

Environmental Impact Assessment Report (EIAR)

Volume 6 of 6: Appendices

(Appendix A9.6) Laboratory Analysis and In Situ Results

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Acronyms and Abbreviations

Acronym	Description
ECSR	European Communities Environmental Objectives (Surface Water) Regulations 2009 - 2019
ECQSW	European Communities (Quality of Salmonid Waters) Regulations 1988
UWWT	Urban Waste Water Treatment Regulations for Ireland 2001
WFD	Water Framework Directive
BOD	Biological Oxygen Demand
COD	Chemical Oxygen Demand
CaCO ₃	Calcium Carbonate
MCPA	2-methyl-4-chlorophenoxyacetic acid
MCPB	4-butanoic acid
2,4 – DB	2,4-dichlorophenoxybutyric acid
diss. filt	Dissolved filtered
l	Litre
N	Nitrogen
P	Phosphorus
mS/cm	Millisiemens per centimetre
mg	Milligram
µg	Microgram

Laboratory Analysis and In Situ Results 2016 – 2017

1. Introduction

1. This Annex provides the Laboratory Analysis and In Situ results for spot samples taken during field surveys for the Proposed Project in 2016 and 2017.
2. Table 1 sets out the surface water receptors, organising the latter around WFD water body names and EPA names for ease of reference, alongside the sampling point numbers.
3. These results contribute to the understanding of the baseline conditions of the surface water receptors.

Table 1.1: Laboratory Analysis and In Situ Results for WSP Project Spot Sampling 2016-2017

				Conductivity - Electrical 20C	Total Hardness as CaCO3	Ammonia as NH3, Calculated	Ammoniacal Nitrogen as N	Nitrate as N	Phosphate, Ortho as P	Total Suspended Solids	Dissolved Oxygen, Fixed	EH >C6 - C40	EH >C6 - C8	EH >C8 - C10	EH >C16 - C24	EH >C24 - C40	EH >C10 - C16	Ammonium as NH4 (Calc)	BOD5 + ATU	pH	In-situ Results								
Unit				uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	pH		pH	C	%	uS/cm				
Fresh Water EQS (AA)						High status < 0.040 (mean) or < 0.090 (95%ile) Good status < 0.065 (mean) or < 0.140 (95%ile)													High status < 1.3 (mean (1)) or < 2.2 (95%ile) Good status < 1.5 (mean (1)) or 2.6 (95%ile)	4.5 < pH < 9.0 (S) 6.0 < pH < 9.0 (H)		4.5 < pH < 9.0 (S) 6.0 < pH < 9.0 (H)	Not greater than a 1.5°C rise in ambient temperature outside the mixing zone	95%ile > 80% saturation 95%ile < 120% saturation					
WFD Waterbody Name	EPA Watercourse Name	Sample No & Watercrossing ID (WCX)																											
Oct 2016	Kilmastulla_040	Incha_Beg	1 (WCX001)	198	85.2	<0.5	<0.41	0.7	<0.6	2	10.1	<10	<10	<10	<10	<10	<10	<0.53	<2	7.8		7.56	12.6	98.7	234				
May 2017				No sample taken - land access																									
Oct 2016		Knockadromin	2 (WCX005)		203	94.3	<0.5	<0.41	0.7	<0.6	3	11	<10	<10	<10	<10	<10	<10	<0.53	<2	8.2		8	12.7	101.4	232.8			
May 2017					No sample taken - land access																								
Oct 2016		Kilmastulla	3		416	22	<0.5	<0.41	1.5	<0.6	2	12	<10	<10	<10	<10	<10	<10	<0.53	<2	8.3		8.19	N/A	109.4	468.5			
May 2017					517	259	<0.5	<0.41	1.8	<0.6	3	12	<10	<10	<10	<10	<10	<10	<10	<0.53	<1	8.3		7.83	13.87	91.8	475		
Oct 2016					Burgesbeg	4 (WCX009)		224	104	<0.5	<0.41	2.1	<0.6	1	10.3	<10	<10	<10	<10	<10	<10	<0.53	<2	8.2		8.14	13	99.2	257.5
May 2017								252	113	<0.5	<0.41	2.3	<0.6	2	9.5	<10	<10	<10	<10	<10	<10	<10	<0.53	<1	8.1		7.88	14.85	71	198
Oct 2016	Kilmastulla_020	Gortmore 25	1N (WCX010)	Not Sampled in 2016																									
May 2017				372	160	<0.5	<0.41	4.6	<0.6	34	9.2	108	<10	<10	<10	108	<10	<0.53	<1	8.1		8.09	14.58	77	286				
Oct 2016		Carrigal	2N (WCX011)	Not Sampled in 2016																									
May 2017				No sample taken - land access																									
Oct 2016		Mountsack	3N (WCX012)	Not Sampled in 2016																									
May 2017				No sample taken - land access																									
Oct 2016		Cloghleigh	4N (WCX013)	Not Sampled in 2016																									
May 2017				<10	262	<0.5	<0.41	8.4	<0.6	188	9	26	<10	<10	<10	26	<10	<0.53	<1	7.9		8.29	12	77.1	.....			
Oct 2016	Patrickswell 25	5N (WCX014)	Not Sampled in 2016																										
May 2017			<10	184	<0.5	<0.41	3.3	<0.6	6	3.9	<10	<10	<10	<10	<10	<10	<0.53	1	8.2		7.81	8.36	70	266					
Oct 2016	Ardregane Stream_010	Toorfune	5	381	210	<0.5	<0.41	2.7	<0.6	2	8.1	<10	<10	<10	<10	<10	<10	<0.53	<2	8.1		7.89	11.3	92.6	456.9				
May 2017				475	202	<0.5	<0.41	2.3	<0.6	6	3.3	<10	<10	<10	<10	<10	<10	<10	<0.53	<1	8		7.93	9.96	75	321			
Oct 2016	Ardregane Stream_020	Ardregane Stream	6N (WCX011)	Not Sampled in 2016																									
May 2017				<10	164	<0.5	<0.41	5.4	<0.6	6	4.5	<10	<10	<10	<10	<10	<10	<10	<0.53	<1	8.3		8.39	9.8	90	256			

				Conductivity- Electrical 20C	Total Hardness as CaCO3	Ammonia as NH3, Calculated	Ammoniacal Nitrogen as N	Nitrate as N	Phosphate, Ortho as P	Total Suspended Solids	Dissolved Oxygen, Fixed	EH >C6 - C40	EH >C6 - C8	EH >C8 - C10	EH >C16 - C24	EH >C24 - C40	EH >C10 - C16	Ammonium as NH4 (Calc)	BOD5 + ATU	pH	In-situ Results					
Unit				uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	pH		pH	C	%	uS/cm	
Fresh Water EQS (AA)						High status < 0.040 (mean) or < 0.090 (95%ile) Good status < 0.065 (mean) or < 0.140 (95%ile)													High status < 1.3 (mean (1)) or < 2.2 (95%ile) Good status < 1.5 (mean (1)) or 2.6 (95%ile)	4.5 < pH < 9.0 (S) 6.0 < pH < 9.0 (H)		4.5 < pH < 9.0 (S) 6.0 < pH < 9.0 (H)	Not greater than a 1.5°C rise in ambient temperature outside the mixing zone	95%ile > 80% saturation 95%ile < 120% saturation		
WFD Waterbody Name	EPA Watercourse Name	Sample No & Watercrossing ID (WCX)																								
Oct 2016	Fatthen	6 (WCX012)	306	162	<0.5	<0.41	3.2	<0.6	12	8.8	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	8.3		8.11	25	99.3	.....
May 2017			373	169	<0.5	<0.41	2.8	<0.6	5	4.7	<10	<10	<10	<10	<10	<10	<10	<10	<0.53	<1	8.2		8.41	10.28	88	254
Oct 2016		Ardgregane Stream	7	No sample taken – land access																						
May 2017				Dry - no sample																						
Oct 2016		Ardgregane Stream	8 (WCX013)	487	276	<0.5	<0.41	2.9	<0.6	5	8	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	8.2		7.98	10.1	90.2	.....
May 2017				653	329	<0.5	<0.41	3	<0.6	5	3.6	<10	<10	<10	<10	<10	<10	<10	<10	<0.53	1	8.1		8.14	10.00	87	444
Oct 2016		Monsea 25	9 (WCX014)	Not enough water to take a sample																						
May 2017				796	373	<0.5	<0.41	1.2	<0.6	81	3	64	<10	<10	<10	<10	<10	<10	<10	<0.53	1	8		8.13	11	74	561
Oct 2016		Monsea 25	10 (WCX015)	622	433	<0.5	<0.41	0.8	<0.6	2	5.5	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	7.8		7.44	10.3	61.1	.....
May 2017				Dry - no sample																						
Oct 2016	Nenagh River	11 (WCX016)	436	228	<0.5	<0.41	3.8	<0.6	2	12.3	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	8.5		8.36	12	114.3	.....
May 2017			615	245	<0.5	<0.41	3.8	<0.6	16	3.1	<10	<10	<10	<10	<10	<10	<10	<10	<0.53	1	8.2		8.65	16.33	137.3	494
Oct 2016	Nenagh_070	Upper Ballyanny	7N (WCX017)	Not Sampled in 2016																						
May 2017				Dry - no sample																						
Oct 2016	Ardcrony Stream	12 (WCX018)	Dry - no sample																							
May 2017			698	367	0.5	0.45	3.7	<0.6	4	3.5	<10	<10	<10	<10	<10	<10	<10	<10	0.58	<2	8.2		8.49			
Oct 2016	Shesheraghmore	13 (WCX019)	Dry - no sample																							
May 2017			Dry - no sample																							
Oct 2016	Ballyfinboy_040	Ballyfinboy River	605	399	<0.5	<0.41	5.7	<0.6	8	9.9	<10	<10	<10	<10	<10	<10	<10	<0.53	2	8.4		8.1	10	97.6	.....
May 2017			723	372	<0.5	<0.41	3.3	<0.6	6	4.9	<10	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	8.2		9.32	10.77	95.9	489
Oct 2016	Kilcomin Stream_030	Derrinclare	15 (WCX022)	Not enough water to take a sample																						
May 2017				797	446	<0.5	<0.41	1.5	<0.6	8	3.2	<10	<10	<10	<10	<10	<10	<10	<10	<0.53	2	8.1		8.02	9.07	67	528
Oct 2016	Derrinclare	15.1	638	424	<0.5	<0.41	3.1	<0.6	2	7.4	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	8		7.43	10.7	75	.....

