

RINGSSEND WASTEWATER TREATMENT WORKS Performance December 2008 through November 2009



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RINGSEND WwTW PERFORMANCE

December 2008 through November 2009

1.1 Introduction

The Ringsend WwTW was designed to meet the requirements of the Urban Wastewater Treatment Regulations (UWWT) SI No. 410 of 1994. These regulations did not treat Dublin Bay as 'sensitive' and therefore the required effluent standards were:

- BOD mg/L 25
- COD mg/L 125
- TSS mg/L 35
- Ammonia (N) mg/L 18.75

Since then the Liffey Estuary has been designated as a 'sensitive' area under the UWWT Directive SI No. 254 of 2001 and the following nutrient standards apply:

- Total Nitrogen (N) mg/L 10
- Phosphorus (P) mg/L 1

In addition, the implementation of the Water Framework Directive and the publication of the European Communities Environmental Objectives (Surface Waters) regulations 2009 in July have implications for the Ringsend WwTW discharge. These regulations set Environmental Quality Standards (EQS) for all surface water bodies and public authorities, in so far as their function allow, must ensure compliance with the good status parametric values by September 2015. The EPA will take these Surface Water Regulations into consideration when issuing the Discharge License for the Plant.

Dublin City Council (DCC) have engaged CDM as consultants to upgrade the plant to provide additional future capacity and comply with all relevant legislation and discharge standards.

The Bathing Water Directive (SI no. 155 of 1992) also imposes conditions that impact the discharge from the Ringsend WwTW. Faecal Coliform (FC) levels must not exceed 1,000 FC/100 ml on an 80 percentile basis and 2,000 FC/100ml on a 95 percentile basis in bathing waters. To meet the required bacteriological water quality in Dublin Bay the secondary treated effluent from Ringsend WwTW received UV irradiation. The contract requirements for Faecal Coliforms are 100,000 MPN/100 ml

1.2 Influent Load to the WwTW

The average load to the Ringsend WwTW for the 12 month period from December 2008 to the end of November 2009 was 102 t BOD/d. This equates to a population equivalent (PE) load of 1,700,381 PE using a per capita BOD of 60g/d. Table 1.1 shows the WwTW loads received from 2003 to 2009.

Table 1.1 BOD and PE loads to Ringsend WwTW 2003 to 2009

	Average (BOD Load t/d)	PE (million)	95%ile	Maximum	No. of samples	Standard Deviation
Period						
2003*	111.0	1.85	157.3	221.8	107*	26.8
2004	118.8	1.98	162.8	237.6	257	26.8
2005	117.9	1.97	162.3	257.6	257	26.4
2006	117.3	1.96	195.1	293.3	258	40.0
2007	101.5	1.69	140.3	361.5	249	32.2
2008	107.4	1.79	181.7	289.8	256	39.0
2009**	102.0	1.70	141.0	429.5	252	38.1
Design	98.4	1.64	157.6			

*Data for 2003 begins 1st August

**Data for 2009 covers the 12 month period from 01/12/2008 to 30/11/2009

1.3 Effluent Quality

1.3.1 Effluent chemical parameters

Over the period of 1 December 2008 through 30 November 2009, the average BOD removal rate was 91.3% and the average effluent concentration was 17.4 mg/L. The effluent achieved compliance with the effluent standard of 25 mg/L 87% of the time. While not achieving the required 95percentile compliance rate, 45% (15 of 33) of the exceedances occurred during days on which the influent loadings exceeded the design basis. There were 11 days when the effluent exceeded the not-to-exceed limit of 50 mg/L, seven of which were on days when the influent load exceed the design.

TSS removal was not as good as BOD. Over the same period, the average effluent TSS concentration was 31.7 mg/L as compared to the 95percentile standard of 35 mg/L. The average TSS removal rate was 86.4%. The effluent achieved compliance with the effluent standard of 35 mg/L 78% of the time. There were fifteen days when the effluent exceeded the not-to-exceed limit of 87.5 mg/L. Effluent TSS non compliant results were related to both high influent loading and high inflow. 60% of exceedances (49 out of 81 samples) occurred on days when the influent TSS load exceeded the design basis. 35% (28 out of 81) noncompliances occurred when the inflow exceeded the average daily flow (ADF) of 492,480 m³/d.

In 2009, effluent Total-N and NH₃-N averaged 15.8 mg/L and 3.2 mg/L, respectively. The works is reliably achieving its ammonia limit of 18.75 mg/L as required by the Contract between DCC and CAW. The works is not currently meeting the 10 mg/L Total-N Urban Waste Water Treatment (UWWT) limit for Nutrient Sensitive Waters.

