

Comhairle Contae Chorcaí Cork County Council

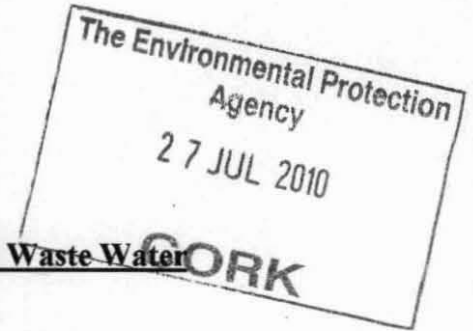
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Mr. Stuart Huskisson,
Inspector,
Environmental Protection Agency,
Office of Climate, Licensing & Resource Use,
Regional Inspectorate,
Inniscarra,
County Cork.

26/07/2010

D0437-01



Re: Notices in accordance with Regulation 18(3)(b) of the Waste Water Discharge

(Authorisation) Regulations 2007)

Dear Mr. Huskisson,

Your notices dated 31st. May and 1st. June last and previous correspondence regarding the following Waste Water Discharge Licence applications refer.

Reg No.	Agglomeration Name	Date of Application
D0437-01	Boherbue	22/06/2009
D0438-01	Bweeng	22/06/2009
D0439-01	Corna	22/06/2009
D0445-01	Glanworth	22/06/2009
D0450-01	Clondulane	22/06/2009

Attached find an assessment of the impact of the discharge in relation to the requirements of the Environmental Quality Objectives regulations (S.I. No. 272 of 2009 for Boherbue WWTP. CD – ROM also attached.

Yours truly,
Paddy O' Friel
Substitute Senior Engineer
Email: paddy.ofriel@corkcoco.ie



022- 30441.

Mobile 087/2700065



Attachment E4 Boherbue Inlet Table E4

Sample Date	19/01/2006	10/08/2006	04/03/2009	07/04/2009	07/05/2009	19/05/2009	Average
Sample	Influent	Influent	Influent	Influent	Influent	Influent	
Sample Code					GT626	GT777	
Flow M ³ /Day	*	*	*	*	*	*	
pH	7.1	7.9	7.7	7.4	7.7	7.5	7.55
Temperature °C	*	*	*	*	*	*	
Cond 20°C	427	800	1232	599	668	588	719
SS mg/L	34	28	120	15	101	99	66.16666667
NH ₃ mg/L	6	27	21.8	10.5	24.3	9.4	16.5
BOD mg/L	100	103	65	69	182	243	127
COD mg/L	108	240	200	137	275	888	308
TN mg/L	*	*	23	16	35.8	26.6	25.35
Nitrite mg/L	*	*	*	*	0.25	*	0.25
Nitrate mg/L	*	*	*	*	3.21	*	3.21
TP mg/L	3	17	1.9	3.1	3.88	4.8	5.613333333
O-PO ₄ -P mg/L	1	11	1.7	1.3	2.12	1.8	3.153333333
SO ₄ mg/L	*	*	*	*	32	*	32
Phenols µg/L	*	*	*	*	<0.10	*	<0.10
Atrazine µg/L	*	*	*	*	<0.01	*	<0.01
Dichloromethane µg/L	*	*	*	*	<1	*	<1
Simazine µg/L	*	*	*	*	<0.01	*	<0.01
Toluene µg/L	*	*	*	*	<0.28	*	<0.28
Tributyltin µg/L	*	*	*	*	not required	*	not required
Xylenes µg/L	*	*	*	*	<1	*	<1
Arsenic µg/L	*	*	*	*	<0.96	*	<0.96
Chromium ug/L	*	*	*	*	<20	<20	<20
Copper ug/L	*	*	*	*	33	23.9	28.45
Cyanide µg/L	*	*	*	*	<5	*	<5
Fluoride µg/L	*	*	*	*	200	*	200
Lead ug/L	*	*	*	*	<20	<20	<20
Nickel ug/L	*	*	*	*	<20	<20	<20
Zinc ug/L	*	*	*	*	37	49.6	43.3
Boron ug/L	*	*	*	*	10	115	62.5
Cadmium ug/L	*	*	*	*	<20	<20	<20
Mercury µg/L	*	*	*	*	0.2	*	0.2
Selenium µg/L	*	*	*	*	1	*	1
Barium ug/L	*	*	*	*	<20	<20	<20

