

# **Massey Pond Calculator Reports**

# Dairy Effluent Storage Calculator

## Summary Report

**Regional authority:** Environment Southland Regional Council  
**Authorised agent:** Q Scandrett Dairy Green Ltd  
**Client:** White Waters  
**Program version:** 1.48  
**Report date:** Tuesday, 1 May 2018

**General description:**

DESC run to support a consent renewal application

Seasonal supply, milking maximum cow numbers of 559.

Water use of 40 L/cow/day with a minimum volume of 10 m<sup>3</sup> for shoulders of season.

Pump sumps entered as one storage tank

Existing Hynds megapond entered as storage tank

Slurry tanker used for application, 12,000 L capacity

Low rate system run direct from pump sump

Umbilical system used as required

Small number of cows has been entered in the animal shelter to allow for effluent generated by calves in a covered shed with wood chip bedding.

### Climate

**Rainfall site:** Te Anau Downs  
**Mean annual rainfall:** 1363 mm/year

### Effluent Block

**Area of low risk soil:** 0.0 hectares  
**Minimum area of high risk soil:** 70.0 hectares  
**Surplus area of high risk soil:** 0.0 hectares

### Wash Water

**Yard wash:**

- Milking season starts: 25 August  
 - Milking season ends: 31 May

Month	Number of Cows	Hours in Yard	Wash Volume (cubic metres)
January	599	3.0	23.9
February	599	3.0	23.9
March	599	3.0	23.9
April	400	2.0	16.0
May	180	1.5	10.0
June	0	0.0	0.0
July	0	0.0	0.0
August	110	1.0	10.0
September	360	2.0	14.5
October	500	3.0	20.0
November	550	3.0	22.0
December	599	3.0	23.9

**Animal sheiter wash:**

Month	Number of Cows	Hours in Shelter	Wash Volume (cubic metres)
January	0	0.0	0.0
February	0	0.0	0.0
March	0	0.0	0.0
April	0	0.0	0.0
May	0	0.0	0.0
June	0	0.0	0.0
July	0	0.0	0.0
August	5	2.0	0.0
September	5	2.0	0.0
October	5	2.0	0.0
November	0	0.0	0.0
December	0	0.0	0.0

**Irrigation**

Winter-spring depth:	3 mm
Spring-autumn depth:	5 mm
Winter-spring volume:	60 cubic metres
Spring-autumn volume:	96 cubic metres
Irrigate all year?	No
Don't irrigate start:	10 June
Don't irrigate end:	31 July

**Catchments**

Yard Area:	730 square metres
Diverted?	Yes
- diversion start:	31 May
- diversion end:	25 August
Shed Roof Area:	225 square metres
Diverted?	Yes
Feedpad Area:	0 square metres
Covered?	No
Diverted?	No
Animal Shelter Area:	25 square metres
Covered?	Yes
Diverted?	Yes
- diversion start:	01 November
- diversion end:	15 August
Other Areas:	0 square metres

**Storage**

Pond/s present?	No
Tank/s present?	Yes
No. of tanks:	2 tank/s
Tank 1	
- total volume:	1498 cubic metres
- pumpable volume:	1238 cubic metres
- surface area:	651 square metres
- diameter:	28.8 metres
- total height:	2.3 metres
- pumped?	Yes
Tank 2	

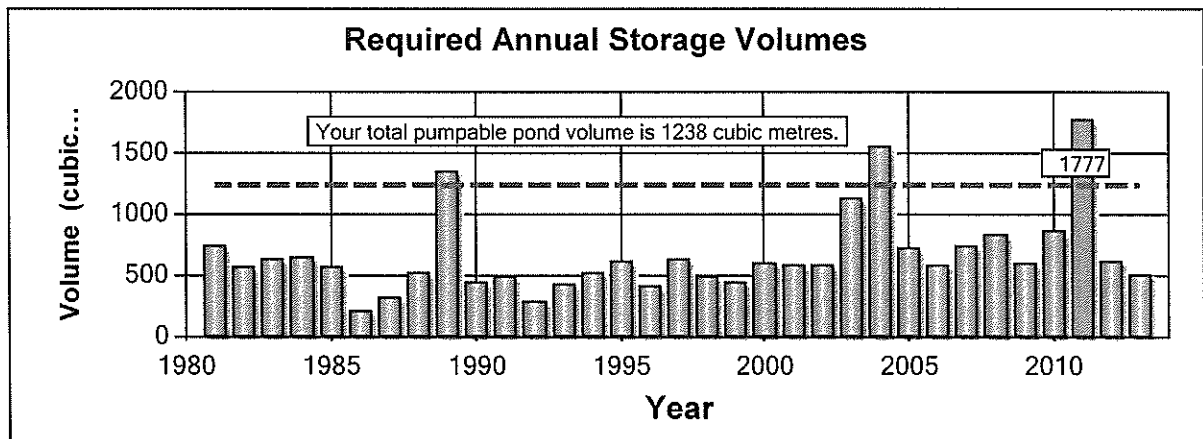
- total volume: 32 cubic metres
- pumpable volume: 29 cubic metres
- surface area: 10 square metres
- diameter: 3.5 metres
- total height: 3.3 metres
- pumped? No
- Emergency storage period: 0 days

