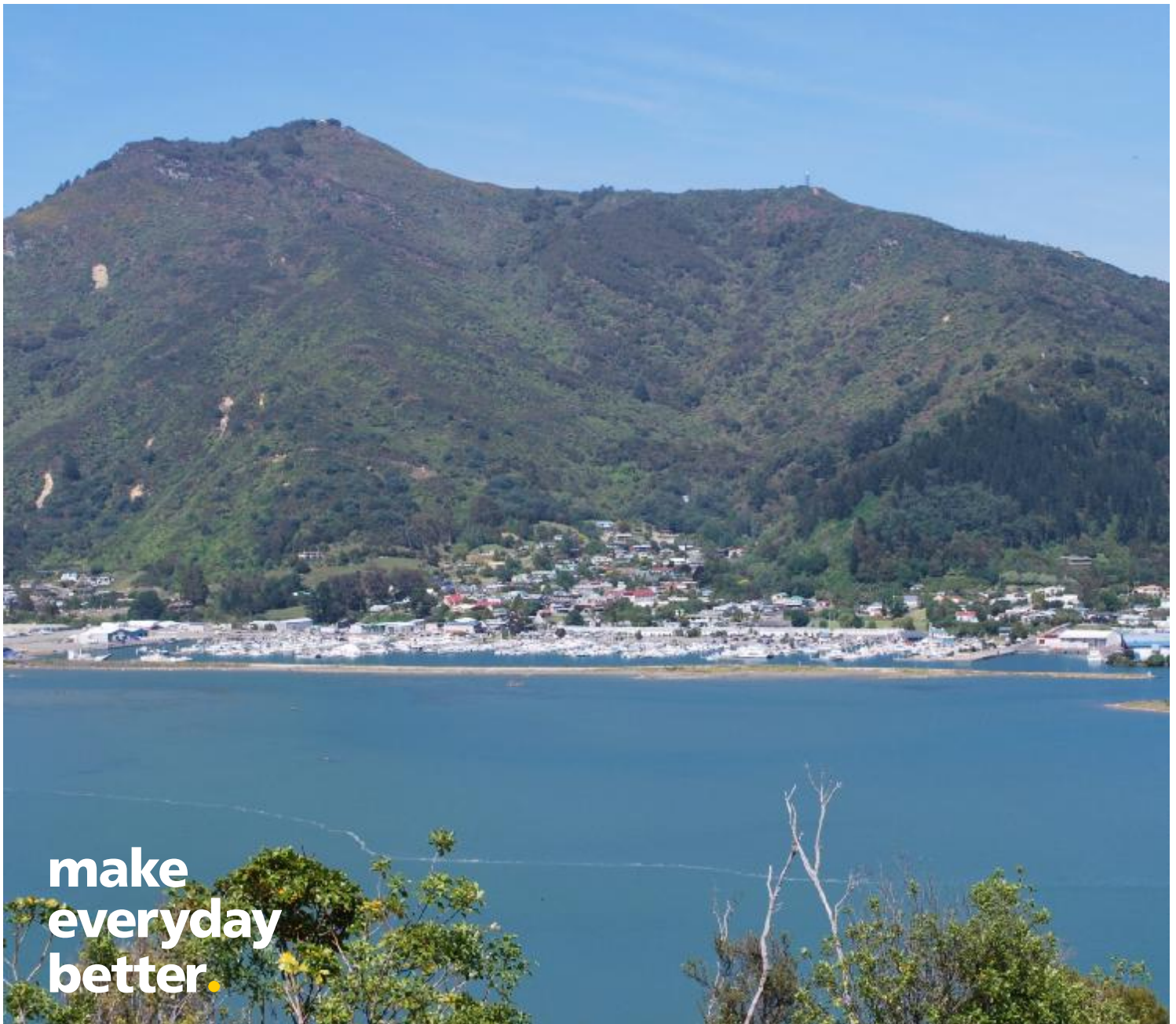


# Havelock Sewage Treatment Plant Consent Compliance Report (1 February - 31 May 2019)

Consent U170942

Prepared for Marlborough District Council  
Prepared by Beca Limited

20 December 2019



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## Appendices

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**Appendix A – Consent U170942**

**Appendix B – Havelock Sewage Treatment Ponds and Sampling Locations**

**Appendix C – Weekly Kaituna River Monitoring Data**

**Appendix D – Cawthron Report**

## Revision History

Revision N°	Prepared By	Description	Date
A	Kevin Joeng	Draft for client review	4/12/2019
B	Kevin Joeng	For final issue	20/12/2019

## Document Acceptance

Action	Name	Signed	Date
Prepared by	Kevin Joeng		20/12/2019
Reviewed by	Sarah Burgess		20/12/2019
Approved by	Graeme Jenner		20/12/2019
on behalf of	Beca Limited		

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## Consent Compliance Summary

Condition	Requirement	Observation	Compliance
<b>Consent U170942.1 (Discharge to Water)</b>			
1 & 2	Discharge rate as measured by inlet to ponds must not exceed 2,400 m <sup>3</sup> /day	90 <sup>th</sup> percentile flow of 403 m <sup>3</sup> /day and maximum flow of 1,304 m <sup>3</sup> /day.	Met
4	Discharge of treated effluent must not create any effects 50m outside of the mixing zone.	High effluent quality and available dilution means that any effects outside of the mixing zone are unlikely.	Met
5	Dissolved oxygen concentrations must be taken at the outlet of the pond weekly.	Average duration between DO measurements throughout the monitoring period is 6.5 days.	Met
6	Single grab sample must be taken from pond outlet in June or July and analysed for the required parameters.	Grab sample obtained on 5 July 2018 and tested for all parameters.	Met
7	Single grab sample must be taken from pond outlet in January or February and analysed for the required parameters.	Grab sample obtained on 15 January 2019, and tested for all of the required parameters.	Met
8	Monthly grab samples to be obtained from pond outlet from November to April inclusive, and tested for the required parameters.	All samples taken for monitoring period, and analysed for all required parameters,	Met
9	24-hour composite influent sample to be obtained in January of February and tested for the required parameters.	Composite influent samples obtained on 15 January 2019. Tested for all the required parameters except for conductivity.	Partially met
10 a)	Monthly upstream and downstream sampling on the Kaituna River to be conducted in December, January and February. Samples to be tested for the required parameters.	Consent granted in February 2019, no samples were tested for the required parameters in February. New sampling location constructed in March 2019 following investigations by Cawthron in 2018.	Not met
10 b)	Monthly upstream and downstream sampling on the Kaituna River to be conducted in June, July and August. Samples to be tested for the required parameters.	Outside of truncated monitoring period considered in this report.	Not required
10 c)	Weekly upstream and downstream sampling on the Kaituna River to be conducted from November to April inclusive. Samples to be tested for the required parameters.	All weekly samples obtained, some sample testing was incomplete. Comparison of D/S and U/S data showed no effect of effluent on receiving water. Microbiological concentrations in U/S samples were higher than those taken from D/S locations.	Partially met
11 & 12	Annual reporting requirement.	Fulfilled by submission of report	Met
<b>Consent U170942.2 (Discharge to Air)</b>			
1 & 2	No offensive or objectional odours detectable outside of STP site boundary.	No complaints relating to odour.	Met

# 1 Introduction

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The purpose of this report is to summarise the performance of the Havelock Sewage Treatment Plant (STP), for the period 1 February 2019 to 31 May 2019, against the requirements of Consent U170942. The previous discharge consent (U070012) expired on 31 May 2018, but the STP continued to operate under the terms of this consent until Consent U170942 was granted on 1 February 2019 for a term of 5 years. This period will allow MDC to implement plans to relocate the STP. A copy of Consent U170942 is attached in **Appendix A**.

The Havelock STP is operated by Marlborough District Council (MDC) and is located on the true left bank of the Kaituna River, just upstream of the road bridge on the Mahakipawa/Queen Charlotte Drive, Havelock. The STP was constructed in 1984 and originally consisted of a single pond (Pond 1) discharging to the Kaituna River. A second pond was constructed in 1999 to allow desludging of Pond 1 in the summer of 1999/2000.

The two ponds operate in series with continuous discharge of treated effluent to a tidal portion of the Kaituna River. An upgrade in 2008 consisted of adding a bund to Pond 2 to create two smaller ponds (Ponds 2 and 3) for improving the disinfection of the water (i.e. increased removal of potential pathogens), as well as further reduction of the biochemical oxygen demand (BOD) and suspended solids concentrations in the discharged effluent.

In June 2010, mechanical aeration was added to Pond 1 to increase the BOD loading capacity, for treating increased loads from local industries. An in-bank rock diffuser was also constructed to allow for more efficient disposal of treated effluent to the river.

Since the overloading incident in 2010, some reduction in loads from local industries have been made through improved on-site treatment, but trade waste loads still remain significant and local industries are encouraged to reduce the discharge of high strength influent to the wastewater network. Mechanical aeration has been used regularly on Pond 1 over the past year.

A map showing the layout and location of the ponds, as well as the treated effluent and river sampling locations, is included in **Appendix B**.

The old and new consents have a number of common conditions, but some additional monitoring was introduced under the new consent.

Only those consent conditions that have numerical or qualitative monitoring requirements are assessed. For clarity, consent conditions are quoted in *italics*.

## 2 Consent U170942.1

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### 2.1 Consent Purpose

Consent U170942.1 allows for the discharge of up to 2,400 cubic metres per day of treated municipal wastewater to the Kaituna River through an existing outfall.

### 2.2 Condition 1 & 2 – Discharge Quantity

#### 2.2.1 Condition 1

*The maximum daily discharge rate as measured by the inflow to the ponds shall not be more than 2400 cubic metres per day.*

#### 2.2.2 Condition 2

*The consent holder shall record daily flows. The results shall be provided to the Compliance Manager, Marlborough District Council, as part of the reporting required under Condition 12 or on request.*

A flow meter is installed at the terminal pump station, fulfilling Condition 1. No flow meter is currently installed at the outlet of the ponds.

A 90<sup>th</sup> percentile flow of 398 m<sup>3</sup>/d and a maximum flow of 862 m<sup>3</sup>/d was recorded in the 2018/2019 monitoring period. This is significantly lower than the consent limit of 2,400 m<sup>3</sup>/d, so Condition 2 has been met.

The maximum daily discharge volume of 2,400 m<sup>3</sup>/d was selected for the consent, as this is the capacity of the two pumps at the terminal pump station and allows for a significant component of wet weather inflow and infiltration.

### 2.3 Condition 4 – Discharge Effects

*The discharge of treated wastewater shall no cause any of the following effects outside of the 50 metre mixing zone:*

- a) *A change in the natural temperature of the receiving water of more than 3 degrees Celsius.*
- b) *There shall be no production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials.*
- c) *A concentration of dissolved oxygen in the receiving water of below 80 percent of the saturation concentration provided upstream dissolved oxygen is no less than 85 percent of the saturation concentration.*

No specific monitoring has been carried out at the outfall in the 2018/2019 monitoring period, but it is unlikely that effects a) to c) would be observed at the outfall, due to the high quality of effluent (see Section 2.5) produced at the Havelock STP and the significant dilution factor within the Kaituna River. No complaints were received from any effects observed that are attributable to the discharge. It can therefore be assumed that Condition 4 is fulfilled.

### 2.4 Condition 5 – Dissolved Oxygen

*The consent holder shall take weekly Dissolved Oxygen samples at the outlet of the tertiary pond.*

17 dissolved oxygen measurements were taken at the outlet of the STP in the 1 February 2019 to 31 May 2019 monitoring period. Although there were periods of time where a DO measurement was not taken for 15



days (21 March 2019 – 5 April 2019) the average duration between readings was 7 days. This fulfils Condition 5's requirements.

There is a large spread in DO concentrations, as they vary between 0 – 14 g/m<sup>3</sup> (see Figure 2-1). As there is no stipulated time frame for DO measurement, it is possible that the irregular measurement times would have contributed to this variation. DO usually peaks between 11am – 2pm due to high algal activity (from sunlight) and drops in the evenings and mornings due to lower light intensity and temperatures. The median DO at the effluent for this monitoring period is 6.69 g/m<sup>3</sup>. The consent does not place minimum limits on DO concentrations in the tertiary pond outlet.

