

Comhairle Contae Chorcaí Cork County Council

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Administration,
Environmental Licensing Programme,
Office of Climate, Licensing & Resource Use,
Environmental Protection Agency,
headquarters,
POBox3000,
Johnstown, Castle Estate,
County Wexford.
Your Ref.: D0433-01
Our Ref. : MS /RS/11



Sub.: Riverstick Agglomeration (Register No. D0433-01) Regulation 16 of the Waste Water Discharge (Authorisation) Regulations 2007

Dear Sir/Madam,

With reference to your letter of the 22 of September 2010, please find the following attached:

- 1 Original of the Riverstick Agglomeration (Register No. D0433 -01) Regulation 18(3)(b) Further Information Response & attachments.
- 1 Copy of the Riverstick Agglomeration (Register No. D0 433 -01) Regulation 18(3)(b) Further Information Response & attachments.
- 1 CDROM with the Further Information Response & attachments in PDF Format.

Yours faithfully,

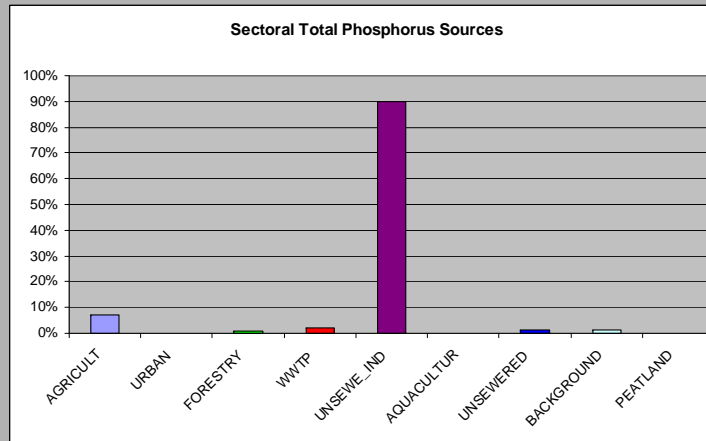
Noel O'Keeffe,
County Engineer & Director of Water Services,
Cork County Council,
County Hall, Cork.
22/12/2011



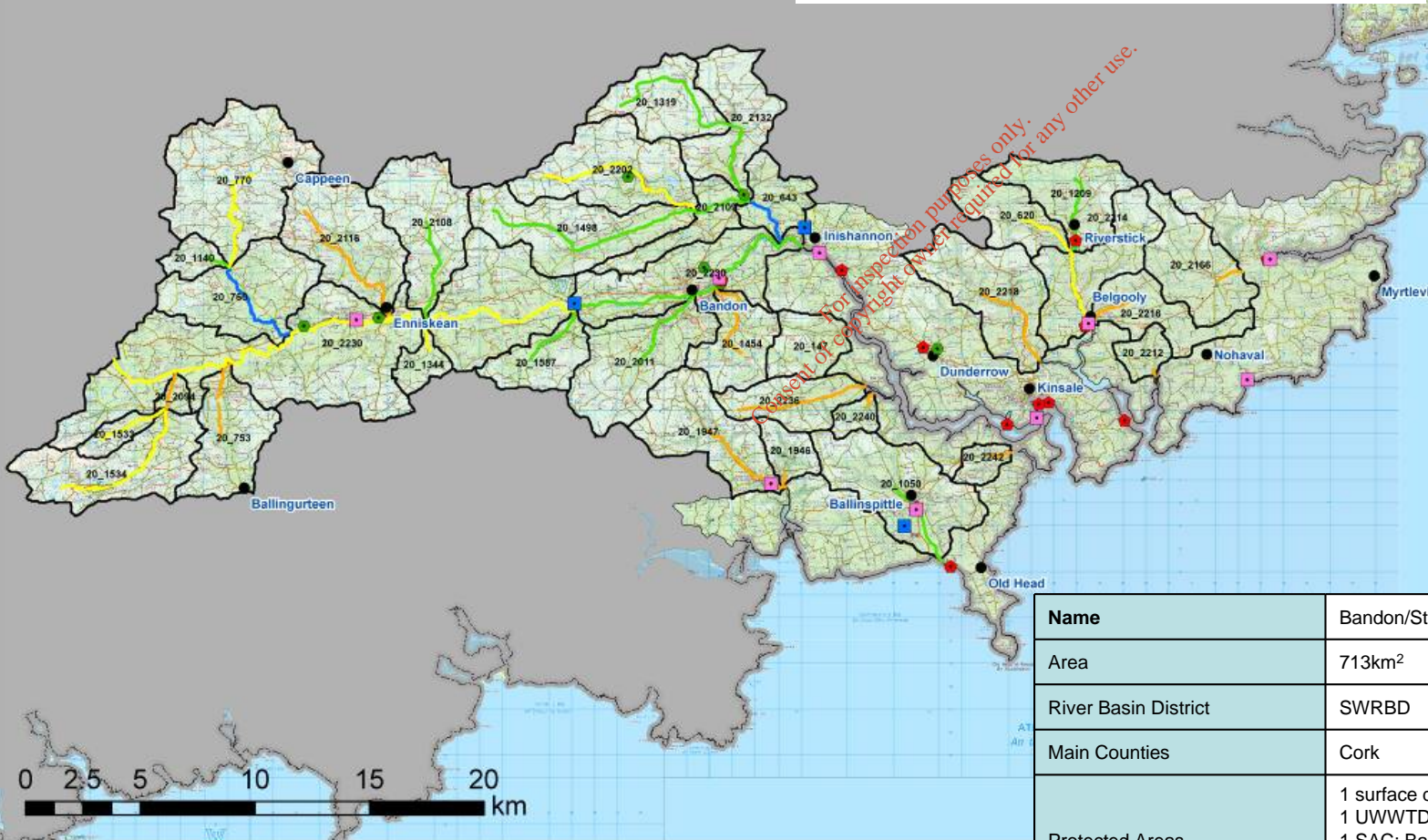
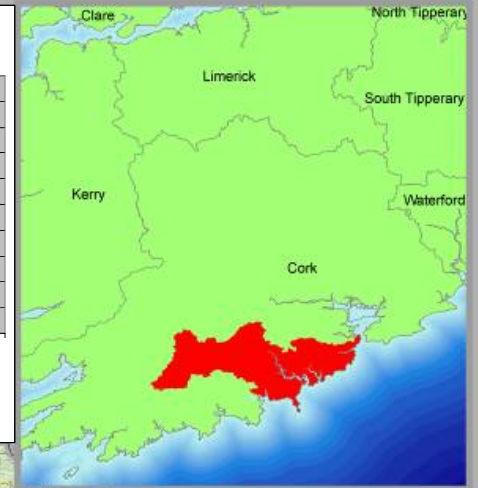
Bandon - Stick WMU



Cork



Calculated in accordance with OSPAR HARP Guidelines.
Not an indication of risk, rather an indication of potential to cause risk.



Legend

- Towns and Villages
- EPA Licensed Facility (IPPC)
- Local Authority Licensed Discharge
- Wastewater Treatment Plants
- Water Treatment Plants
- County Boundary
- River Water Body Boundary

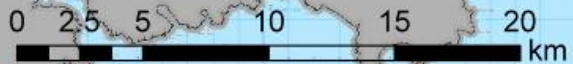
River Status

- High
- Good
- Moderate
- Poor
- Bad

Lake Status

- High
- Good
- Moderate
- Poor
- Bad

Name	Bandon/Stick Water management Unit
Area	713km ²
River Basin District	SWRBD
Main Counties	Cork
Protected Areas	1 surface drinking water: Curragallicky Lake 1 UWWTD: Bandon Estuary Lower 1 SAC: Bandon River Baxters Bridge (Bandon) & Innishannon WTP 1 Freshwater Pearl Mussel catchment (Bandon/Caha)



