Akaroa

Wastewater Treatment Plant

Annual Monitoring Report

07/2010 – 06/2011

Prepared by: City Care Ltd
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On behalf of

Christchurch City Council, City Water & Waste Unit

Christchurch, 15/08/2011

Resource Consent Number: CRC071865.1
File Number: CO6C/01282
Client Name: Christchurch City Council (City Solutions)
To: To discharge contaminants into the Coastal Waters.
Consent Location: Red House Bay, Beach Road, AKAROA HARBOUR
State: Current

Events:

17/08/2010 Change in Conditions takes effect
1/07/2013 Consent Expires
1/07/2013 Lapse Date if not Given Effect To

1	The discharge shall be only treated wastewater from the Akaroa Wastewater Treatment Plant, located at Redhouse Bay, Akaroa Harbour
	Complies
2	Treated wastewater from the Akaroa Wastewater Treatment Plant shall be discharged into Akaroa Harbour via an existing 100 meter long submerged outfall at map reference NZMS 260 N37:05561-09862, as shown in Appendix A which forms part of this consent.
	Complies
3	Warning notices, which can be read from a distance of five metres, shall be erected and maintained at the following locations: On the shoreline 400 metres either side of the point on the shoreline nearest the outfall, and Beside Beach Road adjacent to the rocks that lead out to Green Point. The warning notices shall advise the public of the existence of a wastewater outfall and the dangers of swimming in the area or eating shellfish collected in that location..
	Complies
4	The volume of wastewater exiting the Akaroa Wastewater Treatment Plant shall be continuously recorded using a flow meter. The readings from the flow meter shall be recorded in litres per second and shall be used to calculate the daily volume of wastewater entering the treatment plant, and these daily volumes shall be recorded. The daily volumes recorded shall be used to determine compliance with condition (5).
	Complies
5	The volume of treated wastewater discharged shall not exceed 750 cubic metres per day, except during rainfall events of a total of 50 millimetres or more over 3 consecutive days, when the volume of treated wastewater discharged may exceed 750 cubic metres per day but not 3,000 cubic metres per day. Note: For the purposes of this condition, the rainfall shall be that measured at the weather station operated by NIWA on Rue Lavaud, Akaroa (Agent number = 4951).
	Complies **Three exceedances of the dry weather maximum of 750 m^3/d were observed in August; 09/08, 10/08 and 12/08. These flows were caused by an extreme rain event of 190 mm over 08/09/10 Aug 2010, see attachment 8. Attachment 9 shows that station 4951 stopped operation.**
6	Treated wastewater shall be sampled after treatment and prior to discharge into Akaroa Harbour via the outfall. The samples shall be collected at the frequencies specified and analysed for the contaminants listed in Table 1: Table 1: Treated wastewater quality monitoring – contaminants and sampling frequency Weekly (Dec, Jan, Feb) Monthly Monthly (between 1 Mar and 30 Nov) Annually (Jan) faecal coliforms dissolved reactive phosphorus (DRP) Faecal coliforms lead enterococci ammonia enterococci copper total suspended solids (TSS) total nitrogen (TN) TSS chromium total five day biochemical oxygen demand (BOD5) oxides of nitrogen (NOx) BOD5 cadmium total phosphorus (TP) zinc temperature
	Complies

7	The median concentration of faecal coliforms in the treated wastewater shall not exceed 1,000 per 100 millilitres
	Complies **Maximum Median was 230 FEC / 100 ml**
8	The consent holder shall use the best practicable option to ensure the median concentration of BOD5 and TSS does not exceed 30 grams per cubic metre
	Complies **The treatment plant is operated in accordance with business best practise and plant management plans. Maximum median for BOD5 was 16.0 mg/l and for TSS 14.0 mg/l.**
9	For the purposes of conditions (7) and (8) the median shall be calculated from the results of any five consecutive treated wastewater samples analysed
	Complies
10	The receiving water shall be sampled and analysed for faecal coliforms and enterococci at the following locations, as shown on plan CRC071865A: Adjacent to the two rocky outcrops either side of the Treatment Plant at or about map references NZMS260:N36:0573-1022 and NZMS260:N37:0554-0979; At the shoreline nearest the outfall; 400 metres along the shoreline in a southerly direction from site (b); and 400 metres along the shoreline in a northerly direction from site (b).
	Complies
11	Receiving water sampling and analysis for faecal coliforms and enterococci shall be occur at least weekly during December, January and February each year and at least monthly for faecal coliforms between 1 March and 30 November. Receiving water sampling shall occur within six hours of treated wastewater sampling.
	Complies
12	In the event that the analysis of receiving water samples collected under condition (11) from outside the 250 metre radius mixing zone indicates: A concentration of faecal coliforms that exceeds a median of 14 per 100 millilitres and/or That the concentration of the faecal coliforms in more that ten percent of samples exceeds 43 per 100 millilitres; The consent holder shall notify the Canterbury regional council, Attention: RMA Compliance and Enforcement manager. The results of all samples collected in December and the following January and February of each year shall be used to determine whether the values specified in this condition have been exceeded for each site.
	Complies **Median was 10 FEC / 100 ml, max 9.5 % of samples per location were > 43 FEC / 100 ml.**
13	The notification required by condition (12) shall be provided within one month of detecting the exceedance, and shall identify whether the exceedance resulted from wastewater discharge and, if so, shall detail what measures the consent holder has implemented or will implement to mitigate any adverse environmental effects as a result of the exceedance and to prevent a reoccurrence. Such measures may include: Additional sampling and analysis; and Investigation of whether the exceedance was related to high concentrations in the treated wastewater.
	Complies
14	The receiving water shall be sampled and analysed for temperature, TN, NOx, TP, DRP and ammonia at the following locations, as shown on plan CRC071865.1A attached to this consent as Appendix B: 250 metres due north of the outfall; 250 metres due west of the outfall; and 250 metres due south of the outfall.
	Complies
15	Receiving water sampling and analysis for temperature, TN, NOx, TP, DRP and ammonia shall occur at least once during the first week of February, May, August and November. Receiving water sampling shall occur within six hours of treated wastewater sampling.

