



Diamond Harbour Wastewater Treatment Plant Annual Monitoring Report July 2017 – June 2018

Prepared by: Citycare Water
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On behalf of

Christchurch City Council, City Water & Waste Unit

30 August 2018



Resource Consent Number: CRC101835
File Number: CO6C/14460
Client Name: Christchurch City Council
To: Discharge Contaminants Into Water.
Consent Location: Pauahinekotou Head, LYTTELTON HARBOUR
Status: Active

07/08/2012 Consent Commenced
 07/08/2017 Lapse Date
 03/09/2012 Given Effect to Date
 31/12/2021 Expiry Date

Subject to the Following Conditions:

1	The discharge shall be only treated sewage from the Diamond Harbour Wastewater Treatment Plant, located at the based of Pauahinekotou Head, Diamond Harbour.
Compliance	
2	a. Treated sewage effluent shall only be discharged to Lyttelton Harbour/Whakaraupo via an existing outfall approximately 60 metres seaward from Pauahinekotou Head, at or about map reference NZMS 260 M36: 8729-3141. b. The discharge at this location shall cease on 31 December 2021.
Compliance	
3	The volume of effluent discharged shall not exceed 2500 cubic metres per day at a maximum rate of 34 litres per second.
Compliance	The instantaneous inflow flowrate exceeded the consented limit of 34l/s 3,508 times during the twelve month period, primarily due to 7 major events. The peak flows through the treatment plant will be buffered through the large treatment tanks in the treatment plant prior to UV disinfection and discharge into the harbour. At present there is no flow meter on the discharge pipework. The maximum discharge of 2500 m³ per day was exceeded once. Max Flow was recorded on 22 July 2017, 2,760m³(Attachment 1.1).
4	The consent holder shall measure flows from the Diamond Harbour Sewage Treatment Plant, on a continuous basis, to a degree of accuracy of plus or minus ten percent, and shall maintain a record of total daily flows. This record shall be made available to the Canterbury Regional Council on request.
Compliance	
5	The median concentration of the five-day biological oxygen demand in the effluent discharged shall not exceed 30 grams per cubic metre from the date of commencement of this consent.
Compliance	
6	The median concentration of the suspended solids in the effluent discharged shall not exceed 30 grams per cubic metre from the date of commencement of this consent.
Compliance	
7	a. The median concentration of faecal coliforms shall not exceed 700 colony forming units (CFU) per 100 millilitres of effluent. b. The median concentration of enterococci shall not exceed 1,750 MPN per 100 millilitres of effluent.
Complies	
8	For the purposes of determining whether the consent holder is complying with Conditions (5), (6) and (7): a. The effluent shall be sampled at any point after treatment and prior to discharge, and analysed for the concentration of the five-day biological oxygen demand, suspended solids, faecal coliforms and enterococci. b. The effluent shall be sampled at the following frequency: i. At least monthly samples shall be taken from 1 March to 30 November; and ii. At least weekly samples, on separate days selected at random, shall be taken during December, January and February. c. For the purposes of Conditions (5), (6) and (7), whenever a new sample result is available for each determinand, it shall be grouped with the previous four results obtained under Conditions (8)(a) and (b) or Condition (9), and the median result recorded. d. The time of day samples are taken shall be recorded.
Compliance	
9	If any sample measured has a faecal coliform count greater than 700 faecal coliforms per 100 millilitres of effluent or an enterococci count or more that 1,750 MPN per 100 millilitres of effluent, the consent holder shall take a further sample of treated effluent within two days of obtaining that result and shall test for faecal coliform and enterococci concentrations.

	Unable to confirm Compliance
10	If the median concentration of faecal coliforms or enterococci, as calculated in accordance with Condition 8(c), exceeds 700 faecal coliforms per 100 millilitres or 1,750 enterococci per 100 millilitres of effluent, the consent holder shall within ten working days of the exceedance, write to the Canterbury Regional Council outlining the measures the consent holder proposes to undertake to address the concentration exceedances, and the timeframe within which this will occur.
	Compliance; no exceedances occurred for either parameter
11	Prior to discharge, the effluent shall be sampled and analysed not less than once per month for the following: <ul style="list-style-type: none"> a. Dissolved reactive phosphorous (grams per cubic metre); b. Ammoniacal nitrogen (grams per cubic metre); c. Total oxidized nitrogen (grams per cubic metre); and d. Total nitrogen (grams per cubic metre).
	Compliance
12	Prior to discharge, the effluent shall be sampled at least annually during January and analysed for the following: <ul style="list-style-type: none"> a. Arsenic (milligrams per cubic metre); b. Cadmium (milligrams per cubic metre); c. Chromium (milligrams per cubic metre); d. Copper (milligrams per cubic metre); e. Lead (milligrams per cubic metre); f. Nickel (milligrams per cubic metre); and g. Zinc (milligrams per cubic metre).
	Compliance
13	<ul style="list-style-type: none"> a. The water of the receiving environment shall be sampled in January, March, May, June, September, November and December, at each of the following locations: <ul style="list-style-type: none"> i. 50 metres due north of the outfall; ii. 50 metres due south of the outfall; iii. 50 metres due east of the outfall; iv. 50 metres due west of the outfall; and v. surface water quality monitoring site SQ35187 (which is located at or about NZMS 260: M36:8636-3190, east of Quail Island/Otamahua). vi. surface water quality monitoring site at Church Bay, which is located at or about NZMS 260 M36:872-305. b. Each sample shall be analysed for the concentration of faecal coliforms, enterococci, total suspended solids, chlorophyll-a, ammoniacal nitrogen, total oxidized nitrogen total nitrogen and dissolved reactive phosphorus. The time the samples are taken shall be recorded. c. Samples shall be taken at approximately 0.5 metres below the surface of the water. d. Samples shall not be taken on consecutive days. e. Samples shall be taken within one hour of low water.
	Compliance
14	If any of the samples collected from around the mixing zone in accordance with Condition (13) contain concentrations of total nitrogen greater than 1.0 mgN/l or ammoniacal nitrogen greater than 0.91 mgN/l, the consent holder shall undertake an investigation of the operation of the Wastewater Treatment Plant and shall re-sample the discharge for ammoniacal nitrogen, total oxidized nitrogen, total nitrogen and dissolved reactive phosphorus, within 48 hours of receiving the results of the initial survey. The consent holder shall report the findings of the investigation to Canterbury Regional Council within one week of receipt of the results of the re-sample.
	Compliance
15	The monitoring required under Condition (13) shall be undertaken on the same day as the monitoring required under Condition (8). In the event that the monitoring required under Conditions (13) and (8) cannot be undertaken on the same days, the reason shall be recorded and submitted to the Canterbury Regional Council.
	Compliance
16	The sediment survey as carried out by Golders Associates (Report Number: 0978205527 – January 2010) for the application shall be repeated in 2015 in the month of November. The samples shall be analysed for total organic carbon, copper, lead and zinc and shall be collected from the following locations: <ul style="list-style-type: none"> a. At distances 25 metres perpendicular to the outfall; and b. At 50 metres and 150 metres along a transect in the same trajectory as the outfall pipe. These locations are illustrated on Plan CRC101835A which forms part of this consent.
	CCC to follow up
17	The laboratory carrying out the analyses for the purposes of Conditions (5), (6), (7), (9), (11), (12) and (13) of this consent shall be accredited for the analyses to ISO Guide 25, either by International Accreditation New Zealand (IANZ), or by an organisation with a mutual agreement with IANZ.
	Compliance
18	The consent holder shall submit to the Canterbury Regional Council: <ul style="list-style-type: none"> a. The results of any monitoring required each month under the conditions of this consent, by the 10th working day of