In 2009, the effluent contained an average of 3.5 mg/L total phosphorus (TP). The UWWT limit is 1.0 mg/L (median Value).

Table 1.2 summaries the Ringsend WwTW effluent quality for the period 1 December 2008 to 30 November 2009.

Table 1.2 Final Effluent Quality (mg/L) for the period 01/12/08 to 30/11/09

	BOD	COD	TSS	NH3-N	TKN	TN**	TP*
No. of Samples	258	262	364	248	236	172	93
Average	17.4	68.5	31.7	3.2	7.2	15.8	3.5
No. of non-compliant samples	33	12	81	0			
% Compliance with 95%ile limit	87%	95%	78%	100%			
95%ile Limit	25	125	35	18.75			

*Effluent total phosphorus not measured by contractor on a regular basis - results from DCC Central Laboratories presented

**Effluent Total Nitrogen not measured by contractor on a regular basis - results from DCC Central Laboratories presented (NO₃+NO₂+TKN)

Figures 1.1 to 1.3 display the effluent BOD, COD and TSS (mg/L) for the 12 month period in comparison to the effluent quality standards of 25, 125 and 35 (mg/L), respectively.

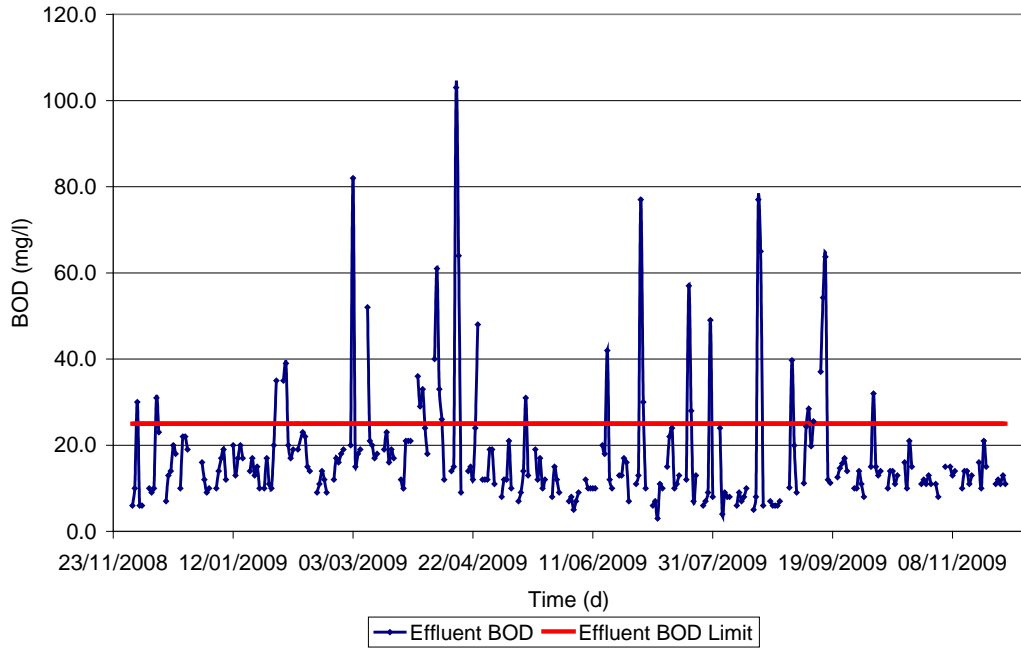


Figure 1.1 2009 Effluent BOD (mg/L)