**Solids Separation**

Solids separator/s present? No

**Outputs**

Maximum required storage pond volume: 1777 cubic metres  
 90 % probability storage pond volume: 1107 cubic metres  
 During the period from: 01 July 1980  
 To: 30 June 2013



# Dairy Effluent Storage Calculator

## Summary Report

**Regional authority:** Environment Southland Regional Council  
**Authorised agent:** Q Scandrett Dairy Green Ltd  
**Client:** White Waters  
**Program version:** 1.48  
**Report date:** Wednesday, 25 July 2018

**General description:**

DESC run to support a consent renewal application

Seasonal supply, milking maximum cow numbers of 599.

Water use of 40 L/cow/day with a minimum volume of 10 m<sup>3</sup> for shoulders of season.

Pump sumps entered as one storage tank

Existing Hynds megapond entered as storage tank

Pulsed low rate effluent application, 18,000 L/hour

Slurry tanker used during summer, 12,000 L capacity

Well drained Te Anau soils with low and high risk areas which are determined by topography

Small number of cows has been entered in the animal shelter to allow for effluent generated by calves in a covered calf rearing shed with wood chip bedding.

### Climate

**Rainfall site:** Te Anau Downs  
**Mean annual rainfall:** 1363 mm/year

### Effluent Block

**Area of low risk soil:** 10.0 hectares  
**Minimum area of high risk soil:** 70.0 hectares  
**Surplus area of high risk soil:** 0.0 hectares

### Wash Water

**Yard wash:**

- Milking season starts: 25 August  
 - Milking season ends: 31 May

Month	Number of Cows	Hours in Yard	Wash Volume (cubic metres)
January	599	3.0	23.9
February	599	3.0	23.9
March	599	3.0	23.9
April	400	2.0	16.0
May	180	1.5	10.0
June	0	0.0	0.0
July	0	0.0	0.0
August	110	1.0	10.0
September	360	2.0	14.5
October	500	3.0	20.0
November	550	3.0	22.0
December	599	3.0	23.9

**Animal shelter wash:**

Month	Number of Cows	Hours in Shelter	Wash Volume (cubic metres)
January	0	0.0	0.0
February	0	0.0	0.0
March	0	0.0	0.0
April	0	0.0	0.0
May	0	0.0	0.0
June	0	0.0	0.0
July	0	0.0	0.0
August	5	2.0	0.0
September	5	2.0	0.0
October	5	2.0	0.0
November	0	0.0	0.0
December	0	0.0	0.0

**Irrigation**

Winter-spring depth:	3 mm
Spring-autumn depth:	5 mm
Winter-spring volume:	60 cubic metres
Spring-autumn volume:	96 cubic metres
Irrigate all year?	No
Don't irrigate start:	10 June
Don't irrigate end:	31 July

**Catchments**

Yard Area:	1069 square metres
Diverted?	Yes
- diversion start:	31 May
- diversion end:	25 August
Shed Roof Area:	225 square metres
Diverted?	Yes
Feedpad Area:	0 square metres
Covered?	No
Diverted?	No
Animal Shelter Area:	25 square metres
Covered?	Yes
Diverted?	Yes
- diversion start:	01 November
- diversion end:	15 August
Other Areas:	0 square metres

**Storage**

Pond/s present?	No
Tank/s present?	Yes
No. of tanks:	2 tank/s
Tank 1	
- total volume:	1498 cubic metres
- pumpable volume:	1238 cubic metres
- surface area:	651 square metres
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- total height:	2.3 metres
- pumped?	Yes
Tank 2	