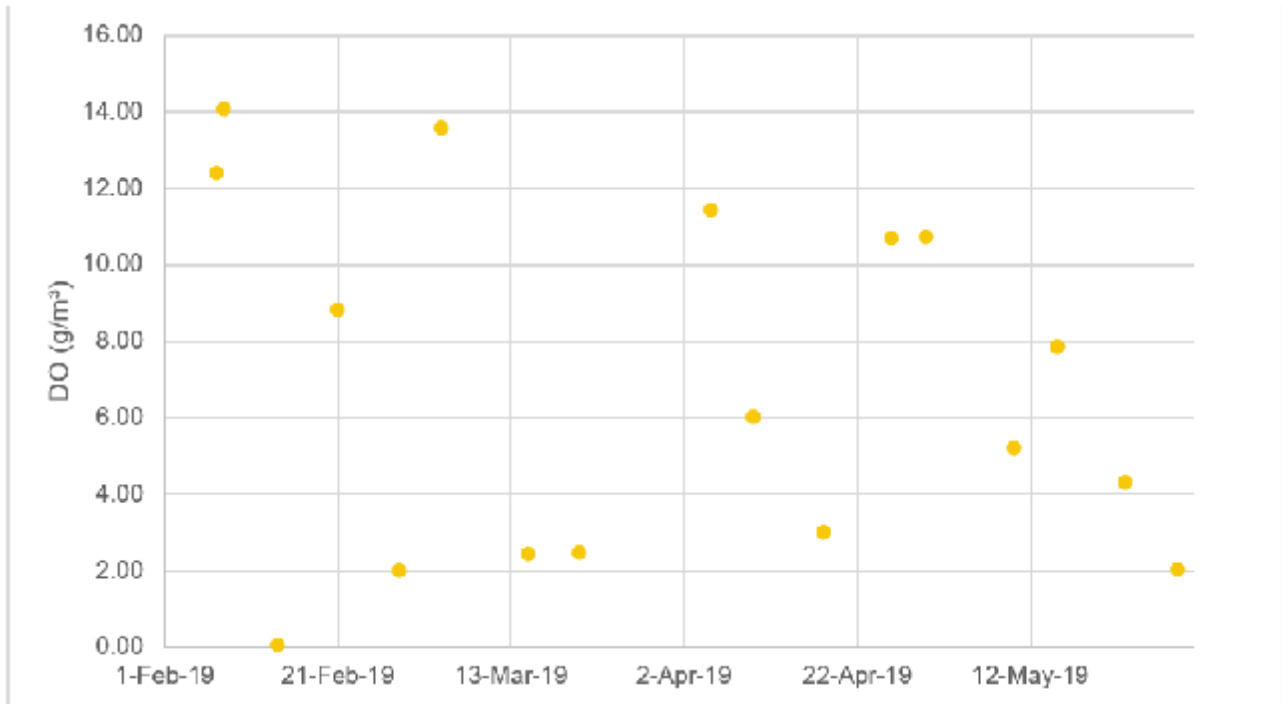


Figure 2-1 Dissolved Oxygen Concentrations at Outlet of Havelock STP

## 2.5 Conditions 6 to 8 – Discharge Quality

### 2.5.1 Condition 6

The consent holder shall take one grab sample of the wastewater from the pond outlet once yearly in June or July and analyse the sample for the following:

- a) Chemical oxygen demand
- b) Biochemical oxygen demand (five day)
- c) Biochemical oxygen demand soluble (five day)
- d) Total suspended solids
- e) Conductivity
- f) Total nitrogen
- g) Nitrite nitrogen
- h) Nitrate nitrogen
- i) Total Kjeldahl nitrogen

- j) Ammonia-nitrogen
- k) Total phosphorous
- l) Dissolved reactive phosphorous
- m) Faecal coliforms
- n) Dissolved oxygen
- o) Temperature
- p) pH

Although this was outside of the truncated monitoring period for the new consent, a grab sample was taken on 5 July 2018 from the pond outlet and was tested for all the required analyses (see Table 2-1). Effluent pH, dissolved oxygen and temperature are routinely measured by the plant operator, and the average of the July 2018 measurements of these parameters are calculated below (Table 2-2).

Table 2-1 Condition 6 – Results of Effluent Sample taken on 5 July 2018

Parameter	Units	Result
Ammonia - Nitrogen	g/m <sup>3</sup>	30.00
C-BOD-5	g O <sub>2</sub> /m <sup>3</sup>	12.00
C-BOD-5 - Dissolved	g O <sub>2</sub> /m <sup>3</sup>	4.00
COD	g O <sub>2</sub> /m <sup>3</sup>	157.00
Conductivity (Field)	uS/cm	1228.00
Dissolved Oxygen Concentration	g/m <sup>3</sup>	1.76
Dissolved Reactive Phosphorus	g/m <sup>3</sup>	3.50
E. coli	number/100ml	4000.00
Enterococci	number/100ml	2050.00
Faecal Coliforms	cfu/100mL	7000.00
Nitrate - Nitrogen	g/m <sup>3</sup>	0.08
Nitrite - Nitrogen	g/m <sup>3</sup>	0.04
Nitrite-Nitrate Nitrogen	g/m <sup>3</sup>	0.12
Suspended Solids - Total	g/m <sup>3</sup>	23.00
Total Kjeldahl Nitrogen	g/m <sup>3</sup>	42.00
Total Nitrogen	g/m <sup>3</sup>	42.00
Total Phosphorus	g/m <sup>3</sup>	4.70
Water Temperature (Field)	°C	10.80
pH (Field)		7.38

Table 2-2 Average of July 2018 pond effluent measurements

Parameter	Value
pH (field)	7.34
Dissolved oxygen (mg/L)	5.68
Water Temperature (field) (°C)	9.44



### 2.5.2 Condition 7

The consent holder shall take one grab sample of the wastewater from the pond outlet once yearly in January or February and analyse the sample for the following:

- a) Chemical oxygen demand
- b) Total nitrogen
- c) Nitrite nitrogen
- d) Nitrate nitrogen
- e) Total Kjeldahl nitrogen
- f) Ammonia-nitrogen
- g) Total phosphorous
- h) Dissolved reactive phosphorous

On 15 January 2019, a grab sample was taken from the pond outlet, and it was analysed for all the required parameters. The results are shown in Table 2-3. Condition 7 has therefore, been met.

Table 2-3 Condition 7 – Result of grab sample taken on 15 January 2019

Parameter	Units	Result
COD	g O <sub>2</sub> /m <sup>3</sup>	250
Total Nitrogen	g/m <sup>3</sup>	52
Nitrite Nitrogen	g/m <sup>3</sup>	0.007
Nitrate Nitrogen	g/m <sup>3</sup>	0.002
Total Kjeldahl Nitrogen	g/m <sup>3</sup>	52
Ammonia-nitrogen	g/m <sup>3</sup>	38
Total Phosphorous	g/m <sup>3</sup>	8.1
Dissolved reactive phosphorous	g/m <sup>3</sup>	5.5

### 2.5.3 Condition 8

The consent holder shall take one grab sample of the wastewater from the pond outlet once monthly in November to April inclusive:

- a) Biochemical oxygen demand (five day)
- b) Biochemical oxygen demand soluble (five day)
- c) Total suspended solids
- d) Conductivity
- e) Enterococci
- f) Faecal coliforms
- g) pH
- h) Dissolved oxygen
- i) Temperature

Due to the truncated monitoring period for the new consent in 2019, only February, March and April grab samples are required to be collected. These were all obtained during this monitoring period. See Table 2-4 for the full results of each grab sample.

Table 2-4 Condition 8 – Results of effluent grab samples obtained for monitoring period

Parameter	Units	8-Feb-19	6-Mar-19	24-Apr-19
C-BOD-5	g O2/m3	27	84	27
C-BOD-5 - Dissolved	g O2/m3	8	13	6
Total suspended solids	g/m3	111	360	172
Conductivity	uS/cm	304	328	213
Enterococci	number/100ml	4,100	24,200	1,236
Faecal coliforms	number/100ml	42,000	16,000	9,200
pH		7.14	7.60	7.80
Dissolved oxygen	g/m3	14.09	31.3	4.65
Temperature	°C	24.2	20.3	16.5

Medians were calculated using the available data for this monitoring period and compared with data from previous monitoring periods to show long term trends in the effluent quality (Table 2-5). Note that the medians for this year includes the samples taken outside of this monitoring period (December 2018 and January 2019).

Table 2-5 Median Pond Effluent Quality Between the Months of November and April Inclusive (2013-2019)

Parameter	Nov 2013 to April 2014 (six samples)	Nov 2014 to April 2015 (six samples)	Nov 2015 to April 2016 (six samples)	Nov 2016 to April 2017 (six samples)	Nov 2017 to April 2018 (six samples)	Nov 2018 to April 2019 (six samples)
C-BOD-5 (g O2/m <sup>3</sup> )	52	46	57	50.5	45 <sup>1</sup>	26.5
C-BOD-5 – Dissolved (g O2/m <sup>3</sup> )	6	11	17.5	21.5	7.0 <sup>2</sup>	9.5
Conductivity (uS/cm)	213	271	258.5	190.7	180.9 <sup>3</sup>	304 <sup>1</sup>
Dissolved Oxygen Concentration (mg/L)	10 <sup>5</sup>	4.84	11.62	6.8	6.68	9.37
Enterococci (number/100mL)	243	1,378	3,130	5,302	1,962	2673
Faecal Coliforms (cfu/100mL)	8,950	25,500	92,000	80,000	71,000	16,000 <sup>1</sup>
Suspended Solids – Total (mg/L)	116	67	108.5	101	70.5	90
Water Temperature (°C)	21	18.1	19.4	20.3	18.05	21.9
pH	8	7.9	8.2	7.8	7.6	7.5

<sup>1</sup> Only five samples in this average due to one measurement not being taken.

<sup>2</sup> Only four samples in this average due to two measurements not being taken.

<sup>3</sup> Value was initially recorded as 1,809 mS/m however, MDC has confirmed this was an error.

<sup>5</sup> The June 2013 to May 2014 report used only three samples in this average because the other four were considered to be above the maximum dissolved oxygen concentrations possible at the water sample

Condition 8 does not set effluent quality limits. However, a comparison of the results over the last six years shows that BOD and TSS concentrations are consistent with expected performance of similar STPs with a three-pond layout. It should be noted that suspended solids concentration has increased in this year's results, though it is not the highest over the past six years. BOD has seen a significant reduction in the 2018/2019 monitoring period. This could be due to increased mechanical aeration or decreased industrial loads. Dissolved oxygen concentration remains variable over the years and is at its lowest concentration this year (although this is likely due to the limited number of samples obtained). pH is consistent with results from previous years. Enterococci and faecal coliforms are also within a similar range to previous years' data.

## 2.6 Condition 9 – Influent Analysis

*The consent holder shall take a 24 hour composite sample of sewage influent once yearly in January or February and analyse the sample for the following:*

- a) *Chemical oxygen demand*
- b) *Biochemical oxygen demand (five day)*
- c) *Total suspended solids*
- d) *Conductivity*
- e) *Total nitrogen*
- f) *Ammonia-nitrogen*
- g) *Nitrate nitrogen*
- h) *Nitrite nitrogen*
- i) *Total Kjeldahl nitrogen*
- j) *Total phosphorous*
- k) *Dissolved reactive phosphorous*
- l) *Faecal coliforms*
- m) *Enterococci*
- n) *pH*

On 15 January 2019, an influent 24-hour composite sample was obtained, and analysed for all the required parameters except total C-BOD<sub>5</sub> (only dissolved C-BOD<sub>5</sub> was available) and conductivity.

Note that the January 2019 sample was taken just before the monitoring period (1 February 2019 – 31 May 2019), but was included for completeness.

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temperature. Reference has since been found to super-saturated water conditions in oxidations ponds and in future results will be included from all samples.