	<p>the following month.</p> <p>b. The results of any sampling undertaken under Condition (9) that have a faecal coliform count greater than 700 faecal coliforms per 100 millilitres of effluent, or an enterococci count greater than 1,750 enterococci MPN per 100 millilitres of effluent, within three working days of receipt of any results.</p>
	Compliance
19	<p>The consent holder shall submit to the Canterbury Regional Council within three months of the commencement of this consent, a Management Plan. This shall include:</p> <p>a. An Operation and Maintenance Manual, which contains the key operation and maintenance tasks of the operator, normal operations, emergency operations and safety precautions. The emergency operations and safety precautions shall set out:</p> <p>i. The contingency measures to be taken at the pumping stations in the Diamond Harbour Wastewater Treatment Plant catchment and at the Treatment Plant in order to avoid the release of effluent to the environment during periods of any mechanical or electrical failure or power cut; and</p> <p>ii. the measures to be taken at the pumping stations in the Diamond Harbour catchment and at the Treatment Plant in the event of an emergency discharge or overflow.</p> <p>b. The Management Practices to ensure compliance with conditions of the Resource Consent.</p> <p>c. The Maintenance Contractor's monitoring programme and reporting provisions, including a specific requirement that monitoring is undertaken in accordance with Conditions (8), (9), (10), (11), (12), (13) (14), (15) and (16) of this consent.</p>
	Compliance; Management Plan submitted on 05/11/2012
20	<p>a. The consent holder shall submit a report to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, and upload the report on the consent holder's website by 31 August of each year summarizing the monitoring data collected and providing an interpretation of the results of the monitoring.</p> <p>b. The consent holder shall supply a copy of the report referred to in condition 20(a) to all the following organisations/groups/people:</p> <p>a. Cass Bay Residents Association</p> <p>b. Church Bay Neighborhood Association</p> <p>c. Diamond Harbour Community Association Incorporated</p> <p>d. Paula Smith C/o 1 Purau Avenue, RD 2, Diamond Harbour</p> <p>e. Te Hapu o Ngati Wheke (Rapaki) Runanga</p> <p>f. Te Runanga o Koukourarata</p> <p>g. Te Runanga o Ngai Tahu</p> <p>h. Governors Bay Community Association.</p> <p>c. The consent holder shall display all effluent and receiving environment monitoring data collected on the consent holder's website. This data shall be updated on a monthly basis.</p>
	Compliance via this report; CCC to distribute
21	<p>a. Within 60 days of the commencement date of this resource consent, the consent holder shall prepare an implementation plan which includes, but is not limited to the following matters:</p> <p>a. No later than 30 June 2015 all preliminary design details have been completed;</p> <p>b. No later than 30 September 2015, all necessary resource consents have been applied for;</p> <p>c. No later than 30 June 2017 detailed design work completed;</p> <p>d. No later than 31 December 2021 all works have been commissioned, and after a period of testing the treatment plant is decommissioned.</p> <p>b. The consent holder shall provide an annual report to the Canterbury Regional Council in July each year, outlining progress on the Implementation Plan for the removal of the sewage discharge from Lyttelton Harbour/Whakaraupo. A copy of this annual report will also be forwarded to all organisations/groups represented on the Lyttelton Harbour/Whakaraupo Wastewater Working Party and also all parties listed in condition 20(b).</p> <p>c. The consent holder shall hold a public meeting once a year to discuss the monitoring data collected in the previous year and also to provide an update on progress relating to the cessation of the discharge at map reference NZMS 260 M36:838-815 on 31 December 2018, and the removal of the sewage discharge from Lyttelton Harbour/Whakaraupo.</p>
	CCC to follow up
22	<p>The Canterbury Regional Council may, once per year, on any of the last five working days of June or November each year, serve notice of its intention to review the conditions of this consent for the purposes of:</p> <p>a. Dealing with any adverse effects which may arise from the exercise of this consent and which it is appropriate to deal with later; or</p> <p>b. Requiring adoption of the best practicable option to remove or reduce any adverse effect on the environment; or</p> <p>c. Complying with the requirements of a relevant rule in an operative regional plan; or</p> <p>d. Amending the frequency of monitoring and the parameters monitored.</p>
	ECAN to request
23	<p>The consent holder shall surrender resource consent CRC031546 within 60 working days of the commencement of this consent.</p>
	Compliance

Treatment Plant Effluent Monitoring

Daily flows for the Diamond Harbour Wastewater Treatment Plant (WwTP) were generally well under the 2,500 m³/d limit with 95% of all flows <600 m³/d (Attachment 1.3). Highest flows recorded were 2,760 m³/d on 22 July 18 with the next highest of 2,298 m³/d on 2 September 2017 and 1,944 m³/d on 14 August 2017, within the consented limit (N.B. flows are measured on the inlet).

