



Diamond Harbour Wastewater Treatment Plant Annual Monitoring Report July 2020 – June 2021

Prepared by: Citycare Water
Kris Kaser

On behalf of

Christchurch City Council, City Water & Waste Unit

01 September 2021



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.
	The instantaneous inflow flowrate exceeded the consented limit of 34l/s 1,373 times during the twelve-month period. 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. There has never been a flow meter on the discharge pipework. The maximum discharge exceeded 2,500 m³ per day once on 31 May 2021 during a major rainfall event (164.6 mm rain over 3 days). (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 determinands, 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.

	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.
	Complies
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> <ol style="list-style-type: none"> 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 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>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> <ol style="list-style-type: none"> a. Cass Bay Residents Association b. Church Bay Neighbourhood Association c. Diamond Harbour Community Association Incorporated d. Paula Smith C/o 1 Purau Avenue, RD 2, Diamond Harbour e. Te Hapu o Ngati Wheke (Rapaki) Runanga f. Te Runanga o Koukourarata g. Te Runanga o Ngai Tahu h. Governors Bay Community Association. <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> <ol style="list-style-type: none"> a. No later than 30 June 2015 all preliminary design details have been completed; b. No later than 30 September 2015, all necessary resource consents have been applied for; c. No later than 30 June 2017 detailed design work completed; d. No later than 31 December 2021 all works have been commissioned, and after a period of testing the treatment plant is decommissioned. <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> <ol style="list-style-type: none"> 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 b. Requiring adoption of the best practicable option to remove or reduce any adverse effect on the environment; or c. Complying with the requirements of a relevant rule in an operative regional plan; or d. Amending the frequency of monitoring and the parameters monitored.
	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 daily limit (except for on 31 May 2021 due to a rainfall event) with 98% of all flows <515 m³/d (Attachment 1.3). Highest flows recorded were 2,521 m³/d on 31 May 2021 with the next highest of 1,735 m³/d on 30 May 2021 (N.B. flows are measured on the inlet).

The instantaneous inflow rate was greater than 34 l/s 1,373 times. The total flow for July 20 to June 21 is 113,005 m³ as compared to 117,490 m³ for July 19 to June 20. The discharge rate is measured on the inlet to the treatment station and the outfall flowrate is 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 9.3 mg/L BOD₅ were below the 30-mg/L limits, TSS max of 20 mg/l compared to allowable 30 mg/l and FC of 40 CFU/100 mL and ENT of 3 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 0.380mg/L TN at 50 m due North of the outfall and 0.100mg/L NH₃ at 50m due South 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 2020-June 2021.

Parameter	Exceedances of Trigger Value
Flow >2,500 m ³ /d	1
Discharge Flowrate >34 L/s	1373
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 2020-June 2021

Month	Values > 34 L/s [#]
Jul-20	123
Aug-20	13
Sep-20	25
Oct-20	5
Nov-20	25
Dec-20	14
Jan-21	29
Feb-21	3
Mar-21	8
Apr-21	29
May-21	1066
Jun-21	33
Total	1373

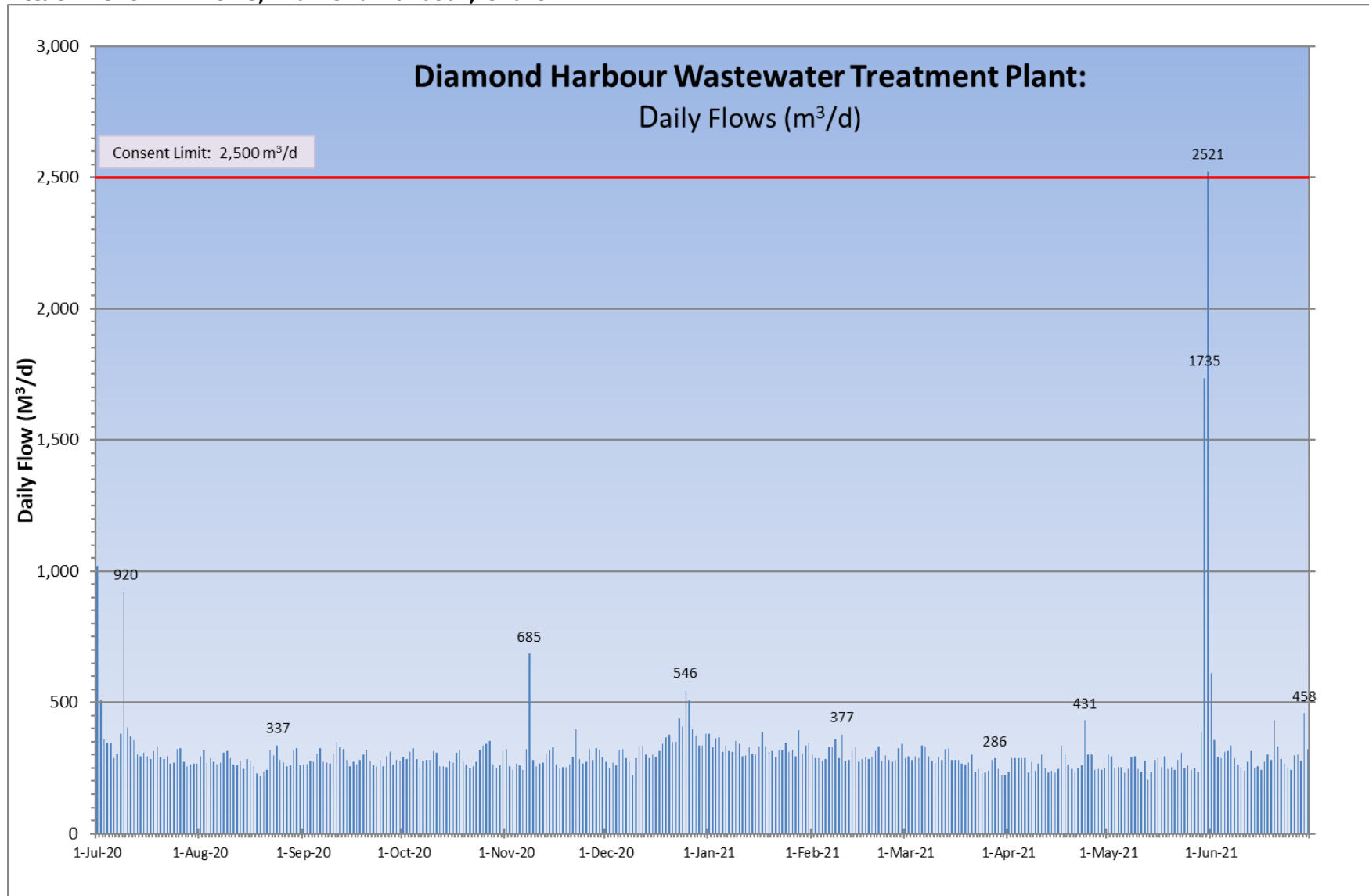
Attachment 1.1: Flows, Diamond Harbour, Data