Table 2-6 Condition 9 - 24 hr Composite Influent Sample

Parameter	Units	15 Jan 2019
Chemical oxygen demand	g O <sub>2</sub> /m <sup>3</sup>	760
C-BOD-5	g O <sub>2</sub> /m <sup>3</sup>	-
C-BOD-5 (dissolved)	g O <sub>2</sub> /m <sup>3</sup>	300
Total Suspended Solids	g/m <sup>3</sup>	157
Conductivity	uS/cm	-
Total nitrogen	g/m <sup>3</sup>	73
Ammonia Nitrogen	g/m <sup>3</sup>	45
Nitrate nitrogen	g/m <sup>3</sup>	<0.02
Nitrite nitrogen	g/m <sup>3</sup>	<0.02
Total Kjeldahl nitrogen	g/m <sup>3</sup>	73
Total phosphorus	g/m <sup>3</sup>	8.1
Dissolved reactive phosphorous	g/m <sup>3</sup>	5.7
Faecal coliforms	number/100mL	>160,000
Enterococci	number/100mL	>24,200
pH	-	6.7

The COD:BOD ratio of the wastewater cannot be established for this sample, but the COD concentration is within the range of typical domestic effluent, although on the high end of the expected range, according to Metcalf & Eddy (see Table 2-7). As mentioned earlier, local industries are being encouraged to reduce wastewater loads to the STP due to a previous overloading incident. To date, the STP has been coping with the influent BOD loads as reflected in the effluent monitoring data.

Table 2-7 Typical Composition of Untreated Domestic Wastewater (Metcalf & Eddy 4<sup>th</sup> Ed, 2004)

Parameter	Low Strength	Medium Strength	High Strength
Chemical Oxygen Demand (mg/L)	250	430	800
Biochemical Oxygen Demand (mg/L)	110	190	350
TSS (mg/L)	120	210	400

## 2.7 Condition 10 – Receiving Environment Monitoring

The consent holder shall carry out a programme of receiving environment monitoring for the duration of the consent as follows:

- a) Water samples (grab samples) shall be taken from the Kaituna River each summer; once in December, once in January and once in February. Samples shall be taken approximately 350 metres upstream of the discharge and 50 metres downstream of the discharge. Samples shall be taken between two and four hours after high tide and analysed for the following:
  - i. Total biochemical oxygen demand (five day)
  - ii. Total suspended solids
  - iii. Total nitrogen
  - iv. Ammoniacal nitrogen
  - v. Nitrate nitrogen
  - vi. Nitrite nitrogen
  - vii. Total Kjeldahl nitrogen

- viii. *Total phosphorous*
  - ix. *Dissolved reactive phosphorous*
- b) *Water samples (grab samples) shall be taken from the Kaituna River each winter; once in June, once in July and once in August. Samples shall be taken approximately 350 metres upstream of the discharge and 50 metres downstream of the discharge. Samples shall be taken between two and four hours after high tide and analysed for the following:*
- i. *Total biochemical oxygen demand (five day)*
  - ii. *Total suspended solids*
  - iii. *Total nitrogen*
  - iv. *Ammoniacal nitrogen*
  - v. *Nitrate nitrogen*
  - vi. *Nitrite nitrogen*
  - vii. *Total Kjeldahl nitrogen*
  - viii. *Total phosphorous*
  - ix. *Dissolved reactive phosphorous*
- c) *Water samples (grab samples) shall be taken from the Kaituna River weekly from November to April inclusive. Samples shall be taken approximately 350 metres upstream of the discharge, 50 metres downstream of the discharge and near the Mahakipawa Road bridge. Samples shall be taken between two and four hours after high tide and analysed for the following:*
- i. *Faecal coliforms*
  - ii. *Enterococci*
  - iii. *Dissolved oxygen*
  - iv. *pH*
  - v. *Temperature*
  - vi. *Conductivity*

### **2.7.1 Condition 10 a) Summer Sampling**

Grab samples were collected throughout the summer, but analysis for the parameters required under Condition 10 a) was not carried out. While the location of the upstream sampling point was not in line with the new consent requirements, a new sampling point has now been constructed (installed March 2019). For these reasons, Condition 10 a) has not been met.

### **2.7.2 Condition 10 b) Winter Sampling**

Winter sampling is outside of the truncated monitoring period for this report, so it is not a requirement for this report. However, in the previous monitoring period, upstream and downstream grab sampling on the Kaituna River was carried out on all months except June 2018. All samples were analysed for total phosphorus, total nitrogen, nitrite nitrogen and ammonia nitrogen. Some samples were missing results (up to 4 out of 10) for BOD<sub>5</sub>, dissolved reactive phosphorus, nitrate nitrogen, suspended solids and total Kjeldahl nitrogen.

### 2.7.3 Condition 10 c) Weekly Sampling

As the months of November 2018 to January 2019 are outside of this monitoring period, only the months of February, March and April 2019 require inclusion in this report. Weekly sampling was carried out 50m downstream of the Kaituna River from 7 February 2019 to 30 April 2019, at an average frequency of a sample every 7.5 days. At the upstream location, samples were taken at the same frequency. Note that up until the 5 March 2019 sample, samples were taken from the old upstream location, 50m upstream of the outfall instead of 350m, as required by the new consent. However, some samples were not analysed for all the required parameters. There is a significant gap in the data for conductivity, dissolved oxygen and E. Coli concentrations in the upstream and downstream samples between 5 March 2019 and 30 April 2019, (taken just after the construction of the new sampling point). All results from the weekly sampling are appended in **Appendix C**.

Figures 2-2 to 2-4 show a summary of the monitoring results. Median microbiological concentrations (shown in Figure 2-2) are higher in the upstream sampling site compared with the downstream site for all species monitored. Discussion around the possible reasons for this are included in Section 2.7.4.

From Figure 2-4, it can be seen that dissolved oxygen, temperature and pH measurements collected at the downstream location is similar to the upstream location. Conductivity readings (Figure 2-4) do not show a significant difference between upstream and downstream samples.

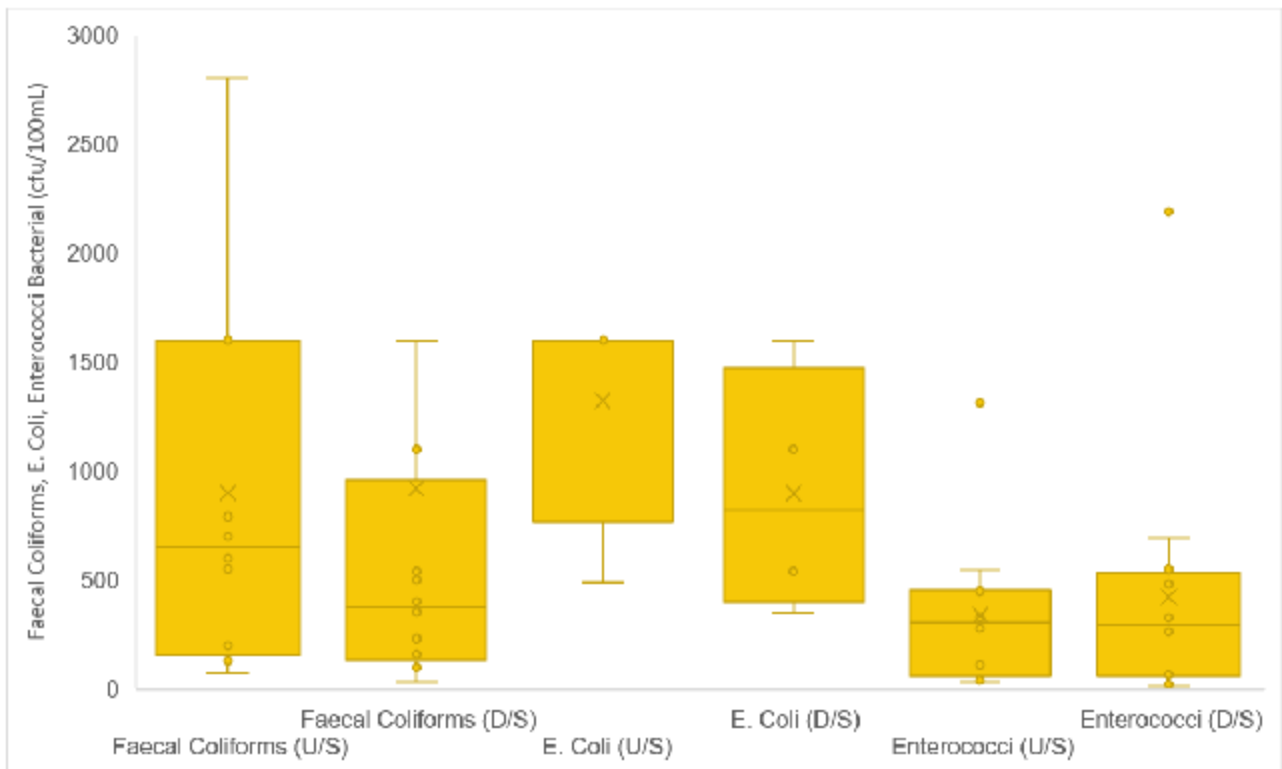


Figure 2-2 Microbiological concentrations measured in Kaituna River for period November 2018 to April 2019

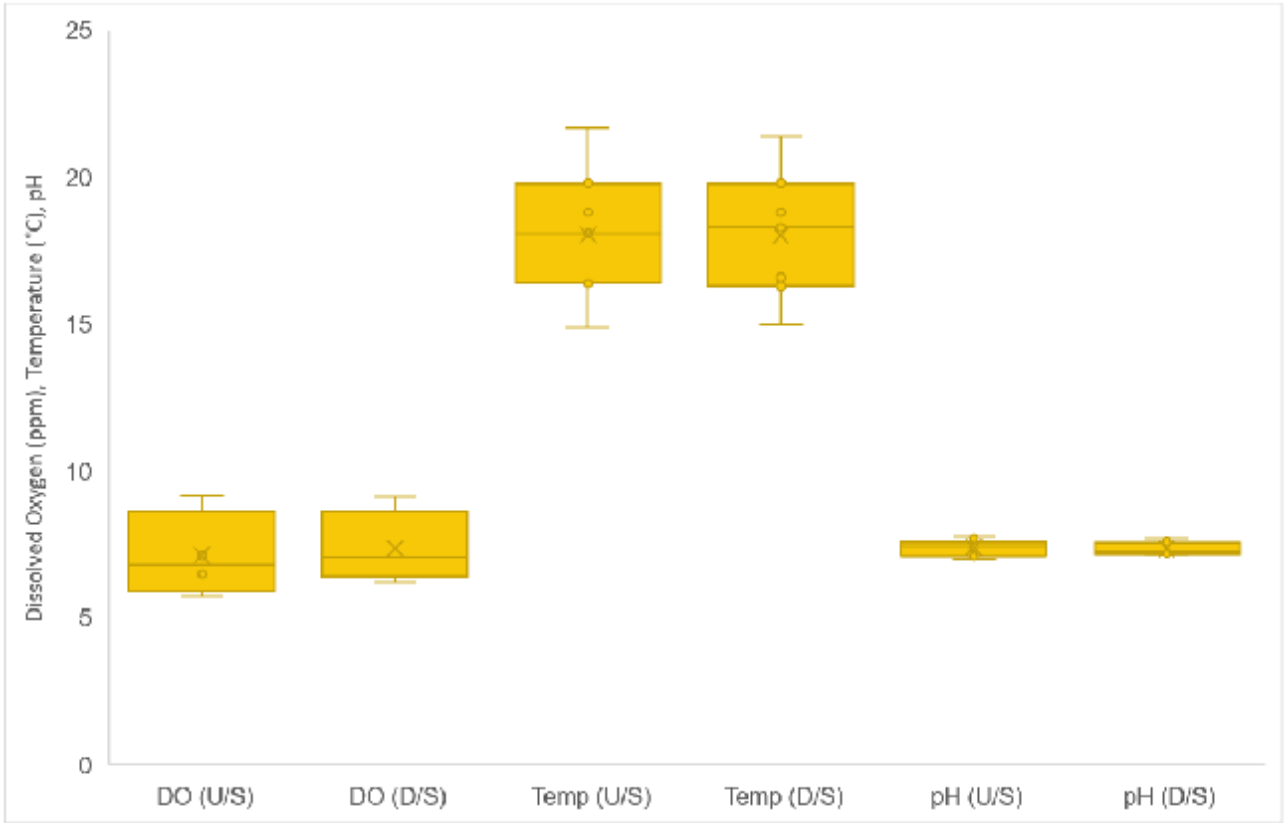


Figure 2-3 Dissolved Oxygen, Temperature and pH measured in Kaituna River for period November 2018 to April 2019