The instantaneous inflow rate was greater than 34 l/s 3,508 times. The majority of the exceedances were during the seven large rainfall events. Other smaller rain events were usually short-lived and uncharacteristic of the normal flow regime. This is more than 2.5 times greater than was recorded the previous year of 1,332 occasions (both years were substantially up on 2015/16 year of 319 – the SCADA logging rate exacerbates this). The discharge rate would be buffered and therefore the inflow rate is a conservative guide only of the discharge rate.

The plant operated with full compliance for effluent water quality relating to BOD₅, TSS, faecal coliforms (FC), and Enterococci (ENT) (Table 1). Maximum medians of 5.5 mg/L BOD₅ were below the 30-mg/L limits, TSS max of 21 mg/l compared to allowable 30 mg/l and FC of 30 CFU/100 mL and ENT of 20 MPN/100 mL were excellent compared to 700 CFU/100 mL and 1,750 MPN/100 mL consented.

Receiving Environment Monitoring

The receiving environment was monitored around the outfall and at two control sites (Quail Island and Church Bay) (Attachment 2.2). Human health related parameters of FC and ENT were usually well below the respective detection limits. Trigger levels of 1 mg/L for TN and 0.91 mg/L for NH₃ were not exceeded at any of the sites with maximum values of 0.350mg/L TN at 50 m due South of the outfall and 0.025 mg/L NH₃ at 50m due North of Outfall. Monitoring results did not appear to be significantly different between the outfall sites and the control sites.

Table 1. Summary of Exceedances and Non-Compliances from July 2017-June 2018.

Parameter	Exceedances of Trigger Value
Flow >2,500 m ³ /d	1
Discharge Flowrate >34 L/s	3508
BOD ₅ median >30 mg/L	0
TSS median >30 mg/L	0
FC >700 CFU/100 mL	0
ENT >1,750 MPN/100 mL	0
Receiving TN >1 mg/L	0
Receiving NH ₃ >0.91 mg/L	0

Table 2. Incoming instantaneous flowrates from July 2017-June 2018.

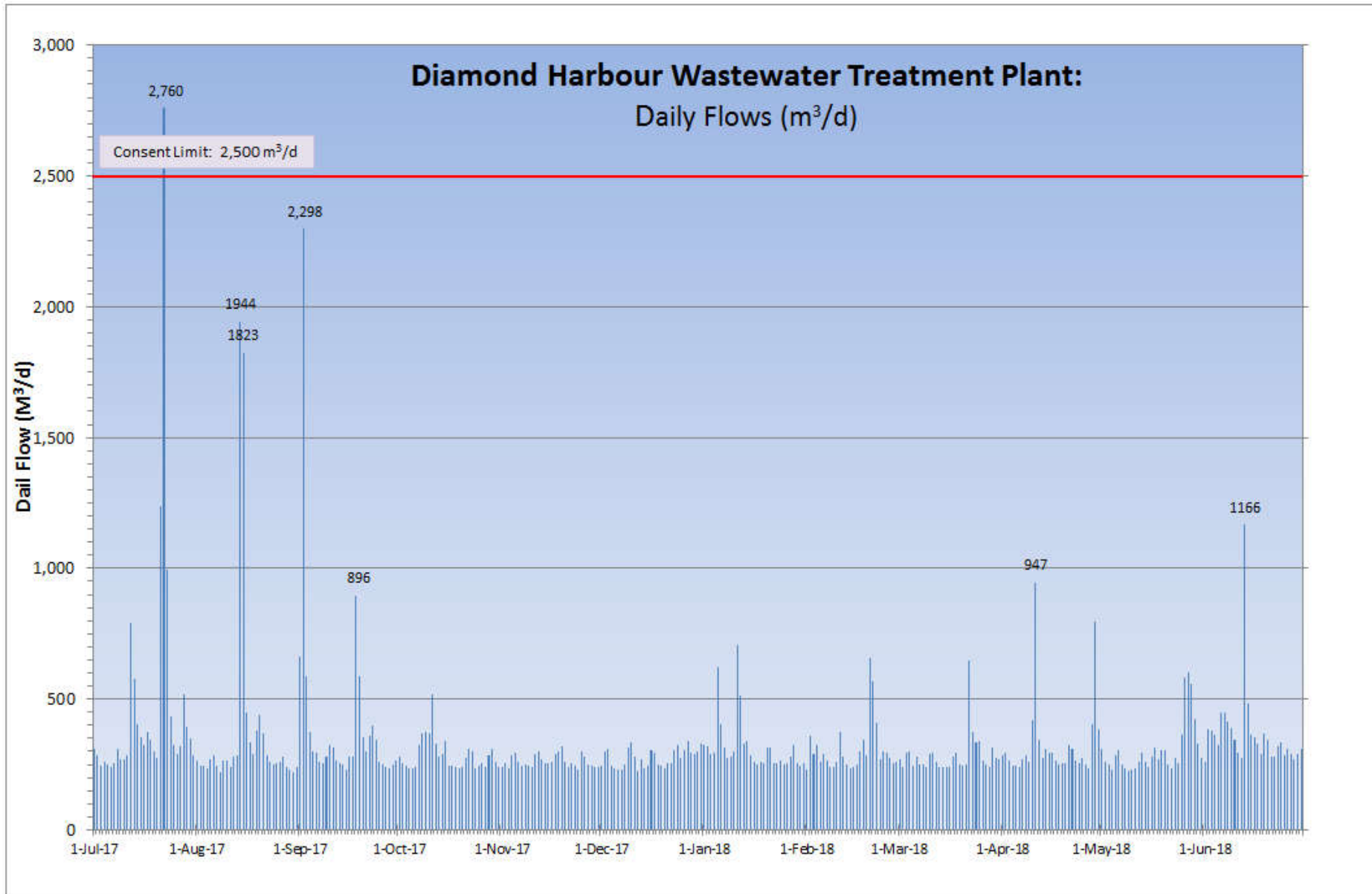
Month	Values > 34 L/s [#]
Jul-17	1264
Aug-17	766
Sep-17	657
Oct-17	7
Nov-17	3
Dec-17	13
Jan-18	25
Feb-18	30
Mar-18	24
Apr-18	122
May-18	124
Jun-18	473
Total	3508