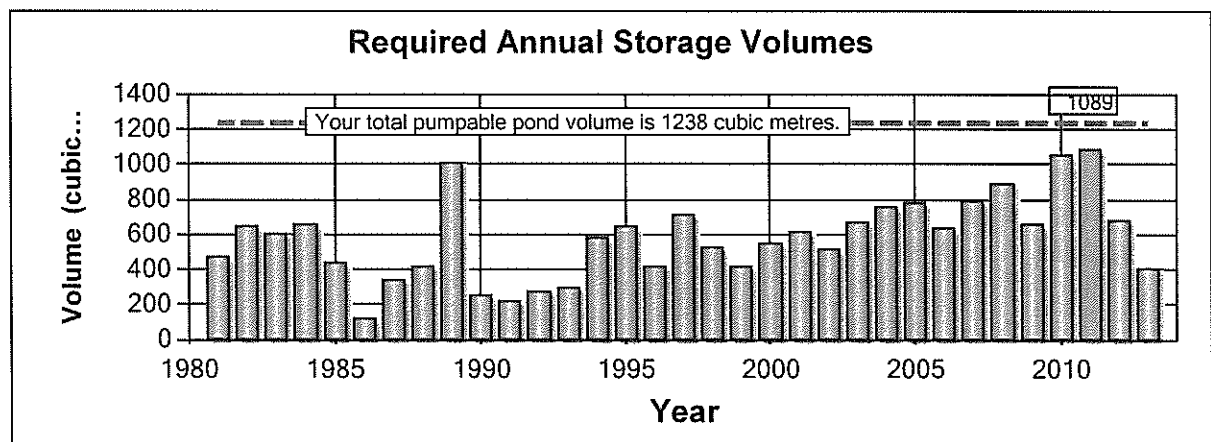
- total volume:	32 cubic metres
- pumpable volume:	29 cubic metres
- surface area:	10 square metres
- diameter:	3.5 metres
- total height:	3.3 metres
- pumped?	No
Emergency storage period:	0 days

### Solids Separation

Solids separator/s present? No

### Outputs

Maximum required storage pond volume:	1089 cubic metres
90 % probability storage pond volume:	886 cubic metres
During the period from:	01 July 1980
To:	30 June 2013



# Submissions





Department of  
Conservation  
*Te Papa Atawhai*



DOCDM-5516974

27 June 2018

Environment Southland  
Private Bag 900116  
Invercargill 9840

Attention: Emily Allan – Consents Officer

Dear Emily,

**WHITE WATER LTD – APP-20181247**

I refer to the application by White Waters Ltd for a discharge permit and water permit at 893 Kakapo Road, RD2, Te Anau.

Please find enclosed a submission by the Director-General of Conservation in respect of this application. You will notice the submission opposes the application as currently proposed. The Department considers that the application does not adequately avoid, remedy or mitigate the adverse effects of the proposed activity. The submission identifies the Director-General's concerns.

Please contact Amelia Ching in the first instance if you wish to discuss any of the matters raised in this submission (Phone: 0276277705 Email: [aching@doc.govt.nz](mailto:aching@doc.govt.nz)).

Yours sincerely

Greg Lind  
Operations Manager  
Te Anau

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**Form 13: Submission on publicly notified application concerning resource consent**

**Resource Management Act 1991**

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**To:** Southland Regional Council

**Name of submitter:** Lou Sanson, Director-General of Conservation

**Applicant:** White Waters Ltd

**Locations:** 893 Kakapo Road, RD 2 Te Anau at about NZTM 2000 1198501E  
4959661N

**Description of activity:** Discharge Permit  
To discharge dairy shed effluent and calving pad effluent to land from up to 599 cows by slurry tanker at 5mm depth. The proposal is a restricted discretionary activity under Rule 50(d)(ii) of the Southland Regional Water Plan and is a non-complying activity under Rule 35(d) of the proposed Southland Water and Land Plan (notified version).

Water Permit  
To take up to 40,000 litres per day of groundwater from a bore in the Te Anau Groundwater Zone. The proposal is a restricted discretionary activity under Rule 23(c)(i) of the Southland Regional Water Plan and a permitted activity under Rule 54(a) in the proposed Southland Water and Land Plan (notified version).

