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12 May 2021

Bianca Sullivan  
Director  
enviser  
PO Box 36039  
Merivale  
Christchurch 8146

**By email:** bianca@enviser.co.nz

Dear Bianca

**REQUEST FOR FURTHER INFORMATION – APPLICATIONS CRC203304 AND  
CRC203305 TO DISCHARGE WASTEWATER TO LAND AND THE COASTAL MARINE  
AREA FROM THE MEAT PROCESSING PLANT AT PAREORA**

- 1 Please find **attached** the response by Silver Fern Farms Management Limited to Environment Canterbury's request for further information dated 31 March 2020 in relation to the above.
- 2 We respond to the questions in the same order.
- 3 For completeness, we will be shortly sending an update of the monitoring data collected for the ocean outfall.
- 4 Please do not hesitate to contact us if you have any questions.

Yours sincerely

A handwritten signature in black ink, appearing to read "Alison Johnstone".

Alison Johnstone  
Group Environmental Manager  
Silver Fern Farms



**100% MADE OF NEW ZEALAND**

### **Question 1**

*Please provide an assessment of the frequency and duration of exposure of sensitive receptors to odour from wastewater irrigation, taking into account the location and timing of irrigation, wind conditions and separation distances.*

Please find attached in **Appendix A** an Odour Assessment prepared by Tonkin + Taylor, dated February 2021.

### **Question 2**

*Please provide an up to date record (to the present day) of all complaints regarding air quality, land discharge and coastal discharge.*

Silver Fern Farms was informed of an odour complaint by Environment Canterbury on the 28 November 2018 but the date of the actual complaint to the Environment Canterbury was on the 24<sup>th</sup> October. The odour may have been generated by wastewater being held in irrigation lines over a long weekend but without more information on the nature of the complaint and delay in receiving notification, no further investigation could be undertaken.

Please note that Section 5.3 of the Tonkin + Taylor report discusses the long-term trends in odour complaints.

### **Question 3**

*Please provide an updated assessment of groundwater users in the area post-2016.*

As shown in **Appendix B**, Canterbury Map Viewer indicates there are thirty-five active wells between the State Highway 1 and coastal marine area in the vicinity of Pareora.

### **Question 4**

*Please provide an addendum to the Lowe Environmental Report (Appendix 1) that show data collected from 2016-present with updated tables, an updated commentary and updated conclusions based on the most recent data.*

Please find attached in **Appendix C** an addendum to the Lowe Environmental Impact Report, dated April 2021.

### **Question 5**

*The draft consent condition states 'discharge shall not exceed a rate of 8,300 cubic metres per day'. However, on page 20 of Appendix 4 it is stated that 'utilisation of existing extent for land treatment to discharge up to 3,000 m<sup>3</sup>/d during summer'. Please explain why you have applied to discharge 8,300 m<sup>3</sup>/day to land and if you will ever discharge this daily quantity to land.*

The report prepared by Lowe Environmental Impact attached in **Appendix C** states that the 95-percentile peak loading to land during the period 2016-2019 was calculated as 3,280 m<sup>3</sup>/d (see Executive Summary). This is consistent with the approximation of up to 3,000 m<sup>3</sup>/d to land set out on page 20 of Pattle Delamore report attached in Appendix 4 of the AEE.

It is important to note, however, that on occasions the volume of wastewater discharged to land and sea has exceeded 8,000 m<sup>3</sup>/d, and; furthermore, 6,938 m<sup>3</sup>/d has been disposed onto land previously during a dry 2012/2013 season.<sup>1</sup>

It is prudent to allow as a contingency for all of the wastewater design flow<sup>2</sup> to go to land for a period of time in the event there was a maintenance breakdown of any equipment that prevented the discharge to the sea.

Putting aside the issue of contingency, the proposed PCDAF wastewater treatment plant should reduce the level of nitrogen in the treated wastewater; and, if there are no hydraulic constraints for land treatment for a period of time, then the plant should be able to divert more treated wastewater onto land than is currently the case.

While the discharge to land is still subject to the on hydraulic and nitrogen loading conditions, it is worth noting that in the event all wastewater is diverted to land on a given day, then based on proposed 20 mm peak application depth, the amount of land area required would be 41.5 ha. The site has access to 140.6 ha of irrigable land at all times.