Bandon/Stick Water Management Unit Action Plan

STATUS/IMPACTS	
Overall status	There are 36 river water bodies in this WMU -2 High, 11 Good, 8 Moderate, 15 Poor Status.
Status elements	Q score dictates overall status for wbs with less than good status, physchem dictates 2 moderate wbs and fish status dictates 1 poor wb. The moderate lake status is dictated by macrophytes or chlorophyll.
Possible Impacts - EPA Water Quality	<p>BALLINSPITTLE – SW_20_1050 2006 - Satisfactory. Status of WB 2009: Good status dictated by Q score and fish status</p> <p>BALLYMAHANE - SW_20_1498 2003 - Continuing satisfactory. The stream entering just downstream of 0200 (Bridge N of Tullyglas), which was grossly polluted in 2000, was clean in 2003; the location, however, was still being used to mix agricultural chemicals. 2009 - Continuing satisfactory. Status of WB 2009: Good status dictated by Q score, good fishery status and good physchem status*****</p> <p>BANDON – SW_20_2230_2; SW_20_2230_1 2003 - Mostly satisfactory with some improvement at one location (0550) since the previous survey. Continuing slightly polluted downstream of Dunmanway (0300, 0400) and moderately polluted downstream of Bandon (0800). Unsightly sludge from a waterworks had accumulated along the left-hand-side of river upstream of Bandon (0700). A protected invertebrate (pearl mussel) lives in part of the river while the fish fauna includes salmonids (salmon and trout) and cyprinids (minnow) as well as sticklebacks. 2009 - Mostly satisfactory, with Good ecological quality, but only Moderate downstream of Dunmanway, Ballineen and Enniskean. SW_20_2230_2 WB Status 2009 : Good status dictated by Q score SW_20_2230_1 WB Status 2009: Moderate status dictated by Q score.</p> <p>BEALANASCARTANE – SW_20_2094; SW_20_1534 2009 - Improved with all three locations sampled Good ecological quality SW_20_2094 WB Status 2009 : Poor Status dictated by Q score - not based on 2009 data SW_20_1534 WB Status 2009 : Moderate Status dictated by Q score</p> <p>BLACKWATER (BANDON) – SW_20_760; SW_20_770 2003- Continuing eutrophic in middle reaches (0600) otherwise satisfactory. The protected pearl mussel still survives in parts of this river. 2009 - Satisfactory with Good and High ecological quality. SW_20_760 WB updated Status : Good status dictated by physchem status SW_20_770 WB updated Status : Moderate status is based Q score</p> <p>BRINNY – SW_20_1319; SW_20_2132; SW_20_643 2009 - Satisfactory at the three locations following improvement at Tuough Bridge since previous survey. SW_20_1319 WB updated Status ; Good status dictated by Q score. SW_20_2132 WB updated Status ; Good status dictated by Q score SW_20_643 WB updated Status ; High status dictated by Q score.</p> <p>KILBRITTAIN – SW_20_1947 2006 - Continuing satisfactory. WB Status 2009 : Poor status dictated by poor Fish status.</p> <p>MINANE – SW_20_2166 2009 - Unsatisfactory with Poor ecological quality at Ballyfeard - impacted by seriously polluted stream entering from right-hand side immediately downstream of bridge. WB Status 2009 : Poor status dictated by Q score</p> <p>SALL – SW_20_2202 2009 - Continuing satisfactory. WB Status 2009 : Moderate status dictated by physchem status</p> <p>STICK – SW_20_2214 2009 - Satisfactory, with Good ecological quality, at both locations. WB Status 2009 : Moderate status dictated by physchem status</p>

Bandon/Stick Water Management Unit Action Plan

PRESSURES/RISKS	
Nutrient sources	90% of TP comes from unsewered industry and 2% from WWTP, 7% from Agriculture
Point pressures	10 WWTP Ballineen Sewerage Scheme, Ballinspittle, Bandon WWTP, Belgooly, Kilbrittain, Kinsale, Minane Bridge, Nohoval, Riverstick WWTP, Innishannon WWTP 5 WTP -Bandon Water Supply Scheme, Ballinspittle New Pws; Inishannon, Ballineen, & Curraghlicky Lake WTP. 9 IPPC licensed activities and 9 Section 4 licensed activities. 1 contaminated site - AIBP Limited T/A AIBP Bandon.
Wastewater Treatment Plants (WWTP) and Industrial Discharges	Bandon WWTP - Non-compliant frequency of monitoring or non-compliant effluent standard where sufficient capacity is available Bandon WWTP - Insufficient future (2015) assimilative capacity (BOD), discharge not to a protected area Innishannon WWTP - Insufficient existing capacity, no evidence of impact, discharge to a protected area Kinsale - PE >2,000, discharge to non-coastal water, no secondary treatment or PE > 10,000, discharge to coastal water, no secondary treatment Kinsale - Insufficient existing capacity, no evidence of impact, discharge to a protected area Minane Bridge - Sufficient existing capacity of treatment plant, evidence of impact, discharge not to protected area Riverstick WWTP - Insufficient existing capacity, evidence of impact, not a protected area Riverstick WWTP - Insufficient future (2015) assimilative capacity (BOD), discharge not to a protected area Ballineen Sewerage Scheme - Sufficient existing capacity, evidence of impact, protected area 5 IPPC licensed activities are causing risk.
Quarries, Mines & Landfills	6 Quarries and 5 Landfills. 1 WB at risk from 2 quarries and 1 landfill - SW_20_2230.
Agriculture	32 WBs at risk - SW_20_2216, SW_20_147, SW_20_2214, SW_20_2236, SW_20_2218, SW_20_1050, SW_20_2011, SW_20_2166, SW_20_2212, SW_20_2240, SW_20_2242, SW_20_2132, SW_20_1947, SW_20_1454, SW_20_1209, SW_20_643, SW_20_753, SW_20_2108, SW_20_2202, SW_20_1319, SW_20_2116, SW_20_2109, SW_20_1344, SW_20_1498, SW_20_620, SW_20_1533, SW_20_1587, SW_20_1534, SW_20_1946, SW_20_2230, SW_20_2094, SW_20_2244.
On-site systems	There are 9764 septic tanks in this WMU, 559 of these are located in areas of very high or extreme risk.
Forestry	None at risk
Dangerous substances	None at risk
Morphology	None at risk
Abstractions	None at risk
Other	

Bandon/Stick Water Management Unit Action Plan

SELECTED ACTION PROGRAMME

NB All relevant basic measures and general supplementary measures/surveys apply

Point Sources	See point source pressures table below for WWTP action programme. IPPC licensed activities – review licenses Section 4s - Review Discharge Licenses
Diffuse Sources	AGRICULTURE - Good Agricultural Practice Regulations and Enforcement Septic Tanks: At Risk septic tanks are to be prioritised for inspections. Subsequent upgrade or connection to municipal systems depends on inspection and economic tests.
Sub-basin plans	1 x Freshwater Pearl Mussel Plans – Bandon Caha – Apply prescribed measures. 2 x Shellfish Waters Pollution Reduction Programmes – Oyster Haven and Kinsale – Apply prescribed measures.
Other	Ensure licensing of quarries under Section 4 of Water Pollution Act 1977. Investigate landfill.

Discharge		Measures							Waterbody	
Point Source Discharge	County	Plants Requiring Capital Works	Agglomerations Requiring Further Investigation Prior to Capital Works	Plants Required to Commence Implementation of Pollution Reduction Programmes for Shellfish Waters	Plants Requiring the Implementation of an Appropriate Performance Management System	Plants Requiring the Investigation of CSO's	Plants Required to Ensure Capacity of Treatment Plant is not Exceeded	Extended Timescale for Measure Implementation	Waterbody Code	Extended Deadline to Achieve Waterbody Objective
Ballineen Sewerage Scheme	Cork West					Yes		Yes	SW_20_2230_1	Yes
Bandon WWTP	Cork South				Yes		Yes	No	SW_20_2230_2	
Innishannon WWTP	Cork South		Yes					Yes	SW_080_0300	Yes
Kinsale	Cork South	Yes		Yes				No	SW_080_0100	
Minane Bridge	Cork South					Yes		No	SW_050_0000	
Riverstick WWTP	Cork South	Yes					Yes	Yes	SW_20_1209	