	Complies

16	The consent holder shall use the best practicable option to ensure the median concentration of TN, NOx, TP, DRP and ammonia in the receiving water do not exceed the following concentrations: TN that exceeds a median of 0.21 mg/L; NOx that exceeds a median of 0.023 mg/L TP that exceeds a median of 0.039 mg/L; DRP that exceeds a median of 0.017 mg/L; and Ammonia that exceeds a median of 0.910 mg/L The consent holder shall notify the Canterbury Regional Council, Attention: RMA Compliance and Enforcements Manager. For the purposes this condition, the median shall be calculated for each site from the results of any four consecutive samples.
	Non Complying. **Results show big discrepancies. The only parameter complying at all locations is Ammonia. A discussion re condition 16 can be found at the summary.**
17	The notification required by condition (16) shall be provided within one month of detecting the exceedance, and shall identify whether the exceedance resulted from the wastewater discharge and, if so, shall detail what measures the consent holder has implemented or will implement to mitigate any adverse environmental effects as a result of the exceedance and to prevent a reoccurrence. Such measures may include: Additional sampling and analysis; and Investigation of whether the exceedance was related to high concentrations in the treated wastewater.
	See comments below
18	The time and date that the sample is collected shall be recorded for all samples collected under this consent. The laboratory carrying out the analyses of all samples collected under 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.
	Complies
19	The consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, any sampling results required by this consent during each month by the 15th working day of the following month.
	Complies
20	The consent holder shall submit to the Canterbury Regional Council, Attention: RMA Compliance and Enforcement Manager, an annual report by 31 July each year which includes, but is not limited to, the following: Results of the monitoring undertaken in the previous year from 1 July to 30 June; An analysis of monitoring results with limits and trigger values specified in the conditions of this consent; An analysis of receiving water monitoring results with treated wastewater monitoring results; Measures taken to remedy any exceedances of limits or trigger values; Comparison of monitoring results with historical data; An interpretation of the results in relation to the effects of the discharge on the environment; and Details of all upgrades to the treatment plant or that may affect the quality or volume of treated wastewater discharged.
	This report
21	Copies of all monitoring results and reports relating to the discharge from the wastewater treatment plant shall be made available to the community via the Akaroa Service Centre and the Christchurch City Council website.
	CCC to follow up
22	The consent holder shall submit to the Canterbury Regional Council, within six months of the grant of this consent, a management plan that details the measures that will be taken to ensure compliance with the trigger values specified in this consent relating to treated wastewater and receiving environment quality and shall include contingency measures in response to mechanical or electrical failures.
	Complies
23	The consent shall be exercise in accordance with the management plan.
	Complies

24	The consent holder shall use its best endeavours to establish and maintain a Community Working Party (CWP), and provide reasonable organisational and administrative support for such a group for the duration of the consent. The CWP shall be established within 6 months of the granting of this consent and the first meeting shall set up the framework and aims for the group and their responsibilities. In establishing the group, the consent holder shall invite a representative of each of the following organisations to be members of the CWP and to meet at least once per year: Friends of Banks Peninsula; Department of Conservation; Environment Canterbury; Onuku Runanga; Wairewa Runanga; Taiapure Management Group; Akaroa Promotions; Akaroa Harbour marine Protection Society; and Any other interested person or interest group. The consent holder shall liaise with the CWP with the aim of facilitating the following outcomes: The consent holder has access to community opinions, observations, and activities that may be affected by the exercise of this consent; and Communication and liaison between the consent holder and local community is maintained.
	CCC to follow up
25	The consent holder shall undertake a programme of works associated with the investigation and selection of a long-term method of treatment and disposal of wastewater from the Akaroa Wastewater Treatment Plant. This programme shall be undertaken in general accordance with the schedule attached as Appendix C which forms part of this consent. The consent holder shall submit to the Canterbury Regional Council and the CWP: a report on the list of options for wastewater treatment and disposal, no later than 31 July 2009; and a report of the preferred option for wastewater treatment and disposal, no later than 31 July 2011. A progress report shall be submitted to the Canterbury Regional Council and to the CWP, six months prior to the dates set out in (b) above, to show that progress is being made to meet these timeframes.
	CCC to follow up
26	The Canterbury Regional Council may, on any of the last five working days of May or November, serve notice of its intention to review the conditions of this consent for the purposes of: Dealing with any adverse effect on the environment which may arise from the exercise of the consent and which it is appropriate to deal with at a later stage; Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; and Requiring the consent holder to conduct monitoring instead of, or in addition to, that required by the consent.
	Comment re conditions 14 and 17 received

Monitoring summary:

Treatment Plant:

The Akaroa wastewater treatment plant had a very positive year with above average performance (attachment 1). There was only one exceedance this year relating FEC and **no** transgression. This demonstrates a real good success for CCC and City Care. The maximum FEC count during the summer month (bathing season) was 200 FEC/100ml with the maximum median at 27. BOD5 and TSS were complying as well (median at 16 mg/l and 12 mg/l respectively compared to 30 mg/l consented).

Flows are very well under control. I&I improved dramatically over recent years. 95 % of all flows into the plant were less than 412 m^3/d (attachment 5, 6 and 7).