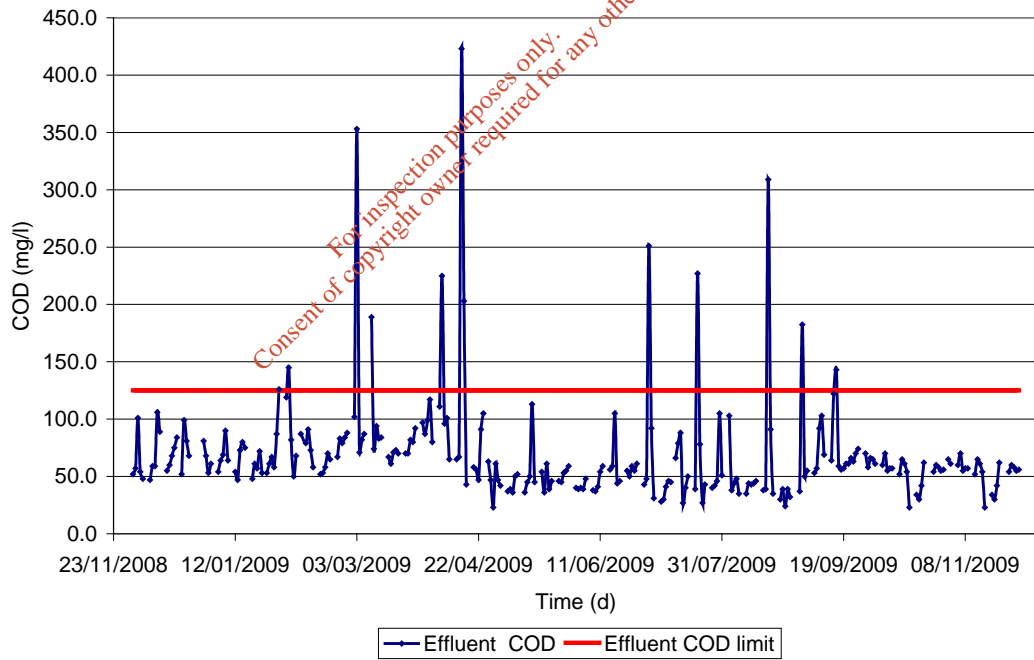


Figure 1.2 2009 Effluent COD (mg/L)

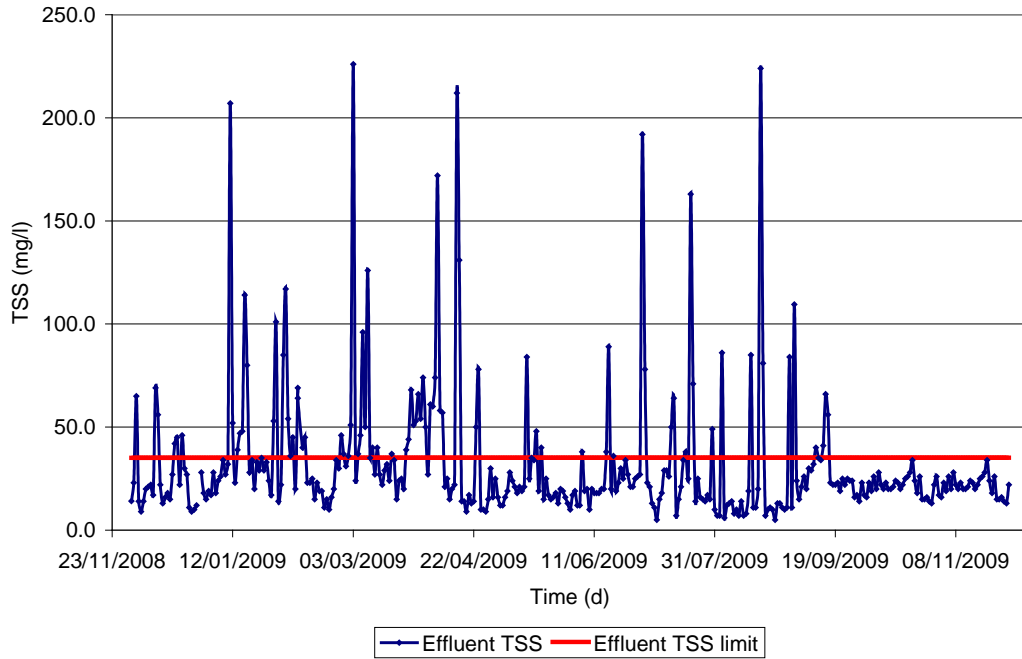


Figure 1.3 2009 Effluent TSS (mg/L)

1.3.2 Effluent Bacteriological Quality

Disinfection is required from 1 May through 31 August, annually. Effluent samples during this period (post UV treatment) are analyzed for *E.Coli* and *Faecal Streptococci* by City Analysts and *E.Coli* and *Enterococci* by Central Laboratories.

The average *E.Coli* measured over the bathing season period was 16,500 MPN/100ml. Out of a total of 71 samples there were two exceedances of the 100,000 MPN/100ml effluent standard (Figure 1.4).

