

River: <u>Ballyegan Stream</u>	Code:	Date: <u>31/8/22</u>	Time: <u>11:15</u>
Station no. <u>Site 6A</u>	Location: <u>Ballyegan Landfill</u>		Grid (6 figure):
Field Chemistry		Stream Order:	Stream flow: Riffle Riffle/Glide <u>Slow flow</u>
DO%	Modifications: <u>Y/N</u> Canalised-widened-bank erosion-arterial drainage		
DO mg/l	Dominant Types: <u>Bedrock</u>		
Temp (°C)	<u>Boulder (&gt;128mm)</u>		
Conductivity	<u>Cobble (32-128mm)</u>		
pH	<u>Gravel (8-32mm)</u>		
Bank width (cm)	<u>Fine Gravel (2-8mm)</u>		
Wet width (cm)	Sand (0.25-2mm)		
Avg Depth (cm)	Silt (<0.25mm)		
Staff gauge	Slope: <u>Low</u> - Medium - High - Very High		Shading: High - <u>Moderate</u> - Low - None
Velocity	Colour	Geology: <u>Calcareous-Siliceous-Mixed</u>	Cattle access Y: upstream - downstream <u>(or N)</u>
Torrential	<u>None</u>	Substratum Condition: <u>Calcareous-Compacted-Loose</u> - Normal	Photo <u>Y</u> / N
<u>Fast</u>	Slight	Substratum:	
<u>Moderate</u>	Moderate	<u>Stony bottom</u> - Muddy bottom - Mud over stones	
Slow	High	Degree of siltation: <u>Clean-Slight</u> - <u>Moderate</u> - Heavy	
Very slow	Discharge	Depth of mud: None < 1cm - <u>1-5cm</u> - 5-10cm - > 10cm	
Clarity	Flood	Litter: None - <u>Present</u> - Moderate - Abundant	
Very clear	<u>Normal</u>	Filamentous Algae: None - Present - Moderate - Abundant	Sewage Fungus: None - Present - Moderate - Abundant
<u>Clear</u>	Low	Main land use u/s:	Sample retained: <u>Y</u> / <u>N</u>
Slightly turbid	Very Low	Pasture	<u>Sampled in Minutes:</u>
Highly turbid	Dry	Bog	<u>Pond net</u>
	Recent Flood	Forestry	Stone wash x
		Urban Tillage Other	Weed sweep x

General Comments:

Gammarus present (~25)

Macroinvertebrate Composition

The macroinvertebrates are divided into the following 5 specific groups

- Group 1 = Ephemeroptera (3-tails) - note that tails may be damaged during sampling
- Group 2 = Plecoptera (2-tails) - note that tails may be damaged during sampling
- Group 3 = Trichoptera
- Group 4 = G.O.L.D (Gastropoda, Oligochaeta and Diptera)
- Group 5 = Asellus
- Calculate the total number of taxa and relative abundance of each macroinvertebrate group below: (Abundance - Ab)