**Application number:** APP-20181247

**My submission relates to:** The discharge permit application. The Director-General does not oppose the water permit application to take and use up to 40,000l/day of groundwater from a bore in the Te Anau Groundwater Zone for dairy shed use and stock drinking water.

**My submission is:** I oppose the discharge permit application as currently proposed.

- use of low depth irrigation;
- use of an effluent storage tank.

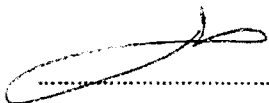
The D-G is concerned that the application relies on these good management practices to minimise the effects, however, no certainty is provided that the good management practices that are proposed are sufficient to ensure adverse effects are avoided, remedied or mitigated.

**Decision sought:**

1. That the council impose and enforce appropriate consent conditions on a short-term consent with regard to best management practice on farm, avoidance of discharge of contaminants to sensitive areas of the property and/or when ground conditions are not suitable.
2. Consent duration to align with the freshwater management unit limit setting process.
3. Any consequential amendments to any consent conditions required to give effect to the above submission.

I do wish to be heard in support of my submission.

If others make a similar submission, I will consider presenting a joint case with them at a hearing.



Greg Lind

Operations Manager

Te Anau

Acting pursuant to delegated authority from the Director-General of Conservation

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Date: 27 June 2018

Note: A copy of the Instrument of Delegation may be inspected at the Director-General's office at Conservation House Whare Kaupapa Atawhai, 18/32 Manners Street, Wellington 6011

**The reasons for my submission are that:**

1. The Department of Conservation has statutory functions under the Conservation Act 1987 to protect recreational freshwater fisheries and freshwater fish habitats and preserve as far as practicable, indigenous freshwater fisheries (including specific powers for the Director-General under section 53(3)(d)), and to advocate for the conservation of natural resources generally under section 6(ab) and 6(b).
2. The property is 227 hectares of land which is generally described as undulating and is located approximately 11km north-east of Te Anau. Three unnamed tributaries of the Whitestone River run through the 103.5ha discharge area. The property is predominantly located within the mid – upper reaches of the Whitestone River catchment (approximately 89% - 203ha) and Upukerora River catchment (approximately 11% - 23ha). The Whitestone River flows into the Mararoa River which is a tributary of the Waiau River. The Upukerora River flows to Lake Te Anau, which is a statutory acknowledgement area under schedule 58 of the Ngai Tahu Claims Settlement Act 1998.
3. As currently configured, the application is:
  - contrary to Part 2 of the RMA by not achieving the sustainable management purpose in section 5;
  - inconsistent with the National Policy Statement for Freshwater Management 2014 (amended 2017) Water Quality including: Objectives A1 and C1 and Policies A2, A3 and A4;
  - inconsistent with the Southland Regional Policy Statement 2017 including: Objectives WQUAL.1, WQUAL.2, BIO.1, BIO.2, AND BIO.3; and Policies WQUAL.1, WQUAL.2, WQUAL.3, BIO.2 and BIO.4;
  - inconsistent with the Southland Regional Water Plan including: Objectives 2, 4, 9C, and 10; Policies 3, 4, 25, 31A, 31C, 41, 42, and 43; and Appendix G;
  - inconsistent with the proposed Southland Regional Water and Land Plan including: Objective 1, 6, 13A, 14, and 18; Policies 36, 13, 15A, 16, 17, 39A, and 41; and Appendices A and E.
4. The Applicant has proposed to use good management practices to minimise adverse effects arising from the activity. These measures are:
  - adherence to standard Council buffer distances between the discharge area and nearby waterways to reduce the risk of overland flow of effluent into waterways. A 20 metre buffer for the discharge of contaminants will be in place from any internal waterways;

**Address for service:**

RMA Shared Services

Department of Conservation

Private Bag 4715

Christchurch Mail Centre 8140

**Attn: Amelia Ching**

## Bronwyn Auckram

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**From:** Mikayla Scott on behalf of Facility Manager  
**Sent:** Wednesday, 27 June 2018 4:04 p.m.  
**To:** Bronwyn Auckram  
**Subject:** FW: White Waters Ltd - Notified Resource Consent - DOC submission  
**Attachments:** RMA Southland Notified Resource Consent - White Waters Ltd - DOC submission - DOC-5517160.pdf

Submission ☺

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**From:** Amelia Ching [<mailto:aching@doc.govt.nz>]  
**Sent:** Wednesday, 27 June 2018 4:03 p.m.  
**To:** Emily Allan; Facility Manager; Consents Team  
**Subject:** White Waters Ltd - Notified Resource Consent - DOC submission

Dear Emily

Please find attached a submission by the Director-General of Conservation opposing the publicly notified application APP-20181247 by White Waters Ltd for a discharge permit.