Receiving Environment:

Performance dealing with health related parameters like Faecal Coliforms and Enterococci were excellent with **no** transgression at all (attachment 2). Data around the 24/01/2011 showing high counts resulting in a closure of the beach cannot be attributed to plant performance which was complying and above average at this time.

As shown in attachments 3 and 4 nutrient data gathered from the marine environment was none complying. Data discrepancies were observed which lead to the conclusion that this is caused by external issues and not related to plant discharge. Attachment 4 explains some of the details including a comparative estimate of the results expected in the marine environment which differ from the results in this report.

The real positive fact is that Ammonia figures were consistently below the threshold (0.015 to 0.140 mg/l actually tested compared to 0.910 mg/l consented). This is important to highlight as Ammonia is of big environmental concern as being poisonous to certain marine species.

Ammonia Concentration Marine Environment Trigger Value is 0.91 mg/l				
Date / Location	**North**	**West**	**South**	**Plant effluent**
4/11/2010	<0.03	0.14	0.13	11.0
31/01/2011	<0.05	<0.05	<0.05	0.50
06/05/2011	0.021	0.015	0.022	2.50

Summary of Exceedances and Transgressions:

Parameter	Exceedances	Transgressions
Treatment Plant		
Flow	0	0
BOD5	0	0
TSS	0	0
FEC	**1**	0
Marine Environment		
FEC median < 14	0	0
FEC 10 % of samples > 43	0	0
TN	**12**	**3**
NNN	**11**	**3**
TP	**6**	**3**
DRP	**6**	**2**
Ammonia	0	0
Total	**36**	**11**

Attachment 1: Lab Data, Akaroa Wastewater Treatment Plant

Plant:	Akaroa Wastewater Treatment, Banks Peninsula																		
Asset Owner:	Christchurch City Council																		
Laboratory	Christchurch City Council Laboratory, City Water & Waste Unit																		
																	Median		
	Date	Flow	BOD_5	NH_4-N	TKN	N_{org}	NO_2-N	NO_3-N	NNN	N_{tot}	DRP	P_{tot}	TSS	Temp	FEC	Ent	BOD_5	TSS	FEC
		[m^3/d]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[mg/l]	[deg C]	CFU/100ml	MPN/100ml	[mg/l]	[mg/l]	[mg/l]
Mar-10	2/03/2010		9.3										17.0		120				
Apr-10	6/04/2010		20.0										21.0		2,200				
May-10	4/05/2010		6.5										14.0		5				
Jun-10	1/06/2010		3.4										7.0		230				
Jul-10	6/07/2010	195	4.4	2.0	3.0	1.0	0.6	20.1	20.7	23.7	3.4	4.2	7.0	10.8	27	31	6.5	14.0	120.0
Aug-10	3/08/2010	195	11.0	4.0	6.7	2.7	0.8	17.9	18.7	25.4	4.1	5.2	11.0	11.0	330	140	6.5	11.0	230.0
Sep-10	7/09/2010	252	4.8	4.3	5.8	1.5	0.8	13.0	13.8	19.6	2.9	3.3	8.0	11.9	4,400	700	4.8	8.0	230.0
Oct-10	5/10/2010	215	16.0	19.0	21.0	2.0	1.2	9.1	10.3	31.3	3.3	6.7	14.0	13.8	9	10	4.8	8.0	230.0
Nov-10	4/11/2010	208	4.7	11.0	15.0	4.0	0.6	11.3	11.9	26.9	4.6	5.1	5.0	17.0	9	10	4.8	8.0	27.0
Dec-10	3/12/2010	204	8.1	10.0	12.0	2.0	1.7	17.5	19.2	31.2	5.5	5.8	8.0	19.2	9	10	8.1	8.0	9.0
	6/12/2010	247	7.0	0.5	15.0	14.5	0.2	24.4	24.6	39.6	6.3	7.0	10.0	19.8	9	10	7.0	8.0	9.0
	13/12/2010	201	15.0	0.5	9.9	9.4	2.4	18.0	20.4	30.3	5.8	7.4	9.9	19.5	18	10	8.1	9.9	9.0
	20/12/2010	332	8.1	0.5	9.1	8.6	2.6	17.5	20.1	29.2	6.1	6.8	7.0	20.3	27	10	8.1	8.0	9.0
	29/12/2010	519	20.0	0.5	34.0	33.5	4.2	7.0	11.2	45.2	6.9	8.6	17.0	19.6	73	20	8.1	9.9	18.0
Jan-11	5/01/2011	306	17.0	0.5	32.0	31.5	1.8	4.0	5.8	37.8	6.1	8.0	12.0	21.5	200	41	15.0	10.0	27.0
	10/01/2011	351	16.0	0.1	22.0	21.9	1.2	15.8	17.0	39.0	5.6	8.1	13.0	18.8	9	10	16.0	12.0	27.0
	18/01/2011	272	11.0	0.1	21.0	20.9	2.9	17.8	20.7	41.7	7.7	9.7	11.0	20.8	99	63	16.0	12.0	73.0
	24/01/2011	281	11.0	0.1	19.0	18.9	1.5	19.9	21.4	40.4	7.3	7.4	8.0	19.5	9	2	16.0	12.0	73.0
Feb-11	31/01/2011	199	6.2	0.5	9.2	8.7	1.5	23.6	25.1	34.3	6.2	7.6	6.0	19.6	9	10	11.0	11.0	9.0
	8/02/2011	223	5.4	0.5	6.7	6.2	0.8	15.3	16.1	22.8	5.8	7.1	8.0	20.8	18	10	11.0	8.0	9.0
	14/02/2011	229	2.3	6.5	7.4	0.9	0.9	26.7	27.6	35.0	7.0	7.4	6.0	20.9	82	10	6.2	8.0	18.0
	21/02/2011	205	nr	7.3	8.8	1.5	1.5	23.4	24.9	33.7	7.3	7.3	5.0	21.0	nr	nr	5.8	6.0	13.5
Mar-11	9/03/2011	178	5.9	3.3	9.9	6.6	0.7	21.8	22.5	32.4	6.4	6.6	3.0	18.0	3	10	5.7	6.0	13.5
Apr-11	13/04/2011	135	5.8	1.8	3.3	1.5	0.5	23.3	23.8	27.1	4.8	4.9	3.0	16.1	9	10	5.6	5.0	13.5
May-11	6/05/2011	166	4.9	2.5	2.8	0.3	0.4	14.5	14.9	17.7	4.7	5.0	5.0	15.8	9	10	5.4	5.0	9.0
Jun-11	1/06/2011	156	5.1	1.7	2.3	0.6	0.3	22.1	22.4	24.7	4.6	4.8	6.0	12.7	9	10	5.5	5.0	9.0
		As	Cd	Cr	Cu	Pb	Ni	Zn											
		[µg/l]	[µg/l]	[µg/l]	[µg/l]	[µg/l]	[µg/l]	[µg/l]											
Jan-11	5/01/2011	1.0	0.7	1.0	22.0	1.0	3.4	46.0											