Plant : Diamond Harbour Wastewater Treatment, Banks Peninsula: Daily Flows for July 2020 - June 2021							
Date	Flow (m ³ /d)	Date	Flow (m ³ /d)	Date	Flow (m ³ /d)	Date	Flow (m ³ /d)
1-Jul-20	1,021	1-Oct-20	291	1-Jan-21	380	1-Apr-21	236
2-Jul-20	506	2-Oct-20	284	2-Jan-21	330	2-Apr-21	288
3-Jul-20	359	3-Oct-20	312	3-Jan-21	362	3-Apr-21	288
4-Jul-20	347	4-Oct-20	325	4-Jan-21	367	4-Apr-21	288
5-Jul-20	346	5-Oct-20	284	5-Jan-21	313	5-Apr-21	288
6-Jul-20	288	6-Oct-20	253	6-Jan-21	335	6-Apr-21	288
7-Jul-20	306	7-Oct-20	276	7-Jan-21	315	7-Apr-21	233
8-Jul-20	381	8-Oct-20	279	8-Jan-21	312	8-Apr-21	272
9-Jul-20	920	9-Oct-20	280	9-Jan-21	352	9-Apr-21	239
10-Jul-20	403	10-Oct-20	314	10-Jan-21	343	10-Apr-21	267
11-Jul-20	369	11-Oct-20	307	11-Jan-21	296	11-Apr-21	301
12-Jul-20	355	12-Oct-20	258	12-Jan-21	297	12-Apr-21	251
13-Jul-20	301	13-Oct-20	257	13-Jan-21	327	13-Apr-21	233
14-Jul-20	294	14-Oct-20	253	14-Jan-21	305	14-Apr-21	238
15-Jul-20	308	15-Oct-20	276	15-Jan-21	301	15-Apr-21	233
16-Jul-20	296	16-Oct-20	271	16-Jan-21	331	16-Apr-21	245
17-Jul-20	285	17-Oct-20	308	17-Jan-21	388	17-Apr-21	337
18-Jul-20	316	18-Oct-20	320	18-Jan-21	331	18-Apr-21	301
19-Jul-20	333	19-Oct-20	275	19-Jan-21	311	19-Apr-21	265
20-Jul-20	292	20-Oct-20	264	20-Jan-21	314	20-Apr-21	247
21-Jul-20	285	21-Oct-20	251	21-Jan-21	291	21-Apr-21	233
22-Jul-20	293	22-Oct-20	257	22-Jan-21	320	22-Apr-21	250
23-Jul-20	268	23-Oct-20	274	23-Jan-21	317	23-Apr-21	261
24-Jul-20	270	24-Oct-20	320	24-Jan-21	347	24-Apr-21	431
25-Jul-20	322	25-Oct-20	335	25-Jan-21	312	25-Apr-21	300
26-Jul-20	326	26-Oct-20	343	26-Jan-21	320	26-Apr-21	300
27-Jul-20	272	27-Oct-20	352	27-Jan-21	296	27-Apr-21	243
28-Jul-20	255	28-Oct-20	263	28-Jan-21	393	28-Apr-21	247
29-Jul-20	265	29-Oct-20	251	29-Jan-21	304	29-Apr-21	242
30-Jul-20	266	30-Oct-20	261	30-Jan-21	335	30-Apr-21	248
31-Jul-20	268	31-Oct-20	315	31-Jan-21	347	1-May-21	300
1-Aug-20	293	1-Nov-20	323	1-Feb-21	300	2-May-21	293
2-Aug-20	319	2-Nov-20	258	2-Feb-21	287	3-May-21	251
3-Aug-20	270	3-Nov-20	243	3-Feb-21	288	4-May-21	254
4-Aug-20	288	4-Nov-20	266	4-Feb-21	276	5-May-21	254
5-Aug-20	275	5-Nov-20	260	5-Feb-21	284	6-May-21	232
6-Aug-20	263	6-Nov-20	242	6-Feb-21	329	7-May-21	246
7-Aug-20	271	7-Nov-20	321	7-Feb-21	330	8-May-21	291
8-Aug-20	308	8-Nov-20	685	8-Feb-21	360	9-May-21	293
9-Aug-20	315	9-Nov-20	279	9-Feb-21	287	10-May-21	245
10-Aug-20	286	10-Nov-20	255	10-Feb-21	377	11-May-21	237
11-Aug-20	265	11-Nov-20	266	11-Feb-21	278	12-May-21	277
12-Aug-20	261	12-Nov-20	269	12-Feb-21	281	13-May-21	206
13-Aug-20	277	13-Nov-20	306	13-Feb-21	315	14-May-21	237
14-Aug-20	247	14-Nov-20	320	14-Feb-21	329	15-May-21	282
15-Aug-20	283	15-Nov-20	330	15-Feb-21	275	16-May-21	289
16-Aug-20	278	16-Nov-20	263	16-Feb-21	285	17-May-21	253
17-Aug-20	256	17-Nov-20	250	17-Feb-21	292	18-May-21	295
18-Aug-20	230	18-Nov-20	252	18-Feb-21	283	19-May-21	245