A copy of the submission has been posted to the Applicant's consultant.

Yours sincerely

**Amelia Ching**  
RMA Planner  
Department of Conservation—*Te Papa Atawhai*  
M: +64 27 6277 705

**Christchurch Office**  
161 Cashel Street, Christchurch 8011 | Private Bag 4715, Christchurch 8140, New Zealand

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## Bronwyn Auckram

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**From:** Mikayla Scott on behalf of Facility Manager  
**Sent:** Tuesday, 26 June 2018 3:42 p.m.  
**To:** Bronwyn Auckram  
**Subject:** FW: White Waters Ltd - Fish & Game written submission on APP-20181247 for discharge permit - 26-06-2018.pdf  
**Attachments:** White Waters Ltd - Fish & Game written submission on APP-20181247 for discharge permit - 26-06-2018.pdf



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**From:** Jacob Smyth [<mailto:jacob.smyth@southlandfishgame.co.nz>]  
**Sent:** Tuesday, 26 June 2018 3:37 p.m.  
**To:** Facility Manager  
**Subject:** White Waters Ltd - Fish & Game written submission on APP-20181247 for discharge permit - 26-06-2018.pdf

Dear Sir / Madame

Please find attached a written submission by Fish & Game New Zealand – Southland Region opposing the publicly notified application APP-20181247 by White Waters Ltd for a discharge permit.

I understand that submissions close at 5:00pm on Wednesday, 27 June 2018.

A copy of the submission has been posted to the Applicant's consultant.

Yours sincerely

A handwritten signature in black ink that reads "Jacob Smyth".

Jacob Smyth  
Resource Management Officer  
Fish & Game New Zealand – Southland Region



## **Submission on Application for Resource Consent**

**To:** Environment Southland  
Private Bag 90116  
Invercargill 9840

**Name of submitter:** Fish & Game New Zealand – Southland Region ('Fish & Game')  
PO Box 159  
**Invercargill 9825**

**Attention:** Emily Allan - Consents Officer

**Name of Applicant:** White Waters Ltd ('the Applicant')

**Application:** APP-20181247

**Description of activity:** Discharge Permit  
  
To discharge dairy shed effluent and calving pad effluent to land from up to 599 cows by slurry tanker at 5mm depth. The proposal is a restricted discretionary activity under Rule 50(d)(ii) of the Regional Water Plan and is a non-complying activity under Rule 35(d) of the proposed Southland Water and Land Plan (notified version).

Water Permit  
  
To take up to 40,000 litres per day of groundwater from a bore in the Te Anau Groundwater Zone. The proposal is a restricted discretionary activity under Rule 23(c)(i) of the Regional Water Plan and a permitted activity under Rule 54(a) in the proposed Southland Water and Land Plan (notified version).

**Purpose:** Dairy Farming Operation.

**Location:** 893 Kakapo Road, RD 2, Te Anau at about NZTM 2000 1198510E 4959661N.

**Property Legal Description:** Section 2 SO 385807.

**Our submission relates to:** The discharge permit application.

**Our submission is:** Fish & Game opposes the discharge permit application.  
  
For the avoidance of doubt, Fish & Game does not oppose the water permit application to take and use up to 40,000l/day of groundwater from a bore in the Te Anau Groundwater Zone for dairy shed use and stock drinking water.

### **Our reasons for comments are:**

Fish & Game is responsible for the management and enhancement of sports fisheries and game bird populations in Southland Region in the recreational interests of anglers and hunters.

Research in New Zealand identifies that poorly performing farm dairy effluent systems can have large deleterious effects on water quality, particularly when direct losses of farm dairy effluent containing high concentrations of contaminants (e.g. phosphorus, nitrogen and fecal microbes) discharge, drain or run off directly to surface water bodies. In particular, land application of farm dairy effluent has proven difficult when it has occurred on soils with a high degree of preferential flow, soils with artificial drainage or coarse structure, soils with infiltration or drainage impediments, or when applied to soils on rolling / sloping country. These effects can be exacerbated by climate as high rainfall can further contribute to the poor environmental performance of such land application systems.