value at 1/2 of LOD for stistical purposes =

Attachment E4 Boherbue Discharge Outlet Table E4

Sample Date	19/01/2006	10/08/2006	13/11/2008	18/12/2008	04/03/2009	12/03/2009	07/04/2009	07/05/2009	19/05/2009	Average	Kg/Day	Kg/year
Sample	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent	Effluent			
Sample Code			GS1213	GS1413	GT377	GT377	GT483	GT627	GT778			
Flow M ³ /Day	*	*	*	*	*	*	*	*	*			
pH	7.3	7.5	*	*	7.5	7.1	7.5	7.3	7.3	7.357142857		
Temperature °C	*	*	*	*	*	*	*	*	*			
Cond 20°C	348	634	*	*	494	*	494	326	386	447		
SS mg/L	4	8	8	22	4	22	4	1.25	4	8.583333333		
NH ₃ mg/L	2	3	*	*	5.3	*	5.3	0.6	0.28	2.746666667		
BOD mg/L	2	4	2.89	24.8	<2	35	<2	3.4	2.7	10.68428571		
COD mg/L	30	38	26	60	16	65	16	10.5	43	33.83333333		
TN mg/L	*	*	*	*	7	8.2	7	0.79	2.29	5.056		
Nitrite mg/L	*	*	*	*	*	*	*	<0.10	*	<0.10		
Nitrate mg/L	*	*	*	*	*	*	*	0.66	*	0.66		
TP mg/L	3	9	*	*	1.9	0.9	1.9	1.64	1.6	2.848571429		
O-PO4-P mg/L	2	8	*	*	1.9	*	1.9	1.37	1.5	2.778333333		
SO4 mg/L	*	*	*	*	*	*	*	<30	*	<30		
Phenols µg/L	*	*	*	*	*	*	*	<0.10	*	<0.10		
Atrazine µg/L	*	*	*	*	*	*	*	<0.01	*	<0.01		
Dichloromethane µg/L	*	*	*	*	*	*	*	<1	*	<1		
Simazine µg/L	*	*	*	*	*	*	*	<0.01	*	<0.01		
Toluene µg/L	*	*	*	*	*	*	*	<0.28	*	<0.28		
Tributyltin µg/L	*	*	*	*	*	*	*	Not required	*			
Xylenes µg/L	*	*	*	*	*	*	*	<1	*	<1		
Arsenic µg/L	*	*	*	*	*	*	*	<0.96	*	<0.96		
Chromium ug/L	*	*	*	<20	<20	<20	<20	<20	<20	<20		
Copper ug/L	*	*	*	<20	<20	<20	<20	<20	<20	<20		
Cyanide µg/L	*	*	*	*	*	*	*	<5	*	<5		
Fluoride µg/L	*	*	*	*	*	*	*	171	*	171		
Lead ug/L	*	*	*	<20	<20	<20	<20	<20	<20	<20		
Nickel ug/L	*	*	*	<20	<20	<20	<20	<20	<20	<20		
Zinc ug/L	*	*	*	<20	<20	<20	<20	<20	<20	<20		
Boron ug/L	*	*	*	10	24.8	10	10	10	47	18.63333333		
Cadmium ug/L	*	*	*	<20	<20	<20	<20	<20	<20	<20		
Mercury µg/L	*	*	*	*	*	*	*	<0.2	*	<0.2		
Selenium µg/L	*	*	*	*	*	*	*	<0.74	*	<0.74		
Barium ug/L	*	*	*	30	10	10	10	10	<20	14		