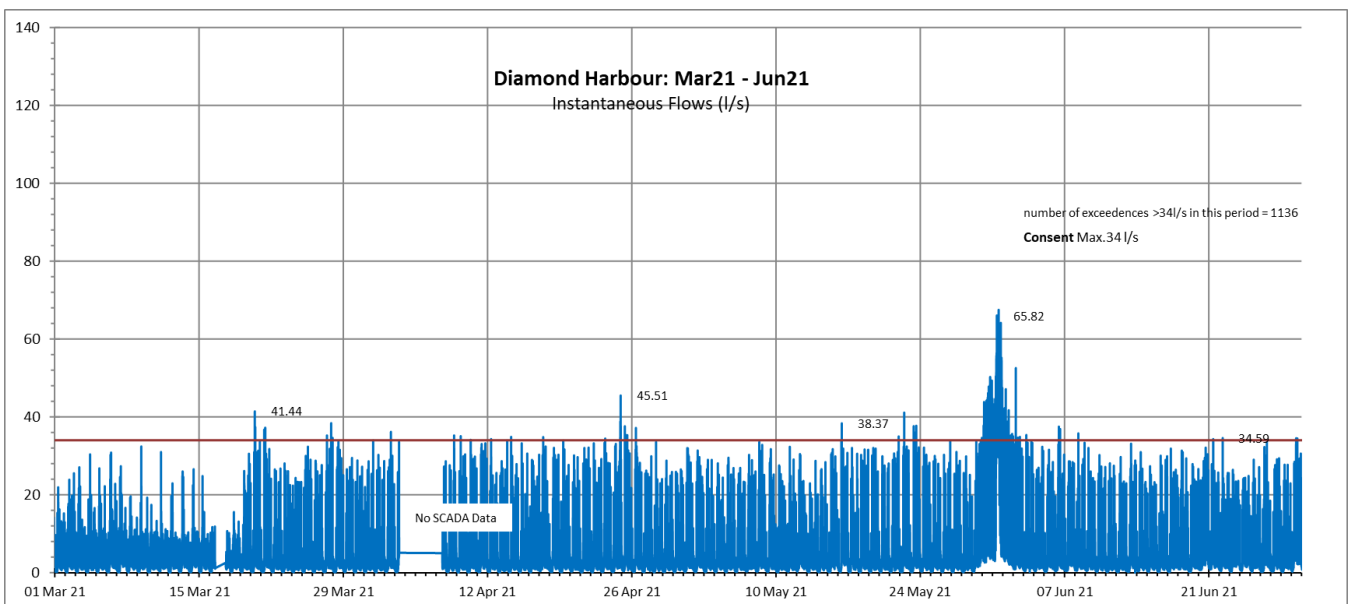
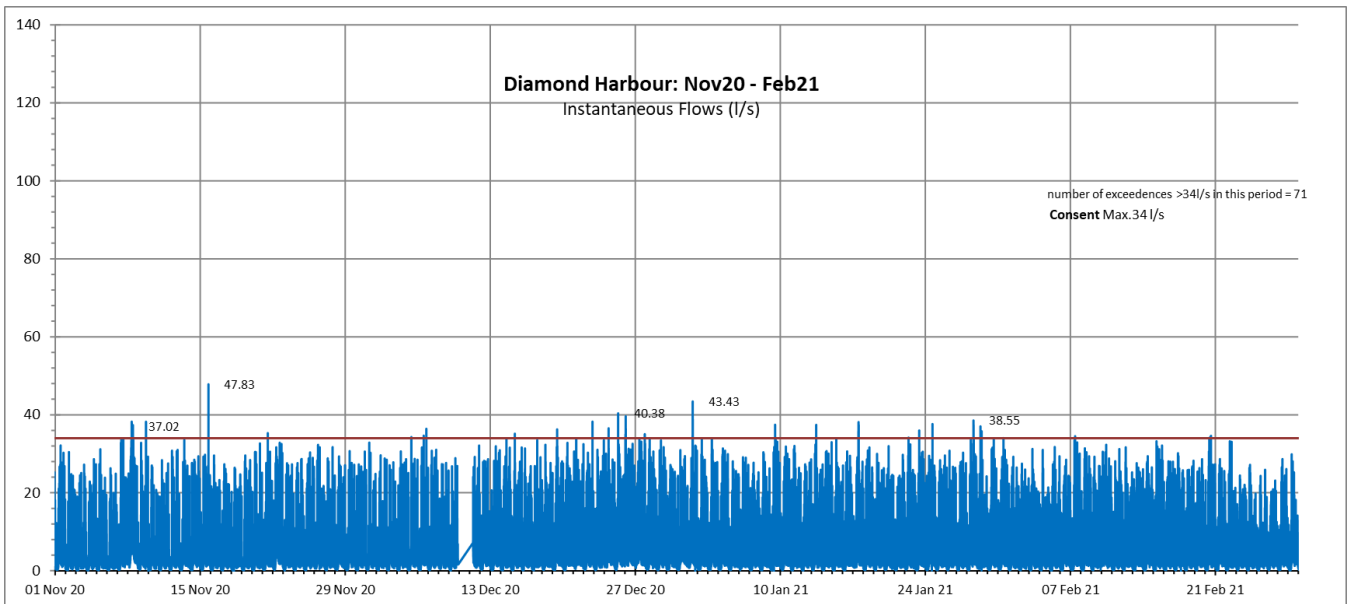
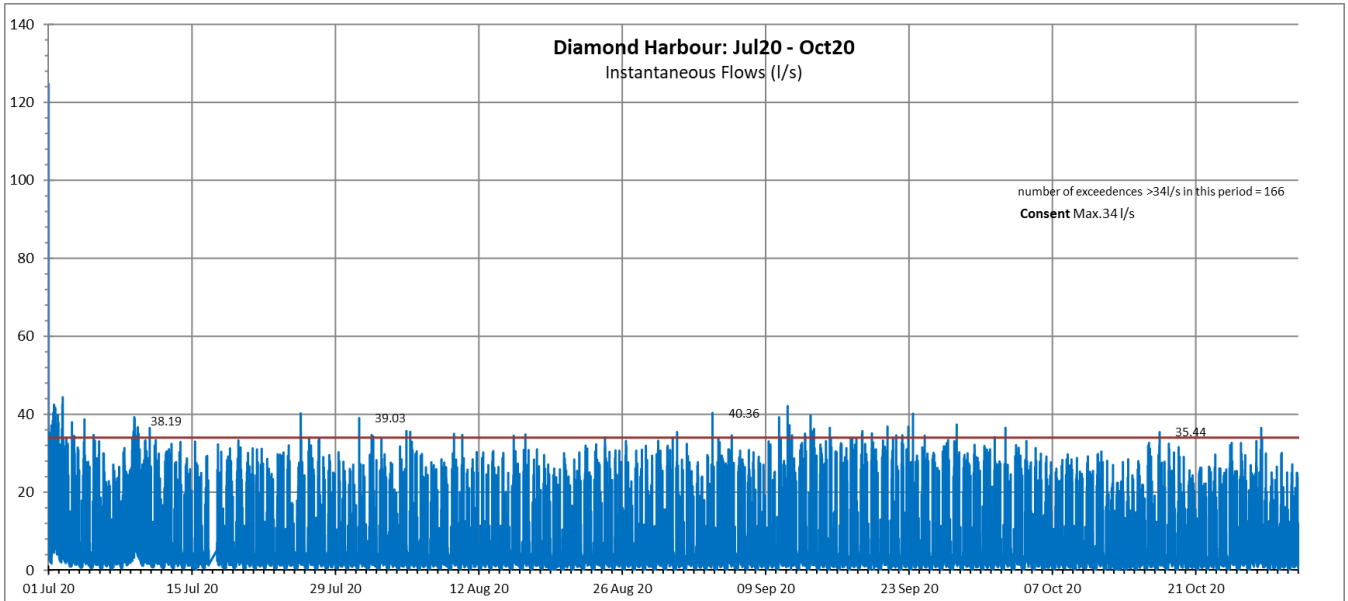
Plant : Diamond Harbour Wastewater Treatment, Banks Peninsula: Daily Flows for July 2020 - June 2021							
Date	Flow (m ³ /d)	Date	Flow (m ³ /d)	Date	Flow (m ³ /d)	Date	Flow (m ³ /d)
19-Aug-20	218	19-Nov-20	253	19-Feb-21	290	20-May-21	253
20-Aug-20	237	20-Nov-20	263	20-Feb-21	314	21-May-21	243
21-Aug-20	243	21-Nov-20	290	21-Feb-21	331	22-May-21	282
22-Aug-20	318	22-Nov-20	396	22-Feb-21	276	23-May-21	309
23-Aug-20	298	23-Nov-20	284	23-Feb-21	297	24-May-21	250
24-Aug-20	337	24-Nov-20	268	24-Feb-21	279	25-May-21	261
25-Aug-20	279	25-Nov-20	275	25-Feb-21	272	26-May-21	242
26-Aug-20	271	26-Nov-20	322	26-Feb-21	279	27-May-21	249
27-Aug-20	258	27-Nov-20	279	27-Feb-21	325	28-May-21	235
28-Aug-20	261	28-Nov-20	325	28-Feb-21	341	29-May-21	389