For these reasons, Silver Fern Farms is seeking the ability to discharge all wastewater generated from the site onto land as part of the land discharge consent application.

## **Question 6**

*Please provide an assessment of the cumulative impacts of the ocean outfall with regard to other nearby potential coastal discharges (Timaru municipal wastewater, Fonterra Studholme, Oceania Dairy Glenavy).*

Please find attached in **Appendix D** a letter from Cawthron dated 19<sup>th</sup> May 2020 that addresses this question.

## **Question 7**

*Please provide an assessment of the ocean outfall discharge with regard to the Fisheries New Zealand proposed south eastern South Island marine protected area.*

A sixteen person Forum, called South-East Marine Protection Forum, was established in 2014 to examine sites from Timaru down to Waipapa Point in Southland that are deserving of marine protection. The Forum was also asked to consider the type of marine protection

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<sup>1</sup> See Figure 5.1(b) contained in Part A of the AEE for the total combined (page 40) and Section 3 of the LIE Addendum Report for the discharge to land

<sup>2</sup> The design flow is based on combined total stream volume of 7,545 m<sup>3</sup>/d. Allowing for a 10% factor of safety and accounting for any seasonal variation, the total peak volume discharged for condition and compliance purposes is proposed to be set at 8,300 m<sup>3</sup>/d

needed for the identified sites. In 2018 the Forum, after public consultation, provided a recommendations report to the Minister of Conservation and the Minister of Fisheries with two network options for them to consider.<sup>3</sup>

Since the application has been relodged in January 2020, the Ministers announced their preferred option<sup>4</sup> but agreed to consult further with Treaty partners and the public on the proposed network. The consultation document is called the "Proposed southeast marine protected areas - Consultation Document [June 2020]) and hereafter is referred to as the pSMPA. Submissions on the pSMPA closed in August 2020 but no final decisions have as yet been made.

The coastal marine area south of Timaru down to approximately the Waihao River is subject to a proposed Type 2 Marine Protection Area and a kelp protection area as shown in **Figure 1**. The Type 2 Marine Protection Area is called the "Tuhawaiki Type 2 MPA" and the includes four coastal habitat types called moderate gravel beach, moderate shallow mud, moderate shallow sand, and moderate shallow gravel. The northern section of Tuhawaiki Type 2 MPA extends approximately 7km out to sea and then narrows to about 2.8km from Paerora south.

The reasons why Tuhawaiki Type 2 MPA has been identified is because the waters south of Timaru are an important nursery area for school sharks (*Galeorhinus galeus*) and a spawning area for elephant fish (*Callorhinchus milii*). In addition, this area is particularly significant for pahu/Hector's dolphins (*Cephalorhynchus hectori*), kororā/little blue penguins, hoiho/yellow-eyed penguins (particularly juveniles in their pelagic phase) and a range of sessile invertebrates, indicating its wider ecological value, which would be enhanced by establishment of the proposed protection area.

The site is proposed to be protected by prohibiting a range of fishing methods pursuant to the Fisheries Act 1996 (see page 39). There are no restrictions on discharges as this is a matter addressed under the Resource Management Act, 1991

Section 7.2.2 of the AEE previously discussed this matter and states that no adverse effects on fish populations have been identified (page 72) and also observes that elephant fish rig and school shark are located northward of the discharge (page 58).

Although there are no restrictions on discharges, the Forum group in 2018 noted that point source discharges, including city or district council's stormwater and wastewater discharges, and ocean outfalls from meat-processing works, as well as non-point source discharges such as nutrient run-off from farmland or sediment from disturbed land all impact on marine habitats and ecosystems.