value at 1/2 of LOD for stistical purposes =

Attachment E4 Boherbue Upstream Table E4

Sample Date	13/11/2008	04/03/2009	12/03/2009	07/04/2009	07/05/2009	19/05/2009	
Sample	River	River	River	River	River	River	Average
Sample Code	GS1214	GT378	GT353	GT484	GT628	GT779	
Flow M ³ /Day	*	*	*	*	*	*	
pH	*	7.3	*	7.3	7.6	7.1	7.325
Temperature °C	*		*		*		
Cond 20°C	*	124	*	135	119	107	121.25
SS mg/L	*	14	*	2.6	12	9	9.4
NH ₃ mg/L	*	0.12	*	0.025	0.05	0.14	0.08375
BOD mg/L	*	1	*	2	3	3	2.25
COD mg/L	*	51	*	15	10.5	67	35.875
TN mg/L	*	1	*	0.5	1.3	1.85	1.1625
Nitrite mg/L	*	*	*	*	<0.10	*	
Nitrate mg/L	*	*	*	*	1.06	*	1.06
TP mg/L	*	0.14	*	0.025	0.025	0.15	0.085
O-PO ₄ -P mg/L	0.1	0.06	0.21	0.025	0.025	0.07	0.081666667
SO ₄ mg/L	*	*	*	*	<30	*	<30
Phenols µg/L	*	*	*	*	<0.10	*	<0.10
Atrazine µg/L	*	*	*	*	<0.01	*	<0.01
Dichloromethane µg/L	*	*	*	*	<1	*	<1
Simazine µg/L	*	*	*	*	<0.01	*	<0.01
Toluene µg/L	*	*	*	*	<0.28	*	<0.28
Tributyltin µg/L	*	*	*	*	not required	*	
Xylenes µg/L	*	*	*	*	<1	*	<1
Arsenic µg/L	*	*	*	*	<0.96	*	<0.96
Chromium ug/L	*	*	<20	<20	<20	<20	<20
Copper ug/L	*	*	<20	<20	<20	<20	<20
Cyanide µg/L	*	*	*	*	<5	*	<5
Fluoride µg/L	*	*	*	*	<100	*	<100
Lead ug/L	*	*	<20	<20	<20	<20	<20
Nickel ug/L	*	*	<20	<20	<20	<20	<20
Zinc ug/L	*	*	<20	<20	<20	<20	<20
Boron ug/L	*	*	<20	<20	<20	<20	<20
Cadmium ug/L	*	*	<20	<20	<20	<20	<20
Mercury µg/L	*	*	*	*	<0.2	*	<0.2
Selenium µg/L	*	*	*	*	2	*	2
Barium ug/L	*	*	10	10	34.87	<20	18.29

value at 1/2 of LOD for stistical purposes =

Attachment E4 Boherbue Downstream Table E4

Sample Date	13/11/2008	04/03/2009	12/03/2009	07/04/2009	07/05/2009	19/05/2009	Average
Sample	River	River	River	River	River	River	
Sample Code	GS1215	GT379	GT354	GT485	GT629	GT780	
Flow M ³ /Day	*	*	*	*	*	*	
pH	*	7.2	*	7.4	7.8	7.2	7.4
Temperature °C	*		*		*		
Cond 20°C	*	131	*	158	136	118	135.75
SS mg/L	*	12	*	2.6	3	11	7.15
NH ₃ mg/L	*	0.13	*	0.025	0.05	0.09	0.07375
BOD mg/L	*	1	*	2	2	3	2
COD mg/L	*	40	*	2.5	10.5	56	27.25
TN mg/L	*	1	*	1	1.89	2.02	1.4775
Nitrite mg/L	*	*	*	*	<0.10	*	
Nitrate mg/L	*	*	*	*	1.75	*	1.75
TP mg/L	*	0.1	*	0.06	<0.05	0.18	0.113333333
O-PO ₄ -P mg/L	0.025	0.08	0.025	0.025	0.025	0.1	0.051
SO ₄ mg/L	*	*	*	*	<30	*	
Phenols µg/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	*	*	*	*	<0.28	*	<0.28
Tributyltin µg/L	*	*	*	*	not required	*	
Xylenes µg/L	*	*	*	*	<1	*	<1
Arsenic µg/L	*	*	*	*	<0.96	*	<0.96
Chromium ug/L	*	<20	<20	<20	<20	<20	<20
Copper ug/L	*	<20	<20	<20	<20	<20	<20
Cyanide µg/L	*	*	*	*	<5	*	<5
Fluoride µg/L	*	*	*	*	<100	*	<100
Lead ug/L	*	<20	<20	<20	<20	<20	<20
Nickel ug/L	*	<20	<20	<20	<20	<20	<20
Zinc ug/L	*	<20	<20	<20	<20	<20	<20
Boron ug/L	*	<20	<20	<20	<20	<20	<20
Cadmium ug/L	*	<20	<20	<20	<20	<20	<20
Mercury µg/L	*	*	*	*	<0.2	*	<0.2
Selenium µg/L	*	*	*	*	1.5	*	1.5
Barium ug/L	*	10	10	10	31.745	10	14.349