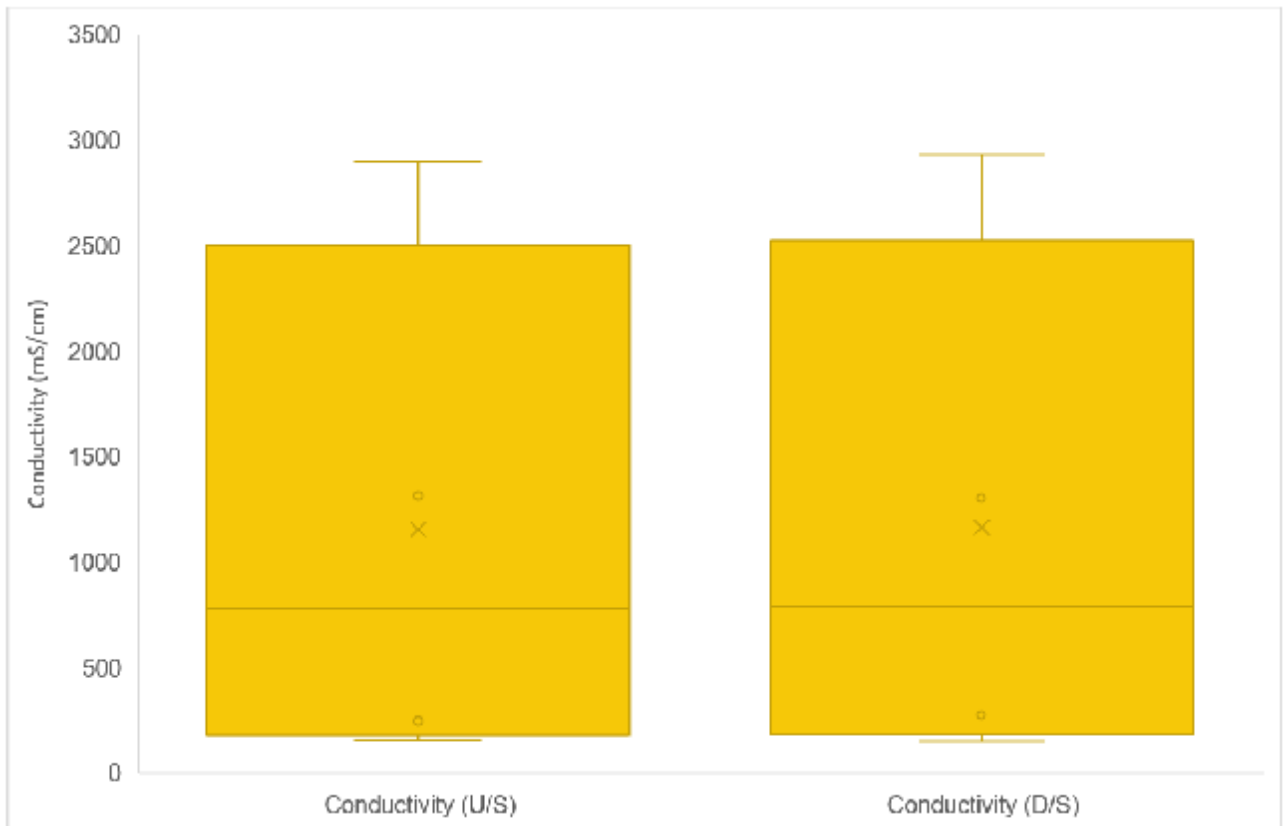


Figure 2-4 Conductivity measurements in Kaituna River for period November 2018 to April 2019



## 2.7.4 Commentary on Kaituna River Monitoring Results

Upstream samples for several water quality parameters, including *E. Coli* and faecal coliforms, were shown to have higher concentrations than the downstream samples. Questions were raised by MDC's Regulatory Department regarding the suitability of the sampling point 50m upstream of the STP discharge following the submission of the 2016/17 monitoring report. To investigate the behaviour of the treated wastewater plume from the STP discharge under different tidal flow scenarios, MDC commissioned Cawthron Institute to conduct a tracer dye study in March 2018 (see report in **Appendix D**). The results from this study indicated that the STP effluent is unlikely to be contributing to the higher concentrations upstream, and there are other likely factors at play, which include:

- The position of the sampling point is a shallow area close to the river bank and may be accumulating contaminants.
- Faecal contamination in particular may be coming from alternative sources such as a farm drain located 150m upstream, or wildfowl, such as paradise ducks, that frequent the area.

The report recommends that future monitoring be taken as near as possible to low tide, to allow for maximum possible flushing from the upstream site, as well as avoiding sample collection too close to the river bank.

The upstream sampling location was moved further upstream (by 300m) mid-way through the sampling period in March 2019. This has not appeared to make any significant difference based on available results. However, this conclusion will be confirmed in next year's monitoring report, which will have a complete set of data from the new location.

## 2.8 Condition 11 & 12 – Reporting

### 2.8.1 Condition 11

*The results of the monitoring period required under Conditions 2 and 6 to 10 shall be provided to the Compliance Manager, Marlborough District Council, in accordance with Condition 12 or on request.*

### 2.8.2 Condition 12

*The consent holder shall annually from the commencement of this consent and for the period 1 June to 31 May of each year, provide to the Compliance Manager, Marlborough District Council, by 1 August a written annual compliance report that:*

- a) Includes all sampling and monitoring results and records;*
- b) Provides an analysis of sampling and monitoring results and trends and actions taken;*
- c) Includes details of any complaints received regarding the operation of the treatment plant and how they have been responded to and, where necessary, the actions undertaken to address the cause of the complaint; and*
- d) Summarises the state of compliance with the conditions of these consents.*

The submission of this report fulfils the requirements of Conditions 11 and 12. Regarding Condition 12 c), no complaints were received regarding the operation of the treatment plant in this monitoring period.

## 3 Consent U170942.2

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### 3.1 Consent Purpose

Consent U170942.2 allows for the discharge of odour and gases from the Havelock sewage treatment plant to air. The expiry date is 1 February 2024.

### 3.2 Condition 2 – Odour

*There shall be no odour detectable beyond the boundary of the property that in the opinion of a Marlborough District Council Officer is offensive and objectionable.*

No complaints of odour were received by Council, during this monitoring period, so it can be concluded that compliance with this condition has been achieved.

## 4 Conclusions

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Based on the data available, the Havelock STP produces a reasonably good quality effluent with BOD and TSS concentrations generally within the expected range for the current pond layout. Discharge of effluent into the Kaituna River does not appear to have any measurable impact on the downstream water quality. Based on monitoring data, the upstream microbiological concentrations are higher than those downstream of the outfall, according to the samples obtained. While the sampling site has been moved further upstream, these results are an ongoing anomaly, and the cause has not yet been resolved. The 2019/20 monitoring report will contain a full set of monitoring data from the new upstream location, which may provide greater insight into this matter.

Sampling of the STP influent shows that the wastewater loads entering the STP are typical of mid to high strength domestic wastewater. Overloading of the STP due to industrial wastewater was not occurring at the time the sample was obtained.

No odour complaints, or other complaints relating to the operation of the Havelock STP, were made to Council during the monitoring period.

Adhering to the sampling frequency required by the consent was an issue for this monitoring period. This is mostly due to additional sampling requirements and incomplete sample analysis for the required parameters under the new consent. It is recommended that Council ensure that the sample collection and analysis meets the requirements of Consent U170942 in the next monitoring year.

# A

Appendix A – Consent U170942

**RESOURCE MANAGEMENT ACT 1991****Decision of Marlborough District Council**

**RESOURCE CONSENT:** U170942  
**APPLICANT:** Marlborough District Council  
**LOCATION:** 62 Queen Charlotte Drive, Havelock

**THIS IS THE DECISION ON THE APPLICATION FOR RESOURCE CONSENT:**

**DECISION:** **Granted**

**RESOURCE CONSENTS ISSUED:**

Type of Consent	Number	Activity	Page
Discharge Permit (to Water)	U170942.1	To discharge treated municipal wastewater to the Kaituna River through an existing outfall (Grid Ref 1655097E 5428945N) up to a maximum rate of 2400 cubic metres per day.	1
Discharge Permit (to Air)	U170942.2	To discharge odour and gases from the Havelock sewage treatment pond to air.	7
Land Use (River Surface or Bed Activity)	U170942.3	To maintain an existing sewage outfall structure in the Kaituna River (Grid Ref 1665097E 5428945N).	8

## Certificate of Resource Consent

**Consent Holder:** Marlborough District Council

**Consent Type:** Discharge Permit (to Water)

**Consent Number:** U170942.1

**Lapse Date:** This consent will lapse on 1 February 2021 unless given effect to prior to that date.

**Expiry Date:** This consent expires on 1 February 2024.

Pursuant to sections 34A(1) and 104B and after having regard to Part 2 matters and sections 104, 105 and 107 of the Resource Management Act 1991, the Marlborough District Council **grants** consent to discharge treated municipal wastewater to the Kaituna River through an existing outfall (Grid Ref 1655097E 5428945N) up to a maximum rate of 2400 cubic metres per day, subject to the following conditions imposed under section 108 of the Resource Management Act 1991.

### Conditions

#### *Discharge Quantity*

1. The maximum daily discharge rate as measured by the inflow to the ponds shall be not more than 2400 cubic metres per day.
2. The consent holder shall record daily flows. The results shall be provided to the Compliance Manager, Marlborough District Council, as part of the reporting required under Condition 12 or on request.

#### *Mixing Zone*

3. The mixing zone in the Kaituna River shall be defined as 50 metres from the discharge point both upstream and downstream.

#### *Discharge Quality*

4. The discharge of treated wastewater shall not cause any of the following effects outside of the 50 metre mixing zone:
  - a) A change in the natural temperature of the receiving water of more than 3 degrees celsius.
  - b) There shall be no production of conspicuous oil or grease films, scums or foams, or floatable or suspended materials.
  - c) A concentration of dissolved oxygen in the receiving water of below 80 percent of the saturation concentration provided upstream dissolved oxygen is no less than 85 percent of the saturation concentration.
5. The consent holder shall take weekly Dissolved Oxygen samples at the outlet of the tertiary pond.

6. The consent holder shall take one grab sample of the wastewater from the pond outlet once yearly in June or July and analyse the sample for the following:
- Chemical oxygen demand
  - Biochemical oxygen demand (five day)
  - Biochemical oxygen demand soluble (five day)
  - Total suspended solids
  - Conductivity
  - Total nitrogen
  - Nitrite nitrogen
  - Nitrate nitrogen
  - Total Kjeldahl nitrogen
  - Ammonia-nitrogen
  - Total phosphorus
  - Dissolved reactive phosphorus
  - Faecal coliforms
  - Dissolved oxygen
  - Temperature
  - pH
7. The consent holder shall take one grab sample of the wastewater from the pond outlet once yearly in January or February and analyse the sample for the following:
- Chemical oxygen demand
  - Total nitrogen
  - Nitrite nitrogen
  - Nitrate nitrogen
  - Total Kjeldahl nitrogen
  - Ammonia-nitrogen
  - Total phosphorus
  - Dissolved reactive phosphorus
8. The consent holder shall take one grab sample of the wastewater from the pond outlet once monthly in November to April inclusive:
- Biochemical oxygen demand (five day)
  - Biochemical oxygen demand soluble (five day)
  - Total suspended solids
  - Conductivity
  - Enterococci
  - Faecal coliforms
  - pH
  - Dissolved oxygen
  - Temperature



***Influent Analysis***

9. The consent holder shall take a 24 hour composite sample of sewage influent once yearly in January or February and analyse the sample for the following:
- a) Chemical oxygen demand
  - b) Biochemical oxygen demand (five day)
  - c) Total suspended solids
  - d) Conductivity
  - e) Total nitrogen
  - f) Ammonia-nitrogen
  - g) Nitrate nitrogen
  - h) Nitrite nitrogen
  - i) Total Kjeldahl nitrogen
  - j) Total phosphorus
  - k) Dissolved reactive phosphorus
  - l) Faecal coliforms
  - m) Enterococci
  - n) pH