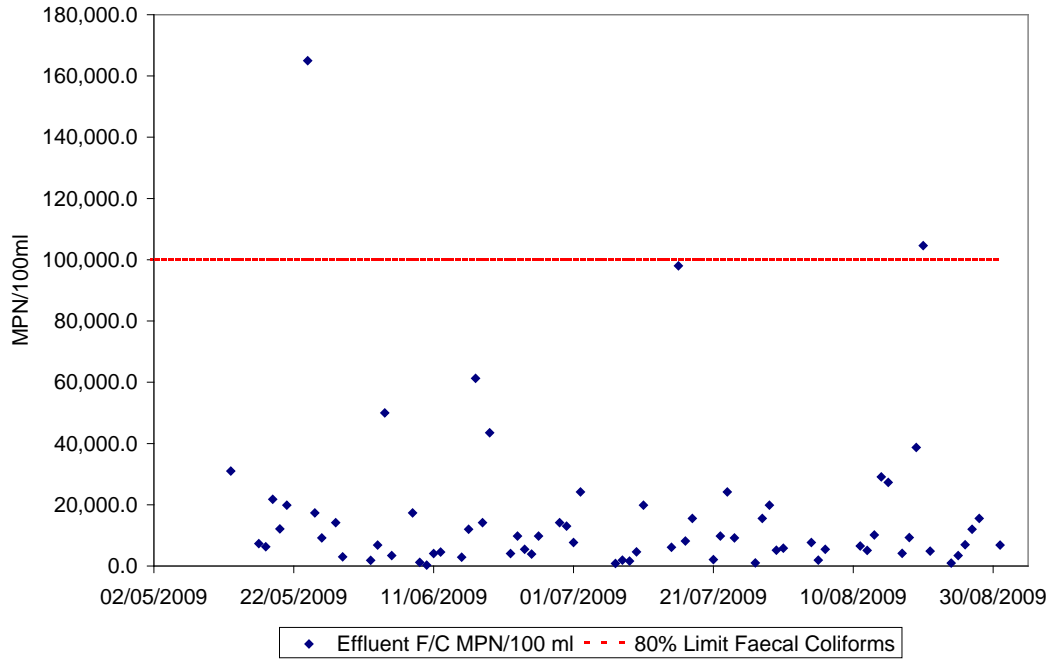


Figure 1.4 Ringsend 2009 Bacteriological water quality

1.4 Storm water Overflow

Influent flow data indicates that a high proportion of all incoming flows arriving at the works are receiving full treatment (Table 1.3). Storm discharges to the Estuary outfall, account for 1.1% of all measured inflows to the plant.

Table 1.3 Ringsend 2009 Storm Flows

	Average Daily Influent m ³ /d	Average Daily Storm Flow to Liffey m ³ /d	% of Total Flow Treated
2009	442,522	71,983.2	98.9

For the period 1 December 2008 to 30 November 2009, there were 25 spills to the Liffey Estuary from the Ringsend Storm tanks. Eleven of these were during November 2009 (Table 1.4)

Table 1.4 2009 Storm Events, Flow (m3/d) and Effluent Quality

Date	Influent Flow m3/d	Storm Water Discharge m3/d	% of flow receiving treatment	Storm BOD mg/L	Storm COD mg/L	Storm TSS mg/L	Storm F/C MPN/100 ml
12/12/2008	601,268.0	6,036.0	99.0	127	298	176	2,200,000
13/12/2008	608,433.0	14,531.0	97.6				
19/01/2009	657,894.0	7,188.0	98.9				
30/01/2009	660,718.0	5,546.0	99.2				
03/02/2009	889,965.0	79,116.0	91.1	100	335	182	1,600,000
04/02/2009	929,402.0	463,136.0	50.2				
05/02/2009	917,512.0	77,469.0	91.6				
06/02/2009	862,640.0	2,020.0	99.8				
25/05/2009	347,124.0	33,264.0	90.4				
06/06/2009	826,295.0	116,558.0	85.9	62	221	132	1,600,000
07/06/2009	688,268.0	29,196.0	95.8				
02/07/2009	925,556.0	108,626.0	88.3	80	174	131	1,500,000
22/07/2009	765,586.0	3,798.0	99.5				
06/10/2009	674,679.0	11,295	98.3	166	239	146	
01/11/2009	913,271.0	63,611	93.0	35	70	47	
12/11/2009	822,577.0	15,125	98.2	112	242	90	
13/11/2009	764,790.0	89,585	88.3				
14/11/2009	856,732.0	37,947	95.6	9	99	40	2,300,000
16/11/2009	856,692.0	26,603	96.9	47	76	30	1,400,000
18/11/2009	959,164.0	49,088	94.9				
19/11/2009	1,040,320.0	153,625	85.2	57	128	64	1,400,000
20/11/2009	920,984.0	69,691	92.4	23	54	28	1,800,000
21/11/2009	829,739.0	38,337	95.4	73	171	44	450,000
29/11/2009	1,217,554.0	282,401	76.8				
30/11/2009	841,778.0	15,788	98.1				