				Conductivity- Electrical 20C	Total Hardness as CaCO3	Ammonia as NH3, Calculated	Ammoniacal Nitrogen as N	Nitrate as N	Phosphate, Ortho as P	Total Suspended Solids	Dissolved Oxygen, Fixed	EH >C6 - C40	EH >C6 - C8	EH >C8 - C10	EH >C16 - C24	EH >C24 - C40	EH >C10 - C16	Ammonium as NH4 (Calc)	BOD5 + ATU	pH	In-situ Results					
Unit				uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	pH			pH	Temperature	Dissolved Oxygen	Conductivity
Fresh Water EQS (AA)						High status < 0.040 (mean) or < 0.090 (95%ile) Good status < 0.065 (mean) or < 0.140 (95%ile)													High status < 1.3 (mean (1)) or < 2.2 (95%ile) Good status < 1.5 (mean (1)) or 2.6 (95%ile)	4.5 < pH < 9.0 (S) 6.0 < pH < 9.0 (H)		4.5 < pH < 9.0 (S) 6.0 < pH < 9.0 (H)	Not greater than a 1.5°C rise in ambient temperature outside the mixing zone	95%ile > 80% saturation 95%ile < 120% saturation		
	WFD Waterbody Name	EPA Watercourse Name	Sample No & Watercrossing ID (WCX)																							
May 2017			(WCX023)	798	415	<0.5	<0.41	4.2	<0.6	6	4.3	<10	<10	<10	<10	<10	<10	<0.53	1	8		8	12.79	84	580	
Oct 2016	Shinrone Stream_010	Shinrone Stream	8N (WCX024)	Not Sampled in 2016																						
May 2017				635	328	0.9	0.71	3.3	<0.6	15	4.8	17	<10	<10	<10	<10	17	<10	0.92	<2	8.2		8.39	11.79	90	444
Oct 2016		Quakerstown	9N (WCX025)	Not Sampled in 2016																						
May 2017				694	367	0.7	0.55	3.6	<0.6	28	3.8	21	<10	<10	<10	<10	21	<10	0.71	2	7.8		8.14	11.65	92	490
Oct 2016	Little Brosna_030	Little Brosna River	16 (WCX026)	No sample taken – land access																						
May 2017				643	352	<0.5	<0.41	3.4	<0.6	33	5.7	<10	<10	<10	<10	<10	<10	<10	<0.53	1	7.9		8.39	13.78	119	508
Oct 2016	Birr (Rock)_010	Rock (Birr)	17 (WCX027)	597	385	<0.5	<0.41	2.7	<0.6	4	9.4	<10	<10	<10	<10	<10	<10	<0.53	5	8.3		7.02	11.8	93.7	.....
May 2017				683	370	0.5	0.43	2.9	<0.6	8	4.3	73	<10	<10	<10	<10	73	<10	0.55	1	8.2		8.31	12.25	87	498
Oct 2016		North Kilcolman	10N	Not Sampled in 2016																						
May 2017				754	402	0.6	0.48	4.6	<0.6	6	3.6	<10	<10	<10	<10	<10	<10	<10	0.62	2	7.9		7.5	10.28	84	512
Oct 2016	Clareen Stream/Fuarn_020	Kilmaine 25	18 (WCX028)	558	373	<0.5	<0.41	2.4	<0.6	26	9.9	<10	<10	<10	<10	<10	<10	<0.53	<2	8.1		8.03	10.2	95.6	.....
May 2017				639	368	<0.5	<0.41	3.4	<0.6	36	3.9	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	7.8		8.18	10.18	84	462
Oct 2016		Clareen Stream	19 (WCX029)	563	364	<0.5	<0.41	3.7	<0.6	23	10.1	<10	<10	<10	<10	<10	<10	<0.53	<2	8		8.1	9.4	97.2	.....
May 2017				649	375	<0.5	<0.41	4	<0.6	40	4.3	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	7.8		8.21	9.78	90	462
Oct 2016	Camcor_030	Breaghmore	11N / 20.1 (WCX031)	433	270	<0.5	<0.41	1.4	<0.6	10	11	<10	<10	<10	<10	<10	<10	<0.53	<2	8.4		8.09	9.7	102.3	.....
May 2017				510	269	<0.5	<0.41	1.7	<0.6	16	4.3	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	8.2		8.48	11.42	94	361
Oct 2016		Upper Coagh	20 (WCX033)	Not enough water to take a sample																						
May 2017				710	367	<0.5	<0.41	4	<0.6	8	3.7	19	<10	<10	<10	<10	19	<10	<0.53	7.8	2		8.07	12.45	80	505
Oct 2016	Kyleboher_010	Kyleboher	13N	Not Sampled in 2016																						
May 2017				513	302	<0.5	<0.41	<0.7	<0.6	31	4.6	33	<10	<10	<10	<10	33	<10	<0.53	3	8.1		8.29	13.93	69	373

				Conductivity- Electrical 20C	Total Hardness as CaCO3	Ammonia as NH3, Calculated	Ammoniacal Nitrogen as N	Nitrate as N	Phosphate, Ortho as P	Total Suspended Solids	Dissolved Oxygen, Fixed	EH >C6 - C40	EH >C6 - C8	EH >C8 - C10	EH >C16 - C24	EH >C24 - C40	EH >C10 - C16	Ammonium as NH4 (Calc)	BOD5 + ATU	pH	In-situ Results			
Unit				uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	pH	pH	Temperature	Dissolved Oxygen	Conductivity
Fresh Water EQS (AA)						High status < 0.040 (mean) or < 0.090 (95%ile) Good status < 0.065 (mean) or < 0.140 (95%ile)													High status < 1.3 (mean (1)) or < 2.2 (95%ile) Good status < 1.5 (mean (1)) or 2.6 (95%ile)	4.5 < pH < 9.0 (S) 6.0 < pH < 9.0 (H)	4.5 < pH < 9.0 (S) 6.0 < pH < 9.0 (H)	Not greater than a 1.5°C rise in ambient temperature outside the mixing zone	95%ile > 80% saturation 95%ile < 120% saturation	
WFD Waterbody Name	EPA Watercourse Name	Sample No & Watercrossing ID (WCX)																						
Oct 2016	Silver (Kilcormac)_030	Kilgolán Lower	21 (WCX035)	Dry - no sample																				
May 2017				Dry - no sample																				
Oct 2016	Silver (Kilcormac)_020	Silver [Kilcormac]	14N (WCX036)	Not Sampled in 2016																				
May 2017				374	192	<0.5	<0.41	1.1	<0.6	4	6.5	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	8.1	7.76	14.18	89	314
Oct 2016		Gortacur	22 (WCX037)	275	146	<0.5	<0.41	0.7	<0.6	5	6.7	<10	<10	<10	<10	<10	<10	<0.53	1	8.1	7.91	10.9	96.6
May 2017				Dry - no sample																				
Oct 2016		House Derries	15N (WCX038)	Not Sampled in 2016																				
May 2017				530	320	<0.5	<0.41	1.7	<0.6	20	4.5	<10	<10	<10	<10	<10	<10	<10	<0.53	1	8	8.15	14.9	72	463
Oct 2016	Clodaigh (Tullamore)_020	Clodaigh (Tullamore)	23 (WCX039)	Dry - no sample																				
May 2017				Dry - no sample																				
Oct 2016		Poland's Lough	16N	Not Sampled in 2016																				
May 2017				Dry - no sample																				
Oct 2016		Unnamed Tributary to Clodaigh (Tullamore)	24	Dry - no sample																				
May 2017				637	385	<0.5	<0.41	0.8	<0.6	5	4.3	14	<10	<10	<10	<10	<10	<10	<0.53	1	7.7	7.78	10.82	79	459
Oct 2016		Clodiagh (Tullamore)	25 (WCX039)	98.8	52.7	<0.5	<0.41	<0.7	<0.6	5	9	<10	<10	<10	<10	<10	<10	<0.53	<2	7.5	7.74	9.6	98.1	
May 2017				319	165	<0.5	<0.41	<0.7	<0.6	9	6.4	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	7.9	8.24	12.49	83	242
Oct 2016	Killeigh Stream	26	Dry - no sample																					
May 2017			Dry - no sample																					
Oct 2016	Meelaghans_010	Toberfin (River) / Finter	17N (WCX041 /WBX053)	Not Sampled in 2016																				
May 2017				549	325	<0.5	<0.41	3.3	<0.6	10	6.4	<10	<10	<10	<10	<10	<10	<10	<0.53	1	7.8	8.17	13.8	98	494
Oct 2016	Tullamore_020	Annagharvey 25	27 (WCX043)	552	379	<0.5	<0.41	<0.7	<0.6	4	7.6	<10	<10	<10	<10	<10	<10	<0.53	<2	8	7	9.5	90	
May 2017				626	369	<0.5	<0.41	2.2	<0.6	5	5	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	8	8.25	12.41	95	510