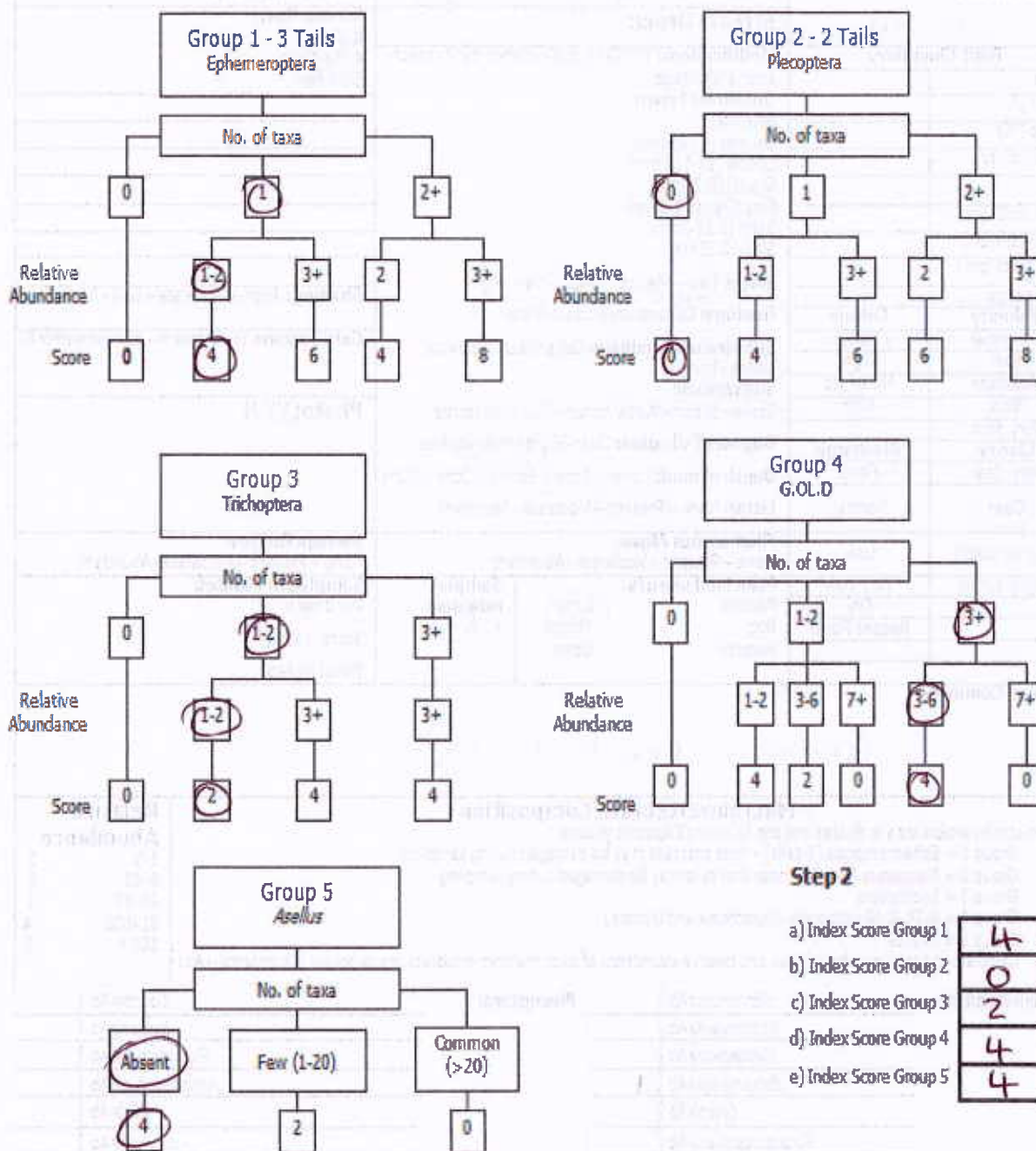
Relative Abundance

1-5	1
6-20	2
21-50	3
51-100	4
101+	5

<b>Ephemeroptera:</b>		<b>Plecoptera:</b>	
<u>Ectyopus</u> Ab		<u>Leuctra</u> Ab	
<u>Rhyacoptera</u> Ab		<u>Isopoda</u> Ab	
<u>Heptagenia</u> Ab		<u>Protonemura</u> Ab	
<u>Ephemerella</u> Ab	1	<u>Amphinemura</u> Ab	
<u>Gaenis</u> Ab		<u>Baetis</u> Ab	
<u>Paraleptophlebia</u> Ab		<u>Dinocras</u> Ab	
<u>Ephemerella danica</u> Ab		Other Plecop Ab	
Other Ephem Ab		Other Plecop Ab	
Total no. of taxa	1	Total no. of Taxa	0
Total Relative Abundance	1	Total Relative Abundance	0
<b>Trichoptera:</b>		<b>G.O.L.D:</b>	
<u>Hydropsychidae</u> Ab		<u>Lymnaea</u> (G) Ab	
<u>Polycentropodidae</u> Ab		<u>Potamogeton</u> (G) Ab	
<u>Rhyacophila</u> Ab		<u>Planorbis</u> (G) Ab	3
<u>Philopotamidae</u> Ab		<u>Anolis</u> (G) Ab	
<u>Limnephilidae</u> Ab		<u>Physa</u> (G) Ab	
<u>Senecostomatidae</u> Ab	2	<u>Lumbriculus</u> (O) Ab	
<u>Glossosomatidae</u> Ab		<u>Eiseniella</u> (O) Ab	
<u>Lepidostomatidae</u> Ab		<u>Tubificidae</u> (O) Ab	
Other Trichoptera Ab			
Total no. of Taxa	1	Total no. of Taxa	3
Total Relative Abundance	2	Total Relative Abundance	5
		<b>Chironomidae (D) Ab</b>	
		<u>Chironomus</u> (D) Ab	
		<u>Simuliidae</u> (D) Ab	
		<u>Dicranota</u> (D) Ab	
		<u>Tipulidae</u> (D) Ab	
		<u>Ceratopogonidae</u> (D) Ab	
		Other GOLD Ab	
		<b>Asellus:</b>	
		Absent ✓	
		Fav (1-20)	
		Common (>20)	
		NOTE: Asellus must be recorded as absent if none are found	

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.

**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

Total Index Score (TIS) sum (a+b+c+d+e) **14**

Average Index Score (AIS) TIS/5 (5 for 5 groups) **2.8**

SSR Score (AIS x 2) **5.6**

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

> 7.25  
Probably not at risk

> 6.5 - 7.25  
Indeterminate  
Stream may be at risk

< 6.5  
Stream at risk

Surveyor (signed): Dan Hayden Name (print): DAN HAYDEN Date: 31 / 8 / 22



# FEHILY TIMONEY

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