Attachment 1.1: Flows, Diamond Harbour, Data

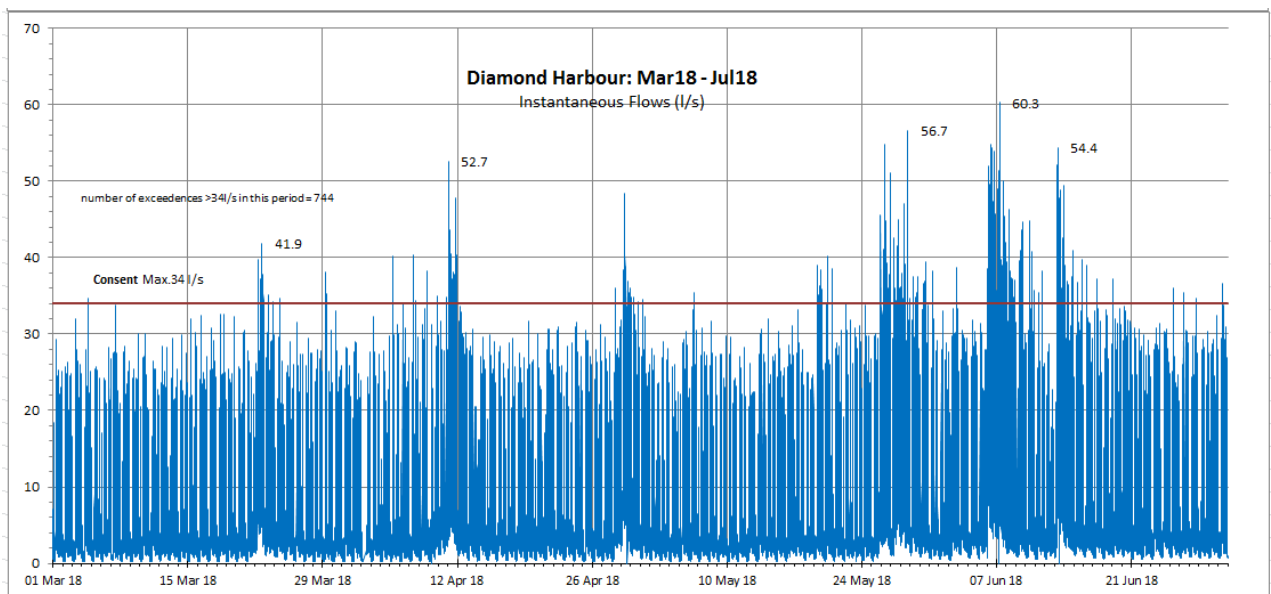
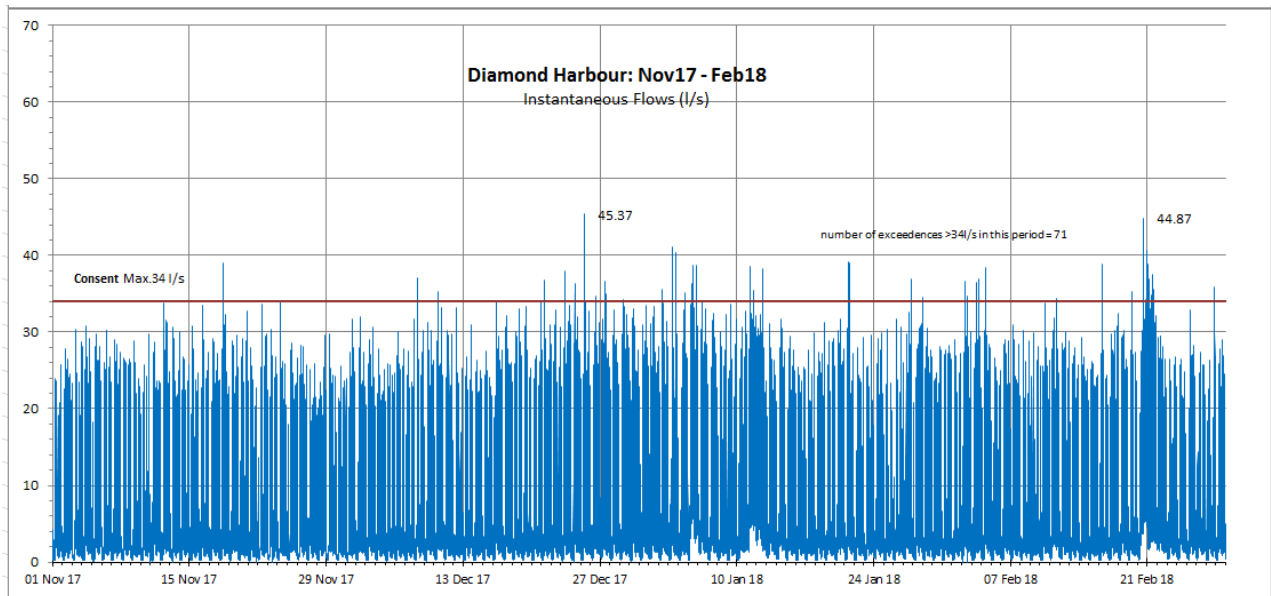
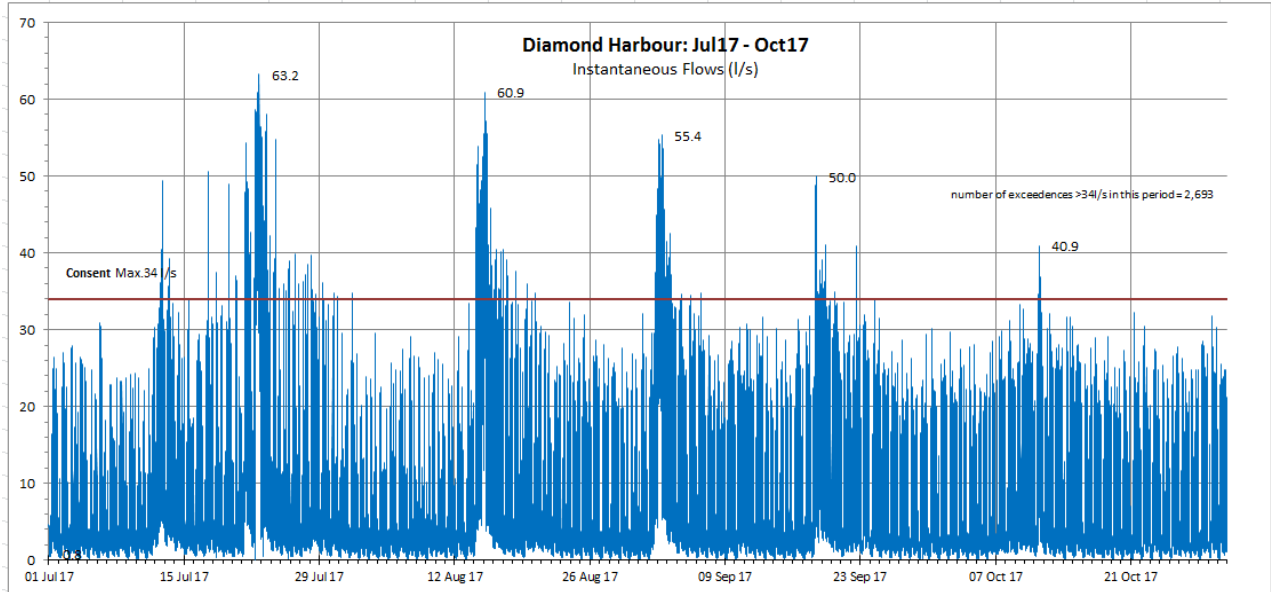
Plant : Diamond Harbour Wastewater Treatment, Banks Peninsula: Daily Flows for July 2017 - June 2018							
Date	Flow (m ³ /d)	Date	Flow (m ³ /d)	Date	Flow (m ³ /d)	Date	Flow (m ³ /d)
1-Jul-17	311	1-Oct-17	281	1-Jan-18	324	1-Apr-18	284
2-Jul-17	286	2-Oct-17	254	2-Jan-18	320	2-Apr-18	297
3-Jul-17	246	3-Oct-17	246	3-Jan-18	290	3-Apr-18	264
4-Jul-17	258	4-Oct-17	236	4-Jan-18	296	4-Apr-18	244
5-Jul-17	251	5-Oct-17	233	5-Jan-18	623	5-Apr-18	244
6-Jul-17	238	6-Oct-17	241	6-Jan-18	403	6-Apr-18	239
7-Jul-17	256	7-Oct-17	324	7-Jan-18	316	7-Apr-18	272
8-Jul-17	310	8-Oct-17	368	8-Jan-18	277	8-Apr-18	286
9-Jul-17	272	9-Oct-17	376	9-Jan-18	280	9-Apr-18	262
10-Jul-17	269	10-Oct-17	370	10-Jan-18	300	10-Apr-18	419
11-Jul-17	287	11-Oct-17	520	11-Jan-18	708	11-Apr-18	947
12-Jul-17	789	12-Oct-17	332	12-Jan-18	512	12-Apr-18	344
13-Jul-17	580	13-Oct-17	278	13-Jan-18	329	13-Apr-18	274
14-Jul-17	406	14-Oct-17	291	14-Jan-18	342	14-Apr-18	309
15-Jul-17	355	15-Oct-17	342	15-Jan-18	286	15-Apr-18	293
16-Jul-17	327	16-Oct-17	243	16-Jan-18	260	16-Apr-18	294
17-Jul-17	376	17-Oct-17	245	17-Jan-18	249	17-Apr-18	265
18-Jul-17	347	18-Oct-17	240	18-Jan-18	262	18-Apr-18	251
19-Jul-17	298	19-Oct-17	233	19-Jan-18	255	19-Apr-18	256
20-Jul-17	273	20-Oct-17	241	20-Jan-18	316	20-Apr-18	255
21-Jul-17	1,238	21-Oct-17	276	21-Jan-18	314	21-Apr-18	327
22-Jul-17	2,760	22-Oct-17	308	22-Jan-18	257	22-Apr-18	308
23-Jul-17	996	23-Oct-17	302	23-Jan-18	253	23-Apr-18	263
24-Jul-17	433	24-Oct-17	236	24-Jan-18	265	24-Apr-18	256
25-Jul-17	326	25-Oct-17	245	25-Jan-18	249	25-Apr-18	275
26-Jul-17	290	26-Oct-17	253	26-Jan-18	256	26-Apr-18	248
27-Jul-17	320	27-Oct-17	240	27-Jan-18	282	27-Apr-18	234
28-Jul-17	516	28-Oct-17	284	28-Jan-18	327	28-Apr-18	403
29-Jul-17	396	29-Oct-17	310	29-Jan-18	253	29-Apr-18	794
30-Jul-17	352	30-Oct-17	258	30-Jan-18	246	30-Apr-18	384
31-Jul-17	284	31-Oct-17	240	31-Jan-18	254	1-May-18	309
1-Aug-17	264	1-Nov-17	238	1-Feb-18	232	2-May-18	260
2-Aug-17	247	2-Nov-17	253	2-Feb-18	359	3-May-18	248
3-Aug-17	243	3-Nov-17	234	3-Feb-18	291	4-May-18	230
4-Aug-17	234	4-Nov-17	283	4-Feb-18	326	5-May-18	284
5-Aug-17	270	5-Nov-17	297	5-Feb-18	258	6-May-18	305
6-Aug-17	284	6-Nov-17	260	6-Feb-18	290	7-May-18	248
7-Aug-17	247	7-Nov-17	245	7-Feb-18	265	8-May-18	237
8-Aug-17	220	8-Nov-17	249	8-Feb-18	241	9-May-18	225
9-Aug-17	265	9-Nov-17	245	9-Feb-18	239	10-May-18	229
10-Aug-17	267	10-Nov-17	242	10-Feb-18	260	11-May-18	233
11-Aug-17	240	11-Nov-17	290	11-Feb-18	375	12-May-18	262
12-Aug-17	280	12-Nov-17	299	12-Feb-18	280	13-May-18	295
13-Aug-17	287	13-Nov-17	271	13-Feb-18	251	14-May-18	262
14-Aug-17	1944	14-Nov-17	254	14-Feb-18	236	15-May-18	241
15-Aug-17	1823	15-Nov-17	256	15-Feb-18	239	16-May-18	278
16-Aug-17	450	16-Nov-17	260	16-Feb-18	249	17-May-18	314
17-Aug-17	336	17-Nov-17	291	17-Feb-18	299	18-May-18	271