				Conductivity- Electrical 20C	Total Hardness as CaCO3	Ammonia as NH3, Calculated	Ammoniacal Nitrogen as N	Nitrate as N	Phosphate, Ortho as P	Total Suspended Solids	Dissolved Oxygen, Fixed	EH >C6 - C40	EH >C6 - C8	EH >C8 - C10	EH >C16 - C24	EH >C24 - C40	EH >C10 - C16	Ammonium as NH4 (Calc)	BOD5 + ATU	pH	In-situ Results					
Unit				uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	pH			pH	Temperature	Dissolved Oxygen	Conductivity
Fresh Water EQS (AA)						High status < 0.040 (mean) or < 0.090 (95%ile) Good status < 0.065 (mean) or < 0.140 (95%ile)													High status < 1.3 (mean (1)) or < 2.2 (95%ile) Good status < 1.5 (mean (1)) or 2.6 (95%ile)			4.5 < pH < 9.0 (S) 6.0 < pH < 9.0 (H)	4.5 < pH < 9.0 (S) 6.0 < pH < 9.0 (H)	Not greater than a 1.5°C rise in ambient temperature outside the mixing zone	95%ile > 80% saturation 95%ile < 120% saturation	
	WFD Waterbody Name	EPA Watercourse Name	Sample No & Watercrossing ID (WCX)																							
Oct 2016		Tullamore 25	28 (WCX045)	644	435	<0.5	<0.41	2.6	<0.6	4	5.3	<10	<10	<10	<10	<10	<10	<0.53	<2	7.9		7.85	10	93.2		
May 2017				605	353	<0.5	<0.41	1.3	<0.6	21	5	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	8.3		8.3	12.86	90	494
Oct 2016	Daingean_030	Esker_Beg	18N (WCX047)	Not Sampled in 2016																						
May 2017				Dry - no sample																						
Oct 2016		Daingean	29 (WCX048)	479	339	<0.5	<0.41	1.1	<0.6	65	6.4	12	<10	<10	<10	12	<10	<0.53	<2	7.5		7.51	11.9	70.4		
May 2017				568	323	<0.5	<0.41	0.9	<0.6	4	10.1	<10	<10	<10	<10	<10	<10	<10	<10	<0.53	2	8		8.2	14.32	90	461
Oct 2016	Esker Stream_010	Esker (Stream)	30.1 (WCX049)	467	296	<0.5	<0.41	<0.7	<0.6	4	6.6	<10	<10	<10	<10	<10	<10	<0.53	<2	7.7		7.70	10.7	83.6		
May 2017				536	290	<0.5	<0.41	1.5	<0.6	6	8	<10	<10	<10	<10	<10	<10	<10	<0.53	1	8		8.25	13.33	76	417
Oct 2016		Rathcobican	30 (WCX050)	540	362	<0.5	<0.41	<0.7	<0.6	4	5.1	<10	<10	<10	<10	<10	<10	<0.53	<2	7.5		7.42	10.5	60.8		
May 2017				540	300	<0.5	<0.41	1.6	<0.6	8	7	<10	<10	<10	<10	<10	<10	<10	<0.53	1	8.1		8.39	14.35	94	439
Oct 2016	Esker Stream_020	Esker (Stream)	19N (WCX051)	Not Sampled in 2016																						
May 2017				529	287	<0.5	<0.41	1.6	<0.6	9	7.5	<10	<10	<10	<10	<10	<10	<10	<0.53	1	8		8.24	13.58	78	421
Oct 2016		Esker (Stream)	31 (WCX053)	No sample taken - land access																						
May 2017																										
Oct 2016		Leitrim 14	32 (WCX054)	354	240	<0.5	<0.41	1.2	<0.6	4	7.2	<10	<10	<10	<10	<10	<10	<0.53	<2	7.7		7.71	11	84.6	N/A	
May 2017				451	239	0.7	0.55	2	<0.6	11	7.2	20	<10	<10	<10	<10	20	<10	0.7	<2	7.7		8.07	11.44	69	332
Oct 2016	Figile_030	Figile	33	No sample taken - land access																						
May 2017				No sample taken - land access																						
Oct 2016		Ballykilleen	34 (WCX055)	552	382	<0.5	<0.41	<0.7	<0.6	6	5.7	<10	<10	<10	<10	<10	<10	<0.53	<2	7.9		7.91	10.9	81.7		
May 2017				658	383	<0.5	<0.41	1.5	<0.6	11	7.6	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	8.1		8.33	9.81	75	474
Oct 2016		Figile	35 (WCX056)	350	223	<0.5	<0.41	1.3	<0.6	5	7.2	22	<10	<10	22	<10	<0.53	<2	7.8		7.57	9.9	81.4			
May 2017				538	287	3.3	2.69	1.6	<0.6	16	2.9	43	<10	<10	<10	43	<10	3.47	5	7.6		8.07	16.91	46	465	
Oct 2016		Figile	36	No sample taken - land access																						

				Conductivity- Electrical 20C	Total Hardness as CaCO3	Ammonia as NH3, Calculated	Ammoniacal Nitrogen as N	Nitrate as N	Phosphate, Ortho as P	Total Suspended Solids	Dissolved Oxygen, Fixed	EH >C6 - C40	EH >C6 - C8	EH >C8 - C10	EH >C16 - C24	EH >C24 - C40	EH >C10 - C16	Ammonium as NH4 (Calc)	BOD5 + ATU	pH	In-situ Results						
Unit				uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	pH		pH	Temperature	Dissolved Oxygen	Conductivity		
Fresh Water EQS (AA)						High status < 0.040 (mean) or < 0.090 (95%ile) Good status < 0.065 (mean) or < 0.140 (95%ile)													High status < 1.3 (mean (1)) or < 2.2 (95%ile) Good status < 1.5 (mean (1)) or 2.6 (95%ile)	4.5 < pH < 9.0 (S) 6.0 < pH < 9.0 (H)		4.5 < pH < 9.0 (S) 6.0 < pH < 9.0 (H)	Not greater than a 1.5°C rise in ambient temperature outside the mixing zone	95%ile > 80% saturation 95%ile < 120% saturation			
WFD Waterbody Name	EPA Watercourse Name	Sample No & Watercrossing ID (WCX)																									
May 2017			(WCX057)	No sample taken – land access																							
Oct 2016				Not Sampled in 2016																							
May 2017	Figile_020	Figile	20N	No sample taken – land access																							
Oct 2016		Figile	37 (WCX058)	538	282	<0.5	<0.41	1.5	<0.6	4	6.2	20	<10	<10	<10	20	<10	<0.53	<2	7.9		7.82	9.7	9.61			
May 2017		Figile	38 (WCX082)	571	295	4.7	3.86	1.2	<0.6	10	3.7	<10	<10	<10	<10	<10	<10	<10	4.98	5	7.7		8.14	16.38	76	506	
Oct 2016		Abbeylough_010	Abbeylough	38 (WCX082)	376	233	<0.5	<0.41	<0.7	<0.6	4	8.2	<20	<20	<20	<20	<20	<20	<0.53	2	7.8		7.62	9.7	8.82		
May 2017	Abbeylough_010	Abbeylough	38 (WCX082)	494	273	<0.5	<0.41	1.6	<0.6	6	5.8	<10	<10	<10	<10	<10	<10	<0.53	<5	7.6		7.93	14.43	64	421		
Oct 2016	N/A	Grand Canal	N / A (WBX078)	N / A																							
May 2017				N / A																							
Oct 2016	Figile_010	Figile / Cushaling (River)	21N (WCX060)	Not Sampled in 2016																							
May 2017				No sample taken – land access																							
Oct 2016	Blackwater (Longwood)_010	Mulgeeth	39 (WCX061)	192	118	<0.5	<0.41	<0.7	<0.6	5	6	<20	<20	<20	<20	<20	<20	<0.53	2	7.5		7.21	10.5	74.3			
May 2017				346	184	<0.5	<0.41	<0.7	<0.6	5	5.2	<10	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	7.5		7.93	15.37	67	292
Oct 2016		Mulgeeth	40 (WCX062)	327	200	<0.5	<0.41	1	<0.6	5	6.7	<40	<40	<40	<40	<40	<40	<0.53	1	7.7		7.38	10.7	79.9			
May 2017				537	291	<0.5	<0.41	1.4	<0.6	9	5	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	7.5		7.8	15.05	85	449	
Oct 2016		Derrycrib	41 (WCX064)	No sample taken – land access																							
May 2017				639	369	<0.5	<0.41	2.6	<0.6	8	9	<10	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	8		8.3	15.45	93	539
Oct 2016	Blackwater [Longwood]	22N (WCX065)	Not Sampled in 2016																								
May 2017			617	343	<0.5	<0.41	1.1	<0.6	2	6.7	<10	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	7.9		8.32	14.94	95	513	
Oct 2016	Clonshanbo_010	Aghafullim	23N (WCX066)	Not Sampled in 2016																							
May 2017				622	360	<0.5	<0.41	<0.7	<0.6	16	4.7	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	8		8.53	17.13	78	570	
Oct 2016		Baltracy Trib Lyreen	42 (WCX067)	No sample taken – land access																							
May 2017	700			316	<0.5	<0.41	<0.7	<0.6	17	5.6	<10	<10	<10	<10	<10	<10	<10	<10	<0.53	<2	8		8.43	18.68	94	629	