Attachment 2: Lab Data, Receiving Environment, condition 12

RECEIVING ENVIRONMENT RESULTS AKAROA WWTP CRC 071865.1

Condition 12 analysis 2010/2011

	North Outcrop				South Outcrop				Shoreline				400m North				400 m South			
Date	Faecals		Entercocci		Faecals		Enterococci		Faecals		Enterococci		Faecals		Enterococci		Faecals		Enterococci	
	CFU/100ml		MPN/100ml		CFU/100ml		MPN/100ml		CFU/100ml		MPN/100ml		CFU/100ml		MPN/100ml		CFU/100ml		MPN/100ml	
6/07/2010	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10
3/08/2010		10	<	10		160	<	10	<	10		10	<	10		10	<	10		10
7/09/2010		6		8		7		2		10		2		6		12		4	<	2
5/10/2010	<	5	<	10		10	<	10	<	5	<	10		10	<	10	<	5	<	10
4/11/2010	<	5	<	10	<	5	<	10	<	5	<	10	<	5	<	10	<	5	<	10
3/12/2010	<	10	<	10	<	10	<	10	<	10	<	10		1900	<	10	<	10	<	10
6/12/2010	<	10	<	10		10	<	10		10		10		10	<	10	<	10	<	10
13/12/2010	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10
20/12/2010	<	10		10	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10
29/12/2010		10		20		10		10		10		20		10		10		10		20
5/01/2011		30	<	10	<	10	<	10	<	10		10	<	10	<	10	<	10	<	10
10/01/2011	<	10	<	10	<	10	<	10		10	<	10	<	10	<	10	<	10	<	10
17/01/2011	<	10	<	10	<	10	<	10	<	10		10	<	10	<	10	<	10	<	10
24/01/2011		250		310		290		500		360		410		110		170		120		140
31/01/2011	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10		10
8/02/2011		20		10	<	10	<	10	<	10		63	<	10		20	<	10		20
14/02/2011	<	10	<	10	<	10	<	10		10	<	10	<	10	<	10	<	10	<	10
21/02/2011		nr		nr		nr		nr		nr		nr		nr		nr		nr		nr
9/03/2011		10		20	<	10		2	<	10		1	<	10		1	<	10		1
13/04/2011	<	10	<	10		9	<	10	<	10	<	10	<	10		10	<	10	<	10
6/05/2011	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10
1/06/2011	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10	<	10
MEDIANS		10				10				10				10				10		
# of samples > 43		1				2				1				2				1		
% of samples > 43		4.8%				9.5%				4.8%				9.5%				4.8%		