value at 1/2 of LOD for stistical purposes =

County	Costello	11/05/2009	Atrazine	09	GT26 - Boherbue Inlet	<0.01
County	Costello	11/05/2009	Simazine	09	GT26 - Boherbue Inlet	<0.01
County	Costello	11/05/2009	Toluene	09	GT26 - Boherbue Inlet	<0.28
County	Costello	11/05/2009	(Total)	09	GT26 - Boherbue Inlet	<1
County	Costello	11/05/2009	Xylene	09	GT26 - Boherbue Inlet	<0.73
County	Costello	11/05/2009	o-xylene	09	GT26 - Boherbue Inlet	<0.35
County	Costello	11/05/2009	ethane	09	GT26 - Boherbue Inlet	<1
County	Costello	11/05/2009	Arsenic	09	GT26 - Boherbue Inlet	
County	Costello	11/05/2009	Mercury	09	GT26 - Boherbue Inlet	0.2
County	Costello	11/05/2009	Selenium	09	GT26 - Boherbue Inlet	
County	Costello	11/05/2009	Cyanide	09	GT26 - Boherbue Inlet	
County	Costello	11/05/2009	(Total)	09	GT26 - Boherbue Inlet	<0.10
County	Costello	11/05/2009	Atrazine	10	GT627 - Boherbue STP (Effluent)	<0.01
County	Costello	11/05/2009	Simazine	10	GT627 - Boherbue STP (Effluent)	<0.01
County	Costello	11/05/2009	Toluene	10	GT627 - Boherbue STP (Effluent)	<0.28
County	Costello	11/05/2009	(Total)	10	GT627 - Boherbue STP (Effluent)	<1
County	Costello	11/05/2009	Xylene	10	GT627 - Boherbue STP (Effluent)	<0.73
County	Costello	11/05/2009	o-xylene	10	GT627 - Boherbue STP (Effluent)	<0.35
County	Costello	11/05/2009	ethane	10	GT627 - Boherbue STP (Effluent)	<1
County	Costello	11/05/2009	Arsenic	10	GT627 - Boherbue STP (Effluent)	
County	Costello	11/05/2009	Mercury	10	GT627 - Boherbue STP (Effluent)	<0.2
County	Costello	11/05/2009	Selenium	10	GT627 - Boherbue STP (Effluent)	
County	Costello	11/05/2009	Cyanide	10	GT627 - Boherbue STP (Effluent)	
County	Costello	11/05/2009	(Total)	10	GT627 - Boherbue STP (Effluent)	<0.10
County	Costello	11/05/2009	Atrazine	11	GT628 - Boherbue Upstream	<0.01
County	Costello	11/05/2009	Simazine	11	GT628 - Boherbue Upstream	<0.01
County	Costello	11/05/2009	Toluene	11	GT628 - Boherbue Upstream	<0.28
County	Costello	11/05/2009	(Total)	11	GT628 - Boherbue Upstream	<1
County	Costello	11/05/2009	Xylene	11	GT628 - Boherbue Upstream	<0.73
County	Costello	11/05/2009	o-xylene	11	GT628 - Boherbue Upstream	<0.35
County	Costello	11/05/2009	ethane	11	GT628 - Boherbue Upstream	<1
County	Costello	11/05/2009	Arsenic	11	GT628 - Boherbue Upstream	
County	Costello	11/05/2009	Mercury	11	GT628 - Boherbue Upstream	<0.2
County	Costello	11/05/2009	Selenium	11	GT628 - Boherbue Upstream	
County	Costello	11/05/2009	Cyanide	11	GT628 - Boherbue Upstream	
County	Costello	11/05/2009	(Total)	11	GT628 - Boherbue Upstream	<0.10
County	Costello	11/05/2009	Atrazine	12	GT629 - Boherbue Downstream	<0.01
County	Costello	11/05/2009	Simazine	12	GT629 - Boherbue Downstream	<0.01
County	Costello	11/05/2009	Toluene	12	GT629 - Boherbue Downstream	<0.28
County	Costello	11/05/2009	(Total)	12	GT629 - Boherbue Downstream	<1
County	Costello	11/05/2009	Xylene	12	GT629 - Boherbue Downstream	<0.73
County	Costello	11/05/2009	o-xylene	12	GT629 - Boherbue Downstream	<0.35
County	Costello	11/05/2009	ethane	12	GT629 - Boherbue Downstream	<1
County	Costello	11/05/2009	Arsenic	12	GT629 - Boherbue Downstream	
County	Costello	11/05/2009	Mercury	12	GT629 - Boherbue Downstream	<0.2
County	Costello	11/05/2009	Selenium	12	GT629 - Boherbue Downstream	
County	Costello	11/05/2009	Cyanide	12	GT629 - Boherbue Downstream	
County	Costello	11/05/2009	(Total)	12	GT629 - Boherbue Downstream	<0.10