				Conductivity- Electrical 20C	Total Hardness as CaCO3	Ammonia as NH3, Calculated	Ammoniacal Nitrogen as N	Nitrate as N	Phosphate, Ortho as P	Total Suspended Solids	Dissolved Oxygen, Fixed	EH >C6 - C40	EH >C6 - C8	EH >C8 - C10	EH >C16 - C24	EH >C24 - C40	EH >C10 - C16	Ammonium as NH4 (Calc)	BOD5 + ATU	pH	In-situ Results					
Unit				uS/cm	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	pH		pH	Temperature	Dissolved Oxygen	Conductivity	
Fresh Water EQS (AA)						High status < 0.040 (mean) or < 0.090 (95%ile) Good status < 0.065 (mean) or < 0.140 (95%ile)													High status < 1.3 (mean (1)) or < 2.2 (95%ile) Good status < 1.5 (mean (1)) or 2.6 (95%ile)	4.5 < pH < 9.0 (S) 6.0 < pH < 9.0 (H)		4.5 < pH < 9.0 (S) 6.0 < pH < 9.0 (H)	Not greater than a 1.5°C rise in ambient temperature outside the mixing zone	95%ile > 80% saturation 95%ile < 120% saturation		
WFD Waterbody Name	EPA Watercourse Name	Sample No & Watercrossing ID (WCX)																								
Oct 2016	Lyreen_010	Baltracy Trib Lyreen	43 (WCX068)	No sample taken – land access																						
May 2017				656	336	<0.5	<0.41	0.8	<0.6	3	5.1	32	<10	<10	<10	<10	<10	<10	<10	<0.53	2	8	8.55	16.53	90	555
Oct 2016	Clonshanbo_020	Clonshanbo 09	24N (WCX069)	Not Sampled in 2016																						
May 2017				No sample taken – land access																						
Oct 2016	Lyreen_010	Lyreen 09	44 (WCX070)	No sample taken – land access																						
May 2017				No sample taken – land access																						
Oct 2016	Liffey_140	Posseckstown 09	25N (WCX071)	Not Sampled in 2016																						
May 2017				671	352	0.5	0.42	0.9	<0.6	2	4.7	<10	<10	<10	<10	<10	<10	<10	<10	0.54	2	7.9	8.06	14.06	82	533
Oct 2016		Liffey	Liffey	45 (WCX073)	Not Sampled in 2016																					
May 2017					No sample taken – land access																					
Oct 2016	Reeves_010	Reeves	46 (WCX074)	218	107	<0.5	<0.41	0.8	<0.6	11	9.4	<10	<10	<10	<10	<10	<10	<10	<0.53	8	<2	7.08	11.5	95.3		
May 2017				367	174	<0.5	<0.41	1.5	<0.6	18	7.1	<10	<10	<10	<10	<10	<10	<10	<10	<10	<0.53	2	8.2	8.51	17.23	100	323
Oct 2016		Reeves	Reeves	46.1	553	396	<0.5	<0.41	1.4	<0.6	4	4.8	<10	<10	<10	<10	<10	<10	<10	<0.53	8	<2	7.88	9.6	8.08	
May 2017					538	326	<0.5	<0.41	1.4	<0.6	30	10.7	<10	<10	<10	<10	<10	<10	<10	<10	<0.53	2	8	8.33	22.39	118.1	563
Oct 2016	N/A	Grand Canal	N / A (WBX088)	628	391	<0.5	<0.41	1.6	<0.6	4	5.2	<10	<10	<10	<10	<10	<10	<10	<0.53	7.9	<2	7.76	9.8	72.5		
May 2017				522	361	<0.5	<0.41	1.2	<0.6	48	7.2	<10	<10	<10	<10	<10	<10	<10	<10	<0.53	3	8	8.44	22.65	147	549
Oct 2016	N/A	Grand Canal	N / A (WBX088)	N / A																						
May 2017				N / A																						

Laboratory Analysis and In Situ Results 2021 – 2025

1. Introduction

1. This Appendix provides details of the analyses of samples taken in June 2021, November 2021, November 2022, June 2023, November 2024 and June 2025 as part of the Water Chapter. As water will be transferred between catchments, this information will inform the baseline characteristics as part of the environmental assessment.
2. Data reported in this Appendix has informed preliminary assessments of treatment requirements for commissioning water, both before and after use. Further monitoring should be undertaken in the lead up to commissioning to identify specific treatment requirements (see Appendix 5.2 for further detail).

1.1 Methodology

3. As part of the environmental surveys associated with this project, Jacobs Tobin instructed TelLab to undertake water quality sampling at key locations along the route of the Proposed Project. Surveys were conducted in summer and winter periods to account for season variations in water quality.
4. The water quality sampling was carried out in accordance with the General Conditions set out in the Surface Water Regulations. The locations for these samples are listed in Table 1.1.
5. Each sample value represents one reading from one spot sample only.

1.1.1 Parameters

6. Sampling was carried out for the parameters listed in Table 1.2 with all water samples analysed using the “standard” suite of parameters. At sites where it is proposed to abstract water for the commissioning of the pipeline, an “additional” suite of sampling was undertaken. As part of the “additional” suite of sampling, the selected samples were analysed for heavy metals due to their presence being recorded in upstream water bodies as a result of historic extractive industries. Further details of parameters can be found in Table 1.2.

1.1.2 Standards

7. Standards have been obtained from a number of sources with the standard applied to each parameter considered to be the most suitable. Standards are outlined below with sources comprising of the following:
 - European Communities Environmental Objectives (Surface Water) Regulations 2009 – 2019;
 - Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015 – in the absence of applicable standards in Ireland
 - European Communities (Quality of Salmonid Waters) Regulations 1988*
 - Urban Waste Water Treatment Regulations for Ireland 2001**.

**None of the sampled waterbodies are Salmonid Waters but this is used in absence of applicable standards*

***Used for Chemical Oxygen Demand (COD) parameter in the absence of an applicable standard*

8. As noted in Table 1.1, all sampled waterbodies have ‘Good’, ‘Moderate’ or ‘Poor’ Water Framework Directive (WFD) status and so where the standard applied is in relation to WFD status, the mean value for ‘Good’ status is used.
9. In the results table, where cells are shaded red, this denotes where a reported value exceeds the standard for that parameter as outlined in Table 1.2 below.

10. Note that despite multiple rounds of sampling there remain too few samples taken to calculate %iles and so mean values are used as standard thresholds.
11. Values preceded by a “<” symbol reflect the level of detection for the lab analysis at the time as opposed to representing the actual reading. As a result, values preceded by this symbol have been exempted from comparison against the parameter standards.