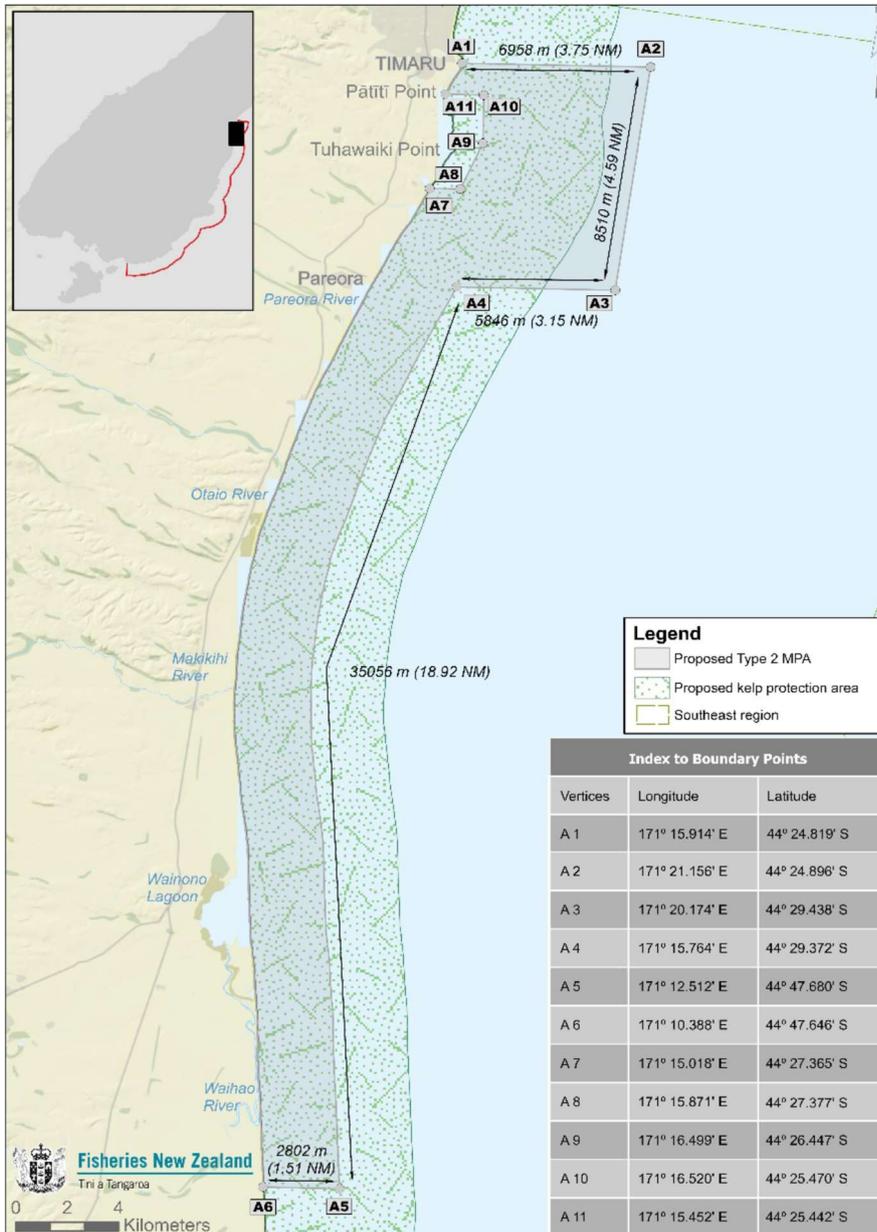
The Forum goes on to recommend that the region's regional and district councils with jurisdiction over activities that could affect the coastal environment in the Forum region ensure that the necessary monitoring and integrated management of land use and land disturbance is carried out to actively address the issues of concern, and protect and safeguard the coastal habitats and ecosystems. The Forum also recommends that central

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<sup>3</sup> South-East Marine Protection Forum (Roopu Manaaki Ki Te Toka) - Recommendations to the Minister of Conservation and the Minister of Fisheries (February 2018)

<sup>4</sup> The larger Network 1 option was adopted for consultation which covers 1,267 km<sup>2</sup> and includes 18 of the 22 coastal habitats in the forum area, seven of 12 estuarine habitats and two biogenic habitats

and local government undertake greater advocacy to protect and better manage marine habitats and ecosystems. These are matters that would be examined during the reviews of these plans, after carrying out the necessary section 32 evaluations under the RMA to determine the appropriate policies and rules.



**Figure 1:** Locations of the proposed Tuhawaiki Type 2 Marine Protected Area (MPA) and the kelp protection area. **Source:** pSMPA (page 38).

The kelp protection area runs from Timaru south to Dunedin Peninsula. Kelp forests (dominated by *Macrocystis pyrifera*) have been likened to terrestrial forests in their structure and ability to support many other species. The pSMPA notes the decline in kelp forests can be linked to increased sedimentation from land and other stressors, and kelp harvesting adds an additional and unwarranted risk to the value provided by this species (page 48). The pSMPA seeks to control the harvesting of kelp.