Bandon/Stick Water Management Unit Action Plan

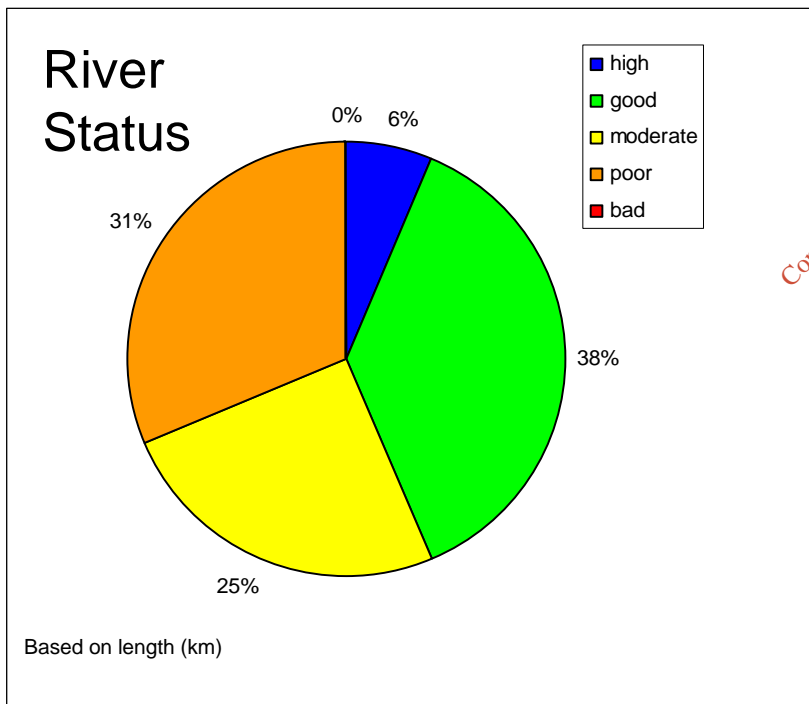
OBJECTIVES	
Good status 2015	Protect 13 waterbodies.
Alternative Objectives	Restore 23 waterbodies by 2021 (SW_20_1344, SW_20_1454, SW_20_147, SW_20_1533, SW_20_1534, SW_20_1946, SW_20_1947, SW_20_2094, SW_20_2116, SW_20_2166, SW_20_2202, SW_20_2212, SW_20_2214, SW_20_2216, SW_20_2218, SW_20_2230_1, SW_20_2236, SW_20_2240, SW_20_2242, SW_20_2244, SW_20_620, SW_20_753, SW_20_770) – extended for nitrogen losses to surface waters via groundwaters (one of which is also extended for wastewater infrastructure to be put in place - SW_20_2230_1) Restore 1 waterbody (SW_20_2230_1) – extended for recovery of Freshwater Pearl Mussel populations.

Transitional Status – Refer to separate transitional waters action programme

Groundwater Status – Refer to separate groundwater action programme

Future Pressures and Developments

Throughout the river basin management cycle future pressures and developments will need to be managed to ensure compliance with the objectives of the Water Framework Directive and the Programme of Measures will need to be developed to ensure issues associated with these new pressures are addressed.



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Bandon/Stick Water Management Unit Action Plan - Rivers

IE_SW_Bandon/Stick																	
Member State Code	Monitored Y (Extrapolated N)	Donor Waterbody	Biological Elements				Supporting Elements				Protected Areas					Objective	Date objective to be achieved
			Macroinvertebrates (O)	Freshwater Mussel	Fish	Phytoplankton (Diatoms)	Morphology	Specific Pollutants	Physio-chemical	Ecological Status	Chemical Status	Special Area of Conservation	Special Protection Area	Nutrient Sensitive Waters	Drinking Water		
SW_20_1050	Y		G		G					G						GES	2009
SW_20_1140	N	SW_20_760								G						GES	2009
SW_20_1209	Y									G						GES	2009
SW_20_1319	Y		G							G						GES	2009
SW_20_1344	N	SW_20_1799								M						GES	2021
SW_20_1454	N	SW_20_1947								P						GES	2021
SW_20_147	N	SW_20_1947								P						GES	2021
SW_20_1498	Y		G		G					G	G					GES	2009
SW_20_1533	N	SW_20_1534								M						GES	2021
SW_20_1534	Y		M							M						GES	2021
SW_20_1587	N	SW_20_1498								G						GES	2009
SW_20_1946	N	SW_20_1947								P						GES	2021
SW_20_1947	Y		G		P					P						GES	2021
SW_20_2011	N	SW_20_1498								G						GES	2009
SW_20_2094	Y		P							P						GES	2021
SW_20_2108	N	SW_20_1498								G						GES	2009
SW_20_2109	N	SW_20_2132								G						GES	2009
SW_20_2116	N	SW_20_2094								P						GES	2021
SW_20_2132	Y		G							H	G					GES	2009
SW_20_2166	Y		P							G	P					GES	2021
SW_20_2202	Y		G							M	M					GES	2021
SW_20_2212	N	SW_20_2166								P						GES	2021
SW_20_2214	Y		G							M	M					GES	2021
SW_20_2216	N	SW_20_2166								P						GES	2021
SW_20_2218	N	SW_20_2166								P						GES	2021
SW_20_2230_1	Y		M							H	M		Y			GES	2021
SW_20_2230_2	Y		G							H	G			Y		GES	2009
SW_20_2236	N	SW_20_1947								P						GES	2021
SW_20_2240	N	SW_20_1947								P						GES	2021
SW_20_2242	N	SW_20_1947								P						GES	2021
SW_20_2244	N	SW_20_1947								P						GES	2021
SW_20_620	N	SW_20_2214								M						GES	2021
SW_20_643	Y		H							H						HES	2009
SW_20_753	N	SW_20_2094								P						GES	2021
SW_20_760	Y		H							G	H					HES	2009
SW_20_770	Y		M							M						GES	2021

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Bandon/Stick Water Management Unit Action Plan - Lakes

IE_SW_Bandon/Stick																	
Member State Code	Name	Monitored Y (Extrapolated N)	Biological Elements			Supporting Elements			Ecological Status	Chemical Status	Protected Areas					Objective	Date objective to be achieved
			Macrophytes	Chlorophyll	Fish	Morphology	Nutrient Enrichment	Physico Chemical			Special Area of Conservation	Special Protection Area	Nutrient Sensitive Waters	Bathing Water	Drinking Water		
SW_20_158	Curraghally Lake	Y	M	M			G	G	M						GES	2015	

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Register Number D0433-01 2011 Riverstick Outlet Table E4

Sample Date	18/01/2011	24/02/2011	19/05/2011	16/06/2011	14/07/2011	UWW Reg Limits
Sample	Effluent	Effluent	Effluent	Effluent	Effluent	Mean value 2011
Sample Code	GV013	GV114	GV412	GV487	GV600	
Flow M ³ /Day	*	*				
Suspended Solids mg/L	26	37	101	77	82	64.6
BOD mg/L	62	55	64	82	214	95.4
COD mg/L	147	161	240	243	438	245.8

BREACH OF UWW REGS

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Register Number D0433-01 Riverstick Outlet Table E4

Sample Date	21/01/2010	05/05/2010	03/06/2010	12/08/2010	14/12/2010	16/12/2010	Mean value 2010	Urban WW Reg Limits
Sample	Effluent GU009	Effluent GU302	Effluent GU373	Effluent GU587	Effluent GU948	Effluent GU981		
Sample Code	GU009	GU302	GU373	GU587	GU948	GU981		
Flow M ³ /Day	*	*			*	*		
Suspended Solids mg/L	17	65	110	19	55	63	54.833333	35
BOD mg/L	52	131	108	63	204	212	128.333333	25
COD mg/L	97	328	366	212	380	416	299.833333	125

breach of UWW reg Limits

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Register Number D0433-01 Attachment E4 Riverstick Upstream
Table E4

Sample Date	16/10/2008	07/05/2009	Recorded Value below LOD
Sample	River	River	
Sample Code	GS1103	GT641	
pH	*	7.3	n/a
Cond 20°C	*	211	n/a
SS mg/L	*	<2.5	n/a
NH ₃ mg/L	*	<0.1	n/a
BOD mg/L	*	1	n/a
COD mg/L	*	<21	n/a
TN mg/L	*	5.01	n/a
Nitrite mg/L	*	<0.10	n/a
Nitrate mg/L	*	4.88	n/a
TP mg/L	*	<0.05	n/a
O-PO4-P mg/L	<0.05	<0.05	n/a
O-PO4-P mg/L	0.015	0.00	0.0075
SO4 mg/L	*	<30	n/a
Phenols µg/L	*	<0.10	n/a
Atrazine µg/L	*	<0.01	n/a
Dichloromethane	*	<1	n/a
Simazine µg/L	*	<0.01	n/a
Toluene µg/L	*	<0.28	n/a
Tributyltin µg/L	*	not required	n/a
Xylenes µg/L	*	<1	n/a
Arsenic µg/L	*	<0.96	n/a
Chromium ug/L	*	<20	<1
Copper ug/L	*	<20	<1
Cyanide µg/L	*	<5	n/a
Fluoride µg/L	*	<100	n/a
Lead ug/L	*	<20	4.75
Nickel ug/L	*	<20	1.10
Zinc ug/L	*	<20	<1
Boron ug/L	*	<20	<1