29-Aug-20	320	29-Nov-20	319	1-Mar-21	286	30-May-21	1735
30-Aug-20	324	30-Nov-20	292	2-Mar-21	294	31-May-21	2521
31-Aug-20	261	1-Dec-20	274	3-Mar-21	282	1-Jun-21	610
1-Sep-20	263	2-Dec-20	249	4-Mar-21	294	2-Jun-21	355
2-Sep-20	264	3-Dec-20	271	5-Mar-21	288	3-Jun-21	291
3-Sep-20	276	4-Dec-20	259	6-Mar-21	335	4-Jun-21	286
4-Sep-20	272	5-Dec-20	318	7-Mar-21	332	5-Jun-21	312
5-Sep-20	306	6-Dec-20	321	8-Mar-21	293	6-Jun-21	316
6-Sep-20	325	7-Dec-20	288	9-Mar-21	278	7-Jun-21	335
7-Sep-20	275	8-Dec-20	272	10-Mar-21	269	8-Jun-21	286
8-Sep-20	269	9-Dec-20	223	11-Mar-21	291	9-Jun-21	264
9-Sep-20	266	10-Dec-20	288	12-Mar-21	279	10-Jun-21	253
10-Sep-20	306	11-Dec-20	334	13-Mar-21	321	11-Jun-21	241
11-Sep-20	351	12-Dec-20	336	14-Mar-21	324	12-Jun-21	273
12-Sep-20	327	13-Dec-20	300	15-Mar-21	279	13-Jun-21	315
13-Sep-20	321	14-Dec-20	288	16-Mar-21	280	14-Jun-21	249
14-Sep-20	280	15-Dec-20	302	17-Mar-21	280	15-Jun-21	255