D0437-01 Attachment E4 tabulation of monitoring results for compliance purposes against SI 272 of 2009 for comparison purposes where results are below LOD for analytical method

Sample Date	13/11/2008	04/03/2009	12/03/2009	07/04/2009	07/05/2009	19/05/2009	Average	95% percentile
Sample	Upstream River	Upstream River	Upstream River	Upstream River	Upstream River	Upstream River		
Sample Code	GS1214	GT378	GT353	GT484	GT628	GT779		
NH ₃ mg/L	*	0.12	*	0.033	0.0225	0.14	0.078875	0.137
O-PO4-P mg/L	0.10	0.06	0.21	0.01	0.0115	0.07	0.076916667	0.1825
Chromium ug/L	*	*	<1	<1	<1	1.384	1.384	n/a
Copper ug/L	*	*	<1	<1	<1	1.54	1.54	n/a
Lead ug/L	*	*	10.29	<1	<1	7.77	9.03	n/a
Nickel ug/L	*	*	2.213	2.529	1.747	2.249	2.1845	n/a
Zinc ug/L	*	*	7.11	<1	1.601	3.076	3.929	n/a
Boron ug/L	*	*	<1	<1	<1	17.355	17.355	n/a
Cadmium ug/L	*	*	<1	<1	<1	<1	<1	n/a
Barium ug/L	*	*	7.961	9.579	34.87	4.801	14.30275	n/a

Sample Date	13/11/2008	04/03/2009	12/03/2009	07/04/2009	07/05/2009	19/05/2009	Average	95% percentile
Sample	Downstream River	Downstream River	Downstream River	Downstream River	Downstream River	Downstream River		
Sample Code	GS1215	GT379	GT354	GT485	GT629	GT780		
NH ₃ mg/L	*	0.13	*	0.03	0.0145	0.09	0.066125	0.124
O-PO4-P mg/L	0.0245	0.08	0.024	0.02	0.017	0.1	0.04425	0.095
Chromium ug/L	*	2.274	<1	<1	<1	1.005	1.6395	n/a
Copper ug/L	*	<1	<1	<1	<1	2.988	2.988	n/a
Lead ug/L	*	7.164	<1	<1	<1	<1	7.164	n/a
Nickel ug/L	*	3.931	2.01	<1	1.796	2.402	2.53475	n/a
Zinc ug/L	*	3.274	<1	<1	14.197	3.148	6.873	n/a
Boron ug/L	*	5.805	<1	<1	<1	11.68	8.7425	n/a
Cadmium ug/L	*	<1	<1	<1	<1	<1	<1	n/a
Barium ug/L	*	7.682	4.607	10.34	31.745	5.528	11.9804	n/a