Register Number D0433-01 Attachment E4 Riverstick Downstream Table E4

Sample Date	16/10/2008	07/05/2009	Recorded Value below LOD
Sample	River	River	
Sample Code	*	GT640	
pH	*	7.4	n/a
Cond 20°C	*	216	n/a
SS mg/L	*	<2.5	n/a
NH ₃ mg/L	*	0.2	n/a
BOD mg/L	*	2	n/a
COD mg/L	*	<21	n/a
TN mg/L	*	5.2	n/a
Nitrite mg/L	*	<0.10	n/a
Nitrate mg/L	*	3.7	n/a
TP mg/L	*	0.05	n/a
O-PO4-P mg/L	<0.05	<0.05	n/a
O-PO4-P mg/L	0.02	0.02	0.02
SO4 mg/L	*	<30	n/a
Phenols µg/L	*	<0.10	n/a
Atrazine µg/L	*	<0.01	n/a
Dichloromethane	*	<1	n/a
Simazine µg/L	*	<0.01	n/a
Toluene µg/L	*	<0.28	n/a
Tributyltin µg/L	*	not required	n/a
Xylenes µg/L	*	<1	n/a
Arsenic µg/L	*	<0.96	n/a
Chromium ug/L	*	<20	<1
Copper ug/L	*	<20	<1
Cyanide µg/L	*	<5	n/a
Fluoride µg/L	*	<100	n/a
Lead ug/L	*	<20	1.997
Nickel ug/L	*	<20	2.338
Zinc ug/L	*	<20	1.881
Boron ug/L	*	<20	<1

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Register Number D0433-01 Attachment E4 Riverstick Discharge Outlet -2009

Sample Date	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Mean value 2009
16/10/2008	GS1105	GT639	GT928	GT1029	GT1296	GT1383	GT1424	GT1449			
Sample	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent			
Sample Code	GS1105	GT639	GT928	GT1029	GT1296	GT1383	GT1424	GT1449			
Flow M ³ /Day	*	*	*	*	*	*	*	*			
pH	7.3	7.2	*	*	*	*	*	*			7.25
Temperature °C	*	*	*	*	*	*	*	*			
Cond 20°C	*	772	*	*	*	*	*	*			772
SS mg/L	13	29	25	25	22	9	10	20			19.125
NH ₃ mg/L	*	42.8	*	*	26.5	*	*	*			34.65
BOD mg/L	*	83	65	58	66	54	53	69			64
COD mg/L	103	194	125	182	124	123	135	170			144.5
TN mg/L	26	49.1	*	*	*	*	*	*			37.55
Nitrite mg/L	*	<0.10	*	*	*	*	*	*			<0.10
Nitrate mg/L	*	<0.50	*	*	*	*	*	*			<0.50
TP mg/L	2.9	7.23	*	*	*	*	*	*			5.065
O-P04-P mg/L	*	5.62	*	*	3.24	*	*	*			4.48
SO4 mg/L	*	32	*	*	*	*	*	*			32
Phenols mg/L	*	<0.10	*	*	*	*	*	*			<0.10
Atrazine µg/L	*	<0.01	*	*	*	*	*	*			<0.01
Dichloromethane	*	<1	*	*	*	*	*	*			<1
Simazine µg/L	*	<0.01	*	*	*	*	*	*			<0.01
Toluene µg/L	*	48.53	*	*	*	*	*	*			48.53
Tributyltin µg/L	*	not required	*	*	*	*	*	*			not required
Xylenes µg/L	*	<1	*	*	*	*	*	*			<1
Arsenic µg/L	*	<0.96	*	*	*	*	*	*			<0.96
Chromium µg/L	*	<20	*	*	*	*	*	*			<20
Copper µg/L	*	<20	*	*	*	*	*	*			<20
Cyanide µg/L	*	<5	*	*	*	*	*	*			<5
Fluoride µg/L	*	390	*	*	*	*	*	*			390
Lead µg/L	*	<20	*	*	*	*	*	*			<20
Nickel µg/L	*	<20	*	*	*	*	*	*			<20
Zinc µg/L	*	23	*	*	*	*	*	*			23

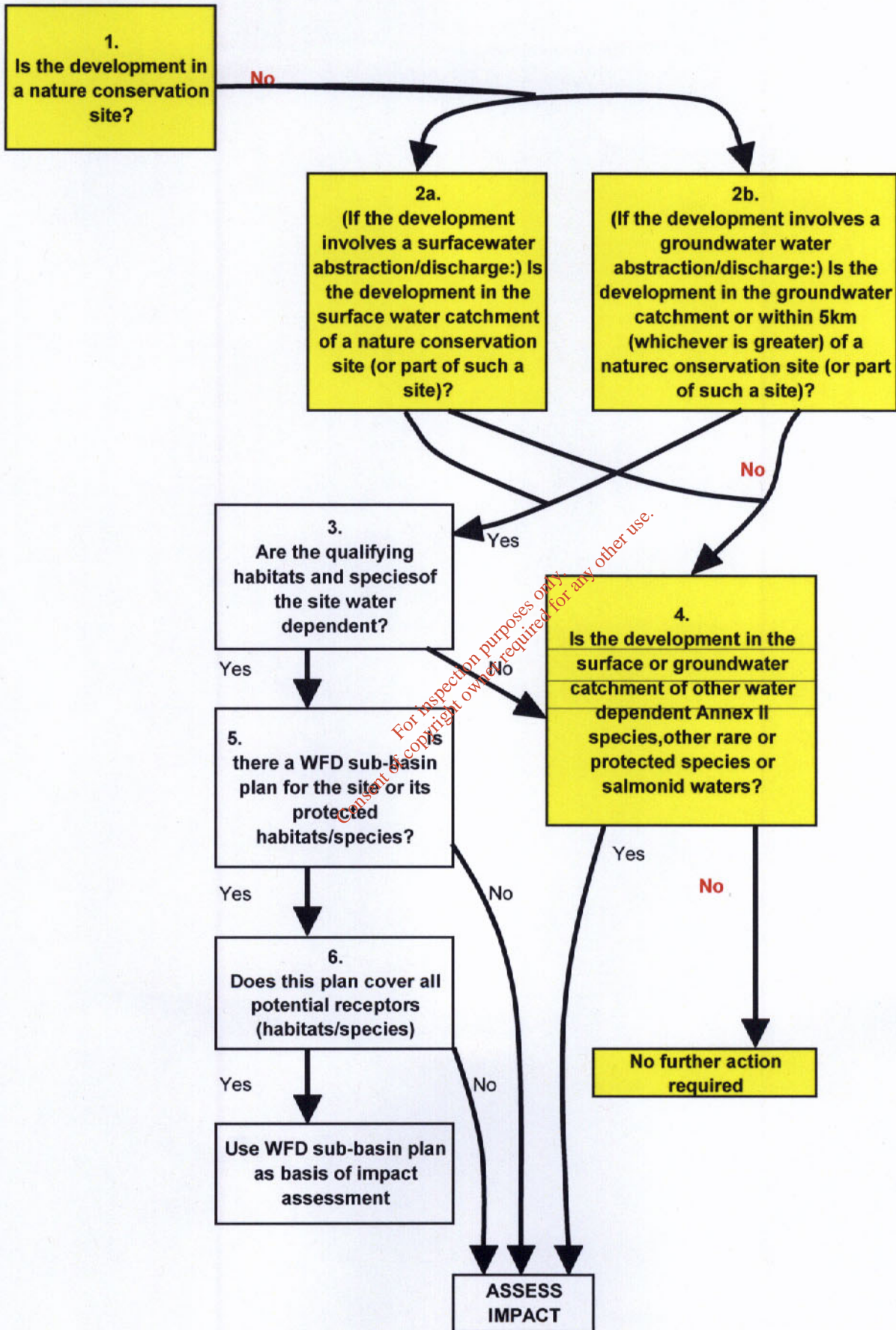
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Boron ug/L	*	32	*	*	*	*	*	*	*	*	*	32
Cadmium ug/L	*	<20	*	*	*	*	*	*	*	*	*	<20
Mercury µg/L	*	<0.2	*	*	*	*	*	*	*	*	*	<0.2
Selenium µg/L	*	0.8	*	*	*	*	*	*	*	*	*	0.8
Barium ug/L	*	<20	*	*	*	*	*	*	*	*	*	<20

breach of UMW reg Limits

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Flow Diagram for Riverstick



Conclusion: No assessment is required at this Agglomeration

Riverstick Regulation 18 Further Information Response

Question 1 Assess the likelihood of significant effect of the waste water discharges from the above agglomerations on the relevant European sites by referring to Circular L8/08 “Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments” issued by the Department of Heritage and Local Government. In particular, the flow diagram in Appendix 1 should be completed and the results of each section recorded. Provide details of the results of this assessment within one month of the date of this notice and provide a reasoned response for the decision. If significant effects are likely then and appropriate assessment must be carried out and a report of this assessment forwarded to the Agency by the date specified below. You are advised to provide the requested information in accordance with the “Note on Appropriate Assessments for the purposes of the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I. 684 of 2007)”.