15-Sep-20	256	16-Dec-20	292	18-Mar-21	267	16-Jun-21	243
16-Sep-20	272	17-Dec-20	314	19-Mar-21	263	17-Jun-21	273
17-Sep-20	263	18-Dec-20	341	20-Mar-21	270	18-Jun-21	300
18-Sep-20	279	19-Dec-20	367	21-Mar-21	300	19-Jun-21	282
19-Sep-20	302	20-Dec-20	377	22-Mar-21	236	20-Jun-21	431
20-Sep-20	317	21-Dec-20	348	23-Mar-21	246	21-Jun-21	331
21-Sep-20	276	22-Dec-20	349	24-Mar-21	229	22-Jun-21	284
22-Sep-20	260	23-Dec-20	440	25-Mar-21	232	23-Jun-21	266
23-Sep-20	255	24-Dec-20	409	26-Mar-21	238	24-Jun-21	251
24-Sep-20	280	25-Dec-20	546	27-Mar-21	282	25-Jun-21	243
25-Sep-20	257	26-Dec-20	508	28-Mar-21	286	26-Jun-21	297
26-Sep-20	293	27-Dec-20	399	29-Mar-21	245	27-Jun-21	301
27-Sep-20	311	28-Dec-20	372	30-Mar-21	223	28-Jun-21	276
28-Sep-20	262	29-Dec-20	337	31-Mar-21	222	29-Jun-21	458
29-Sep-20	282	30-Dec-20	334			30-Jun-21	322
30-Sep-20	277	31-Dec-20	380				