Table 1.1: Waterbody and Sample ID Details

Waterbody	Sample ID	WFD Ecological Status	Sampling Suite
Washout Location	WCW003	N/A	Standard / Additional*
KILMASTULLA_050	WCX002	Moderate	Standard
KILMASTULLA_050	WCX003 and WCX004	Moderate	Standard / Additional*
KILMASTULLA_020	WCX006	Moderate	Standard
KILMASTULLA_020	WCX009	Moderate	Standard
KILMASTULLA_020	WCX010	Moderate	Standard
ARDGREGANE STREAM_010	WCX011	Poor	Standard
NENAGH_070	WCX016	Moderate	Additional / Standard**
BALLYFINBOY_040	WCX020	Moderate	Standard / Additional***
KILCOMIN STREAM_030	WCX022	Moderate	Standard
KILCOMIN STREAM_030	WCX023	Moderate	Standard
SHINRONE STREAM_010	WCX024	Poor	Additional / Standard**
SHINRONE STREAM_010	WCX025	Poor	Standard
LITTLE BROSNA_030	WCX026	Good	Additional
CAMCOR_030	WCX032	Good	Standard
SILVER (KILCORMAC)_020	WCX036	Good	Additional
CLODIAGH (TULLAMORE)_020	WCX039	Good	Additional / Standard**
DAINGEAN_010	WCX046	Poor	Standard
DAINGEAN_030	WCX047	Poor	Standard
ESKER STREAM_010	WCX049	Moderate	Standard / Additional***
ESKER STREAM_020	WCX054	Moderate	Standard / Additional***
FIGILE_030	WCX056	Moderate	Additional / Standard**
FIGILE_020	WCX058	Moderate	Standard / Additional***
FIGILE_010	WCX060	Poor	Standard / Additional***
BLACKWATER (LONGWOOD)_010	WCX062	Poor	Standard / Additional***
CLONSHANBO_010	WCX066	Poor	Additional / Standard**
CLONSHANBO_020	WCX069	Poor	Standard
LYREEN_010	WCX070	Poor	Standard
LIFFEY_140	WCX072	Good	Standard
LIFFEY_140	WCX073	Good	Additional / Standard**
KILMASTULLA_050	WCX077	Moderate	Standard

* Seasonal variation in sampling suite.

** "Additional" suite used except for November 2024 sampling which was "Standard" only.

*** "Standard" suite used except for November 2024 sampling which was then "Additional"

Table 1.2: Parameter Standards and Source

Parameter	Standard	Unit	Source
Alkalinity, Total as CaCO ₃	No suitable standard	-	-
Ammoniacal Nitrogen as N	≤0.065	mg/l	ECSR
BOD, unfiltered	≤1.5	mg/l	ECSR
Chloride	No suitable standard	-	-
Chlorine, Combined (Residual)	No suitable standard	-	-
Chlorine, Free (Residual)	No suitable standard	-	-
<i>Chlorine, Total (Residual)</i>	≤0.005	mg/l	ECQSW
<i>COD, unfiltered</i>	125	mg/l	UWWT
Conductivity @ 20 deg.C	No suitable standard	-	-
Oxygen, dissolved	No suitable standard	-	-
pH	4.5 to 9.0 (≤100 mg/l CaCO ₃) 6.0 to 9.0 (>100 mg/l CaCO ₃)	pH	ECSR
Phosphate (Ortho as P)	No suitable standard	-	-
<i>Suspended solids, Total</i>	≤25	mg/l	ECQSW
2,3,6-Trichlorobenzoic acid	No suitable standard	-	-
2,4,5-Trichlorophenoxyacetic acid	No suitable standard	-	-
2,4-DB	No suitable standard	-	-
2,4-Dichlorophenoxyacetic acid	0.3	µg/l	WFD
Benazolin	No suitable standard	-	-
Bromoxynil	No suitable standard	-	-
Clopyralid	No suitable standard	-	-
Dicamba	No suitable standard	-	-
Dichlorprop	No suitable standard	-	-
Dinitro-o-cresol	No suitable standard	-	-
Fenoprop (Silvex)	No suitable standard	-	-
Fluroxypyr	No suitable standard	-	-
Ioxynil	No suitable standard	-	-
MCPA	No suitable standard	-	-
MCPB	No suitable standard	-	-
Mecoprop	18	µg/l	WFD
Pentachlorophenol	0.4	µg/l	ECSR
Triclopyr	No suitable standard	-	-
Arsenic (diss.filt)	25	µg/l	ECSR
Cadmium (diss.filt)	0.08 ≤50 mg/l CaCO ₃) 0.09 (>50 and ≤100 mg/l CaCO ₃) 0.15 (>100 and ≤200 mg/l CaCO ₃) 0.25 (>=200 mg/l CaCO ₃)	µg/l	ECSR
Chromium (diss.filt)	No suitable standard	-	-
Copper (diss.filt)	5 (≤100 mg/l CaCO ₃) 30 (>100 mg/l CaCO ₃)	µg/l	ECSR
Lead (diss.filt)	1.2	µg/l	ECSR
Mercury (diss.filt)	0.07	µg/l	ECSR

Environmental Impact Assessment Report (EIAR) Volume 6 of 6: Appendices
 (Appendix A9.6) Laboratory Analyses – Surveys 2021 - 2025

Nickel (diss.filt)	4	µg/l	ECSR
Selenium (diss.filt)	No suitable standard	-	-
Zinc (diss.filt)	8 (≤10 mg/l CaCO ₃) 50 (>10 and ≤100 mg/l CaCO ₃) 100 (>100 mg/l CaCO ₃)	µg/l	ECSR