Taken off the < sign so can calculate

Ecan Audit Sampling

n = 21

Condition 12(a): Median < 14. **ALL COMPLIANT**

Condition 12(b): <10% **ALL COMPLIANT**

Attachment 3: Lab Data, Receiving Environment, condition 14

RECEIVING ENVIRONMENT RESULTS (NUTRIENTS) AKAROA WWTP CRC 071865

Condition 14,15,16

Date	250 metres due north											250 metres due west											250 metres due south									
	Time	Temp		TN		Nox		TP		DRP		NH	Time	Temp		TN		Nox		TP		DRP		NH	Time	Temp		TN		Nox		TP		DRP		NH
		°C		mg/L		mg/L		mg/L		mg/L		mg/L		°C		mg/L		mg/L		mg/L		mg/L		mg/L		°C		mg/L		mg/L		mg/L		mg/L		mg/L
TRIGGER				0.21		0.023		0.039		0.017		0.91				0.21		0.023		0.039		0.017		0.91				0.21		0.023		0.039		0.017		0.91
4-Nov-08	08:10			1.800		0.030		0.030		0.020		0.030				1.500	<	0.060	<	0.060		0.030		0.060				1.500	<	0.060	<	0.060		0.020		0.050
2/02/2009	07:10			1		0.98		0.060		0.020	<	0.030				42.3		40.67		0.032	<	0.01	<	0.03				41		41.04	<	0.06		0.01	<	0.03
4/05/2009	07:40			13.4		11.57		0.030		0.022		0.030				11.7		10.01	<	0.06		0.021	<	0.03				11.2		10.1	<	0.06		0.015	<	0.03
25/06/2009				2.400		0.640		0.030		0.022		0.030				2.300		0.590		0.003		0.021		0.015				1.800		0.740		0.030		0.015	<	0.030
4/08/2009				0.040		0.008		0.018		0.007		0.023				0.090		0.006		0.020		0.007		0.025				0.100		0.008		0.022		0.007		0.026
4/08/2009	09:00			0.500		0.030		0.010		0.005		0.500				0.500		0.003		0.020		0.005		0.500				0.500		0.030		0.020		0.050		0.500
5/11/2009				2.100		0.620		0.030		0.010		0.025				1.900		0.510		0.015		0.005		0.025				2.600		0.530		0.015		0.050		0.025
2/02/2010				1.400		1.400		0.030		0.005		0.500				1.700		1.700		0.500		0.030		0.500				2.300		2.300		0.500		0.030		0.500
4/05/2010	09:30			0.600		0.210		0.026		0.100		0.005				0.530		0.003		0.021		0.100		0.005				0.580		0.170		0.030		0.100		0.005
2/08/2010	14:55	11.0		1.600	<	0.020		0.030		0.017	<	0.030	15:00	11.0		1.100	<	0.040		0.030	<	0.010	<	0.030	15:05	11.0		2.200	<	0.040		0.030		0.012	<	0.030
4/11/2010	09:45	13.4		0.400		0.390		0.085		0.048	<	0.030	09:40	13.4		0.400		0.420		0.081	<	0.014		0.140	09:55	13.4		0.400		0.370		0.096		0.036		0.130
31/01/2011	08:30	15.3		4.600		0.070		0.320	<	0.020	<	0.050	08:30	15.3		0.800		0.040		0.120	<	0.020	<	0.050	08:30	15.3		1.500		0.030		0.270		0.024	<	0.050
6/05/2011	09:30	12.9	<	1.000		0.060		0.014		0.014		0.021	09:30	12.9	<	1.000		0.050		0.017		0.012		0.015	09:30	12.9	<	1.000		0.030		0.014		0.014		0.022
MEDIANS (from 25/06/10)				1.300		0.065		0.058		0.019		0.030				0.900		0.045		0.056		0.013		0.040				1.250		0.035		0.063		0.019		0.040

Removing < for median calculation (and halving the number)

Over trigger levels

ECan audit sampling

Notified by CCC, thought to be samplig error?

LABORATORY ANAYLSIS METHODOLGY ERROR

Attachment 4: Comments Relating Exceedances and Transgressions for the Marine Environment - Nutrients

Results for the receiving environment show big discrepancies and uncertainty in the data. 'Less than' results for TN and DRP can be found occasionally above the consented thresholds (indicating the detection limit was too high) and the total of NNN and Ammonia often lies above the TN result (indicating either of the parameters might be misinterpreted by the lab). The letter written by Dr. Lesley Bolton-Ritchie relating this issue left unconsidered by CCC. Dr. Bolton Ritchie's recommendation was to swap to Chlorophyll A testing instead of TN testing to actually monitor algae growth. Data relating monitoring of the marine environment is not satisfactory and the procedure needs revising.

Exceedances and transgressions relating the chemical parameters for the receiving environment should not be linked to the wastewater plant discharge. To evaluate current exceedances and transgressions (which seem to be substantial) a comparison using data from the sampling analysis of 04/08/2009 executed by Ecan laboratories was undertaken. On this day a clear picture of plant effluent and marine environment can be drawn. The assumption was made that plant effluent influences linearly the chemical parameters in the marine environment (which is not correct but simple for a start and no base data for the marine environment was available). The procedure was to correlate the plant effluent at sampling days to the corresponding parameters from 04/08/2009 and scale up or down the parameters from the marine environment proportionally. The results show neither an exceedance nor a transgression within the marine environment for the nutrient parameters of concern. This calculation is placed at the safe side of the equation for TN and NNN, about right for TP and DRP and too light for Ammonia. Assumption was that the base chemical concentration of the parameters of concern in the sea was 0.00 mg/l for all parameters. The calculation can be cross checked in the original spread sheet.

	250 m South estimated				
	TN	Nox	TP	DRP	NH
	mg/L	mg/L	mg/L	mg/L	mg/L
	0.21	0.023	0.039	0.017	0.91
4/08/2009	0.100	0.008	0.022	0.007	0.026
2/08/2010	0.127	0.021	0.018	0.005	0.009
4/11/2010	0.135	0.013	0.018	0.006	0.026
31/01/2011	0.172	0.028	0.027	0.008	0.001
6/05/2011	0.089	0.017	0.017	0.006	0.006
Median	**0.131**	**0.019**	**0.018**	**0.006**	**0.008**

This estimate backs the assumption about data inconsistencies relating the monitoring of the effects onto the marine environment. To avoid this dilemma either a swap of parameters indicated by Dr. Ritchie-Bolton or a Round Robin test including another accredited laboratory should be considered.