Total volume	113,005	m ³ /year
Max flow	2,521	m ³ /day
Average flow	310	m ³ /day

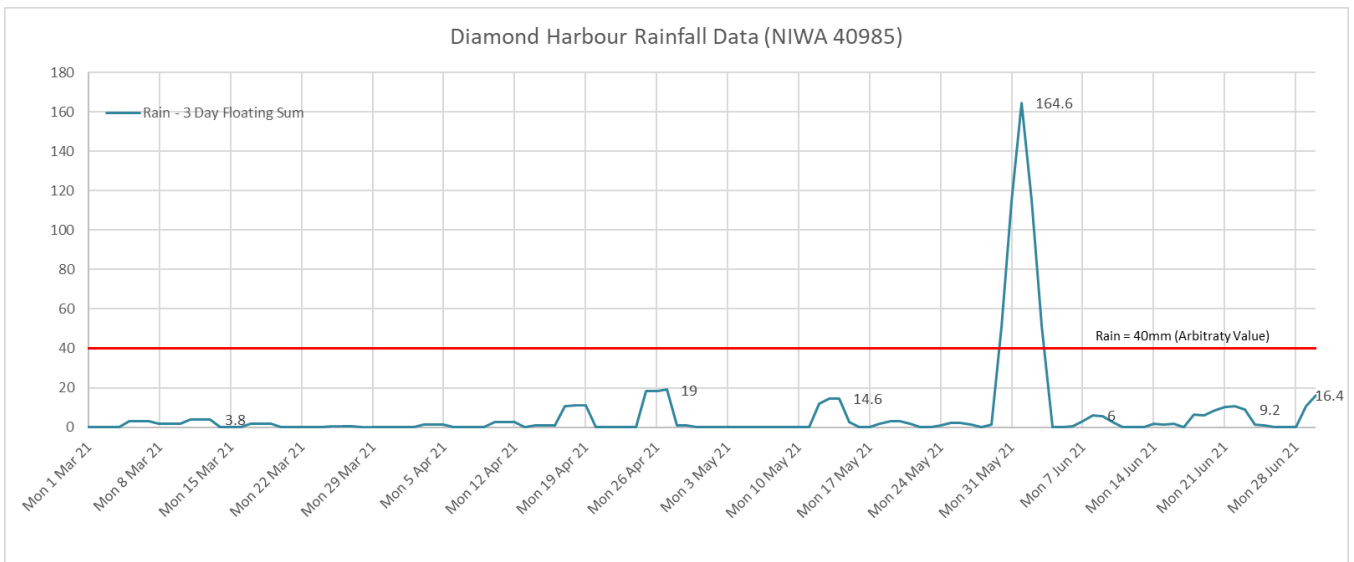
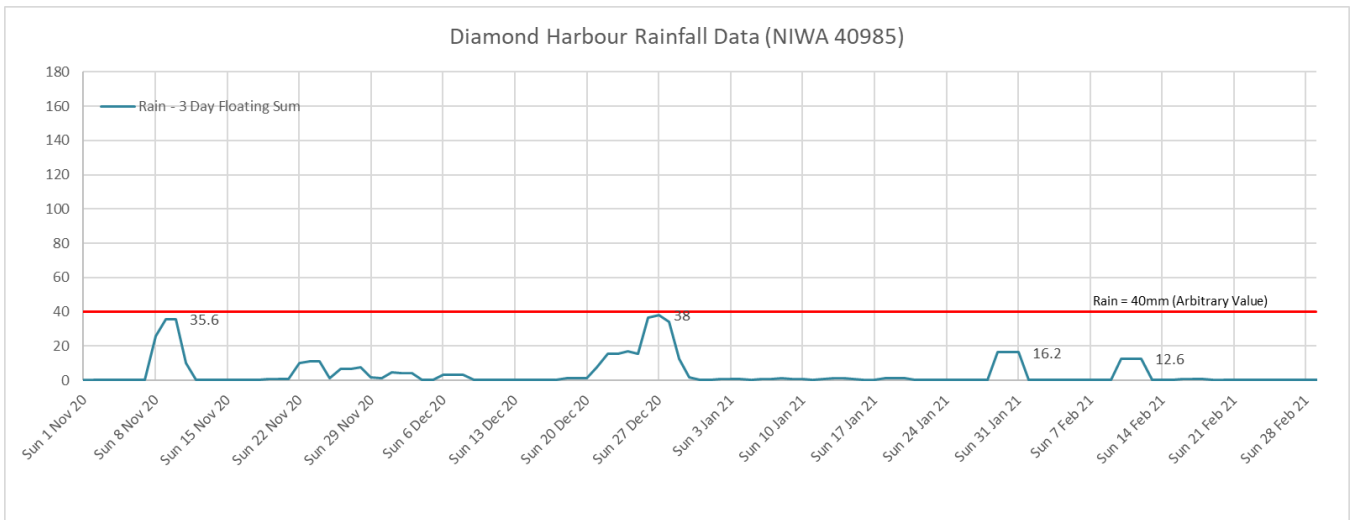
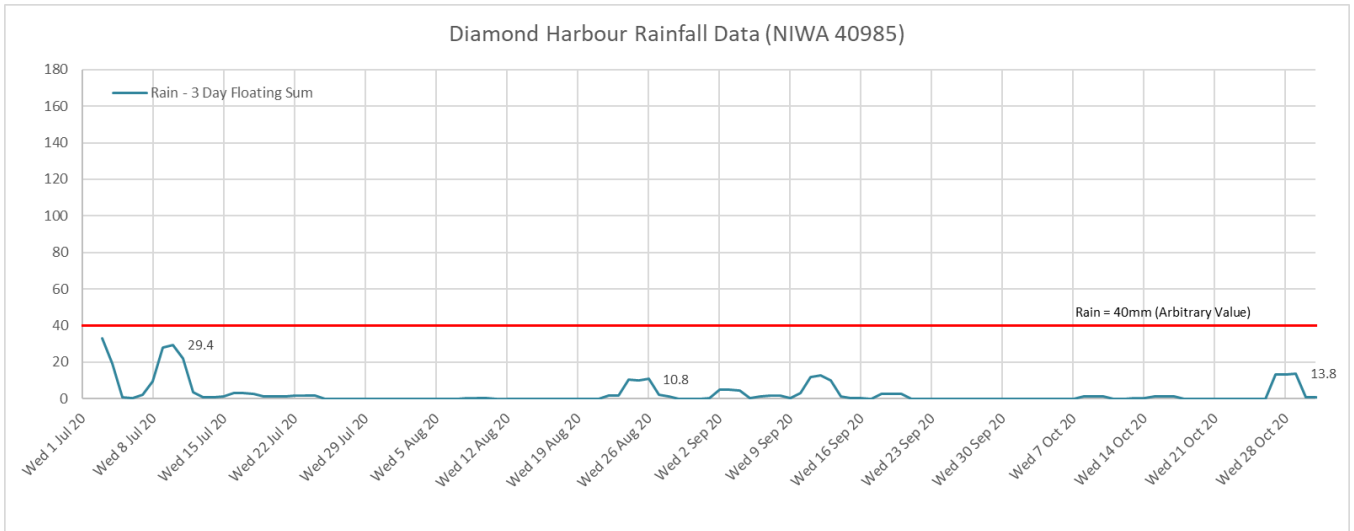
Attachment 1.2: Flows, Diamond Harbour, Chart