2. Baseline Sampling Results

Date	EPA Watercourse Name	Watercrossing ID	Parameter	Alkalinity, Total as CaCO3	Ammoniacal Nitrogen as N	BOD, unfiltered	Chloride	Chlorine, Combined (Residual)	Chlorine, Free (Residual)	Chlorine, Total (Residual)	COD, unfiltered	Conductivity @ 20 deg.C	Oxygen, dissolved	pH	Phosphate (Ortho as P)	Suspended solids, Total		
			Unit	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mS/cm	mg/l	pH	mg/l	mg/l		
			Standards	-	≤ 0.065 (ECSR)	≤ 1.5 (ECSR)	-	-	-	≤ 0.005 (ECQSW)	125 (UWWT)	-	-	-	4.5 < 9.0 (≤ 100mgL CaCO3) 6.0 < 9.0 (> 100mgL CaCO3) (ECSR)	-	≤ 25 (ECQSW)	
Sampling																		
June 2021	Washout Location	WCW003	Standard	212	<0.2	<1	16.6	<0.01	<0.01	<0.01	<7	0.466	8.86	8.19	<0.02	<4		
November 2021			Additional	142	<0.08	<3	15	-	-	-	16	377	-	7.8	<0.16	2		
November 2022			Standard	57	<0.080	<2	-	-	-	-	31	142	98	7.6	<0.16	11		
June 2023			Standard	205	<0.080	<1	-	-	-	-	<4	528	11.8	8	<0.16	8		
November 2024			No Data															
June 2025	Standard	185	<0.060	<1	-	-	-	-	-	13	423	-	8	<0.16	2			
June 2021	KILMASTULLA_050	WCX002	Standard	86.7	<0.2	<1	14.4	<0.01	<0.01	<0.01	<7	0.207	9.54	7.96	<0.02	<4		
November 2021			Standard	67	<0.08	<3	-	-	-	-	18	176	-	7.8	<0.16	<2		
November 2022			Standard	300	<0.080	<2	-	-	-	-	37	594	89.7	7.8	<0.16	3		
June 2023			Standard	150	<0.080	<1	-	-	-	-	<4	227	11.7	8.1	<0.16	<2		
November 2024			Standard	57	<0.060	2	-	-	-	-	42	0.175	-	7.7	0.1	5		
June 2025	Standard	175	<0.060	<1	-	-	-	-	-	13	405	-	8.1	<0.16	2			
June 2021	KILMASTULLA_050	WCX003 and 004 Combined	Standard	85.3	<0.2	<1	14.4	<0.01	<0.01	<0.01	<7	0.21	10.2	7.98	<0.02	<6		
November 2021			Standard	63	<0.08	<3	-	-	-	-	19	177	-	7.8	<0.16	2		
November 2022			Additional	45	<0.080	<2	13	-	-	-	33	141	100	7.7	<0.16	8		
June 2023			Standard	160	<0.080	<1	-	-	-	-	<4	226	11.4	8	<0.16	<2		
November 2024			Additional	60	<0.060	2	16	-	-	-	21	0.317	-	7.8	0.07	11		
June 2025	Standard	81	<0.060	<1	-	-	-	-	-	12	202	-	7.9	<0.16	<2			
June 2021	KILMASTULLA_020	WCX006	No Data															
November 2021			Standard	155	<0.08	3	-	-	-	-	-	13	334	-	8	<0.16	<2	
November 2022			Standard	41	<0.080	<1	-	-	-	-	-	18	355	102.2	7.7	<0.16	6	
June 2023			Standard	205	<0.080	<1	-	-	-	-	-	7	420	11.7	8.1	<0.16	28	
November 2024			No Data															
June 2025	Standard	165	<0.060	<1	-	-	-	-	-	7	384	-	8.1	<0.16	<2			
June 2021	KILMASTULLA_020	WCX009	Standard	-	<0.2	<1	-	-	-	-	<7	0.386	9.9	8.04	<0.02	<2		
November 2021			Standard	280	<0.08	4	-	-	-	-	85	764	-	7	<0.16	17		
November 2022			Standard	160	<0.080	<1	-	-	-	-	25	343	100.4	7.6	<0.16	6		
June 2023			No Data															
November 2024			Standard	45	0.17	<3	-	-	-	-	-	83	0.193	-	6.7	0.23	16	
June 2025	Standard	205	<0.060	<1	-	-	-	-	-	38	434	-	7.7	<0.16	22			
June 2021	KILMASTULLA_020	WCX010	Standard	195	<0.2	<1	-	-	-	-	<7	0.4	9.9	7.85	0.0281	<2		
November 2021			Standard	160	<0.08	<4	-	-	-	-	25	414	-	7.6	<0.16	10		
November 2022			Standard	155	<0.080	<2	-	-	-	-	46	344	100.2	7.7	<0.16	4		
June 2023			No Data															
November 2024			Standard	118	<0.060	2	-	-	-	-	-	59	0.393	-	7.7	0.1	22	
June 2025	Standard	170	<0.060	<1	-	-	-	-	-	13	381	-	7.8	<0.16	4			
June 2021	ARDGREGANE STREAM_010	WCX011	Standard	145	<0.2	<1	-	-	-	-	<7	0.337	9.86	8.17	0.0284	5.25		
November 2021			Standard	100	<0.08	<3	-	-	-	-	15	303	-	8.1	<0.16	14		
November 2022			Standard	175	<0.080	<1	-	-	-	-	10	307	99.4	8.1	<0.16	7		
June 2023			Standard	165	<0.080	<1	-	-	-	-	7	410	11.3	7.7	<0.16	8		
November 2024			Standard	39	<0.060	4	-	-	-	-	34	0.38	-	8.1	0.14	31		
June 2025	Standard	122	<0.060	2	-	-	-	-	-	10	345	-	8	<0.16	24			
June 2021	NENAGH_070	WCX016	Additional	211	<0.2	<1	39	<0.01	<0.01	<0.01	<7	0.505	11.7	8.44	0.0212	<2		
November 2021			Additional	155	<0.08	<2	21	<0.05	<0.05	<0.05	10	360	-	8.1	<0.16	<2		
November 2022			Additional	185	<0.080	<1	21	<0.05	<0.05	<0.05	25	416	98.3	8	<0.16	26		
June 2023			Standard	240	<0.080	<1	45	<0.05	<0.05	<0.05	8	588	8.3	8.1	<0.16	3		
November 2024			Standard	52	<0.060	3	-	-	-	-	41	0.312	-	7.9	0.1	13		
June 2025	Additional	225	<0.060	<1	43	-	-	-	-	12	566	-	8.1	<0.16	4			
June 2021	BALLYFINBOY_040	WCX020	Standard	375	<0.2	34.7	28.9	<0.05	<0.05	<0.05	45.3	0.734	3.71	7.51	1.28	944		
November 2021			Standard	335	<0.08	3	-	-	-	-	41	708	-	8	<0.16	20		
November 2022			Standard	350	0.2	<2	-	-	-	-	45	681	89.1	7.7	<0.16	4		
June 2023			Standard	320	<0.080	<1	-	-	-	-	11	663	8.4	7.6	<0.16	8		
November 2024			Additional	320	<0.060	1	24	-	-	-	35	0.643	-	7.8	<0.020	2		
June 2025	Standard	370	<0.060	2	-	-	-	-	17	695	-	7.1	<0.16	45				
June 2021	KILCOMIN STREAM_030	WCX022	Standard	390	<0.2	<1	24.1	<0.01	<0.01	<0.01	12	0.731	8	8.22	0.0548	4.5		
November 2021			Standard	390	<0.08	<5	-	-	-	-	36	711	-	8	<0.16	3		
November 2022			Standard	340	0.19	<2	-	-	-	-	40	659	89.3	7.6	<0.16	2		
June 2023			Standard	365	<0.080	<1	-	-	-	-	14	721	9	7.8	<0.16	23		
November 2024			Standard	360	<0.060	<1	-	-	-	-	24	0.736	-	7.7	<0.020	<2		
June 2025	Standard	345	<0.060	<1	-	-	-	-	17	706	-	8.1	<0.16	5				
June 2021	KILCOMIN STREAM_030	WCX023	Standard	378	<0.2	<1	25.4	<0.01	-	-	7.73	0.725	9.84	8.04	<0.02	<2		
November 2021			Standard	360	<0.08	<4	-	-	-	-	27	722	-	7.5	<0.16	2		
November 2022			Standard	360	<0.080	<3	-	-	-	-	17	694	97.9	8	<0.16	21		
June 2023			Standard	350	<0.080	<1	-	-	-	-	16	719	10.3	7.9	<0.16	7		
November 2024			Standard	370	<0.060	<1	-	-	-	-	23	0.683	-	7.3	<0.020	3		
June 2025	Standard	350	<0.060	1	-	-	-	-	22	692	-	8	<0.16	10				
June 2021	SHINRONE STREAM_010	WCX024	Additional	331	<0.2	<1	26.6	<0.01	-	-	12.1	0.633	10.3	8.14	0.277	8.2		
November 2021			Additional	370	0.37	15	21	-	-	-	34	683	-	8.1	<0.16	40		
November 2022			Standard	350	<0.080	<1	23	<0.05	<0.05	<0.05	14	618	90.4	8	<0.16	2		
June 2023			No Data															
November 2024			Standard	360	<0.060	1	-	-	-	-	-	26	0.622	-	7.5	<0.020	4	
June 2025	Additional	340	<0.060	<1	23	-	-	-	-	16	620	-	8.2	<0.16	2			
June 2021	SHINRONE STREAM_010	WCX025	Standard	236	<0.2	<1	18.8	<0.01	-	-	7.45	0.471	12	8.14	<0.02	7.1		
November 2021			Standard	305	<0.08	<3	-	-	-	-	21	626	-	8.2	<0.16	27		
November 2022			Standard	285	<0.080	<4	-	-	-	-	22	571	98	7.9	<0.16	3		
June 2023			Standard	245	<0.080	<1	-	-	-	-	11	472	9.3	8.3	<0.16	4		
November 2024			Standard	370	<0.060	2	-	-	-	-	26	0.653	-	7.9	<0.020	6		
June 2025	Standard	225	<0.060	<1	-	-	-	-	-	17	448	-	8.4	<0.16	<2			
June 2021	LITTLE BROSNA_030	WCX026	Additional	313	<0.2	<1	24.8	<0.01	-	-	7.54	0.637	10.8	8.11	<0.02	7.6		
November 2021			Additional	340	0.09	<3	21	-	-	-	19	640	-	8.1	<0.16	7		
November 2022			Additional	290	<0.080	<2	19	<0.05	<0.05	<0.05	34	546	96.3	7.8	<0.16	7		
June 2023			Additional	325	<0.080	<1	28	<0.05	<0.05	<0.05	12	632	9.1	7.9	<0.16	5		
November 2024			Additional	360	<0.060	1	21	-	-	-	26	0.602	-	8.1	0.02	8		
June 2025	Additional	305	<0.060	<1	29	-	-	-	-	18	611	-	8.3	-	4			
June 2021	CAMCOR_030	WCX032	No Data															
November 2021			Standard	200	<0.08	<3	-	-	-	-	-	16	348	-	8.2	<0.16	2	
November 2022			No Data															
June 2023			Standard	325	<0.080	<1	-	-	-	-	-	12						