<1 Note values of 0ug/l recorded as <1ug/l

BOHERBUE WWTP UPSTREAM COMPARISON TABLE

<i>Physico-chemical conditions</i>	<i>Ecological quality ratio/standard</i>	<i>2008 upstream ambient sampling results</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)	2.25mg/L (mean) 3mg/L (95%ile)
<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	7.1-7.6 (range)
<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)	0.0788mg/L (mean) 0.137mg/L (95%ile)
Molybdate Reactive Phosphorus (MRP) (mg P/l)	Good status ≤0.035(mean) or ≤0.075(95%ile)	0.0769mg/L (mean) 0.1825mg/L (95%ile)
<i>Specific pollutants Table 10</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Phenol	8	<0.1µg/L
Toulene	10	<0.28µg/L
Xylene	10	<1.0µg/L
Arsenic	25	<0.96µg/L
Total Chromium	8.1	<20µg/L
Copper (depending on water hardness)	30	<20µg/L
Cyanide	10	<5µg/L
Flouride	500	<100µg/L
Zinc (depending on water hardness)	100	<20µg/L
<i>Priority Substances Table 11</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Atrazine	0.6	<0.01µg/L
Dichloromethane	20	<1.0µg/L
Simazine	1	<0.01µg/L
Lead and its compounds	7.2	<20µg/L
Nickel and its compounds	20	<20µg/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)	0.25	<1µg/L
Mercury and its compounds	0.05	<0.2 µg/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.
 Water hardness in the Brogeen River is 111mgCaCO₃/L

**UPSTREAM COMPARISON TABLE
(ACTUAL METAL RESULTS)**

Physico-chemical conditions	Ecological quality ratio/standard	2009 upstream ambient sampling results
	Good boundary	
	Rivers (All Types)	
Specific pollutants Table 10	Inland surface waters AA-EQS	Ambient sampling results
Total Chromium	8.1	1.384µg/L
Copper (depending on water hardness)	30	<1.54µg/L
Zinc (depending on water hardness)	100	<3.929µg/L
Priority Substances Table 11	Inland surface waters AA-EQS	Ambient sampling results
Lead and its compounds	7.2	9.03µg/L on excel as 2 results of <1 recorded and excel excludes values- if results were divided by recording 0ug/l for 2 then value is 4.51 ug/l
Nickel and its compounds	20	2.18µg/L
Priority Hazardous Substances Table 12	Inland surface waters AA-EQS	Ambient sampling results
Cadmium and its compounds (depending on water hardness)	0.25	<1µg/L however results were 0 ug/l-no breach of limit

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DOWNSTREAM COMPARISON TABLE

Physico-chemical conditions	Ecological quality ratio/standard	2009 Downstream ambient sampling results
	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)	2mg/L (mean) 2.85mg/L (95%ile)
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	7.2-7.8 (range)
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)	<0.0788mg/L (mean) <0.137mg/L (95%ile)
Molybdate Reactive Phosphorus (MRP) (mg P/l)	Good status ≤0.035(mean) or ≤0.075(95%ile)	0.0769mg/L (mean) 0.1825mg/L (95%ile)
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	<20µg/L Chromium
Copper (depending on water hardness)	30	<20µg/L
Cyanide	10	<5µg/L
Flouride	500	<100µg/L
Zinc (depending on water hardness)	100	20µg/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	<20µg/L
Nickel and its compounds	20	<20µg/L
Priority Hazardous Substances Table 12	Inland surface waters AA-EQS	Ambient sampling results
Cadmium and its compounds (depending on water hardness)	0.25	<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
(ACTUAL METAL RESULTS)**

<i>Physico-chemical conditions</i>	<i>Ecological quality ratio/standard</i>	<i>2009 Downstream ambient sampling results</i>
	<i>Good boundary</i>	
	<i>Rivers (All Types)</i>	
<i>Specific pollutants Table 10</i>	<i>Inland surface waters AA-EQS</i>	<i>Ambient sampling results</i>
Total Chromium	8.1	<1µg/L
Copper (depending on water hardness)	30	1.54µg/L
Zinc (depending on water hardness)	100	3.929µg/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	7.16µg/L on excel as 4 results of <1 recorded and excel excludes values- if results were divided by recording 0ug/l for 4 then value is 1.43 ug/l
Nickel and its compounds	20	2.18µg/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)	0.25	<1µg/L however results were 0ug/l-no breach of limit

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PREDICTED IMPACTS

MASS BALANCE EQUATIONS FOR BOD:

Worst Case Scenario:

Maximum Discharge, Low Flow in the River, Maximum BOD in Discharge.

Flow of River (95%ile) = 0.103m³/sec

Mean BOD in River (upstream) = 2.25mg/L

Max volume of discharge = 0.0027m³/sec – based on 1,000 PE at 238l/h/d

Max value for BOD in discharge = 35mg/L

$$C_{\text{final}} = \frac{(0.103 \times 2.25) + (0.0027 \times 35)}{(0.103 + 0.0027)}$$

$$C_{\text{final}} = 3.08\text{mg/l BOD}$$

This is in breach of the 1.5mg/L Mean EQS for BOD.