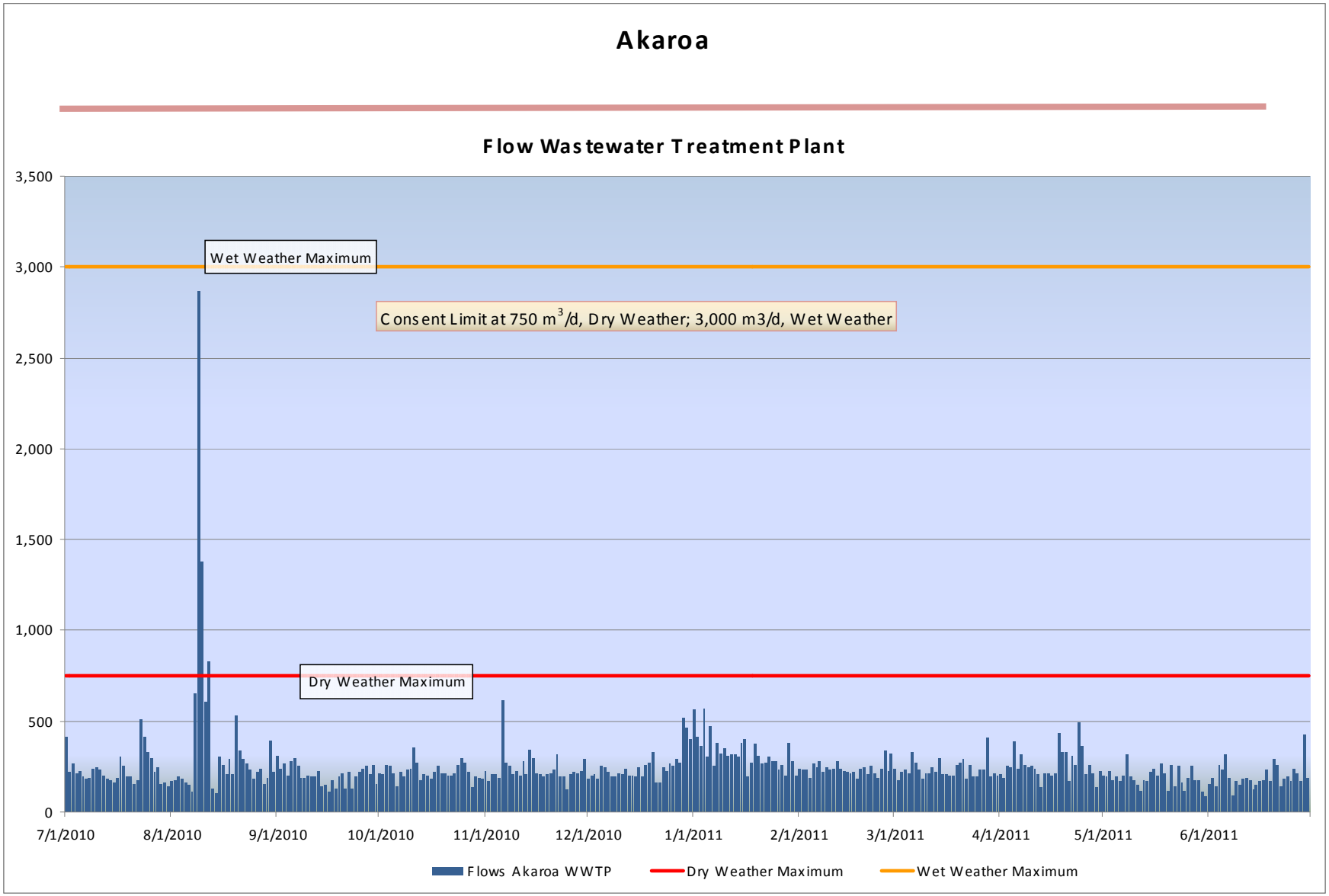
Attachment 5: Flows, Akaroa, Data

Plant:	Akaroa Wastewater Treatment, Banks Peninsula
Asset Owner:	Christchurch City Council
Laboratory	Christchurch City Council Laboratory, City Water & Waste Unit

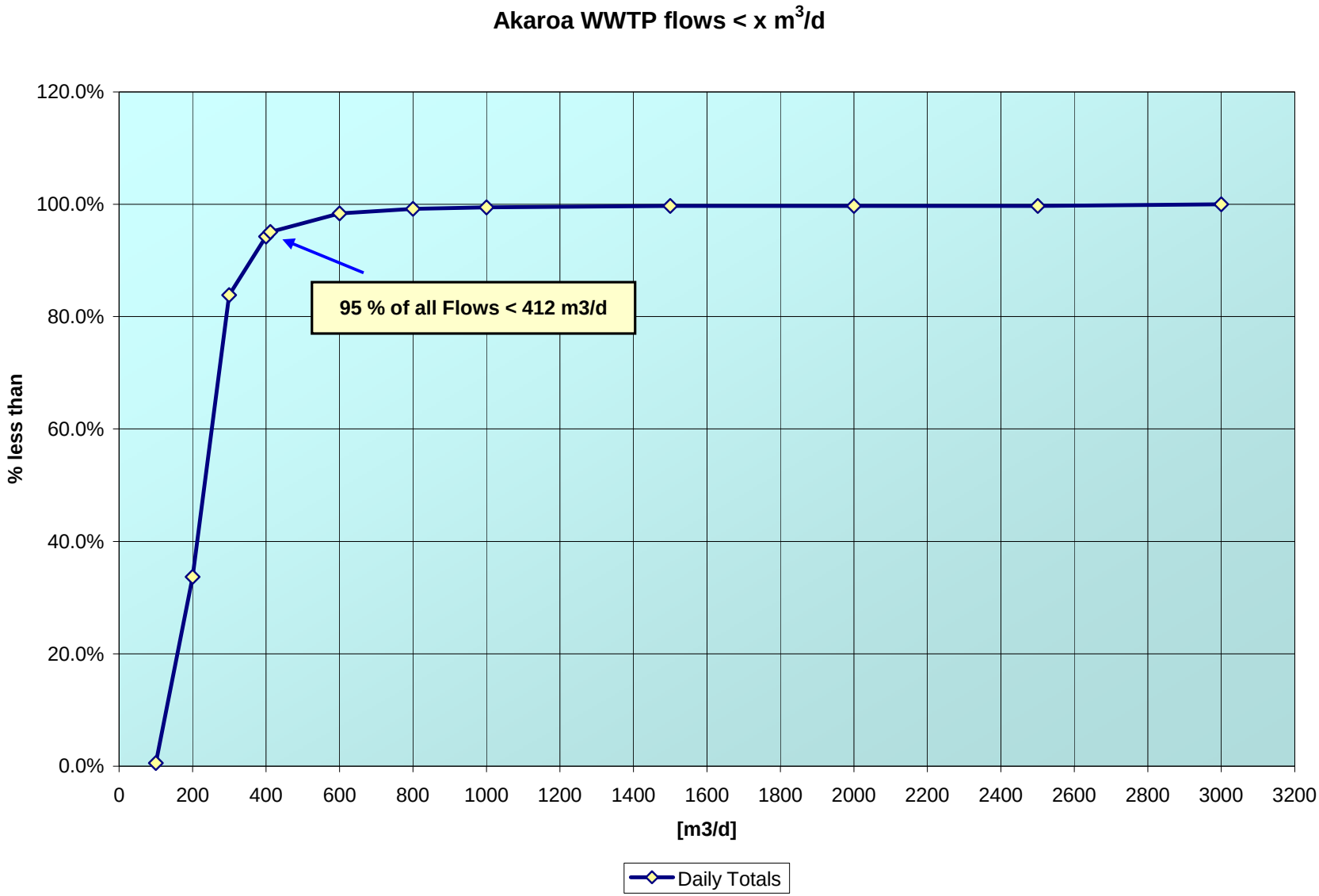
Max:	750	m^3/d	Dry weather	Max:	3,000	m^3/d	Wet weather