Date	EPA Watercourse Name	Watercrossing ID	Parameter	Alkalinity, Total as CaCO3	Ammoniacal Nitrogen as N	BOD, unfiltered	Chloride	Chlorine, Combined (Residual)	Chlorine, Free (Residual)	Chlorine, Total (Residual)	COD, unfiltered	Conductivity @ 20 deg.C	Oxygen, dissolved	pH	Phosphate (Ortho as P)	Suspended solids, Total
			Unit	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mS/cm	mg/l	pH	mg/l	mg/l
			Standards	-	≤ 0.065 (ECSR)	≤ 1.5 (ECSR)	-	-	-	≤ 0.005 (ECQSW)	125 (UWWT)	-	-	4.5 < 9.0 (≤ 100mgL CaCO3) 6.0 < 9.0 (> 100mgL CaCO3) (ECSR)	-	≤ 25 (ECQSW)
June 2021	CLODIAGH (TULLAMORE)_020	WCX039	Additional	300	<0.2	<1	15.6	<0.02	<0.02	<0.02	14.9	0.539	10.1	8.23	<0.02	<2
November 2021				180	<0.08	<5	11	-	-	-	35	321	-	8	<0.16	4
November 2022				225	<0.080	<2	17	<0.05	<0.05	<0.05	59	508	90.3	7.7	<0.16	8
June 2023				345	<0.080	1	16	<0.05	<0.05	<0.05	32	657	9.7	8	<0.16	4
November 2024				215	<0.060	1	-	-	-	-	40	0.367	-	7.9	<0.020	<2
June 2025	355	0.1	1	16	-	-	-	37	631	-	7.7	<0.16	4			
June 2021	DAINGEAN_010	WCX046	Standard	321	4.68	6.07	12	<0.02	<0.02	<0.02	73.1	0.514	1.29	7.23	<0.02	47.4
November 2021				175	0.56	28	-	-	-	-	201	279	-	7.1	<0.16	236
November 2022				66	0.15	<3	-	-	-	-	90	99	74.6	6.8	<0.16	3
June 2023				No Data												
November 2024				No Data												
June 2025	No Data															
June 2021	DAINGEAN_030	WCX047	Standard	340	<0.2	<1	20.7	<0.02	<0.02	<0.02	23.3	0.605	12.3	8.25	<0.02	<2
November 2021				315	<0.08	<2	-	-	-	-	39	595	-	7.8	<0.16	4
November 2022				285	0.094	<2	-	-	-	-	68	524	72.6	7.7	<0.16	11
June 2023				305	<0.080	<1	-	-	-	-	32	564	8.2	7.9	<0.16	<2
November 2024				No Data												
June 2025	310	<0.060	1	-	-	-	-	35	564	-	7.7	<0.16	<2			
June 2021	ESKER STREAM_010	WCX049 Upstream	Standard	297	<0.2	<1	15.5	<0.02	<0.02	<0.02	27.5	0.547	6.87	8.1	<0.02	-
November 2021				285	<0.08	<2	-	-	-	-	97	538	-	7.9	<0.16	4
November 2022				175	<0.080	<2	-	-	-	-	54	464	76.7	7.7	<0.16	9
June 2023				305	<0.080	1	-	-	-	-	25	581	9.1	8.2	<0.16	<2
November 2024				200	0.12	1	14	-	-	-	54	0.476	-	7.9	0.06	9
June 2025	270	<0.060	1	-	-	-	-	43	482	-	7.7	<0.16	<2			
June 2021	ESKER STREAM_020	WCX054	Standard	305	<0.2	<1	16.6	<0.02	<0.02	<0.02	26.2	0.547	7.88	8.19	<0.02	-
November 2021				280	<0.08	<2	-	-	-	-	41	533	-	8	<0.16	5
November 2022				220	0.12	<2	-	-	-	-	59	488	78.1	7.7	<0.16	11
June 2023				310	<0.080	4	-	-	-	-	26	562	9.2	8.1	<0.16	19
November 2024				133	0.37	<1	11	-	-	-	59	0.325	-	7.6	<0.020	<2
June 2025	290	<0.060	1	-	-	-	-	38	519	-	8	<0.16	3			
June 2021	FIGILE_030	WCX056	Additional	310	<0.2	<1	17.3	<0.02	<0.02	<0.02	88.4	0.561	7.86	8.09	0.0313	6.35
November 2021				235	<0.08	3	13	-	-	-	68	458	-	7.8	<0.16	<2
November 2022				170	<0.080	<3	13	<0.05	<0.05	<0.05	83	362	77.9	7.7	<0.16	7
June 2023				290	<0.080	2	16	<0.05	0.18	0.2	46	560	6.6	8	<0.16	6
November 2024				145	0.18	1	-	-	-	-	71	0.376	-	7.6	0.06	5
June 2025	445	0.22	1	14	-	-	-	65	473	-	7.8	-	6			
June 2021	FIGILE_020	WCX058	Standard	183	<0.2	2.2	9.6	<0.05	<0.05	<0.05	79.9	0.384	2.64	7.68	0.0274	-
November 2021				255	<0.08	<10	-	-	-	-	273	517	-	7.8	<0.16	534
November 2022				160	<0.080	<3	-	-	-	-	95	879	76.1	7.6	<0.16	4
June 2023				290	<0.080	1	-	-	-	-	45	574	8.6	8.1	<0.16	4
November 2024				147	0.24	1	9.4	-	-	-	65	0.313	-	7.6	0.03	2
June 2025	No Data															
June 2021	FIGILE_010	WCX060	Standard	284	<0.2	<1	14.4	<0.02	<0.02	<0.02	49.7	0.502	4.75	7.87	<0.02	-
November 2021				245	<0.08	5	-	-	-	-	110	478	-	7.6	<0.16	75
November 2022				185	<0.080	<4	-	-	-	-	144	436	72.9	7.4	<0.16	132
June 2023				295	<0.080	1	-	-	-	-	63	535	8.8	7.7	<0.16	24
November 2024				205	0.48	1	14	-	-	-	63	0.457	-	7.6	0.09	8
June 2025	465	10	9	-	-	-	-	61	759	-	7.7	0.86	206			
June 2021	BLACKWATER (LONGWOOD)_010	WCX062	Standard	291	<0.2	2.03	14.5	<0.05	<0.05	<0.05	49.4	0.526	3.89	7.73	<0.02	-
November 2021				175	<0.08	<2	-	-	-	-	85	397	-	7.5	<0.16	2
November 2022				160	<0.080	<3	-	-	-	-	89	387	69.1	7.4	<0.16	2
June 2023				280	0.15	2	-	-	-	-	53	635	6.8	7.6	<0.16	7
November 2024				150	0.39	1	16	-	-	-	65	0.389	-	7.5	0.06	2
June 2025	195	0.099	2	-	-	-	-	78	436	-	7.5	<0.16	2			
June 2021	CLONSHANBO_010	WCX066	Additional	385	<0.2	<1	16.7	<0.01	<0.01	<0.01	15.3	0.669	7.05	8.09	<0.02	-
November 2021				410	<0.08	<3	17	-	-	-	17	689	-	8	<0.16	<2
November 2022				330	<0.080	<1	19	<0.05	<0.05	<0.05	7	667	73.8	7.8	<0.16	<2
June 2023				355	<0.080	1	20	<0.05	<0.05	<0.05	28	1189	8.4	7.8	<0.16	13
November 2024				375	0.21	<1	-	-	-	-	11	0.717	-	7.9	0.11	9
June 2025	370	<0.060	1	17	-	-	-	19	627	-	7.9	<0.16	4			
June 2021	CLONSHANBO_020	WCX069	Standard	336	<0.2	6.41	20	<0.01	<0.01	<0.01	12.9	0.615	11.1	8.25	<0.02	-
November 2021				375	<0.08	<3	-	-	-	-	18	681	-	8.2	<0.16	6
November 2022				325	<0.080	<1	-	-	-	-	11	666	78.2	7.9	<0.16	5
June 2023				340	<0.080	2	-	-	-	-	35	1172	7.7	8	<0.16	57
November 2024				No Data												
June 2025	365	<0.060	1	-	-	-	-	16	609	-	8.2	<0.16	<2			
June 2021	LYREEN_010	WCX070	Standard	347	<0.2	<1	22.5	<0.01	<0.01	<0.01	<7	0.65	8.42	8.11	0.0646	-
November 2021				360	0.09	<3	-	-	-	-	17	733	-	8	<0.16	6
November 2022				430	<0.080	<1	-	-	-	-	11	741	76	7.8	<0.16	2
June 2023				370	<0.080	<1	-	-	-	-	25	1280	7.3	7.8	<0.16	8
November 2024				No Data												
June 2025	360	<0.060	<1	-	-	-	-	11	636	-	7.9	<0.16	8			
June 2021	LIFFEY_140	WCX072	Standard	299	<0.2	<1	30.2	<0.01	<0.01	<0.01	12	0.712	3.42	8.17	<0.02	3.55
November 2021				375	<0.08	<3	-	-	-	-	18	739	-	7.8	<0.16	18
November 2022				325	<0.080	2	-	-	-	-	5	714	91.7	7.9	<0.16	2
June 2023				320	<0.080	<1	-	-	-	-	25	1276	7.4	7.9	<0.16	14
November 2024				315	<0.060	<1	-	-	-	-	4	0.565	-	8.3	0.07	5
June 2025	345	<0.060	2	-	-	-	-	13	631	-	7.8	<0.16	6			
June 2021	LIFFEY_140	WCX073	Additional	208	<0.2	<1	21	<0.01	<0.01	<0.01	15.1	0.448	8.34	8.37	<0.02	<2
November 2021				135	<0.08	5	12	-	-	-	28	243	-	8	<0.16	8
November 2022				165	<0.080	1	12	<0.05	<0.05	<0.05	18	247	89.5	8	<0.16	3
June 2023				175	<0.080	1	19	<0.05	<0.05	<0.05	23	722	8.4	8	<0.16	3
November 2024				305	<0.060	<1	-	-	-	-	4	0.578	-	8.3	0.04	8
June 2025	195	<0.060	<1	20	-	-	-	13	399	-	8.2	<0.16	4			
June 2021	KILMASTULLA_050	WCX077	Standard	200	<0.2	<1	-	-	-	-	<7	0.437	9.31	8.33	<0.02	2.55
November 2021				131	<0.08	4	-	-	-	-	30	343	-	8	<0.16	84
November 2022				155	<0.080	<4	-	-	-	-	27	312	96.3	7.8	<0.16	9
June 2023				46	<0.080	<1	-	-	-	-	5	471	10.8	8.2	<0.16	4
November 2024				64	<0.060	2	-	-	-	-	34	0.284	-	7.8	0.08	13
June 2025	170	<0.060	<1	-	-	-	-	18	526	-	8.1	<0.16	2			