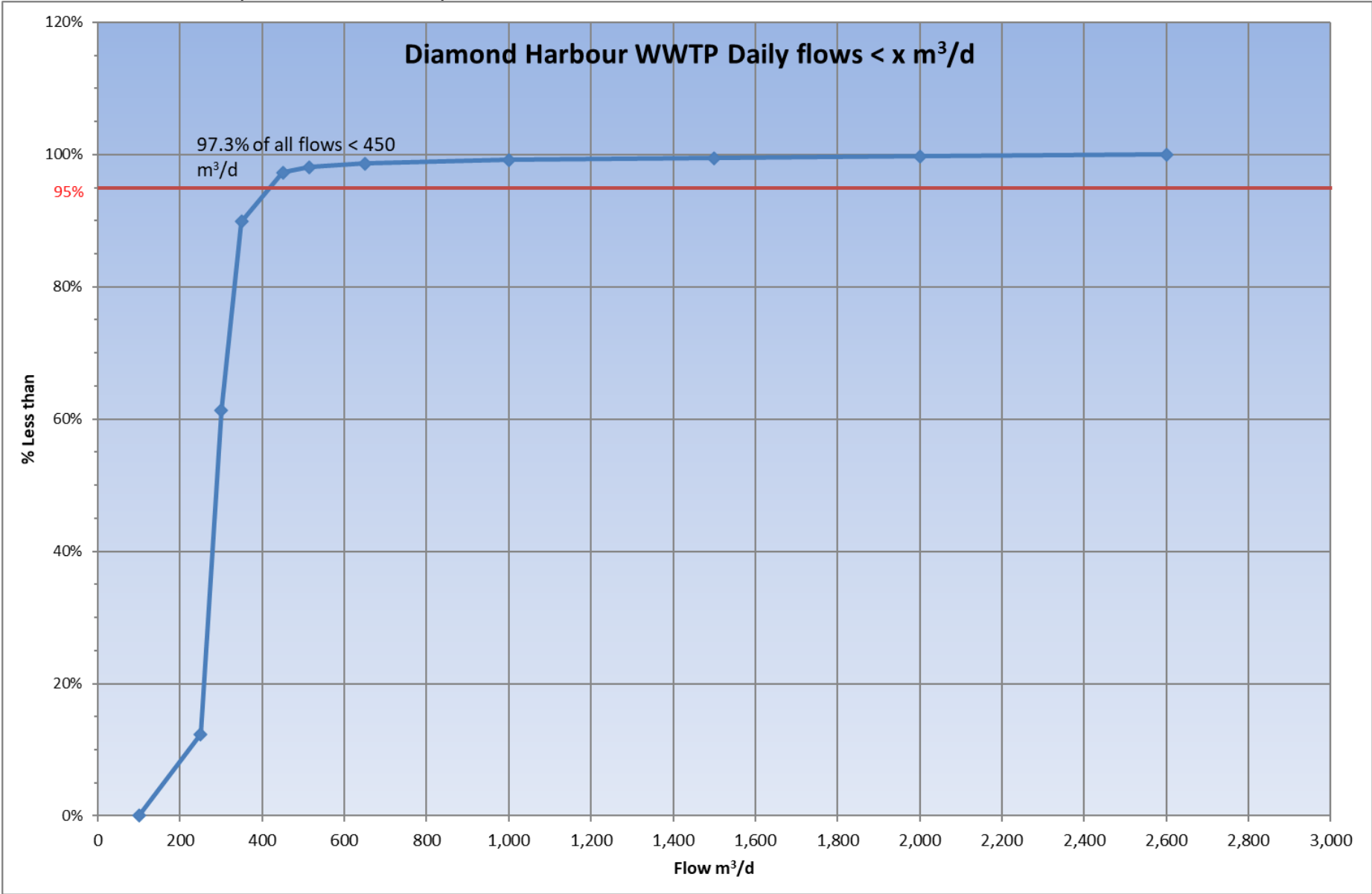
Attachment 1.3: Instantaneous Flows, Diamond Harbour