***Receiving Environment Monitoring***

10. The consent holder shall carry out a programme of receiving environment monitoring for the duration of the consent as follows:
- a) Water samples (grab samples) shall be taken from the Kaituna River each summer; once in December, once in January and once in February. Samples shall be taken approximately 350 metres upstream of the discharge and 50 metres downstream of the discharge. Samples shall be taken between two and four hours after high tide and analysed for the following:
    - i) Total biochemical oxygen demand (five day)
    - ii) Total suspended solids
    - iii) Total nitrogen
    - iv) Ammoniacal nitrogen
    - v) Nitrate nitrogen
    - vi) Nitrite nitrogen
    - vii) Total Kjeldahl nitrogen
    - viii) Total phosphorus
    - ix) Dissolved reactive phosphorus
  - b) Water samples (grab samples) shall be taken from the Kaituna River each winter; once in June, once in July and once in August. Samples shall be taken approximately 350 metres upstream of the discharge and 50 metres downstream of the discharge. Samples shall be taken between two and four hours after high tide and analysed for the following:
    - i) Biochemical oxygen demand (five day)
    - ii) Total suspended solids
    - iii) Total nitrogen

- iv) Ammoniacal-nitrogen
  - v) Nitrite nitrogen
  - vi) Nitrate nitrogen
  - vii) Total Kjeldahl nitrogen
  - viii) Total phosphorus
  - ix) Dissolved reactive phosphorus
  - x) Faecal coliforms
  - xi) Enterococci
  - xii) Dissolved oxygen
  - xiii) pH
  - xiv) Temperature
  - xv) Conductivity
- c) Water samples (grab samples) shall be taken from the Kaituna River weekly from November to April inclusive. Samples shall be taken approximately 350 metres upstream of the discharge, 50 metres downstream of the discharge and near the Mahakipawa Road bridge. Samples shall be taken between two and four hours after high tide and analysed for the following:
- i) Faecal coliforms
  - ii) Enterococci
  - iii) Dissolved oxygen
  - iv) pH
  - v) Temperature
  - vi) Conductivity

***Reporting***

11. The results of the monitoring required under Conditions 2 and 6 to 10 shall be provided to the Compliance Manager, Marlborough District Council, in accordance with Condition 12 or on request.
12. The consent holder shall annually from the commencement of this consent and for the period 1 June to 31 May of each year, provide to the Compliance Manager, Marlborough District Council, by 1 August a written annual compliance report that:
- a) Includes all sampling and monitoring results and records;
  - b) Provides an analysis of sampling and monitoring results and trends and actions taken;
  - c) Includes details of any complaints received regarding the operation of the treatment plant and how they have been responded to and, where necessary, the actions undertaken to address the cause of the complaint; and
  - d) Summarises the state of compliance with the conditions of these consents.

***Treatment Upgrade Investigations***

13. Within 24 months of the grant of this consent the consent holder shall submit to the Compliance Manager, Marlborough District Council, and Te Rūnanga o Ngāti Kuia a report with the option(s) for the treatment plant including improvement of treatment and/or alteration of the discharge. A preferred option shall be provided with the timeline for the works to be implemented. The report shall document how Ngāti Kuia has been involved in the investigations.

14. By 1 August of each year, the consent holder shall provide an update of investigations undertaken and progress made.
15. The consent holder shall lodge any resource consent applications and (if necessary) notices of requirement to implement the option identified prior to the expiry of these consents.

## **General**

### ***Signage***

16. A warning sign highlighting the presence of the discharge shall be maintained warning people of the treated wastewater discharge.
17. A sign shall be erected at the Mahakipawa Road bridge when the enterococci results exceed 180/100 millilitres. The sign wording shall be agreed with the Public Health Service.

### ***Outfall***

18. The consent holder shall ensure that all structures and works authorised under this consent are maintained in a structurally sound condition at all times to the satisfaction of the Compliance Manager, Marlborough District Council.

### ***Notifications***

19. The consent holder shall notify the Compliance Manager, Marlborough District Council, in writing of any maintenance or upgrade works to the plant which may increase discharges of contaminants to air on a short term basis and explain any processes in place to manage the potential effects.
20. The consent holder shall notify the Compliance Manager, Marlborough District Council, the Medical Officer of Health and iwi as soon as practicable and, as a minimum requirement, within 48 hours of any accidental discharge, plant breakdown or other contingency (Incident) which is likely to result in an abnormal discharge quality.
21. Within seven working days of an Incident occurring, the consent holder shall submit a written report describing the Incident, the reasons for it occurring, its consequences (including the nature of any complaints), the measures taken to remedy or mitigate its effects, and any measures taken to prevent a recurrence of the Incident, including any changes to operating procedures to the Compliance Manager, Marlborough District Council, and iwi.

### ***Complaints***

22. The consent holder shall maintain and keep a file for all complaints made about the treatment and discharge operations received by the consent holder. The following shall be recorded:
  - a) The date, time and duration of the event/incident that has resulted in the complaint;
  - b) The name and address of the complainant;
  - c) The location of the complainant when the event/incident was detected;
  - d) The outcome of all investigations including site and boundary surveys following notification of the issue including an assessment as to whether the odour was likely to have been of an intensity or nature that was offensive;
  - e) The possible cause of the Incident;

- f) The weather conditions and wind direction at the site when the Incident allegedly occurred, if significant to the complaint; and
  - g) Any corrective action undertaken by the consent holder in response to the complaint.
23. The complaints information shall be made available to the Compliance Manager, Marlborough District Council, on request.
24. Complaints which may indicate non-compliance with the conditions of this resource consent shall be forwarded to the Compliance Manager, Marlborough District Council, within five working days of the complaint being received.

#### ***Review of Conditions***

25. The Compliance Manager, Marlborough District Council, may within two months of receiving the annual report required under Condition 12 serve notice of its intention to review and amend or add to the conditions of this resource consent under section 128 of the Resource Management Act 1991 for the purpose of:
- a) Dealing with any adverse effect on the environment which may arise from the exercise of the resource consent and which it is appropriate to deal with at a later stage; or
  - b) Requiring the adoption of the best practicable option to remove or reduce any adverse effect on the environment; or
  - c) Requiring the consent holder to carry out monitoring in addition to or instead of that required by the resource consent; or
  - d) Addressing any issues identified in the annual reports submitted under Condition 12 of this resource consent.

#### **Advice Notes**

1. The consent holder is reminded of the general duty under section 17 of the Resource Management Act 1991 to avoid, remedy or mitigate any adverse effect of the discharge on the environment irrespective of this consent. Such adverse effects could include generation of an offensive or objectionable odour beyond the boundary of the property upon which this consent is exercised. Such an adverse effect could result in Marlborough District Council taking enforcement action under section 17.
2. In accordance with section 137 of the Resource Management Act 1991, the discharge permit is transferrable to another owner or occupier of the land on which the permit is exercised, on the same conditions and for the same use as originally granted. Such a transfer should occur whenever there is a change in property ownership. Written notice of the transfer must be provided to the Marlborough District Council.
3. In accordance with section 36 of the Resource Management Act 1991, the consent holder will be responsible for all actual and reasonable costs associated with the monitoring of this resource consent. The costs will be charged in accordance with the Marlborough District Council's current Schedule of Fees. The consent holder is advised that the costs of monitoring may include costs associated with site visits, assessment of results and reports, administration and if complaints bring to Marlborough District Council's attention non-compliance with resource consent conditions.
4. Any and all archaeological sites are protected under the Heritage New Zealand Pouhere Taonga Act 2014. It is an offence under that Act to modify, damage or destroy any archaeological site, whether the site is recorded or not. Application must be made to Heritage New Zealand for an authority to modify, damage or destroy an archaeological site. This may include the planting of trees within an archaeological site.

## Certificate of Resource Consent

**Consent Holder:** Marlborough District Council

**Consent Type:** Discharge Permit (to Air)

**Consent Number:** U170942.2

**Lapse Date:** This consent will lapse on 1 February 2021 unless given effect to prior to that date.

**Expiry Date:** This consent shall expire on 1 February 2024.

Pursuant to sections 34A(1) and 104B and after having regard to Part 2 matters and sections 104, 105 and 107 of the Resource Management Act 1991, the Marlborough District Council **grants** consent to discharge odour and gases from the Havelock sewage treatment pond to air, subject to the following conditions imposed under section 108 of the Resource Management Act 1991.

### Conditions

1. The discharge to the air shall be in general accordance with resource consent application U170942, received by the Marlborough District Council on 10 November 2017.
2. There shall be no odour detectable beyond the boundary of the property that in the opinion of a Marlborough District Council Officer is offensive and objectionable.

### Advice Notes

1. A reminder to the consent holder, that in the event of relinquishing the discharge permit to a new owner, notification of the transfer must be lodged with the Marlborough District Council on the appropriate forms, containing signatures of both parties and with payment of the appropriate fee. Further, all conditions of consent must have been complied with.
2. Pursuant to section 36 of the Resource Management Act 1991 and the Marlborough District Council's schedule of fees, the consent holder will be responsible for all actual and reasonable costs associated with the monitoring of this resource consent.

## Certificate of Resource Consent

**Consent Holder:** Marlborough District Council

**Consent Type:** Land Use (River Surface or Bed Activity)

**Consent Number:** U170942.3

**Lapse Date:** This consent will lapse on 1 February 2024 unless given effect to prior to that date.

**Expiry Date:** This consent shall expire on 1 February 2024.

Pursuant to sections 34A(1) and 104B and after having regard to Part 2 matters and sections 104, 105 and 107 of the Resource Management Act 1991, the Marlborough District Council **grants** consent to maintain an existing sewage outfall structure in the Kaituna River (Grid Ref 1665097E 5428945N), subject to the following conditions imposed under section 108 of the Resource Management Act 1991.

### Conditions

1. The activity shall be undertaken in accordance with the application U170942, received by the Marlborough District Council on 10 November 2017, unless required otherwise by the following conditions of this consent.
2. Any equipment/machinery used shall be high pressure water blasted and air dried prior to arrival on the site.
3. The consent holder shall minimise the amount of works undertaken in the wetted part of the channel.
4. No works are to be undertaken in flowing water in weekends or public holidays.
5. No refuelling or fuel storage or the storage or placement of substances including but not limited to: oil; hydraulic fluid or other fluid lubricants; poly-aromatic hydrocarbons (PAHs); paint and solvents shall take place in or within 20 metres of the riverbed.
6. All practicable steps shall be taken to minimise the release of sediment to the river during the works authorised by this consent.
7. To prevent the spread of Didymo or other aquatic pest, the consent holder shall ensure that activities authorised by this consent are undertaken in accordance with Ministry of Primary Industries Didymo hygiene procedures.

### Advice Notes

1. A reminder to the consent holder, that in the event of relinquishing the discharge permit to a new owner, notification of the transfer must be lodged with the Marlborough District Council on the appropriate forms, containing signatures of both parties and with payment of the appropriate fee. Further, all conditions of consent must have been complied with.
2. Pursuant to section 36 of the Resource Management Act 1991 and the Marlborough District Council's schedule of fees, the consent holder will be responsible for all actual and reasonable costs associated with the monitoring of this resource consent.

## Reasons

### Proposal

1. The applicant is proposing to:
  - a) Discharge treated municipal wastewater to the Kaituna River through an existing outfall (Grid Ref 1655097E 5428945N) up to a maximum rate of 2400 cubic metres per day;
  - b) Discharge odour and gases from the Havelock sewage treatment pond to air; and
  - c) Maintain an existing sewage outfall structure in the Kaituna River (Grid Ref 1665097E 5428945N).

### Background

2. The Havelock Sewage Treatment Plant (STP) has been in operation for over 30 years. The pond is currently authorised under resource consent U070013, which was granted on 12 May 2008 and expired on 31 May 2018. The current consent allows for the discharge of up to 2400 cubic metres per day, but the average dry weather discharge is only estimated to be between 150-200 cubic metres per day. The maximum daily discharge volume of 2400 cubic metres per day is proposed as this flow equates to the capacity of the two pumps at the terminal pump station and allows for a significant component of wet weather inflow and infiltration.
3. The STP serves both the Havelock residential and commercial areas. There is only a relatively minor commercial contribution to the system and Marlborough District Council has a policy for controlling new industrial and commercial connections. Current population utilising the STP is estimated to be 550. The average inflow into the ponds is estimated at 370 cubic metres per day.
4. The plant is made up of a single facultative (oxidation) pond and two interlinked maturation ponds. The facultative pond is approximately 1.55 metres deep and the surface area is 5000 square metres. The system is essentially passive both in flow through and in aeration (although portable irrigators are used to combat anaerobic surface conditions in the facultative pond).
5. The applicant is proposing to investigate alternative options for treatment and disposal of the wastewater over the proposed consent term and apply for new consents to allow for the new system.