Wastewater Discharge Licence Application: D0433-01 Riverstick

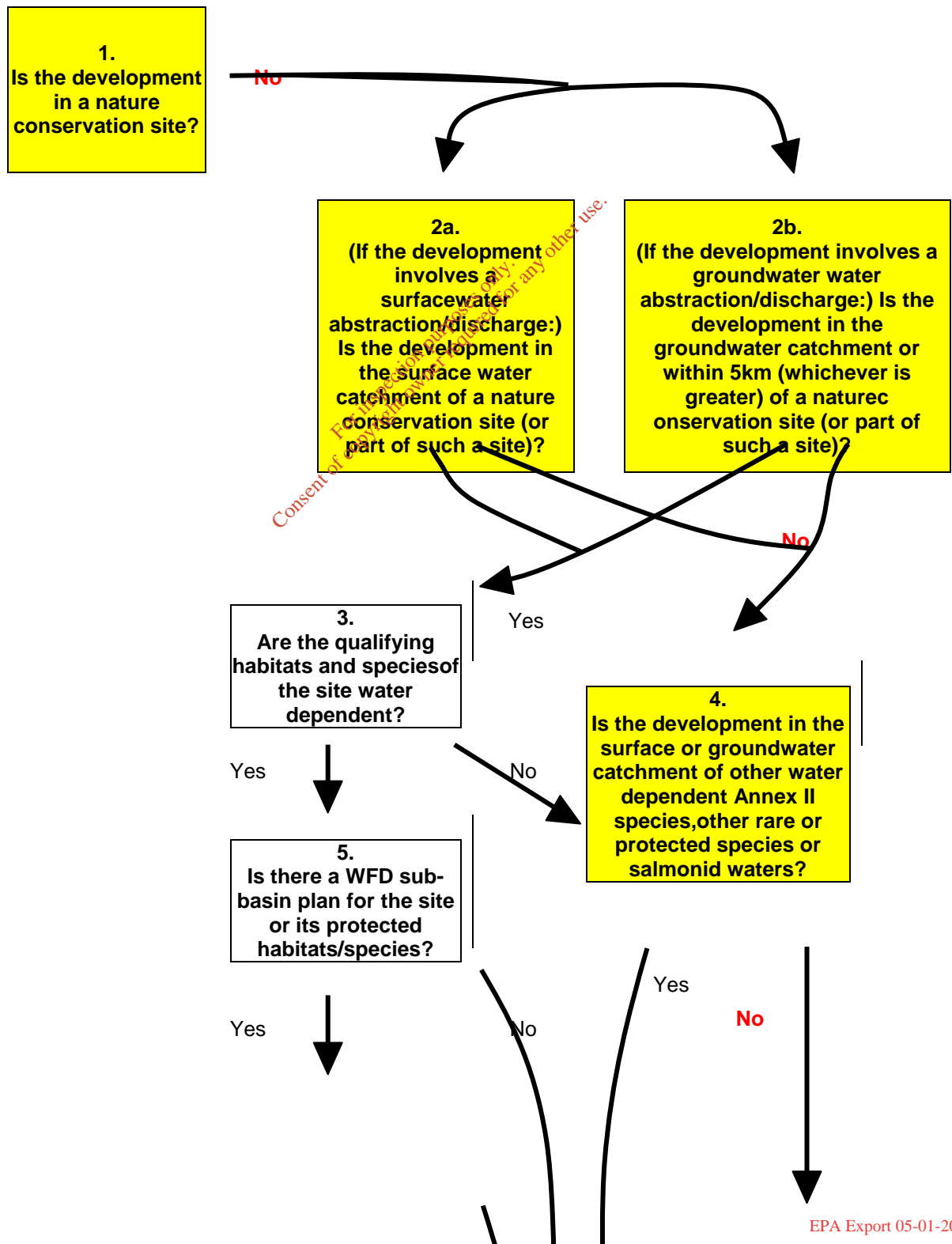
Circular L8/08 2 September 2008

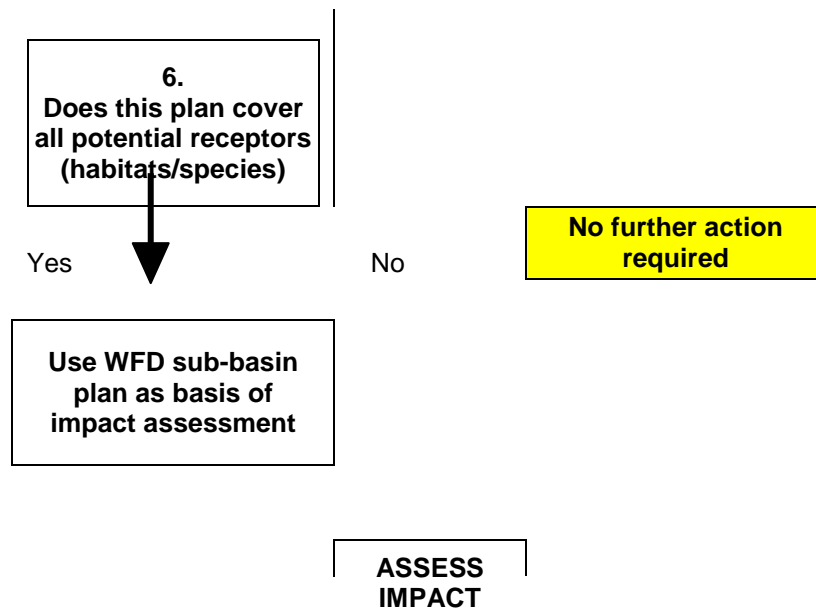
Water Services Investment and Rural Water Programmes – Protection of Natural Heritage and National Monuments

For new projects and significant changes to any existing operations, if the answer is 'yes' to any of the following, the project (i.e. construction, operation and maintenance) must be screened for its impacts:	NO
1. Is the development in or on the boundary of a nature conservation site NHA/SAC/SPA?	NO
2. Will nationally protected species be directly impacted? Wildlife Acts (1976 and 2000), Flora Protection order (S.I. 94 of 1999)?	NO
3. Is the development a surface water discharge or abstraction in the surface water catchment, or immediately downstream of a nature conservation site with water dependant qualifying habitats/ species?	NO
4. Is the development a groundwater discharge or abstraction in the ground water catchment or within 5 km of a nature conservation site with water-dependant qualifying habitats/species?	NO
5. Is the development in the surface water or groundwater catchment of salmonid waters?	NO
6. Is the treatment plant in an active or former floodplain or flood zone of a river, lake, etc?	NO

7. Is the development a surface discharge or abstraction to or from marine waters and within 3km of a marine nature conservation site?	NO
8. Will the project in combination with other projects (existing and proposed) or changes to such projects affect the hydrology or water levels of sites of nature conservation interest or the habitats of protected species?	NO

Flow Diagram for Riverstick Agglomerations





Conclusion: No assessment is required at this Agglomeration

Question 2 Review the assessment of the impact of the discharge in relation to the requirements of the Environmental Quality Objectives regulations (S.I. No. 272 of 2009) and resubmit and update where relevant

The River Stick (20S03) is contained within Hydrometric Area 20 and is located entirely in County Cork. The River Stick rises near Coolkirky and flows in a southerly direction past Riverstick continuing on towards Belgooly. At Belgooly River Stick discharges to Oyster Haven, water becomes transitional at this point. There is no water quality management plan or catchment management plan in place for the River Stick.

The River Stick has been classified as ‘at risk’ of not achieving ‘good’ status by 2015 under the Water Framework Directive Article 5 Characterisation (2004). Oyster Haven Bay has been classified as ‘expected’ to achieve ‘good’ status by 2015.