Date	Flow [m^3/d]	Date	Flow [m^3/d]	Date	Flow [m^3/d]	Date	Flow [m^3/d]
1/07/2010	411	1/10/2010	216	1/01/2011	561	1/04/2011	207
2/07/2010	217	2/10/2010	204	2/01/2011	416	2/04/2011	186
3/07/2010	266	3/10/2010	260	3/01/2011	363	3/04/2011	251
4/07/2010	215	4/10/2010	255	4/01/2011	570	4/04/2011	247
5/07/2010	227	5/10/2010	215	5/01/2011	306	5/04/2011	386
6/07/2010	195	6/10/2010	143	6/01/2011	473	6/04/2011	242
7/07/2010	181	7/10/2010	221	7/01/2011	251	7/04/2011	317
8/07/2010	190	8/10/2010	195	8/01/2011	384	8/04/2011	259
9/07/2010	238	9/10/2010	234	9/01/2011	321	9/04/2011	246
10/07/2010	245	10/10/2010	240	10/01/2011	351	10/04/2011	251
11/07/2010	234	11/10/2010	354	11/01/2011	313	11/04/2011	240
12/07/2010	201	12/10/2010	272	12/01/2011	314	12/04/2011	205
13/07/2010	179	13/10/2010	172	13/01/2011	320	13/04/2011	135
14/07/2010	174	14/10/2010	209	14/01/2011	305	14/04/2011	211
15/07/2010	161	15/10/2010	203	15/01/2011	384	15/04/2011	211
16/07/2010	187	16/10/2010	178	16/01/2011	399	16/04/2011	198
17/07/2010	307	17/10/2010	221	17/01/2011	191	17/04/2011	213
18/07/2010	250	18/10/2010	253	18/01/2011	272	18/04/2011	432
19/07/2010	194	19/10/2010	214	19/01/2011	373	19/04/2011	327
20/07/2010	197	20/10/2010	211	20/01/2011	310	20/04/2011	331
21/07/2010	158	21/10/2010	198	21/01/2011	265	21/04/2011	166
22/07/2010	175	22/10/2010	198	22/01/2011	274	22/04/2011	310
23/07/2010	513	23/10/2010	211	23/01/2011	301	23/04/2011	260
24/07/2010	416	24/10/2010	261	24/01/2011	281	24/04/2011	494
25/07/2010	333	25/10/2010	295	25/01/2011	279	25/04/2011	365
26/07/2010	300	26/10/2010	274	26/01/2011	230	26/04/2011	206
27/07/2010	222	27/10/2010	218	27/01/2011	256	27/04/2011	261
28/07/2010	245	28/10/2010	133	28/01/2011	199	28/04/2011	212
29/07/2010	154	29/10/2010	195	29/01/2011	383	29/04/2011	133
30/07/2010	161	30/10/2010	187	30/01/2011	275	30/04/2011	226
31/07/2010	141	31/10/2010	184	31/01/2011	199	1/05/2011	198
1/08/2010	166	1/11/2010	225	1/02/2011	239	2/05/2011	197
2/08/2010	174	2/11/2010	171	2/02/2011	235	3/05/2011	229
3/08/2010	195	3/11/2010	205	3/02/2011	233	4/05/2011	177
4/08/2010	182	4/11/2010	208	4/02/2011	188	5/05/2011	196
5/08/2010	164	5/11/2010	186	5/02/2011	265	6/05/2011	166
6/08/2010	152	6/11/2010	615	6/02/2011	249	7/05/2011	202
7/08/2010	113	7/11/2010	273	7/02/2011	279	8/05/2011	316
8/08/2010	651	8/11/2010	255	8/02/2011	223	9/05/2011	196
9/08/2010	2,866	9/11/2010	210	9/02/2011	244	10/05/2011	174
10/08/2010	1,381	10/11/2010	226	10/02/2011	231	11/05/2011	149
11/08/2010	608	11/11/2010	202	11/02/2011	242	12/05/2011	115
12/08/2010	826	12/11/2010	280	12/02/2011	275	13/05/2011	174
13/08/2010	130	13/11/2010	210	13/02/2011	242	14/05/2011	171
14/08/2010	103	14/11/2010	340	14/02/2011	229	15/05/2011	223
15/08/2010	304	15/11/2010	300	15/02/2011	220	16/05/2011	240
16/08/2010	258	16/11/2010	214	16/02/2011	213	17/05/2011	198
17/08/2010	209	17/11/2010	210	17/02/2011	220	18/05/2011	264
18/08/2010	288	18/11/2010	193	18/02/2011	183	19/05/2011	215
19/08/2010	210	19/11/2010	204	19/02/2011	240	20/05/2011	117
20/08/2010	528	20/11/2010	212	20/02/2011	249	21/05/2011	256
21/08/2010	335	21/11/2010	230	21/02/2011	205	22/05/2011	143
22/08/2010	292	22/11/2010	316	22/02/2011	251	23/05/2011	254
23/08/2010	265	23/11/2010	191	23/02/2011	213	24/05/2011	162
24/08/2010	236	24/11/2010	193	24/02/2011	189	25/05/2011	115
25/08/2010	181	25/11/2010	122	25/02/2011	238	26/05/2011	190
26/08/2010	219	26/11/2010	204	26/02/2011	334	27/05/2011	254
27/08/2010	240	27/11/2010	223	27/02/2011	224	28/05/2011	176
28/08/2010	157	28/11/2010	215	28/02/2011	323	29/05/2011	176
29/08/2010	186	29/11/2010	224	1/03/2011	242	30/05/2011	111
30/08/2010	396	30/11/2010	289	2/03/2011	172	31/05/2011	82
31/08/2010	218	1/12/2010	182	3/03/2011	223	1/06/2011	156
1/09/2010	312	2/12/2010	200	4/03/2011	233	2/06/2011	186
2/09/2010	241	3/12/2010	204	5/03/2011	214	3/06/2011	143
3/09/2010	263	4/12/2010	182	6/03/2011	328	4/06/2011	262