Date	Flow (m ³ /d)	Date	Flow (m ³ /d)	Date	Flow (m ³ /d)	Date	Flow (m ³ /d)
18-Aug-17	290	18-Nov-17	298	18-Feb-18	345	19-May-18	307
19-Aug-17	377	19-Nov-17	319	19-Feb-18	284	20-May-18	305
20-Aug-17	439	20-Nov-17	259	20-Feb-18	655	21-May-18	250
21-Aug-17	370	21-Nov-17	241	21-Feb-18	567	22-May-18	237
22-Aug-17	286	22-Nov-17	257	22-Feb-18	407	23-May-18	277
23-Aug-17	262	23-Nov-17	245	23-Feb-18	268	24-May-18	253
24-Aug-17	252	24-Nov-17	232	24-Feb-18	299	25-May-18	362
25-Aug-17	255	25-Nov-17	299	25-Feb-18	293	26-May-18	583
26-Aug-17	262	26-Nov-17	282	26-Feb-18	273	27-May-18	602
27-Aug-17	280	27-Nov-17	252	27-Feb-18	255	28-May-18	557
28-Aug-17	240	28-Nov-17	246	28-Feb-18	261	29-May-18	425
29-Aug-17	228	29-Nov-17	239	1-Mar-18	268	30-May-18	330
30-Aug-17	219	30-Nov-17	239	2-Mar-18	239	31-May-18	276
31-Aug-17	238	1-Dec-17	243	3-Mar-18	296	1-Jun-18	259
1-Sep-17	660	2-Dec-17	299	4-Mar-18	301	2-Jun-18	383
2-Sep-17	2,298	3-Dec-17	309	5-Mar-18	245	3-Jun-18	379
3-Sep-17	589	4-Dec-17	245	6-Mar-18	279	4-Jun-18	365
4-Sep-17	373	5-Dec-17	236	7-Mar-18	250	5-Jun-18	327
5-Sep-17	300	6-Dec-17	232	8-Mar-18	251	6-Jun-18	450
6-Sep-17	296	7-Dec-17	229	9-Mar-18	238	7-Jun-18	450
7-Sep-17	261	8-Dec-17	249	10-Mar-18	291	8-Jun-18	413
8-Sep-17	253	9-Dec-17	316	11-Mar-18	296	9-Jun-18	388
9-Sep-17	280	10-Dec-17	336	12-Mar-18	259	10-Jun-18	343
10-Sep-17	323	11-Dec-17	281	13-Mar-18	240	11-Jun-18	295
11-Sep-17	313	12-Dec-17	225	14-Mar-18	240	12-Jun-18	273
12-Sep-17	265	13-Dec-17	270	15-Mar-18	242	13-Jun-18	1166
13-Sep-17	254	14-Dec-17	237	16-Mar-18	240	14-Jun-18	484
14-Sep-17	250	15-Dec-17	245	17-Mar-18	278	15-Jun-18	363
15-Sep-17	232	16-Dec-17	305	18-Mar-18	297	16-Jun-18	356
16-Sep-17	280	17-Dec-17	296	19-Mar-18	250	17-Jun-18	328
17-Sep-17	279	18-Dec-17	250	20-Mar-18	245	18-Jun-18	288
18-Sep-17	896	19-Dec-17	246	21-Mar-18	248	19-Jun-18	367
19-Sep-17	588	20-Dec-17	237	22-Mar-18	646	20-Jun-18	343
20-Sep-17	354	21-Dec-17	254	23-Mar-18	372	21-Jun-18	279
21-Sep-17	301	22-Dec-17	254	24-Mar-18	336	22-Jun-18	280
22-Sep-17	358	23-Dec-17	304	25-Mar-18	342	23-Jun-18	320
23-Sep-17	401	24-Dec-17	324	26-Mar-18	264	24-Jun-18	334
24-Sep-17	343	25-Dec-17	277	27-Mar-18	249	25-Jun-18	286
25-Sep-17	261	26-Dec-17	305	28-Mar-18	239	26-Jun-18	312
26-Sep-17	249	27-Dec-17	339	29-Mar-18	314	27-Jun-18	291
27-Sep-17	241	28-Dec-17	296	30-Mar-18	275	28-Jun-18	271
28-Sep-17	237	29-Dec-17	289	31-Mar-18	269	29-Jun-18	288
29-Sep-17	251	30-Dec-17	302			30-Jun-18	311
30-Sep-17	263	31-Dec-17	329				