### Description of Existing and Surrounding Environment

6. Currently the effluent is discharged through the existing pipe into the Kaituna River approximately 280 metres upstream from the Mahakipawa Road/Queen Charlotte Drive bridge. The Kaituna River flows into the Havelock estuary a few hundred metres downstream of the bridge. There are no water abstractions from the Kaituna River in the vicinity of the discharge and the nearest neighbouring house is located approximately 430 metres to the west. The neighbouring land is either estuary or dairy farm.
7. The ponds are zoned Rural 1 under the Marlborough Sounds Resource Management Plan (the Plan). The ponds are zoned Coastal Environment under the Proposed Marlborough Environment Plan (the Proposed Plan).



## Planning Provisions

8. Section 15(1) of the Resource Management Act 1991 (the Act) states that no person may discharge any contaminant into water unless the discharge is expressly allowed by a rule in a regional plan, a resource consent or regulations. The Act defines a contaminant as any substance that either by itself when discharged into water, changes or is likely to change the physical, chemical or biological condition of water.
9. Section 15(2) of the Act states that no person may discharge any contaminant into the air from any place in a manner that contravenes a rule in a regional plan unless the discharge is expressly allowed by a resource consent. The Act defines a contaminant as any substance that either by itself when discharged into air changes or is likely to change the physical, chemical or biological condition of the air into which it is discharged.
10. Section 13(1)(a) of the Act states that no person may in relation to the bed of any river erect any structure on the bed unless expressly allowed by a rule in a regional plan.
11. Rule 36.4.3.10 of the Plan states that the discharge of contaminants into air and water associated with the treatment of reticulated sewage is a discretionary activity. The Plan does not provide for the maintenance of a structure in the riverbed, therefore in accordance with section 87B of the Act, the activity of maintaining the outlet is a discretionary activity.
12. Rule 2.19.2 of the Proposed Plan states any discharge to water not provided for is a discretionary activity.
13. Rule 4.6.13 of the Proposed Plan states any discharge of contaminants to the air not provided for as permitted or limited as prohibited, is a discretionary activity.
14. Rule 2.7.1 of the Proposed Plan states the maintenance of an existing structure is a permitted activity.
15. This entire proposal shall be bundled and treated a discretionary activity.

## Notification and Affected Parties

16. The application was publicly notified on 19 January 2018 and the notification period ended on 19 February 2018. Marlborough District Council received no submissions on the application so a hearing was not required.

## Assessment of Effects

17. The Plan sets the assessment criteria in Rule 36.4.3.10.1:
  - a) The nature of the contaminants entering the STP: The ponds collect domestic sewage and a small amount of industrial sewage from the Havelock area. The median biochemical oxygen demand (BOD) of the pond effluent over the three year period of the current consent was 386 grams per cubic metre, with a range from 250-300 grams per cubic metre. The total suspended solids (TSS) median for the same period was 238 grams per cubic metre, with a range from 250-300 grams per cubic metre. The average enterococci is 1,414,000 MPN per 100 millilitres.
  - b) Whether trade wastes are included and steps taken to reduce the volume and monitor the quantity: The applicant states that only small volumes are received from industrial premises and the quantities of this waste are monitored and receive special charges. The main industrial producer of trade waste in Havelock is the Talleys muscle processing factory located at the marina.

- c) The extent to which stormwater can enter the system: The Havelock STP does not have the same problem with stormwater entering the system as other urban areas have. Some stormwater does enter the system during very high rainfall events, but as the ponds have a much greater capacity than is currently required to process the existing levels of discharge, the occasional inflow of stormwater can be easily dealt with.
- d) Steps taken to avoid accidental discharges from the ponds: The ponds have discharge level alarms and they are well maintained by Marlborough District Council staff. Although the ponds are right beside the Kaituna River, they are protected from flooding by stopbanks. Pump station overflows in significant storm events have occurred in the past. Telemetry has been installed at the pump stations to detect pump faults, power failure and high level alarms which are automatically relayed to the on-call operator. This and the replacement of the original pumps with more reliable machines have reduced the likelihood of overflows.

The effects of overflows are difficult to anticipate as they could occur anywhere within the sewer network. However the likely effect would be a temporary short term discharge of untreated effluent immediately surrounding the affected area. In such an event, the area would be isolated and cleaned up immediately to minimise the contamination. The Public Health Unit would be advised along with other agencies and community groups.

- e) The extent of treatment in the ponds: The ponds treat the wastewater by a mixture of aerobic processes in the upper layers and anerobic processes in the sludge.
  - f) Any actual or potential effects of the discharge on surface water, coastal water and groundwater: This section will be dealt with in depth below.
  - g) Any effects of the odour discharge: Odourous compounds, including hydrogen sulphide and volatile acids, are produced in anerobic conditions in the sludge layer of the pond. A correctly functioning pond will be aerobic in the upper liquid layer, which controls odour release by oxidising the gases produced from the breakdown of sludge. Good management including controlling the depth of the sludge, monitoring pond performance and the intermittent use of an aerator will minimise the release of odours. Due to the exposed nature of the site and the distance to the nearest house, the risk of odour nuisance is reduced. Over the last 10 years Marlborough District Council has no records of any complaints with regard to odour generated by the ponds.
  - h) Any effect on human health and the ecosystems: This issue will be dealt with below in detail.
  - i) Any values placed upon the discharge site and the surrounding area by tangata whenua: The applicant undertook consultation with the local iwi, Te Runanga O Ngāti Kuia, before the application was lodged. Ngāti Kuia has indicated they would like to part of the process for identifying the new wastewater treatment site and disposal site.
18. The main effect of this application is on the water quality in both the Kaituna River and in the Havelock estuary. The Plan sets water quality standards for both the Kaituna River (F1 clear water managed for fishery purposes) and the coastal waters (SG water managed for the gathering or cultivation of shellfish for human consumption) in the Havelock estuary. These standards are for the Kaituna River at a point where there has been reasonable mixing as defined in the Plan.

**F1 - Clear Water Managed for Fishery Purposes**

19. There shall be no conspicuous oil, or grease films, scums or foams, or floatable or suspended material.

The applicant states that since monitoring began at the STP in 1996 there has been no sign of any of the above in the Kaituna River. Although there may be a scum layer in the oxidation ponds, this is not discharged out into the river.

20. There shall be no change in the colour or visual clarity of the receiving water.

Clarity is a measure of the transparency of a waterbody and decreases as suspended solids concentration and associated turbidity increases. Oxidation ponds often have the general characteristics of being yellow-green in colour and turbid, and therefore have the potential to change the clarity characteristics of the receiving water. A significant reduction in visual clarity can affect fish food chain, e.g. a reduction in photosynthetic algae reliant on light for growth will lead to reduced food for grazing invertebrates and in turn less prey for visually feeding fish such as trout.

Discolouration has been noted inside the pond and a distinct green discolouration was reported in the Kaituna River around the pond discharge. This discolouration was confined to a 1-2 metre strip along the left bank of the Kaituna River and extended no more than 5 metres downstream.

To estimate whether there will be any serious discolouration of the Kaituna River, the applicant undertook modelling of the dilution effect for the worst case scenario. The applicant concludes "*our estimation of 100:1 dilution factor at the edge of the 50 metre mixing zone suggest that SS levels (as a surrogate for turbidity measures) in the discharge are unlikely to cause a conspicuous change in Kaituna River water clarity after mixing*".

21. There shall be no objectionable odour beyond the property boundary.

Limited monitoring of the ponds indicate that there is little odour smell and, given the separation distances to neighbouring houses, there is unlikely to be any adverse effects on the neighbours.

22. The waterway shall not be rendered unsuitable for consumption by farm animals.

There are no numeric parameters set in the Plan for this standard so the applicant has used the ANZECC 2000 guidelines. The standards in these guidelines relate to pathogens and parasites, the presence of cyanobacteria toxins and high nitrate/nitrite levels.

Water quality monitoring downstream of the discharge point shows that faecal coliform levels are in excess of the ANZECC guidelines, but this may be due to stock access to the river upstream of the discharge. Upstream monitoring shows that the Kaituna River is already exceeding the ANZECC guidelines. These results could be a problem for stock, however the farm land downstream of the discharge is fenced off from the river so there is little chance of stock drinking the water. There may be an issue for swimmers downstream of the discharge though.

Monitoring of the effluent discharge indicates that algal blooms are rare and pose little risk to stock drinking water. Additionally, nitrate/nitrite levels are well within the ANZECC guidelines for stock drinking water.

23. There shall be no significant adverse effects on aquatic life.

Light penetration is closely linked to discolouration which has been dealt with above.

High levels of ammonia can be acutely toxic to fish and may cause loss of equilibrium, increased breathing, cardiac output and oxygen uptake may be affected and, in extreme situations, convulsions, coma and death. The results of current monitoring for ammonia in the river 50 metres downstream of the discharge show that the levels are well below threshold levels set in the Plan.

A build-up of particulate organic matter on the banks of the river and/or riverbed has the potential to fill in the riverbed thereby reducing habitat for invertebrates that live between the space created by gravels and cobbles. Monitoring during the last consent period did indicate that there was some sediment enrichment in the riverbank sediments but this was only within 10 metres downstream of the discharge and there was no detectable enrichment beyond 25 metres downstream. Monitoring also indicated that invertebrate communities were not affected beyond 25 metres downstream of the discharge point.

24. The temperature shall not be changed by more than 3 degrees celsius and the temperature shall not exceed 20 degrees celsius.

High temperatures outside the normal tolerance ranges of fish and invertebrates can have profound negative physiological effects.

Monitoring shows that high effluent temperatures are rapidly dissipated in the river and are not recognisable beyond 50 metres below the discharge.

25. Dissolved oxygen shall exceed 80 percent of saturation.

Dissolved oxygen is important for the functioning of many aquatic organisms and represents the balance between oxygen consuming and oxygen releasing processes.

Limited monitoring by the applicant during the last consent suggests that effluent dissolved oxygen is rapidly dissipated in the river by less than 10 metres downstream of the discharge.

26. Fish shall not be rendered unsuitable for human consumption by the presence of contaminants.

Poor water quality can be harmful to fish health, and can also taint fish flavour and endanger human health if bioaccumulation of toxic substances by fish is too high. The freshwater fish species most likely to be harvested for human consumption from the Kaituna River in the vicinity of the outfall are trout and eels. As the STP receives, by and large, domestic sewage, chemical contamination is very low and unlikely to affect fish in the Kaituna River.

Given the high mobility of trout and eels, and the high dispersion of the discharge, these species are unlikely to be exposed to high levels of contamination.

***SG - Water Managed for the Gathering or Cultivation of Shellfish for Human Consumption***

27. The applicant has adopted a conservative approach which assumes that there are shellfish beds at or near the mouth of the river in the estuary, although there is no evidence that there are any beds in this area. The applicant has also used predicted dilutions which do not take into account die-offs in natural water, and has used effluent quality figures based upon the existing treatment which will be substantially higher than when the second maturation pond is used.

28. The temperature shall not be changed by more than 3 degrees celsius and dissolved oxygen shall exceed 80 percent of saturation.

Based upon the data collected during the last consent, it is very unlikely the temperature and dissolved oxygen from the oxidation pond discharge would affect shellfish as indications are that both dissipate within 50 metres mixing zone downstream of the discharge.

29. Fish shall not be rendered unsuitable for human consumption by the presence of contaminants.

The standards identified in the Plan relate to discharges directly from the source to the shellfish beds. As the discharge point is approximately 850 metres upstream from the theoretical site of the shellfish beds, the applicant had to model the dilution effects in the Kaituna River. The model results suggest that the discharge would be diluted by 440:1 by the time it gets to the estuary.