### **Property location**

In this case:

1. The property, which is the subject of the discharge permit application, is located approximately 11km north-east of Te Anau and is generally described as 'undulating';
2. Three unnamed tributaries of the Whitestone River run through the 103.5ha discharge area; and
3. The property is predominantly located within the mid – upper reaches of the Whitestone River catchment (approximately 89% - 203ha) and Upukerora River catchment (approximately 11% - 23%). The Whitestone River flows into the Mararoa River which is a tributary of the Waiau River. The Upukerora River flows to Lake Te Anau, which is a statutory acknowledgement area under schedule 58 of the Ngai Tahu Claims Settlement Act 1998. Lake Te Anau (Te Ana-au) has high cultural significance to local Iwi.

### **Fish & Game values**

There are considerable Fish & Game values associated with the Whitestone and Upukerora Rivers and Lake Te Anau<sup>1</sup> as follows:

1. Of special significance to Fish & Game and freshwater anglers is the self -sustaining population of wild rainbow and brown trout, which the Waiau catchment supports. Rainbow trout are not present in the other three major river catchments in Southland, namely the Aparima, Mataura and Oreti catchments.
2. The Whitestone and Upukerora Rivers have the following specific Fish & Game values:
  - a. **Whitestone River**  
  
The Whitestone River is a sizeable semi braided stream, which rises in the vicinity of Dale Hill and flows through conservation land and privately owned pastoral country to join the Mararoa River in the Mt York area.

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<sup>1</sup> The Whitestone and Upukerora Rivers and Lake Te Anau are all located in the Waiau catchment.

Brown trout from 1 – 3kg and rainbow trout up to 2kg are found in the Whitestone River through to its headwaters, with rainbow trout being more common in the upper reaches.

The main stem of the Whitestone River and its tributaries provides spawning habitat for brown and rainbow trout, with brown trout spawning typically occurring in May – July in the mid / upper reaches and rainbow spawning typically occurring in September – October in the upper reaches

The water quality of the upper Whitestone River is high, and water clarity can be exceptionally high. As such, the upper Whitestone Rivers is characterized as headwater fishery.

b. Upukerora River

The Upukerora River is a small / medium sized semi-braided river which rises on the Western flanks of the Livingstone Mountains and enters Lake Te Anau at Patience Bay to the north of Te Anau township.

The Upukerora River is fishable for virtually its entire 50km length. As a tributary of Lake Te Anau the Upukerora River receives annual influxes of brown and rainbow trout on their spawning migration. Brown and rainbow trout, typically up to 1.5 – 2.5kg, are found in the Upukerora River through to its headwaters, with Rainbow trout being more common in the upper reaches.

The main stem of the Upukerora River and its tributaries provides spawning habitat for brown and rainbow trout, with brown trout spawning typically occurring in May – July in the mid / upper reaches and rainbow spawning typically occurring in September – October in the upper reaches through conservation land.

The water quality of the upper Upukerora River is high, and water clarity can be exceptionally high. As such, the upper Upukerora River is characterized as a headwater fishery.

c. The Waiau catchment is a significant brown and rainbow trout fishery in terms of angler use.

National angler usage surveys are undertaken by the National Institute of Water and Atmosphere (NIWA) once every seven years to assess angler use in terms of the number of angler visits to each waterbody. NIWA estimates that during the 2014 / 2015 angling season approximately 41,000 ± 3,150 angler days were spent in the Waiau catchment, of which:

- i. Approximately 310 ± 110 angler days were spent on the Whitestone River;
- ii. Approximately 490 ± 180 angler days were spent on the Upukerora River; and

- ii. Approximately 15,070 ± 1,770 angler days were spent on Lake Te Anau.<sup>2</sup>

In 2013 NIWA conducted an angler survey of river fisheries managed by Fish & Game. Randomly sampled respondents were asked to identify rivers that they had fished over the last 3 – 5 years, to rate their enjoyment of the fishery on a scale from 1 (least enjoyable) to 5 (most enjoyable) and to identify up to three reasons, from a list of 10, why they fished each river.<sup>3</sup> These 10 reasons were: close to home, close to holiday home, ease of access to river, area of fishable water, scenic beauty, wilderness feeling, angling challenge, anticipated good catch rate; anticipate large fish and other (including a brief description). 431 rivers that had at least 10 responses were analysed.