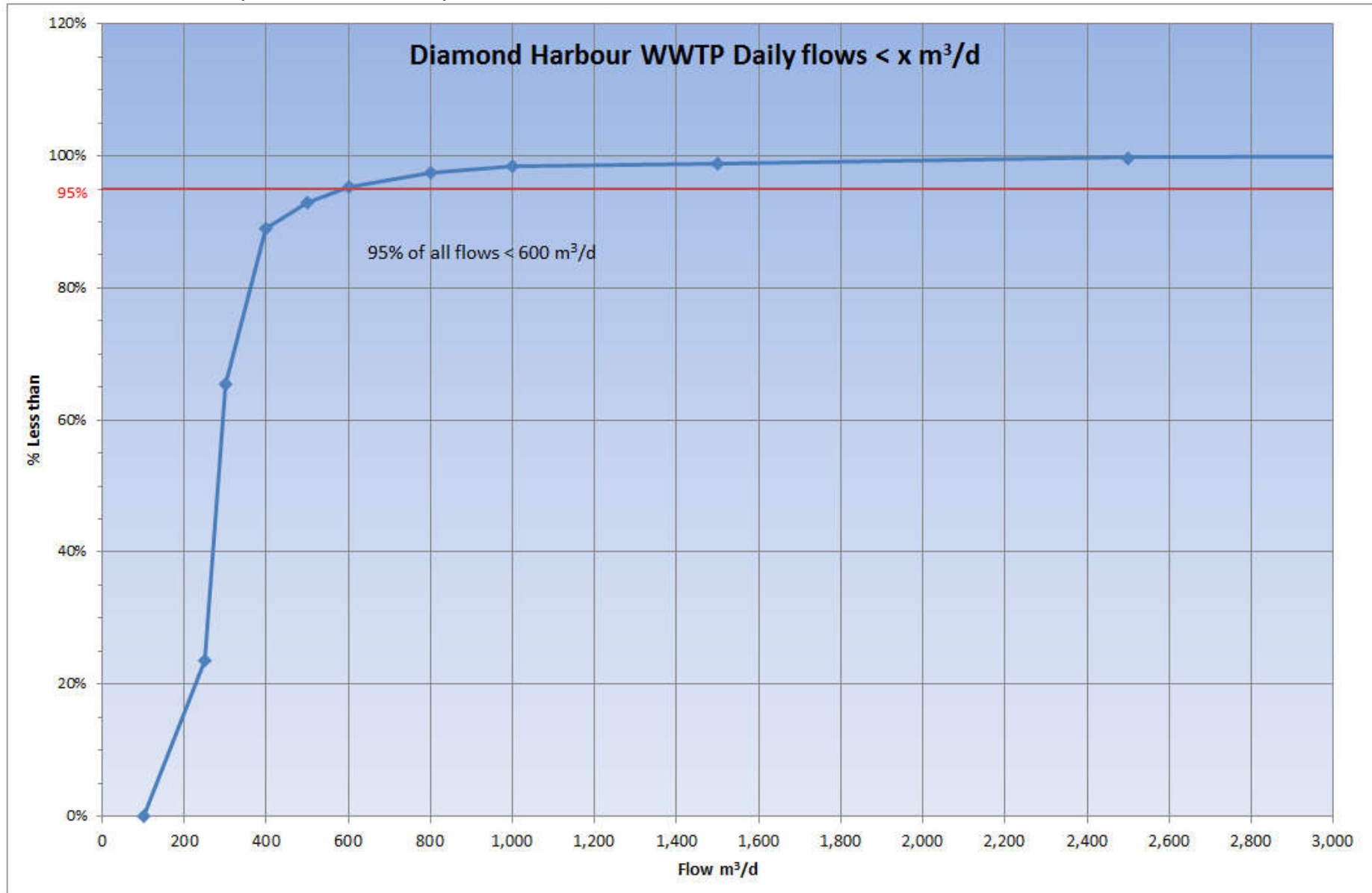
Attachment 1.2: Flows, Diamond Harbour, Chart