Please note that effluent from Boherbue WWTP is polished by means of a constructed wetland prior to discharge to the Broggen River.

Normal Scenario:

Normal Discharge, Median Flow in the River, Mean BOD in Discharge.

Flow of River (Median) = 0.64m³/sec

Mean BOD in River (upstream) = 2.25mg/L

Normal volume of discharge = 0.002m³/sec

Mean value for BOD in discharge = 10.68mg/l

$$C_{\text{final}} = \frac{(0.64 \times 2.25) + (0.002 \times 10.68)}{(0.64 + 0.002)}$$

$$C_{\text{final}} = 2.276\text{mg/l BOD}$$

This is in breach of the 1.5mg/L Mean EQS for BOD.

Please note that effluent from Boherbue WWTP is polished by means of a constructed wetland prior to discharge to the Broggen River.

MASS BALANCE EQUATIONS FOR AMMONIA:

Worst Case Scenario:

Maximum Discharge, Low Flow in the River, Maximum Ammonia in Discharge.

Flow of River (95%ile) = 0.103m³/sec

Mean Ammonia in River (upstream) = 0.0788mg/L

Max volume of discharge = 0.0027m³/sec

Max value for Ammonia in discharge = 5.3mg/L

$$C_{\text{final}} = \frac{(0.103 \times 0.0788) + (0.0027 \times 5.3)}{(0.103 + 0.0027)}$$

$$C_{\text{final}} = 0.21\text{mg/l Ammonia}$$

This is in breach of the 0.14mg/L 95%ile EQS for Ammonia

Please note that effluent from Boherbue WWTP is polished by means of a constructed wetland prior to discharge to the Broggen River.

Normal Scenario:

Normal Discharge, Median Flow in the River, Mean Ammonia in Discharge.

Flow of River (Median) = 0.64m³/sec
Mean Ammonia in River (upstream) = 0.0788mg/L
Normal volume of discharge = 0.002m³/sec
Mean value for Ammonia in discharge = 2.7mg/L

$$C_{\text{final}} = \frac{(0.64 \times 0.0788) + (0.002 \times 2.7)}{(0.64 + 0.002)}$$

$$C_{\text{final}} = 0.087\text{mg/l Ammonia}$$

This is in breach of the 0.065mg/L mean EQS for Ammonia

Please note that effluent from Boherbue WWTP is polished by means of a constructed wetland prior to discharge to the Broggen River.

MASS BALANCE EQUATIONS FOR ORTHOPHOSPHATE:

Worst Case Scenario:

Maximum Discharge, Low Flow in the River, Maximum Orthophosphate in Discharge.

Flow of River (95%ile) = 0.103m³/sec
Mean Orthophosphate in River (upstream) = 0.0769mg/L
Max volume of discharge = 0.0027m³/sec
Max value for Orthophosphate in discharge = 8mg/L

$$C_{\text{final}} = \frac{(0.103 \times 0.0769) + (0.0027 \times 8)}{(0.103 + 0.0027)}$$

$$C_{\text{final}} = 0.28\text{mg/l Orthophosphate}$$

This is in breach of the 0.075mg/L 95%ile EQS for Orthophosphate

Please note that effluent from Boherbue WWTP is polished by means of a constructed wetland prior to discharge to the Broggen River.

Normal Scenario:

Normal Discharge, Median Flow in the River, Mean Orthophosphate in Discharge.

Flow of River (Median) = 0.64m³/sec
Mean Orthophosphate in River (upstream) = 0.0769mg/L
Normal volume of discharge = 0.002m³/sec
Mean value for Orthophosphate in discharge = 2.77mg/L

$$C_{\text{final}} = \frac{(0.64 \times 0.0769) + (0.002 \times 2.77)}{(0.64 + 0.002)}$$

$$C_{\text{final}} = 0.085\text{mg/l Orthophosphate}$$

This is in breach of the 0.035mg/L mean EQS for Orthophosphate

Please note that effluent from Boherbue WWTP is polished by means of a constructed wetland prior to discharge to the Broggen River.

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