The coastline in the vicinity of the outfall comprises a high energy, shifting-gravel beach environment which does not appear to be conducive for kelp habitat. None of previous investigation work has raised the issue of kelp forests.

### Question 8

*Please provide information on what 'unused connections' are in the waste streams.*

There are pipes that were laid at the plant but have not been used to date or pipes that were used but are now redundant. The pipes could potentially be used to further separate different wastewater streams from within the plant or separate stormwater from plant wastewater. This work is on-going.

### Question 9

*Please provide information on pathogens in the discharged wastewater. What are the pathogenic micro-organisms that could be in the wastewater and at what concentrations do they occur? What impact could these micro-organisms have on the marine mammals that frequent the coastal waters in proximity to the wastewater discharge?*

Timaru is considered to be a local hot-spot for Hector's Dolphin<sup>5</sup> although it is noted that Pareora is south of Timaru and is part of a large, gravel dominated beach system, that continues southwards.

Hector's dolphins often frequent the near shore, seeking out fish like red cod, sole, pink cod and arrow squid, and has been seen by Silver Fern Farm's staff on occasions in the vicinity of the outfall.

Research work in the last ten years has revealed greater numbers of Hector's dolphin both north and south of Bank Peninsula generally, and as a consequence the Banks Peninsula Marine Mammal Sanctuary was extended to the north and south in November 2020 as shown in **Figure 2**.<sup>6</sup>

Silver Fern Farms are unaware of any seal colonies in the vicinity of the outfall although individual seals have been seen transiting through the area on occasions in the past.<sup>7</sup>

With respect to pathogenic micro-organisms, Silver Fern Farms monitor both in-pipe and receiving environment concentrations of *Enterococci* and faecal coliforms. Part B of the AEE (page 38) states that the in-pipe concentration is variable depending on stock being processed at the time, and how much wastewater is generated. *Enterococci* is however a much better indicator of the receiving marine environment due to being salt tolerance and more persistent generally.

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<sup>5</sup> But noting the major populations are around Banks Peninsula, Clifford Bay and Cloudy Bays with 87% of Summer and 67% of winter sightings recorded within these general regions – see Ministry of Primary Industries New Zealand Aquatic Environment and Biodiversity Report No. 123: *Abundance and distribution of ECSI Hector's dolphin*, D.L. MacKenzie and D.M. Clement. March 2014.

<sup>6</sup> The Marine Mammal Sanctuary primary task is to control set netting and also the detonation of underwater explosives

<sup>7</sup> Hector's dolphin is classified as 'Nationally Vulnerable' under the New Zealand Threat Classification System New Zealand whereas New Zealand fur seal is classified as 'Not Threatened' by the New Zealand Threat Classification System

Pathogenic diseases of potential terrestrial origin that may potentially affect marine mammals include *Klebsiella pneumoniae*, Tuberculosis and Toxoplasmosis although at present the pathogen of most interest is toxoplasmosis.<sup>8</sup>

Evidence indicates that Toxoplasmosis is likely to be the second major threat to Hector's behind set nets. Cats are the only known animal in which the toxoplasma parasite can reproduce. The oocysts (eggs) are spread via cat faeces and can survive for many months in the environment. Rainwater and run-off transport the oocysts into the marine ecosystem through streams, rivers and stormwater drains.

Most types of warm-blooded animals, including humans, can be an intermediate host of toxoplasmosis. In other words, many animals can be infected by the parasite but do not spread it. For example, sheep are a known intermediate host; although, there is no evidence that the oocysts are spread in the faeces of sheep (unlike cats that are the primary host as noted above).

Given the meat processing plant includes sheep there will be a potential for oocysts in the waste stream depending on whether the sheep have been infected. A general review of the literature indicates that pH treatment from a PCDAF or associated UV disinfection are not effective in killing the oocysts.<sup>9</sup>

Silver Fern Farms sampled for oocysts at Pareora and its Finegand plant located in Balclutha. While only a single snapshot test, the results (see **Appendix E**) did not pick up any oocysts in the waste stream.<sup>10</sup> Even if there had been a positive result, it would be difficult to translate this into the degree of risk this poses to individual Hector's. As noted earlier, the presence of the oocysts in the environment generally would be a confounding factor.