Attachment 1.3: Intantaneous Flows, Diamond Harbour



Attachment 1.3: Flows, Diamond Harbour, '% less than'



Attachment 2.1: Lab Data, Diamond Harbour Wastewater Treatment Plant

Plant:		Diamond Harbour Wastewater Treatment, Banks Peninsula										
Asset Owner:		Christchurch City Council										
Laboratory		Christchurch City Council Laboratory, City Water & Waste Unit										
Date	BOD ₅ [mg/l]	DRP [mg/l]	TSS [mg/l]	TN [mg/l]	NH ₄ -N [mg/l]	NOx [mg/l]	FC CFU/100ml	ENT MPN/100ml	5-Sample Median			
									BOD ₅ [mg/l]	TSS [mg/l]	FC CFU/100ml	ENT MPN/100ml
20-Jul-17	3.3	0.030	10	4.2	0.1	1.8	10	10	3.3	10.0	10.0	10
9-Aug-17	9.5	7.200	26	26	20	0.56	30	20	3.3	10.0	10.0	10
20-Sep-17	35.0	3.400	59	25	21	1.1	20	10	5.3	16.0	20.0	10
25-Oct-17	5.0	0.380	21	6.6	2.2	0.55	10	10	5.0	21.0	10.0	10
14-Nov-17	1.9	6.000	4	5.7	0.98	3.3	20	10	5.0	21.0	20.0	10
6-Dec-17	1.3		5				10	10	5.0	21.0	20.0	10
13-Dec-17	1.5	4.200	4	9.4	0.42	7.1	10	10	1.9	5.0	10.0	10
20-Dec-17	2.0		4				10	10	1.9	4.0	10.0	10
27-Dec-17	2.3		5				60	10	1.9	4.0	10.0	10
3-Jan-18	3.0		10				10	10	2.0	5.0	10.0	10
11-Jan-18	3.4	2.300	11	8.6	1.2	6.4	40	10	2.3	5.0	10.0	10
17-Jan-18	1.0	2.900	9	5.2	1.2	3.7	10	10	2.3	9.0	10.0	10
24-Jan-18	1.4		6				10	10	2.3	9.0	10.0	10
31-Jan-18	3.9		23				10	10	3.0	10.0	10.0	10
7-Feb-18	7.7		18				730	120	3.4	11.0	10.0	10
14-Feb-18	46.0	2.000	18	28	0.073	17	10	10	3.9	18.0	10.0	10
21-Feb-18	5.5		16				40	63	5.5	18.0	10.0	10
28-Feb-18	2.9		18				30	20	5.5	18.0	30.0	20
13-Mar-18	2.9	4.100	12	7.5	0.24	4.1	10	10	5.5	18.0	30.0	20
17-Apr-18	2.6	1.400	8	4.6	0.053	3.3	10	20	2.9	16.0	10.0	20
15-May-18	20.0	0.750	34	16	0.3	11	10	10	2.9	16.0	10.0	20
19-Jun-18	5.1	1.300	8	4.4	0.98	2	60	10	2.9	12.0	10.0	10
								Limit	30	30	700	1750
								Exceedances	0	0	0	0
								Max	5.5	21.0	30.0	20.0
	As [mg/l]	Cd [mg/l]	Cr [mg/l]	Cu [mg/l]	Pb [mg/l]	Ni [mg/l]	Zn [mg/l]					
12 Jan 2016	<0.0015	<0.00020	<0.0010	0.0039	<0.0015	<0.0025	0.025					
18 Jan 2017	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.02					
17 Jan 2018	0.0015	<0.0010	<0.0010	0.0026	<0.0010	0.0012	0.047					