Date	EPA Watercourse Name	Watercrossing ID	Parameter	Arsenic (diss.filt)	Cadmium (diss.filt)	Chromium (diss.filt)	Copper (diss.filt)	Lead (diss.filt)	Mercury (diss.filt)	Nickel (diss.filt)	Selenium (diss.filt)	Zinc (diss.filt)
			Unit	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
			Standards	25 (ECSR)	0.08 (≤ 50 mg/l CaCO3) 0.09 (>50 to ≤ 100 mg/l CaCO3) 0.15 (>100 to ≤ 200 mg/l CaCO3) 0.25 (>=200 mg/l CaCO3) (ECSR)	-	5 (≤ 100 mgL CaCO3) 30 (>100 mgL CaCO3) (ECSR)	1.2 (ECSR)	0.07 (ECSR)	4 (ECSR)	-	8 (≤10 mg/l CaCO3) 50 (>10 to ≤100 mg/l CaCO3) 100 (>100 mg/l CaCO3) (ECSR)
			Sampling									
June 2021	Washout Location	WCW003	Standard	-	-	-	-	-	-	-	-	-
November 2021			Additional	0.43	0.1	0.5	2.4	0.22	<0.01	1.1	<0.25	56
November 2022			Additional	0.5	<0.1	4	3.3	<0.5	<0.02	3.4	<0.2	30.7
June 2023			Standard	-	-	-	-	-	-	-	-	-
November 2024			No Data									-
June 2025	Standard											
June 2021	KILMASTULLA_050	WCX002	Standard	-	-	-	-	-	-	-	-	-
November 2021			Standard	-	-	-	-	-	-	-	-	-
November 2022			Standard	-	-	-	-	-	-	-	-	-
June 2023			Standard	-	-	-	-	-	-	-	-	-
November 2024			Standard	-	-	-	-	-	-	-	-	-
June 2025	Standard											
June 2021	KILMASTULLA_050	WCX003 and 004 Combined	Standard	-	-	-	-	-	-	-	-	-
November 2021			Standard	-	-	-	-	-	-	-	-	-
November 2022			Additional	0.4	<0.1	3.5	3.2	<0.5	<0.02	2.5	<0.2	18.2
June 2023			Standard	-	-	-	-	-	-	-	-	-
November 2024			Additional	0.6	0.2	<1.0	4.6	6.3	<0.02	2.8	<0.2	103.7
June 2025	Standard											
June 2021	KILMASTULLA_020	WCX006	No Data									-
November 2021			Standard	-	-	-	-	-	-	-	-	-
November 2022			Standard	-	-	-	-	-	-	-	-	-
June 2023			Standard	-	-	-	-	-	-	-	-	-
November 2024			No Data									-
June 2025	Standard											
June 2021	KILMASTULLA_020	WCX009	Standard	-	-	-	-	-	-	-	-	-
November 2021			Standard	-	-	-	-	-	-	-	-	-
November 2022			Standard	-	-	-	-	-	-	-	-	-
June 2023			No Data									-
November 2024			Standard	-	-	-	-	-	-	-	-	-
June 2025	Standard											
June 2021	KILMASTULLA_020	WCX010	Standard	-	-	-	-	-	-	-	-	-
November 2021			Standard	-	-	-	-	-	-	-	-	-
November 2022			Standard	-	-	-	-	-	-	-	-	-
June 2023			No Data									-
November 2024			Standard	-	-	-	-	-	-	-	-	-
June 2025	Standard											
June 2021	ARDGREGANE STREAM_010	WCX011	Standard	-	-	-	-	-	-	-	-	-
November 2021			Standard	-	-	-	-	-	-	-	-	-
November 2022			Standard	-	-	-	-	-	-	-	-	-
June 2023			Standard	-	-	-	-	-	-	-	-	-
November 2024			Standard	-	-	-	-	-	-	-	-	-
June 2025	Standard											
June 2021	NENAGH_070	WCX016	Additional	<0.5	<0.08	<1	<0.3	<0.2	<0.01	1.02	<1	3.58
November 2021			Additional	0.38	<0.03	<0.25	0.6	<0.09	<0.01	0.6	<0.25	2.7
November 2022			Additional	0.6	<0.1	3.6	<2.5	<0.5	<0.02	2.1	0.4	29.9
June 2023			Additional	0.6	<0.1	<1.0	1.2	<0.5	<0.02	1.8	0.3	37.3
November 2024			Standard	-	-	-	-	-	-	-	-	-
June 2025	Additional	0.5	<0.1	<1.0	0.7	<0.5	<0.02	0.9	<0.2	10.2		
June 2021	BALLYFINBOY_040	WCX020	Standard	-	-	-	-	-	-	-	-	-
November 2021			Standard	-	-	-	-	-	-	-	-	-
November 2022			Standard	-	-	-	-	-	-	-	-	-
June 2023			Standard	-	-	-	-	-	-	-	-	-
November 2024			Additional	1	<0.1	<1.0	1.9	<0.5	<0.02	2.1	0.2	12.6
June 2025	Standard											
June 2021	KILCOMIN STREAM_030	WCX022	Standard	-	-	-	-	-	-	-	-	-
November 2021			Standard	-	-	-	-	-	-	-	-	-
November 2022			Standard	-	-	-	-	-	-	-	-	-
June 2023			Standard	-	-	-	-	-	-	-	-	-
November 2024			Standard	-	-	-	-	-	-	-	-	-
June 2025	Standard											
June 2021	KILCOMIN STREAM_030	WCX023	Standard	-	-	-	-	-	-	-	-	-
November 2021			Standard	-	-	-	-	-	-	-	-	-
November 2022			Standard	-	-	-	-	-	-	-	-	-
June 2023			Standard	-	-	-	-	-	-	-	-	-
November 2024			Standard	-	-	-	-	-	-	-	-	-
June 2025	Standard											
p	SHINRONE STREAM_010	WCX024	Additional	0.78	<0.03	19	4.3	0.74	<0.01	16	0.27	14
November 2021			Additional	0.5	<0.1	3.5	<2.5	<0.5	<0.02	2	0.3	27.4
November 2022			No Data									-
June 2023			Standard	-	-	-	-	-	-	-	-	-
November 2024			Additional	0.7	<0.1	<1.0	0.8	<0.5	<0.02	<0.5	<0.2	7.5
June 2025	Standard											
June 2021	SHINRONE STREAM_010	WCX025	Standard	-	-	-	-	-	-	-	-	-
November 2021			Standard	-	-	-	-	-	-	-	-	-
November 2022			Standard	-	-	-	-	-	-	-	-	-
June 2023			Standard	-	-	-	-	-	-	-	-	-
November 2024			Standard	-	-	-	-	-	-	-	-	-
June 2025	Standard											
June 2021	LITTLE BROSNA_030	WCX026	Additional	0.53	<0.03	1.1	0.9	0.11	<0.01	4.1	0.34	3.7
November 2021			Additional	0.8	<0.1	3.2	<2.5	<0.5	<0.02	3	0.4	26.8
November 2022			Additional	0.4	<0.1	<1.0	0	<0.5	<0.02	<0.5	0.3	18.6
June 2023			Additional	0.5	<0.1	<1.0	1.5	<0.5	<0.02	1.4	0.3	5.6
November 2024			Additional	0.5	<0.1	<1.0	0.9	<0.5	<0.02	0.7	0.3	15.5
June 2025	Standard											
June 2021	CAMCOR_030	WCX032	No Data									-
November 2021			No Data									-
November 2022			No Data									-
June 2023			Standard	-	-	-	-	-	-	-	-	-
November 2024			Standard	-	-	-	-	-	-	-	-	-
June 2025	Standard											
June 2021	SILVER (KILCORMAC)_020	WCX036	Additional	0.54	<0.03	<0.25	0.6	<0.09	<0.01	1	<0.25	3.4
November 2021			Additional	0.8	<0.1	2.9	<2.5	<0.5	<0.02	2.7	0.3	27.1
November 2022			Additional	0.8	<0.1	<1.0	0	<0.5	<0.02	0.8	0.2	19.7
June 2023			Additional	3.2	<0.1	<1.0	1	<0.5	<0.02	1.1	<0.2	6.1
November 2024			Additional	0.5	<0.1	<1.0	1.2	<0.5	<0.02	1.1	0.2	9.4
June 2025	Standard											