Silver Fern Farms staff have not seen any dead Hector's dolphin stranded on the beach in the vicinity of the outfall. The Department of Conservation were also contacted to obtain any incident records in the vicinity of Pareora but no information was supplied.

Tuberculosis is a bacterial disease that has been detected in New Zealand sea lions, New Zealand fur seals and a Hector's dolphin; where the strain detected in the Hector's dolphin had only previously been detected in New Zealand cattle.<sup>11</sup>

The risk of TB being present in wastewater being discharged from Pareora is low. OSPRI<sup>12</sup> manage a national programme for the control of Bovine Tuberculosis called "TBfree". The programme aims to eradicate bovine TB from New Zealand. A National Bovine Tuberculosis Pest Management Plan has been prepared as part of the TBfree programme, pursuant to

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<sup>8</sup> Pers comm. Kristina Hillock (Marine Ecologist at the Department of Conservation). Also refer to Department of Conservation Fact Sheet R164543

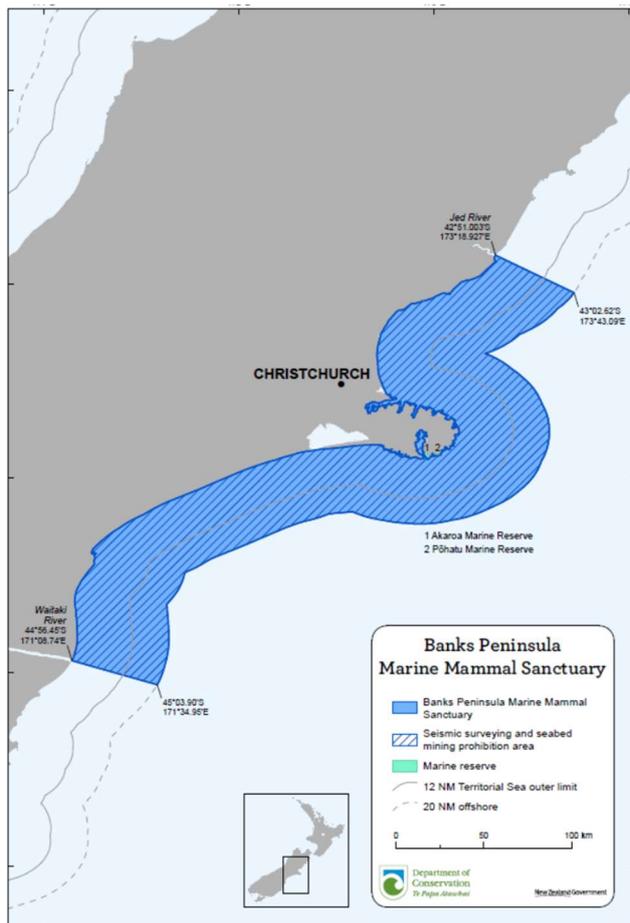
<sup>9</sup> Pers comm Azam Khan, Pattle Delamore Partners Limited

<sup>10</sup> There is no validated method for the detection of toxoplasmosis in this wastewater available. However, the PCR method used here is a well understood and used method for detection of toxoplasmosis and is validated for other sampling regimes and there is considered to give an indication of the presence of Toxoplasma

<sup>11</sup> Refer to <https://doi.org/10.1371/journal.pone.0212363>

<sup>12</sup> A Partnership between primary industries and the government

the Biosecurity Act 1993 and the Biosecurity (National Bovine Tuberculosis Pest Management Plan) Order 1998.



**Figure 2:** Recent expansion of the Marine Mammal Sanctuary set out in Marine Mammals Protection (Banks Peninsula Sanctuary) Amendment Notice Sep 2020

Under the Plan all cattle and deer are registered with OSPRI and are tested on farm every 1-5 years (testing frequency and pre-movement testing depends on an assessment of the TB risk of the herd and the area).

Animals that test positive on farm (Positive reactors) are identified with orange tags and sent for slaughter. Pareora do not routinely slaughter positive reactor animals and none have been processed in the recent past.

All animals slaughtered are inspected post mortem, any suspicious TB lesions found during this process are further tested to confirm the presence/absence of TB. There have been two occasions in the last year where suspect TB lesions have been identified but further testing confirmed that they were negative for TB.