The 1998 Phosphorus Regulations set targets for phosphorus levels and biological quality (Q-values) for rivers and lakes. Where water quality is satisfactory it must be maintained and where water quality is unsatisfactory it must be improved. For levels of phosphorus the baseline Q-value determines the median molybdate-reactive phosphorus (MRP) to be achieved.

The discharge point from Riverstick WWTP is not located within a European designated site. The Sovereign Islands is a designated Natural Heritage Area (NHA) and Special Protection Area (SPA) and are located approximately 14km down-stream of the discharge point. It is not suspected that effluent from the WWTP will impact on the site.

The ambient sampling results for 2009 at aSW-1a were compared to the relevant EQR/S from the surface water regulations in the following tables. The sample results and the EQR/S were included only if there were values for both, to allow comparison.

The ambient sample results incorporated in the following tables are those laid out in the ambient column of the Revised Table E. However many of these results are at the limit of detection, or are based on averages that include assumed figures. Therefore an additional ambient table, which incorporates actual results for analysis below the Limit of Detection have been included. This “Analysis below the Limit of Detection” is laid out on a separate column in the Revised Table E.

UPSTREAM COMPARISON TABLE

<i>Physico-chemical conditions</i>	<i>Ecological quality ratio/standard</i>	<i>2009 upstream ambient sampling results at aSW01u</i>
	<i>Good boundary</i>	
	<i>Rivers (All Types)</i>	
<i>Oxygenation conditions Table 9</i>	<i>River water body</i>	<i>Ambient sampling results</i>
Biochemical Oxygen Demand (BOD) (mgO ₂ /l)	Good status ≤1.5 (mean) or ≤2.6 (95%ile)	1.00 based on one result only
<i>Acidification Status Table 9</i>	<i>River Water Body</i>	<i>Ambient sampling results</i>
pH (individual values)	Soft Water 4.5 < pH < 9.0 Hard Water 6.0 < pH < 9.0	7.30
<i>Nutrient conditions Table 9</i>	<i>River Water body</i>	<i>Ambient sampling results</i>
Total Ammonia (mg N/l)	Good status ≤0.065 (mean) or ≤0.140 (95%ile)	0.2 based on one result only
Molybdate Reactive Phosphorus (MRP) (mg P/l)	Good status ≤0.035 (mean) or ≤0.075 (95%ile)	0.02 based on one result only
<i>Specific pollutants Table 10</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Phenol	8	<0.1 µg/L
Toulene	10	<0.28 µg/L
Xylene	10	<1.0 µg/L
Arsenic	25	<0.96 µg/L
Total Chromium	8.1	<20.0 µg/L
Copper (depending on water hardness)	5	<20.0 µg/L
Cyanide	10	<5.0 µg/L
Flouride	500	<100 µg/L
Zinc (depending on water hardness)	50	<20.0 µg/L
<i>Priority Substances Table 11</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Atrazine	0.6	<0.01 µg/L

Dichloromethane	20	<1.0µg/L
Simazine	1	<0.01µg/L
Lead and its compounds	7.2	<20.0µg/L
Nickel and its compounds	20	<20.0µg/L
Priority Hazardous Substances Table 12	Inland surface waters AA-EQS	Ambient sampling results
Cadmium and its compounds (depending on water hardness)	≤0.08	<20µg/L
Mercury and its compounds	0.05	<0.2µg/L

Note the following:

The black results are within the EQR/S.

The red results break the EQR/S.

The blue results may break the EQR/S.

The results highlighted grey are at the limit of detection.

**UPSTREAM COMPARISON TABLE
(ANALYSIS BELOW THE LIMIT OF DETECTION)**

Physico-chemical conditions	Ecological quality ratio/standard	2009 upstream ambient sampling results at aSW01u
	Good boundary	
	Rivers (All Types)	
Nutrient conditions Table 9	River Water body	Ambient sampling results
Total Ammonia (mg N/l)	Good status ≤0.065(mean) or ≤0.140(95%ile)	0.045mg/L (mean) 0.053mg/L (95%ile)
Molybdate Reactive Phosphorus (MRP) (mg P/l)	Good status ≤0.035(mean) or ≤0.075(95%ile)	0.0098mg/L (mean) 0.0229mg/L (95%ile)
Specific pollutants Table 10	Inland surface waters AA-EQS	Ambient sampling results
Total Chromium	8.1	<1.0µg/L
Copper (depending on water hardness)	5	<1.0µg/L
Zinc (depending on water hardness)	50	<1.0µg/L
Priority Substances Table 11	Inland surface waters AA-EQS	Ambient sampling results
Lead and its compounds	7.2	<1.0µg/L
Nickel and its compounds	20	<1.0µg/L
Priority Hazardous Substances Table 12	Inland surface waters AA-EQS	Ambient sampling results
Cadmium and its compounds (depending on water hardness)	≤0.08	<1.0µg/L

Note: Actual result for Cadmium in sample was zero but <1 is recorded for reporting purposes.

DOWNSTREAM COMPARISON TABLE

Physico-chemical conditions	Ecological quality ratio/standard	2009 Downstream ambient sampling results at aSW01d
	Good boundary	
	Rivers (All Types)	
Oxygenation conditions Table 9	River water body	Ambient sampling results
Biochemical Oxygen Demand (BOD) (mgO ₂ /l)	Good status ≤1.5 (mean) or ≤2.6(95%ile)	2:00 based on one result only
Acidification Status Table 9	River Water Body	Ambient sampling results
pH (individual values)	Soft Water 4.5<pH<9.0 Hard Water 6.0<pH<9.0	7.4
Nutrient conditions Table 9	River Water body	Ambient sampling results
Total Ammonia (mg N/l)	Good status ≤0.065(mean) or ≤0.140(95%ile)	0.2 based on one result only
Molybdate Reactive Phosphorus (MRP) (mg P/l)	Good status ≤0.035(mean) or ≤0.075(95%ile)	0.02 Based on one result only
Specific pollutants Table 10	Inland surface waters AA-EQS	Ambient sampling results
Phenol	8	<0.1µg/L
Toulene	10	<0.28µg/L
Xylene	10	<1.0µg/L
Arsenic	25	<0.96µg/L
Total Chromium	8.1	<20.0µg/L
Copper (depending on water hardness)	5	<20.0µg/L
Cyanide	10	<5.0µg/L
Flouride	500	<100.0µg/L
Zinc (depending on water hardness)	50	<20.0µg/L
Priority Substances Table 11	Inland surface waters AA-EQS	Ambient sampling results
Atrazine	0.6	<0.01µg/L
Dichloromethane	20	<1.0µg/L
Simazine	1	<0.01µg/L
Lead and its compounds	7.2	<20.0µg/L
Nickel and its compounds	20	<20.0µg/L
Priority Hazardous Substances Table 12	Inland surface waters AA-EQS	Ambient sampling results
Cadmium and its compounds (depending on water hardness)	≤0.08	<20µg/L
Mercury and its compounds	0.05	<0.2µg/L

Note the following:

The black results are within the EQR/S.
 The red results break the EQR/S.
 The blue results may break the EQR/S.
 The results highlighted grey are at the limit of detection.

**DOWNSTREAM COMPARISON TABLE
(ANALYSIS BELOW THE LIMIT OF DETECTION)**

<i>Physico-chemical conditions</i>	<i>Ecological quality ratio/standard</i>	<i>2009 Downstream ambient sampling results at aSW01d</i>
	<i>Good boundary</i>	
	<i>Rivers (All Types)</i>	
<i>Nutrient conditions Table 9</i>	<i>River Water body</i>	<i>Ambient sampling results</i>
Total Ammonia (mg N/l)	Good status ≤ 0.065 (mean) or ≤ 0.140 (95%ile)	0.023mg/L (mean) 0.0275mg/L (95%ile)
Molybdate Reactive Phosphorus (MRP) (mg P/l)	Good status ≤ 0.035 (mean) or ≤ 0.075 (95%ile)	0.0095mg/L (mean) 0.0119mg/L (95%ile)
<i>Specific pollutants Table 10</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Total Chromium	8.1	<1.0 μ g/L
Copper (depending on water hardness)	5	<1.0 μ g/L
Zinc (depending on water hardness)	50	<1.0 μ g/L
<i>Priority Substances Table 11</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Lead and its compounds	7.2	6.0 μ g/L
Nickel and its compounds	20	<1.0 μ g/L
<i>Priority Hazardous Substances Table 12</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Cadmium and its compounds (depending on water hardness)	≤ 0.08	<1.0 μ g/L

Note: Actual result for Cadmium in sample was zero but <1 is recorded for reporting purposes

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Existing Environment & Impact of Discharges

The River Stick (20S03) is contained within Hydrometric Area 20 and is located entirely in County Cork. The River Stick rises near Coolkirky and flows in a southerly direction past Riverstick continuing on towards Belgooly. At Belgooly River Stick discharges to Oyster Haven, water becomes transitional at this point. There is no water quality management plan or catchment management plan in place for the River Stick.