Attachment 2.2: Lab Data, Receiving Environment

Diamond Harbour CRC101835	OF - 50m due				Church Bay	Quail island Control	OF - 50m due				Church Bay	Quail island Control	OF - 50m due				Church Bay	Quail island Control	OF - 50m due				Church Bay	Quail island Control
	East	North	South	West			East	North	South	West			East	North	South	West			East	North	South	West		
Date	TN mg/L	TN mg/L	TN mg/L	TN mg/L	TN mg/L	TN mg/L	NH3 mg/L	NH3 mg/L	NH3 mg/L	NH3 mg/L	NH3 mg/L	NH3 mg/L	NOX mg/L	NOX mg/L	NOX mg/L	NOX mg/L	NOX mg/L	NOX mg/L	DRP mg/L	DRP mg/L	DRP mg/L	DRP mg/L	DRP mg/L	DRP mg/L
19/Jul/2017	0.24	0.21	0.25	0.21	0.26	0.29	0.019	0.018	0.016	0.02	0.029	0.019	0.092	0.091	0.09	0.091	0.093	0.099	0.019	0.019	0.018	0.018	0.02	0.019
9/Aug/2017	0.23	0.25	0.24	0.25	0.29	0.27	0.012	0.025	0.015	0.014	0.014	0.022	0.072	0.073	0.072	0.08	0.067	0.092	0.015	0.017	0.015	0.015	0.015	0.016
20/Sep/2017	0.17	0.16	0.17	0.19	0.21	0.26	0.009	0.013	0.014	0.011	0.012	0.025	0.01	0.01	0.01	0.01	0.01	0.036	0.007	0.006	0.006	0.008	0.007	0.011
14/Nov/2017	0.074	0.074	0.081	0.076	0.079	0.084	0.005	0.005	0.005	0.005	0.008	0.005	0.01	0.01	0.01	0.01	0.01	0.026	0.012	0.012	0.012	0.012	0.016	0.04
13/Dec/2017	0.25	0.24	0.23	0.25	0.26	0.25	0.008	0.007	0.006	0.011	0.006	0.007	0.01	0.01	0.015	0.01	0.01	0.01	0.014	0.015	0.015	0.015	0.017	0.018
10/Jan/2018	0.18	0.19	0.18	0.19	0.2	0.23	0.005	0.005	0.005	0.015	0.005	0.005	0.01	0.01	0.01	0.01	0.01	0.01	0.013	0.014	0.012	0.013	0.017	0.019
13/Mar/2018	0.14	0.16	0.13	0.18	0.16	0.18	0.005	0.006	0.007	0.006	0.007	0.005	0.01	0.01	0.01	0.01	0.015	0.01	0.01	0.012	0.012	0.011	0.015	0.014
15/May/2018	0.15	0.17	0.15	0.18	0.2	0.24	0.007	0.007	0.006	0.006	0.007	0.005	0.01	0.01	0.01	0.01	0.01	0.01	0.016	0.017	0.017	0.016	0.017	0.015
19/Jun/2018					0.42	0.38					0.063	0.036					0.11	0.12				0.026	0.024	
13/Jul/2018	0.28	0.29	0.35	0.32		0.31	0.016	0.012	0.014	0.016		0.015	0.11	0.11	0.11	0.1		0.12	0.024	0.021	0.022	0.021		0.021
average	0.190	0.194	0.198	0.205	0.231	0.249	0.010	0.011	0.010	0.012	0.017	0.014	0.037	0.037	0.037	0.037	0.037	0.053	0.014	0.015	0.014	0.014	0.017	0.020
maximum	0.280	0.290	0.350	0.320	0.420	0.380	0.019	0.025	0.016	0.020	0.063	0.036	0.110	0.110	0.110	0.100	0.110	0.120	0.024	0.021	0.022	0.021	0.026	0.040
Note:sampling missed for 19 June 18, additional sampling done 13 July 2018																								
Diamond Harbour CRC101835	OF - 50m due				Church Bay	Quail island Control	OF - 50m due				Church Bay	Quail island Control	OF - 50m due				Church Bay	Quail island Control	OF - 50m due				Church Bay	Quail island Control
	East	North	South	West			East	North	South	West			East	North	South	West			East	North	South	West		
Date	TSS mg/L	TSS mg/L	TSS mg/L	TSS mg/L	TSS mg/L	TSS mg/L	Chla mg/L	Chla mg/L	Chla mg/L	Chla mg/L	Chla mg/L	Chla mg/L	ENT 100mL	ENT 100mL	ENT 100mL	ENT 100mL	ENT 100mL	ENT 100mL	FC CFU/100mL	FC CFU/100mL	FC CFU/100mL	FC CFU/100mL	FC CFU/100mL	FC CFU/100mL
19/Jul/2017	15	12	14	15	54	24	0.019	0.018	0.016	0.02	0.029	0.019	10	10	10	10	10	10	1	1	1	1	2	2
9/Aug/2017	12	13	20	15	18	22	0.012	0.025	0.015	0.015	0.014	0.022	10	10	10	10	10	10	1	1	1	1	1	3
20/Sep/2017	24	28	27	19	22	63	0.009	0.013	0.014	0.011	0.012	0.025	10	10	10	10	10	10	5	9	19	4	9	73
14/Nov/2017	14	15	15	11	25	32	0.005	0.005	0.005	0.005	0.008	0.005	10	10	10	10	10	30	2	1	1	1	2	32
13/Dec/2017	13	13	14	15	19	21	0.008	0.007	0.006	0.011	0.006	0.007	10	10	10	10	10	10	1	1	1	3	1	4
10/Jan/2018	24	34	23	26	85	52	0.005	0.005	0.005	0.015	0.005	0.005	10	10	10	10	10	10	1	1	1	3	1	1
13/Mar/2018	18	15	18	17	18	16	0.005	0.006	0.007	0.006	0.007	0.005	10	10	10	10	10	10	1	1	1	1	1	1
15/May/2018	20	33	20	25	19	28	0.007	0.007	0.006	0.006	0.007	0.005	10	10	10	10	10	10	1	1	2	1	1	2
19/Jun/2018					41	42					0.063	0.036					10	10					3	1
13/Jul/2018	14	14	8	33		10	0.016	0.012	0.014	0.016		1.1	10	10	10	10		10	1	1	1	1		1
average	17.111	19.667	17.667	19.556	33.444	31.000	0.010	0.011	0.010	0.012	0.017	0.123	10.00	10.00	10.00	10.00	10.00	12.00	1.556	1.889	3.111	1.778	2.333	12.000
maximum	24	34.0	27.0	33.0	85.0	63.0	0.0	0.0	0.0	0.0	0.1	1.1	10.0	10.0	10.0	10.0	10.0	30.0	5	9	19	4	9	73
Note:sampling missed for 19 June 18, additional sampling done 13 July 2018																								
* TN should not be > 1																								
* NH3 should not be > 0.91																								