By using the figures for the existing effluent quality and the dilution effects, the results for faecal coliforms is much higher than the standard allowed in the Plan, i.e. 318 colony forming units per 100 millilitres as opposed to the standard of 14 colony forming units per 100 millilitres. However, as the applicant intends to introduce a second maturation pond which will reduce the faecal coliform level down a median of 94,000 colony forming units per 100 millilitres to around 10,000 colony forming units per 100 millilitres, the level after dilution will be within the standard. Once the diluted effluent in the river meets the estuary, it will undergo even more dilution.

***CR - Water Managed for Contact Recreation***

30. Although the water quality standards for the Kaituna River do not include contact recreation, the applicant does note that people do swim in the river in the vicinity of the Mahakipawa Road/Queen Charlotte Drive bridge, so has included the standards for contact recreation.

31. Visual clarity of the water shall not be so low as to be unsuitable for bathing.

As mentioned in the other standards above, it is unlikely that the discharge will cause any significant change in colour or visual clarity in the Kaituna River beyond the mixing point.

32. The water shall not be rendered unsuitable for bathing by the presence of contaminants.

Sampling of the enterococci levels in the Kaituna River have been taken since 2001 by the applicant. The levels of enterococci at the point 50 metres downstream of the discharge point are mostly above the standards set out in the Plan, but the applicant states that these measurements are one-off samples that may not be representative of the river water quality. The results show some variability and some of the upstream results are higher than the downstream results. As the applicant will be significantly improving the quality of the discharged effluent with the introduction of the second maturation pond, it is likely that the bathing water standards will be met.

33. There shall be no undesirable biological growths.

Biological growths can impact on the aesthetic quality of a river (e.g. excessive river algal growth) or be an indirect or direct concern for human health (e.g. aquatic plant growth covering submerged underwater hazards, toxic algal blooms, or bacterial borne diseases). Biological growths such as aquatic plants, river algae are nutrient dependant and changes in the nutrient status of a river can affect the rate of growth.

Monitoring by Marlborough District Council staff and their consultant during the last consent period did not find any evidence of algal growths or periphyton mats. Additionally, there were no bacterial or fungal growths in the river downstream of the discharge. The applicant's agent states the absence of biological growths may be due to the strong tidal influence which could prevent significant growths being established.

34. Possible mitigation measures for this discharge are improving the quality of the discharge, putting up signs to warn people against swimming near the discharge and collecting shellfish, and providing better communication with interested parties for times when there may be accidental discharges.
35. The effects of maintaining the discharge structure in the Kaituna Riverbank should be relatively minor as they will only involve a minor disturbance of the riverbed. These works could produce some small amount of sedimentation but this should only be for a very short time and will be either rapidly diluted by the river or flushed away.

### **Relevant Statutory and Plan Provisions**

#### ***Wairau/Awatere Resource Management Plan***

36. Objective 3.2.2 requires the maintenance and enhancement of aquatic ecosystems and the management of the effects of activities on water quality of rivers that enables contact water recreation, food gathering and cultural integrity. Supporting policies aim to avoid discharges that will modify, damage or destroy any significant ecological value. Discharges that adversely affect important areas identified by iwi, areas identified as outstanding landscapes and the quality of water in the coastal marine area.
37. When assessing discharge applications to discharge contaminants to rivers, Marlborough District Council is to have particular regard to the water classification of that waterbody and the need to:
  - a) Preserve, and where appropriate, restore the natural character of rivers and their margins;
  - b) Protect public health;
  - c) Protect the olfactory aesthetics of the area;
  - d) Protect sites of spiritual, historical or cultural significance to Māori;
  - e) Avoid, remedy or mitigate adverse effects on ecological systems.
38. In terms of the coastal marine water quality, Objective 9.3.2.1 requires the management of effects of activities so that water quality in the coastal marine area is at a level which enables the gathering or cultivation of shellfish for human consumption. Supporting policies requires Marlborough District Council to avoid discharges that will modify, damage or destroy any significant ecological value, and will adversely affect areas identified by iwi as important.

#### ***Proposed Marlborough Environment Plan***

39. Policy 3.1.3 states that where an application is likely to affect the relationship of Marlborough's tangata whenua iwi and their culture and traditions, decision makers shall ensure:
  - a) Mauri is maintained or improved where degraded.
  - b) For waterbodies, the elements of physical health to be assessed are:
    - i) Aesthetic and sensory qualities;
    - ii) Life supporting capacity, ecosystem robustness and habitat richness;

- iii) Productive capacity; and
- iv) Fitness to support human use, including cultural uses.

Given the applicant is proposing to continue discharging treated human effluent to the Kaituna River, the mauri of the waterway will continue to be affected. The quality of the wastewater will ensure there is no change from the current situation and the applicant is investigating alternative discharge sites which will eventually restore the mauri of the waterway. In terms of the parameters identified above, the applicant's monitoring has shown no significant adverse effects on the waterway, although it is unknown whether the waterway downstream of the discharge site is fit to support human use.

- 40. Policy 3.1.5 seeks to ensure iwi management plans are taken into account in the resource management decision making process. Ngāti Kuia do not have an iwi management plan but have been consulted as part of the application process.
- 41. Policy 4.2.1 recognises the social, economic, environmental, health and safety benefits from listed infrastructure as regionally significant. The Havelock STP is one of the listed infrastructure and therefore is considered to be regionally significant as it provides a relatively safe method of treatment and disposal of sewage for the community.
- 42. Policy 15.1.8 seeks to encourage the discharge of contaminants to land in preference to water. The applicant recognises that the discharge of treated wastewater to the Kaituna River is not supported by some parts of the community, particularly iwi, and has begun investigations into alternative discharge options.
- 43. Policy 15.1.9 seeks to enable point source discharge of contaminants to water where the discharge will not result in any of the following adverse effects beyond the zone of reasonable mixing:
  - a) The production of conspicuous oil or grease films, scums, foams or floatable or suspended materials. *The applicant states that none of these effects have been found downstream of the discharge site.*
  - b) Any conspicuous change in the colour or significant decrease in the clarity of the receiving waters. *The applicant states there has been some evidence of change in colour or the receiving waters but these changes are confined to the discharge site.*
  - c) The rendering of freshwater unsuitable for consumption by farm animals. *The applicant states nitrate concentrations measured downstream of the discharge site are well below the 15 grams per cubic metre ANZECC 2000 Guideline to prevent toxicity in stock.*
  - d) Any significant adverse effect on the growth, reproduction or movement of aquatic life. *There has been no evidence that this discharge adversely affects the aquatic life.*
- 44. Policy 15.1.10 requires applicants that propose to discharge contaminants to water to consider all potential receiving environments and adopt best practicable options having regard to the nature of the contaminants, the relative sensitivity of the receiving environment, the financial implications and effects on the environment of each option and the current state of technical knowledge and likelihood that each option can be successfully applied. The applicant is undertaking a review of alternative discharge methods, including membrane treatment and land disposal, but this review will take some time. Therefore, the applicant has requested a short consent term of five years to allow for the current discharge to continue while the review is completed.



45. Policy 15.1.11 requires Marlborough District Council to have regard to:
- a) The potential adverse effects of the discharge on spiritual and cultural values of Marlborough's tangata whenua iwi. *Ngāti Kuia has been consulted and has indicated they wish to be part of the decision process for the new wastewater treatment system.*
  - b) The extent to which contaminants present in the discharge have been removed or reduced through treatment. *The Havelock STP consists of a facultative pond followed by a maturation pond which reduce the BOD level to around 30 grams per cubic metre, the TSS down to 60 grams per cubic metre and the Faecal Coliforms level down to around 180 cfu per 100 millilitres. Further treatment options are available, such as biofilter treatment and membrane filtration, but the final treatment method needs to be assessed in light of the decision on whether the discharge will be to land or to water.*
  - c) Whether the discharge is temporary or short term. *The applicant has only applied for a five year consent term which will enable the investigation into alternative methods of treatment and disposal.*

46. Policy 15.1.12 requires Marlborough District Council, after considering Policies 15.1.10 and 15.1.11, approve discharge permit applications to discharge contaminants into water where:

- a) In the case of non-compliance with the water quality classification standards:
  - i) The consent holder for an existing discharge can demonstrate a reduction in the concentration of contaminants and a commitment to a staged approach for achieving the water quality classification standards within a period of no longer than five years from the date the consent is granted; and
  - ii) The degree of non-compliance will not give rise to significant adverse effects.

The applicant states the BOD, DRP and DIN levels can be above the standards stipulated in the Proposed Plan, but these may be due to the relatively high background levels seen upstream of the discharge site. Overall, the applicant concludes the discharge does have some impact on water quality and ecology immediately downstream of the discharge with effects further reducing downstream. The applicant has requested a five year consent term to investigate alternative discharge options which will either improve the quality of the discharge or totally eliminate the need to discharge to the Kaituna River by discharging to land.

47. Policy 15.1.16 states the duration of any new discharge permit will be no more than five years where the existing discharge will not comply with the water quality classification standards. Given the applicant has only requested a five year consent period, the proposal is in accordance with this policy.
48. Policy 15.1.17 requires discharge permits to be reviewed to impose new conditions requiring the monitoring of the discharge effects to determine compliance with the water quality classification standards. A section 128 review condition has been recommended with the proposed conditions.

49. In summary, the proposal is not in accordance with some objectives and policies, particularly those relating to iwi values and reducing or eliminating discharges to water, but given there have been no signs of significant adverse effects on the environment and given the Havelock STP is recognised as a regionally significant infrastructure that performs a very important function for the community, I believe the proposal is overall not contrary to the objectives and policies of the Plan and the Proposed Plan. The applicant has only requested a short consent term and is investigating alternative disposal options which will eventually satisfy iwi concerns.

### Statutory Framework

50. Section 105 of the Resource Management Act 1991 (the Act) states the Council, when considering a discharge permit, must have regard to:
- a) The nature of the discharge and the sensitivity of the receiving environment to adverse effects; and
  - b) The applicant's reasons for the proposed choice; and
  - c) Any possible alternative methods of discharge, including discharge into any other receiving environment.
51. The applicant has provided a thorough assessment of the nature of the discharge and sensitivity of the receiving environment. Monitoring of the water quality and the instream biota over the last consent period has shown there were no signs of significant adverse effects.
52. An assessment of possible alternative methods of disposal of the wastewater is underway and this is the reason why the applicant has only requested a short five year consent term. Investigations into alternative disposal methods will probably take some time given they will likely be expensive and difficult to implement.
53. Section 107 of the Act states Council shall not grant a discharge permit allowing the discharge of contaminants to water if, after reasonable mixing, the contaminant is likely to give rise to any or all of the following:
- a) The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
  - b) Any conspicuous change in colour or visual clarity;
  - c) Any emission of objectionable odour;
  - d) The rendering of fresh water unsuitable for consumption by farm animals;
  - e) Any significant adverse effects on aquatic life.

The applicant has undertaken ecological surveys downstream of the discharge site and has found none of these effects, apart from some discolouration found only at the discharge site.

54. Section 8 of the Act requires Council to take into account the principles of the Treaty of Waitangi when considering this application. Of particular relevance to this application is the principle of active protection which obliges the Crown to actively protect Māori interests. This principle may also require applicants to investigate alternative options which do not affect Māori relationships with resources. In this particular situation, discharging human effluent (regardless of the level of treatment) to the waterways is abhorrent to Māori who regard the water as very important spiritually and as a food resource. The applicant is investigating alternative options, but requests a further five years for this discharge as the investigations and implementation will take a long time.
55. Section 7 requires Council to have particular regard to certain matters when considering an application. Of relevance to this application is Kaitiakitanga (intergenerational responsibility inherited through whakapapa at birth to care for the environment). Ngāti Kuia hold Rangatiratanga over the lands and water affected by this proposal and have requested they be part of the process identifying the wastewater treatment method.
56. Section 5 states the purpose of the Act is to promote the sustainable management of natural and physical resources. In this particular situation, sustainable management means allowing the applicant to discharge treated municipal wastewater to the Kaituna River, while ensuring the life supporting capacity of the coastal marine area and its ecosystem is safeguarded, and any adverse effects on the environment are avoided, remedied or mitigated. The applicant states there have been no signs of any adverse effects on the instream flora and fauna of the Kaituna River and there is little risk of contamination to humans given the difficult access to the waterway.
57. After weighing the benefits and costs of alternatives of this proposal against the cultural concerns of Māori, I believe this proposal is sustainable in terms of Part 2 of the Act and that the purpose of the Act will be achieved by a grant of consent.