The River Stick has been classified as 'at risk' of not achieving 'good' status by 2015 under the Water Framework Directive Article 5 Characterisation (2004). Oyster Haven Bay has been classified as 'expected' to achieve 'good' status by 2015.

The 1998 Phosphorus Regulations set targets for phosphorus levels and biological quality (Q-values) for rivers and lakes. Where water quality is satisfactory it must be maintained and where water quality is unsatisfactory it must be improved. For levels of phosphorus the baseline Q-value determines the median molybdate-reactive phosphorus (MRP) to be achieved.

Water quality in the River Stick is monitored by the EPA at four different locations. The EPA monitoring station 0300 at the Bridge east of Coolkirky is located approximately 2.2km up-stream of Riverstick WWTP primary discharge point. The sampling results show that the quality of the River Stick at this location went from 'slightly polluted' status in 2003 to 'unpolluted' in 2006. The EPA monitoring station 0240 at the bridge up-stream of the confluence with main channel is located approximately 0.7km down-stream of the discharge point. Water quality at this station has achieved unpolluted status since 2000. Sampling results from 2006 show a Q-value of 4 at this location. A Biological Quality Rating of Q4 represents satisfactory water quality. Eutrophication is unlikely to occur in water bodies with a biological quality rating of Q4 or higher. The sampling results are shown in **Table F1.1**.

Station	1989	1994	1997	2000	2003	2006
0240	-	4	3-4	4	4-5	4
0300	3	3	3	3	3-4	4

Table F1.1.

The River Stick is not designated as salmonid water under the European Communities (Quality of Salmonid Waters Regulations, 1988 (S.I. No. 293/1988)). The Sovereign Islands which are located approximately 14km downstream of the Riverstick waste water discharge point is a Special Protection Area (SPA) and a Natural Heritage Area (NHA). It is unlikely that the waste water treatment plant will have a negative impact on the site due to the distance between the discharge point and the Sovereign Islands. There are no other SPAs or NHAs down-stream of the discharge point.

The estimated 95%ile flow is 0.018430410m³/s and the estimated median flow is 0.17407610m³/s for Upper River Stick. These figures were obtained from the South

Western River Basin District. There is no figure provided for the Dry Weather Flow (DWF).

- o Provide a statement as to whether or not emissions of main polluting substances (as defined in the *Dangerous Substances Regulations S.I. No. 12 of 2001*) to water are likely to impair the environment.

Cork County Council have monitored for the main polluting substances as defined in the *Dangerous Substances Regulations S.I. No. 12 of 2001*. The results are presented in Table D and F.

- o In circumstances where water abstraction points exist downstream of any discharge describe measures to be undertaken to ensure that discharges from the waste water works will not have a significant effect on faecal coliform, salmonella and protozoan pathogen numbers, e.g., *Cryptosporidium* and *Giardia*, in the receiving water environment.

There is no abstraction point down-stream of the Riverstick WWTP primary discharge point.

- o Indicate whether or not emissions from the agglomeration or any plant, methods, processes, operating procedures or other factors which affect such emissions are likely to have a significant effect on –
 - (a) a site (until the adoption, in respect of the site, of a decision by the European Commission under Article 21 of Council Directive 92/43/EEC for the purposes of the third paragraph of Article 4(2) of that Directive) —
 - (i) notified for the purposes of Regulation 4 of the Natural Habitats Regulations, subject to any amendments made to it by virtue of Regulation 5 of those Regulations,
 - (ii) details of which have been transmitted to the Commission in accordance with Regulation 5(4) of the Natural Habitats Regulations, or
 - (iii) added by virtue of Regulation 6 of the Natural Habitats Regulations to the list transmitted to the Commission in accordance with Regulation 5(4) of those Regulations,
 - (b) a site adopted by the European Commission as a site of Community importance for the purposes of Article 4(2) of Council Directive 92/43/EEC¹ in accordance with the procedures laid down in Article 21 of that Directive,
 - (c) a special area of conservation within the meaning of the Natural Habitats Regulations, or
 - (d) an area classified pursuant to Article 4(1) or 4(2) of Council Directive 79/409/EEC²;

¹Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ No. L 206, 22.07.1992)

²Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (OJ No. L 103, 25.4.1979)

The discharge point from Riverstick WWTP is not located within a European designated site. The Sovereign Islands is a designated Natural Heritage Area (NHA) and Special Protection Area (SPA) and are located approximately 14km down-stream of the discharge point. It is not suspected that effluent from the WWTP will impact on the site. The site synopses are included in **Attachment F1**.

Water Framework Directive 2000/60/EC

The objectives of the Water Framework Directive (WFD) are to protect all high status waters, prevent further deterioration of all waters and to restore degraded surface and ground water status by 2015. Cork County Council monitors the inlet and outlet flows from Riverstick WWTP to ensure compliance with the relevant standards. Up-stream and down-stream locations are also monitored.

Birds Directive 79/409/EEC

The directive aims to conserve and manage populations of wild birds throughout Europe partly through the designation of Special Protection Areas (SPA) for birds and their habitats. The discharge point is not located within an SPA.

Groundwater Directives 80/68/EEC and 2006/118/EC

Not applicable as there are no emissions to groundwater.

Urban Waste Water Treatment Directive 91/271/EEC

The Urban Waste Water Treatment Regulations, (S.I. 254 of 2001) gives effect to provisions of the Urban Wastewater Treatment Directive (91/271/EEC). The 2001 Irish Regulations in relation to the collection and treatment of urban wastewater.

Article 7 (a) states that *'Member States shall ensure that, by 31 December 2005, urban waste water entering collecting systems shall before discharge be subject to appropriate treatment as defined in Article 2 (9) in the following cases:*

- *for discharges to fresh-water and estuaries from agglomerations of less than 2 000 p.e.,*
- *for discharges to coastal waters from agglomerations of less than 10,000 p.e.'*

Appropriate treatment is defined as:

...any process and/or disposal system which after discharge allows the receiving waters to meet the relevant provisions of the Directive and of other community Directives.

Relevant Community Directives have been discussed above. Where the agglomeration served is over 2000PE (10000PE if coastal) the second schedule shall not exceed 25 mg/l and 35 mg/l respectively. The limits specified in the Urban Waste Water Treatment Directive are not considered onerous, and compliance with stricter articles of legislation such as the Fisheries Directive will ensure compliance with the Urban Waste Water Treatment Directive.

Habitats Directive 92/43/EEC

There are no Special Areas of Conservation (SAC) or Special Protection Areas (SPA) under the Habitats Directive in the vicinity of the waste water discharge.

Bathing Water Directive 76/160/EEC

There are no designated bathing waters in the vicinity of the discharge.

Shellfish Waters Directive (79/923/EEC)

There are two main EU directives relating to Shellfish Waters. These are the Shellfish Directives (79/923/EEC) as implemented by the Quality of Shellfish Waters Regulations 2006 (S.I. No 268 of 2006), and the Directive on Health Conditions and the placing on the market of Live Bivalve Molluscs (91/67/EEC) and its associated amendments.

The Shellfish Waters Directive is designed to put in place concrete measures to protect waters, including shellfish waters, against pollution and to safeguard certain shellfish populations from various harmful consequences, resulting from the discharge of pollutant substances into the sea. The Directive applies to the aquatic habitat of bivalve and gastropod molluscs only.

The Directive sets physical, chemical and microbiological water quality requirements that designated shellfish waters must either comply with ('mandatory' standards) or endeavour to meet ('guideline' standards). The parameters for testing are pH, temperature, coloration (after filtration), suspended solids, salinity, dissolved oxygen, petroleum hydrocarbons, organohalogenated substances, metals (dissolved), faecal coliforms and substances affecting the taste of the shellfish, faecal coliforms are regarded as one of the most significant parameters. Waters must meet certain mandatory values based on the monitoring regime. Designated waters must conform to the set limit values for the certain parameters within six years of designation.

The Department of Communications, Marine and Natural Resources Live Bivalve Molluscs (Production Areas) Designated 2006 has confirmed that Oysterhaven is a licensed area for the cultivation of shellfish such as oysters as detailed in **Table F.1.2**.