UV-disinfection is known to provide a reasonable control of *Mycobacterium Tuberculosis* and it is also likely that low pH treatment in a PCDAF reduces the bacteria.<sup>13</sup>

*Klebsiella pneumoniae* is a bacterial disease that causes high pup mortality of New Zealand sea lions which has been detected in individuals both in the subantarctic and at Otago and for which anthropogenic exposure has not been ruled out.<sup>14</sup> The proposed PCDAF is again expected to kill at least some of the bacteria during treatment and UV-disinfection.

### **Question 10**

*In the proposed consent conditions the maximum daily volume to be discharged into the sea is 3,700 m<sup>3</sup>/day less than allowed for by the current consent, but the rate of 1,200m<sup>3</sup>/hour has not reduced. Please provide clarity on why this rate has not been reduced.*

Pattle Delamore has assumed a total design flow of 7,545 m<sup>3</sup>/d, with a peaking flow of 830 m<sup>3</sup>/hr (see Appendix 4 of the AEE, page 9). This volume however does not take into account of any stormwater ingress into the wastewater reticulation system nor the risk of flood water ingress into the existing wastewater collection system. These additional inflows need to be accounted for.

The higher rate of discharge is to allow all wastewater including floodwater/stormwater that is entrained within the wastewater treatment system to be pumped to the sea outfall discharge at a higher rate, noting there is no post-treatment buffering of the flows prior to discharge after treatment using the PCDAF.

Once the waste separation works completed and further progress is made on separation and diversion of stormwater, then the rate of discharge can be reviewed.

### **Question 11**

*Please provide a detailed explanation of why the percentage of wastewater discharged to the sea has increased each year and the percentage discharge to land has decreased each year. Please provide updated wastewater volumes (including 2018-2019 data) and the related graphs and tables (Report B Figure 4.2.2.1 (a) and Table 4.2.2.1) with updated commentary and updated conclusions.*

There are two main variables that influence the percentage split between sea and land: the total volume of wastewater being discharged and soil-moisture (hydraulic) conditions of the land subject to irrigation.

Since the pivot upgrades were completed in 2015 and 2016, the wastewater volume discharged to land has been relatively consistent, from 534,367m<sup>3</sup> to 594,048 m<sup>3</sup> each year as shown in the **Table 1**. In other words, the land can take some 500,000 m<sup>3</sup> to 600,000 m<sup>3</sup> of waste each year under normal weather conditions without excessively

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<sup>13</sup> Pers comm Azam Khan, Pattle Delamore Partners Limited

<sup>14</sup> Refer Veterinary Microbiology 122(1-2): 178-184

saturation of the soil (the soil exceeding field capacity). This volume may increase however if conditions were to be particularly dry (see the answer question 5).

The wastewater volume discharged to sea on the other hand varies from 311,789 m<sup>3</sup> to 641,997 m<sup>3</sup> each year. Any increases in total wastewater volumes will see a proportional increase in discharges to sea.

| Year      | Land    | Sea     | Total     | Land % | Sea % |
|-----------|---------|---------|-----------|--------|-------|
| 2015-2016 | 594,089 | 311,789 | 905,878   | 66%    | 34%   |
| 2016-2017 | 534,367 | 444,811 | 979,178   | 55%    | 45%   |
| 2017-2018 | 556,581 | 641,997 | 1,198,578 | 46%    | 54%   |
| 2018-2019 | 543,715 | 499,322 | 1,043,037 | 52%    | 48%   |

**Table 1:** Total Waste Volumes from 2015 to 2019. **Source:** Silver Fern Farms

The 2014 - 2015 season saw the highest volume of wastewater discharged to land. During that season a medium-scale adverse drought was declared for the Timaru area. The drought enabled a greater volume of wastewater to be discharged to land before reaching saturation.

As discussed in the answer to Question 5, the preference would continue to be to discharge to land subject to hydraulic constraints and nitrogen loading.

## **Appendices – Attached in Digital Files**

Appendix A – Odour Assessment prepared by Tonkin + Taylor

Appendix B – Groundwater users shown on Canterbury Map Viewer

Appendix C – Lowe Environmental Impact Addendum Report

Appendix D – Cawthron Letter

Appendix E – Toxoplasmosis Results