**Consent Duration and Lapse Date**

- 58. A consent duration of five years has been imposed as this term was requested by the applicant.
- 59. I have given a lapse date of 1 February 2021 for this consent. A lapse date is largely irrelevant given the STP is in continual operation.

**Recommended for approval:**



.....  
**Glen Parker**  
**Resource Management Officer**

**Approved:**

.....  
*Anna Eatherley*  
**Anna Eatherley**  
**Marlborough District Council Manager Resource Consents**

*30th January 2019*  
Date

**Approved:**

.....  
*Gina Ferguson*  
**Gina Ferguson**  
**Marlborough District Council Group Leader Consents and Compliance**

*30th January 2019*  
Date

# Additional Important Information for Resource Consent Holders

The following information provided in this information sheet is a guide to the legal rights of applicants and submitters.

If you want to discuss matters raised in this information sheet you are welcome to contact Council. However, if you require specific advice you should contact an independent professional and refer to the relevant sections of the Resource Management Act 1991.

## Commencement of a Resource Consent

Refer to section 116 of the Resource Management Act 1991

- Where no submissions were lodged or any submissions were withdrawn, a resource consent commences, (and may be actioned) on the date of the receipt of the decision.
- Where submissions were lodged to the application, and not withdrawn, the resource consent commences once the time for lodging an appeal has passed, provided no appeals have been received, or when all appeals have been resolved or withdrawn.
- If the resource consent was for activities controlled by the district plan on reclaimed land or land in the coastal marine area, or a restricted activity; then there are specific provisions regarding the commencement of resource consent. These provisions are outlined in section 116 of the Resource Management Act 1991.

## Lapsing

Refer to section 125 of the Resource Management Act 1991

- If no lapse date is specified in the conditions of this consent, the consent will lapse 5 years after the decision date, unless the consent has been actioned (given effect to).

## Conditions of Resource Consent

Refer to section 108 of the Resource Management Act 1991

- If conditions are imposed these will be set out in the decision document.
- Please read your consent and ensure that you fully understand any conditions.
- If you have concerns with any condition(s), in the first instance you should discuss your concerns with Council, although an option may be to lodge an appeal or objection.
- It is a legal requirement that there be **compliance with** all conditions.
- If any conditions are contravened it may be that the Council or members of the public will initiate enforcement action (outlined in Part XII of the Resource Management Act 1991).

## Change or Cancellation of Conditions of Resource Consent

Refer to section 127 of the Resource Management Act 1991

- The consent holder may apply to the Council to change or cancel conditions of the consent, except a condition specifying duration.

## Monitoring Fees

Refer to section 36 of the Resource Management Act 1991 and the Council's Schedule of Fees

- The consent holder will be charged for actual and reasonable costs associated with the monitoring of this consent.

## Objections

Refer to section 357 of the Resource Management Act 1991

- In certain circumstances the applicant has the right to object to the Council's decision.
- Any objection shall be made in **writing** and will need to outline the reasons for the objection.
- An objection needs to be lodged with the Council within **15 working days** of the Council's decision being received by you or your agent.

## Appeals

Refer to Form 16 and sections 120 and 121 of the Resource Management Act 1991

- The applicant and any submitters have the right to appeal the whole or any part of the Council's decision, however there is no right of appeal against the whole or any part of the decision to the extent that the decision relates to one or more of the following, but no other, activities:
  - a) a boundary activity, unless the boundary activity is a non-complying activity;
  - b) a subdivision, unless the subdivision is a non-complying activity;
  - c) a residential activity as defined in section 95A(6), unless the residential activity is a non-complying activity.
- A submitter can only appeal to the Environment Court if their appeal is related to a matter raised in their submission and their submission, or the part of their submission to which the appeal relates, has not been struck out under section 41D of the Resource Management Act 1991.
- A notice of appeal must be lodged with the Environment Court and the Council, within **15 working days** of the Council's decision being received (or received by your agent on your behalf). A copy also needs to be served on the applicant and submitters to the application within 5 working days of the notice being lodged with the Environment Court.

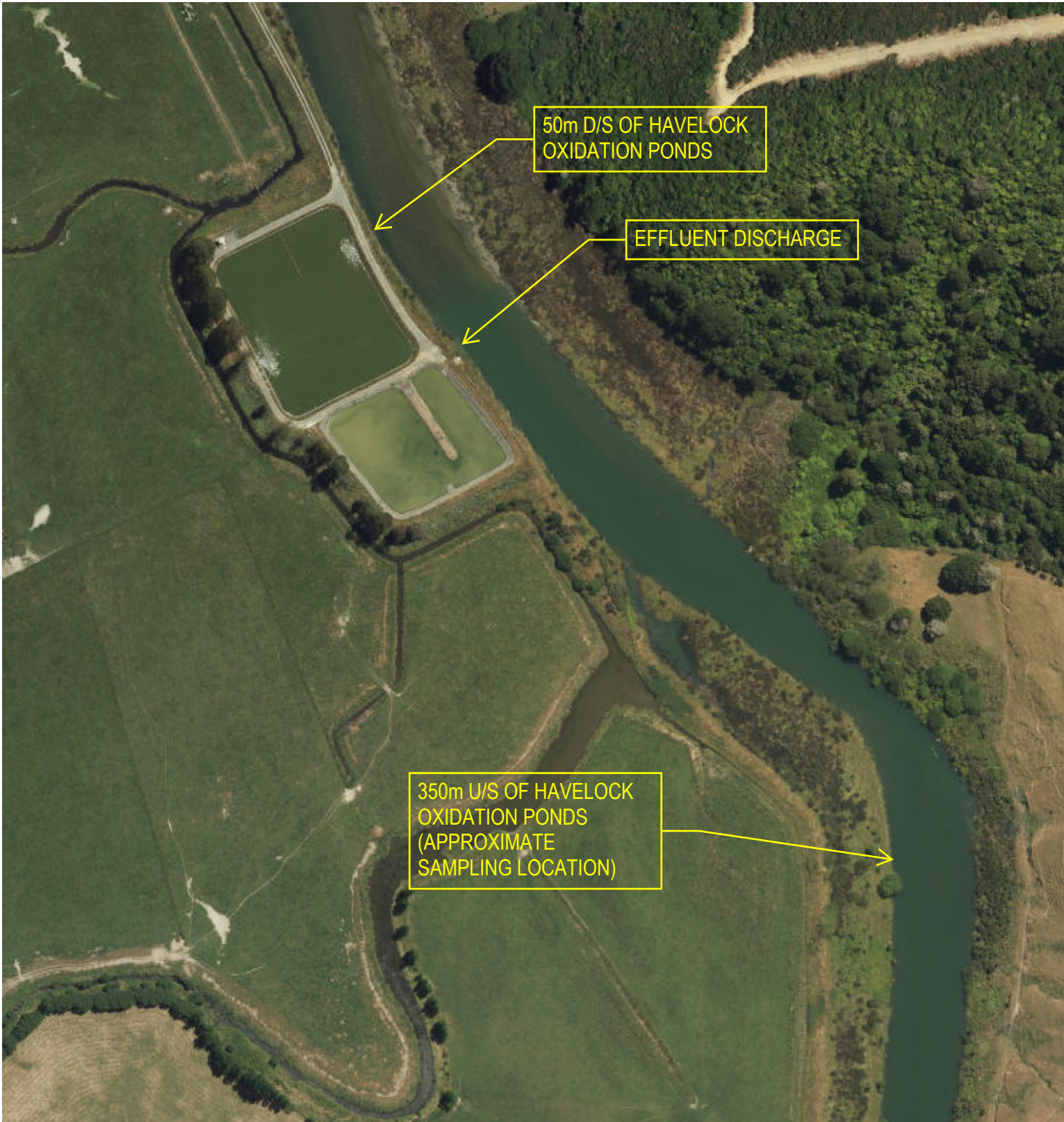
**Before lodging an objection or an appeal it is recommended that you seek professional advice.**

# B

## Appendix B – Havelock Sewage Treatment Ponds and Sampling Locations

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50m D/S OF HAVELOCK  
OXIDATION PONDS

EFFLUENT DISCHARGE

350m U/S OF HAVELOCK  
OXIDATION PONDS  
(APPROXIMATE  
SAMPLING LOCATION)



# C

## Appendix C – Weekly Kaituna River Monitoring Data

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			(uS/cm)	(mg/L)	(number/ 100ml)	(number/100m l)	(cfu/100mL)	(°C)	
Site Name	Date	Time	Conductivity (Field)	Dissolved Oxygen Concentration	E. coli	Enterococci	Faecal Coliforms	Water Temperature (Field)	pH (Field)
Havelock STP - Kaituna River D/S Outfall	7-Feb-19	3:00:00 AM	276.00	9.12	350.00	480.00	350.00	18.30	7.70
Havelock STP - Kaituna River D/S Outfall	14-Feb-19	8:00:00 AM	149.60	7.23	540.00	262.00	540.00	19.80	7.24
Havelock STP - Kaituna River D/S Outfall	21-Feb-19	3:00:00 AM	2930.00	6.92	1600.00	2190.00	1600.00	21.40	7.29
Havelock STP - Kaituna River D/S Outfall	28-Feb-19	8:00:00 AM	1305.00	6.24	1100.00	336.00	1100.00	16.60	7.20
Havelock STP - Kaituna River D/S Outfall	5-Mar-19	3:10:00 PM				74.00	230.00		7.40
Havelock STP - Kaituna River D/S Outfall	15-Mar-19	7:55:00 AM				689.00	5900.00	16.30	7.20
Havelock STP - Kaituna River D/S Outfall	21-Mar-19	1:30:00 AM				20.00	30.00	18.80	7.70
Havelock STP - Kaituna River D/S Outfall	29-Mar-19	9:25:00 AM				548.00	400.00	15.00	7.30
Havelock STP - Kaituna River D/S Outfall	10-Apr-19	3:25:00 AM				63.00	100.00		7.60
Havelock STP - Kaituna River D/S Outfall	18-Apr-19	12:40:00 PM				10.00	120.00		7.20
Havelock STP - Kaituna River D/S Outfall	24-Apr-19	3:45:00 AM				327.00	500.00		7.20
Havelock STP - Kaituna River D/S Outfall	30-Apr-19	10:00:00 AM				52.00	160.00		7.20
Havelock STP - Kaituna River U/S Outfall	5-Mar-19	3:20:00 PM				52.00	2800.00		7.60
Havelock STP - Kaituna River U/S Outfall	15-Mar-19	8:05:00 AM				354.00	550.00	16.60	7.40
Havelock STP - Kaituna River U/S Outfall	21-Mar-19	1:45:00 AM				31.00	70.00	18.80	7.50
Havelock STP - Kaituna River U/S Outfall	29-Mar-19	9:30:00 AM				278.00	600.00	14.90	7.20
Havelock STP - Kaituna River U/S Outfall	10-Apr-19	3:25:00 AM				73.00	200.00		7.80
Havelock STP - Kaituna River U/S Outfall	18-Apr-19	12:30:00 PM				110.00	140.00		7.10
Havelock STP - Kaituna River U/S Outfall	23-Apr-19	3:30:00 AM				328.00	700.00		7.10
Havelock STP - Kaituna River U/S Outfall	30-Apr-19	10:15:00 AM				41.00	130.00		7.20
Havelock STP - OLD Kaituna River U/S Outfall	7-Feb-19	3:00:00 AM	246.00	9.16	1600.00	457.00	1600.00	18.10	7.62
Havelock STP - OLD Kaituna River U/S Outfall	14-Feb-19	8:00:00 AM	157.90	7.12	1600.00	548.00	1600.00	19.80	7.60
Havelock STP - OLD Kaituna River U/S Outfall	21-Feb-19	3:00:00 AM	2900.00	6.49	1600.00	1314.00	1600.00	21.70	6.99
Havelock STP - OLD Kaituna River U/S Outfall	28-Feb-19	8:00:00 AM	1315.00	5.75	490.00	448.00	790.00	16.40	7.71

# D

Appendix D – Cawthron Report