Attachment 1.3a: Rainfall Data



Attachment 1.4: Flows, Diamond Harbour, '% less than'



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			East	North	South	West
	TN mg/L	TN mg/L	TN mg/L	TN 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			DRP mg/L	DRP mg/L	DRP mg/L	DRP mg/L						
	not to exceed 1.0						not to exceed 0.91																					
22-Sep-20	0.16	0.08	0.14	0.17	0.17	0.21	0.005	0.005	0.005	0.005	0.005	0.005	0.019	0.023	0.021	0.024	0.046	0.027	0.005	0.004	0.003	0.003	0.008	0.006				
12-Nov-20	0.26	0.24	0.21	0.25	0.26	0.19	0.005	0.005	0.005	0.005	0.005	0.005	0.010	0.010	0.010	0.010	0.010	0.010	0.008	0.008	0.008	0.008	0.010	0.009				
2-Dec-20	0.24	0.21	0.23	0.23	0.28	0.26	0.015	0.015	0.014	0.014	0.017	0.012	0.010	0.010	0.011	0.010	0.010	0.010	0.009	0.008	0.009	0.007	0.007	0.006				
13-Jan-21	0.27	0.32	0.29	0.29	0.27	0.36	0.005	0.005	0.005	0.005	0.005	0.005	0.010	0.014	0.014	0.019	0.021	0.030	0.010	0.009	0.009	0.010	0.010	0.011				
17-Mar-21	0.18	0.17	0.18	0.19	0.18	0.18	0.005	0.005	0.005	0.005	0.005	0.005	0.010	0.010	0.010	0.010	0.010	0.010	0.023	0.023	0.022	0.021	0.018	0.017				
17-May-21	0.30	0.31	0.34	0.29	0.25	0.29	0.041	0.059	0.100	0.082	0.039	0.053	0.014	0.019	0.023	0.028	0.029	0.025	0.019	0.028	0.040	0.037	0.023	0.022				
14-Jun-21	0.23	0.38	0.33	0.3	0.28	0.35	0.025	0.023	0.025	0.022	0.024	0.023	0.090	0.110	0.088	0.120	0.110	0.120	0.018	0.021	0.017	0.021	0.021	0.021				
average	0.234	0.244	0.246	0.246	0.241	0.263	0.014	0.017	0.023	0.020	0.014	0.015	0.023	0.028	0.025	0.032	0.034	0.033	0.013	0.015	0.015	0.015	0.014	0.013				
maximum	0.180	0.380	0.340	0.300	0.280	0.360	0.041	0.059	0.100	0.082	0.039	0.053	0.090	0.110	0.088	0.120	0.110	0.120	0.023	0.028	0.040	0.037	0.023	0.022				

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			East	North	South	West
	TSS mg/L	TSS mg/L	TSS mg/L	TSS mg/L			Chla mg/L	Chla mg/L	Chla mg/L	Chla mg/L			ENT 100mL	ENT 100mL	ENT 100mL	ENT 100mL			FC 100mL	FC 100mL	FC 100mL	FC 100mL						
22-Sep-20	9	8	9	8	9	7	1.9	2.0	2.1	2.0	2.4	1.6	10	10	10	10	10	10	1	1	1	1	1	7				
12-Nov-20	12	13	14	13	24	16	2.9	3.1	3.1	3.0	2.6	2.5	10	10	10	10	10	10	1	1	1	3	1	2				
2-Dec-20	26	26	37	25	24	23	3.3	3.0	3.0	3.0	3.0	4.0	10	10	10	10	10	10	1	5	1	1	1	21				
13-Jan-21	11	13	11	11	25	19	2.8	2.8	3.0	2.4	2.9	3.9	10	10	41	10	10	20	1	1	1	1	1	29				
17-Mar-21	11	11	13	11	21	9	3.1	3.1	3.3	3.0	4.6	3.0	10	10	10	10	10	10	1	1	1	1	1	1				
17-May-21	13	9	12	6	8	5	1.2	1.3	2.1	1.0	1.0	1.0	10	10	10	10	10	10	2	2	2	2	2	2				
14-Jun-21	7	7	7	7	6	9	1.9	4.1	1.9	2.8	2.5	1.0	10	10	10	10	10	10	1	1	1	2	1	2				
average	12.629	12.371	14.643	11.357	17.071	12.286	2.443	2.771	2.643	2.457	2.714	2.429	10.000	10.000	14.429	10.000	10.000	11.429	1.143	1.714	1.286	1.429	1.143	9.143				
maximum	26.0	26.0	37.0	25.0	25.0	23.0	3.3	4.1	3.3	3.0	4.6	4.0	10.0	10.0	41.0	10.0	10.0	20.0	2.0	5.0	2.0	3.0	2.0	29.0				

* TN should not be > 1
 * NH3 should not be > 0.91