Attachment 6: Flows, Akaroa, Chart



Attachment 7: Flows '% less than', Akaroa, Chart



Attachment 8: Rainfall data Akaroa

Station information:							
Name	Agent Number	Network Number	Latitude (dec.deg)	Longitude (dec.deg)	Height (m)	Posn_Precision	Observing Authority
Akaroa Ews	36593	H32895	-43.809	172.966	45	G	Niwa
Note: Position precision types are: "W" = based on whole minutes, "T" = estimated to tenth minute,							
G = derived from gridref , "E" = error cases derived from gridref,							
H = based on GPS readings (NZGD49), "D" = by definition i.e. grid points.							
Rain: Daily							
Station	Date(NZST)	Amount(mm)	SofG	Deficit(mm)	Runoff(mm)	Period(Hrs)	Freq
36593	1/08/2010 09:00	0	-	3	0	24	D
36593	2/08/2010 09:00	0	-	4	0	24	D
36593	3/08/2010 09:00	6.6	-	0	1.7	24	D
36593	4/08/2010 09:00	0	-	1	0	24	D
36593	5/08/2010 09:00	2.4	-	0	0.5	24	D
36593	6/08/2010 09:00	0	-	1	0	24	D
36593	7/08/2010 09:00	0.4	-	1.5	0	24	D
36593	8/08/2010 09:00	76.6	-	0	74.1	24	D
36593	9/08/2010 09:00	110.6	-	0	109.6	24	D
36593	10/08/2010 09:00	3.2	-	0	2.2	24	D
36593	11/08/2010 09:00	0	-	1	0	24	D
36593	12/08/2010 09:00	0	-	1.9	0	24	D
36593	13/08/2010 09:00	0	-	2.9	0	24	D
UserName is = ecoconsult							
Total number of rows output = 13							
Number of rows remaining in subscription = 1999349							
Copyright NIWA 2011 Subject to NIWA's Terms and Conditions							
See: http://cliflo.niwa.co.nz/pls/niwp/doc/terms.html							
Comments to: cliflo@niwa.co.nz							

Attachment 8: Rainfall data Akaroa, closing of station 4951

Station Details for Agent: 4951

Check Data Availability | Sensor and Site History

Parameter	Indicator
Agent Number	4951
Network Number	H32893
Name	Akaroa,Rue Lavaud
Lat (dec deg, S of equator is neg)	-43.80418
Longitude (dec deg, E of Greenwich is pos e.g. NZ)	172.96997
Position Precision	H
Note: Position precision types are: "W" = based on whole minutes, "T" = estimated to tenth minute, "G" = derived from gridref, "E" = error cases derived from gridref, "H" = based on GPS readings (NZGD49), "D" = by definition i.e. grid points.	
Height above MSL in metres	4m
Grid Reference (NZ Metric Map Series)	N36076117
Start Date	30-Nov-1977
End Date	01-Jan-2008
Closed Indicator (Closed = 1)	1
Sity Station Type	1: Climat (Standard)
Synoptic Number (World Met. Organisation Number)	-
WRA No	328903
Observing Authority	N/A

Current Indicators

Note: the following indicators show the current status for open stations.
Closed stations may show no recorded parameters.

Parameter	Indicator	Parameter	Indicator
Rain	X	Evaporation	-
Surface Wind Dirn	-	Surface Wind Speed	-
Max Gust Dirn	-	Max Gust Speed	-
Solar Radiation	-	Sunshine Hours	-
10cm Earth Temp	-	20cm Earth Temp	-
30cm Earth Temp	-	100cm Earth Temp	-
Dry Bulb Temp	X	Wet Bulb Temp	X
Grass Min Temp	X	Weather Phenomonen	-
Max Temp	X	Min Temp	X
Visibility	-	Cloud Amount	-
MSL Pressure	-		
Wind Run	-		
Time Offset (from UTC)	12	dayl_daylight_area	02

Sensor and Site History | Check Data Availability
Find stations USING datatypes | Find stations IGNORING datatypes
Database Query Form | CliFlo Home