Production Area	Boundaries	Bed Name	Species	Previous Classification	Current Classification
Oysterhaven	Ballymacus Point to Kinure Point	All Beds	Oyster	B	B

Table F.1.2 Designation Bivalve Molluscs Production Areas in Ireland – October 2006

In accordance with the Live Bivalve Molluscs (Production Areas) designation 2006 and Council Directive 91/492/EEC, Oysterhaven has a category B status which means that shellfish from this area have to be treated in a purification centre or a relay bed before they can be placed on the market for human consumption. The water quality standards for shellfish in Category B waters is summarised in **Table F.1.3**.

Category of Waters	Faecal Coliforms / 100g of Flesh	Compliance of Samples	Further Treatment
A- Immediate Human Consumption	< 300	100% < 300	Not Required
B- Human Consumption After Treatment	300 - 6,000	90% < 6,000	Purification After Relaying
C- Human Consumption After Treatment	6,000 - 60,000	100% < 60,000	Relaying for long period - Intensive Purification

Table F.1.3 Requirements for Faecal Coliform levels for Live Bivalve Molluscs in Accordance with Directive 91/492/EEC

Riverstick WWTP primary discharge point is located approximately 8.5km up-stream of the shellfish designation at Oysterhaven.

- o Describe, where appropriate, measures for minimising pollution over long distances or in the territory of other states.

Not applicable

- o This section should also contain full details of any modelling of discharges from the agglomeration.

There was no modelling study conducted for the discharges from Riverstick waste water treatment plant.

F.1 (I) Waste Assimilative Capacity of Receiving Waters

Assimilative Capacity

Receiving waters should have a capacity to assimilate effluent discharges without showing signs of pollution. It is desirable that any effluent discharge to the River Stick should not:

- increase the BOD₅ level in the water by more than 1mg/l;
- increase the overall BOD₅ in the water to more than 4mg/l (ideally 3mg/l);
- increase the Ortho Phosphate level in the water to more than 0.03mg/l;

Assimilative Capacity of the Receiving Water

Mass Balance Equation for Orthophosphates:

Median flow of River (SWRBD) = $0.617\text{m}^3/\text{sec}$

Median $\text{oPO}_4\text{-P}$ in River (upstream) = 0.05mg/l

Average volume of discharge = $0.001\text{ m}^3/\text{sec}$

Median value for $\text{oPO}_4\text{-P}$ in discharge = 5.62mg/l

$$C_{\text{final}} = (0.617 \times 0.05) + (0.001 \times 5.62)$$

$$\frac{\quad}{(0.617 + 0.001)}$$

$$C_{\text{final}} = 0.059 \text{ mg/l } \text{oPO}_4\text{-P}$$

The increase in Orthophosphate due to the discharge of Riverstick WWTP is 0.009 mg/l .

Mass Balance Equation for BOD:

Flow of River (95%ile) = $0.08\text{m}^3/\text{sec}$

Median BOD in River (upstream) = 1.0mg/l

Average volume of discharge = $0.001\text{m}^3/\text{sec}$

Median value for BOD in discharge = 83mg/l

$$C_{\text{final}} = (0.08 \times 1.0) + (0.001 \times 83)$$

$$\frac{\quad}{(0.08 + 0.001)}$$

$$C_{\text{final}} = 2.01\text{mg/l BOD}$$

The increase in BOD due to the discharge of Riverstick WWTP is 1.01mg/l .

Mass Balance Equation for Suspended Solids:

Flow of River (95%ile) = $0.08\text{m}^3/\text{sec}$

Median SS in River (upstream) = 2.5 mg/l

Average volume of discharge = $0.001\text{ m}^3/\text{sec}$

Median value for SS in discharge = 21mg/l

$$C_{\text{final}} = (0.08 \times 2.5) + (0.001 \times 21)$$

$$\frac{\quad}{\quad}$$

$$(0.08 + 0.001)$$

$C_{\text{final}} = 2.73\text{mg/l}$ Suspended Solids

The increase in Suspended Solids due to the discharge of Riverstick WWTP is 0.73 mg/l.

Mass Balance Equation for Total Phosphates:

Median Flow of River (SWRBD) = $0.617\text{m}^3/\text{sec}$
Median $\text{TPO}_4\text{-P}$ in River (upstream) = 0.05mg/l

Average volume of discharge = $0.001\text{m}^3/\text{sec}$
Median value for $\text{TPO}_4\text{-P}$ in discharge = 5.07mg/l

$$C_{\text{final}} = \frac{(0.617 \times 0.05) + (0.001 \times 5.07)}{(0.617 + 0.001)}$$

$C_{\text{final}} = 0.058\text{ mg/l}$ Total Phosphates

The increase in Total Phosphates due to the discharge of Riverstick WWTP is 0.005g/l.

Mass Balance Equation for Total Nitrogen:

Flow of River (95%ile) = $0.08\text{ m}^3/\text{sec}$
Median Total Nitrogen in River (upstream) = 5.01mg/l

Average volume of discharge = $0.001\text{m}^3/\text{sec}$
Median value for Total Nitrogen in discharge = 37.55mg/l

$$C_{\text{final}} = \frac{(0.08 \times 5.01) + (0.001 \times 37.55)}{(0.08 + 0.001)}$$

$C_{\text{final}} = 5.41\text{mg/l}$ Total Nitrogen

The increase in Total Nitrogen due to the discharge of Riverstick WWTP is 0.40mg/l.

Mass Balance Equation for Sulphates:

Flow of River (95%ile) = $0.08\text{m}^3/\text{sec}$
Median Sulphates in River (upstream) = 30.0mg/l

Average volume of discharge = 0.001 m³/sec
Median value for Sulphates in discharge = 32.0 mg/l

$$C_{\text{final}} = \frac{(0.08 \times 30.0) + (0.001 \times 32)}{(0.08 + 0.001)}$$

$C_{\text{final}} = 30.02 \text{mg/l Sulphates}$

The increase in Sulphates due to the discharge of Riverstick WWTP is 0.02mg/l.

Mass Balance Equation for Ammonia - N:

Flow of River (95%ile) = 0.08m³/sec
Median Ammonia in River (upstream) = 0.1mg/l

Average volume of discharge = 0.001m³/sec
Median value for Ammonia in discharge = 42.8mg/l

$$C_{\text{final}} = \frac{(0.08 \times 0.1) + (0.001 \times 42.8)}{(0.08 + 0.001)}$$

$C_{\text{final}} = 0.63 \text{mg/l Total Ammonia}$

The increase in Ammonia due to the discharge of Riverstick WWTP is 0.53mg/l.

Proposed Assimilative Capacity of the Receiving Water

Mass Balance Equation for BOD:

Flow of River (95%ile) = 0.08m³/sec
Median BOD in River (upstream) = 1.0mg/l

Average volume of discharge = 0.003 m³/sec
Median value for BOD in discharge = 10mg/l

$$C_{\text{final}} = \frac{(0.08 \times 1.0) + (0.003 \times 10)}{(0.08 + 0.003)}$$

$C_{\text{final}} = 1.33 \text{ mg/l BOD}$

The increase in BOD due to the discharge of Riverstick WWTP is 0.33 mg/l.

Mass Balance Equation for Suspended Solids:

Flow of River (95% ile) = 0.08m³/sec
Median SS in River (upstream) = 2.5mg/l

Average volume of discharge = 0.003 m³/sec
Median value for SS in discharge = 15mg/l

$$C_{\text{final}} = \frac{(0.08 \times 2.5) + (0.003 \times 15)}{(0.08 + 0.003)}$$

C_{final} = 2.95 mg/l Suspended Solids

The increase in Suspended Solids due to the discharge of Riverstick WWTP is 0.45 mg/l

Mass Balance Equation for Total Phosphates:

Median Flow of River (SWRBD) = 0.617m³/sec
Median TPO₄-P in River (upstream) = 0.05mg/l

Average volume of discharge = 0.003 m³/sec
Median value for TPO₄-P in discharge = 1mg/l

$$C_{\text{final}} = \frac{(0.617 \times 0.05) + (0.003 \times 1)}{(0.617 + 0.003)}$$

C_{final} = 0.055mg/l Total Phosphates

The increase in Total Phosphates due to the discharge of Riverstick WWTP is 0.005 mg/l.

The figure for the 50%ile and 95%ile flow were taken from data supplied by the EPA flow statistics.