The four most highly ranked reasons by 35 respondents for fishing the Whitestone River (in order of importance) were:

- i. Close to home (40%);
- ii. Ease of access (34%);
- iii. Area of fishable water (29%); and
- iv. Wilderness feeling / angling challenge / anticipate good catch rate (26%).

These results suggest that the Whitestone River fishery is valued by anglers for its location, accessibility and angling experience.

The four most highly ranked reasons by 39 respondents for fishing the Upukerora River (in order of importance) were:

- i. Close to home / areas of fishable water / scenic beauty (31%);
- ii. Anticipate good catch rate (28%);
- iii. Ease of access (26%); and
- iv. Close to holiday home (23%).

These results suggest that the Upukerora River fishery is valued by anglers for its location, accessibility and angling experience.

- d. The Whitestone and Upukerora River provide important fish passage for brown and rainbow trout moving within the Waiau catchment. This is an important consideration because:

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<sup>2</sup> Unwin M. (2016). *Angler usage of New Zealand lake and river fisheries - Results from the 20014 / 15 National Angling Survey*, NIWA.

<sup>3</sup> Unwin M. (2013). *Values of New Zealand angling rivers Results of the 2013 National Angling Survey Prepared for Fish & Game New Zealand*, NIWA.

- i. Brown trout spawn in freshwater and move extensively within freshwater, including upstream and downstream. Some brown trout migrate to sea, estuarine or tidal riverine reaches at various times for various periods during their life history.

Brown trout that do migrate to the lower reaches with a greater abundance of large food items are more likely to grow to 'trophy' proportions before migrating back upstream. They are highly valued by recreational anglers.

- ii. Rainbow trout spawn in freshwater and move extensively within freshwater, including upstream and downstream migration often associated with spawning. Rainbow trout are not known to be sea-migratory in New Zealand, although they are in their native range in North America.

The above background information explains the significance of the brown and rainbow trout fishery associated with the catchments of the Applicant's property and the context in which the Applicant's proposal has been considered by Fish & Game.

**Effluent discharge activity**

The potential adverse effects of the proposed conversion and discharge of dairy shed and feed pad effluent onto land include: contamination of groundwater, odour, effects on soil structure and fertility and contamination of watercourses.

Soils

The application provides that:

- 1. Te Anau, Kakapo and Otanomomo soil types have been identified within the farm boundary; and
- 2. Te Anau soils are the main soil type across the farm and effluent disposal area, with correspondingly smaller areas of Kakapo soils inter-fingered with Otanomomo soils.

The soils identified in the application have the following properties<sup>4</sup>:

**Table 1 – Topoclimate soil types and vulnerability factors**

Soil type	Vulnerability factors		
	Structural compaction	Nutrient leaching	Waterlogging
Te Anau	Minimal	Severe	Slight
Kakapo	Slight	Slight	Severe
Otanomomo	Minimal	Slight	Severe

<sup>4</sup> <http://gis.es.govt.nz/soil-classification/index.aspx>

The Te Anau soils are characterised by good drainage, moderate water holding capacity and high organic matter content. The Kakapo and Otanomomo soils are characterised by poor drainage, and slow permeability with high organic matter content.

**Farm dairy effluent categories**

The farm dairy effluent categories within the effluent disposal area are identified as:

1. Te Anau soils – landscape classification of Category C (sloping land - >7°) or D (well drained flat land - <7°) depending on the slope of the land; and
2. Kakapo soils - landscape classification of Category B (impeded drainage or low infiltration rate land) or C depending on the slope of the land

Categories B, C and D land are considered high risk for receiving farm dairy effluent.

**Physiographic zone**

The property is located within the Bedrock/Hill Country physiographic zone.

Physiographic Zone	Variant			
	No Variant	Overland Flow	Deep Drainage	Artificial Drainage
Bedrock / Hill Country	✓	✓	-	-

The Bedrock/Hill Country physiographic zone is generally land with bedrock or glacial till found near the surface, located below 800m above sea level. There are no significant areas of groundwater. Mostly consisting of rolling to steep land, which has high rainfall zone due to its elevation. Contaminant loss to the dense network of branching streams is the main concern in this zone. Water quickly flows down-slope through wet soils and as overland flow to nearby streams following high or prolonged rainfall. Nitrogen, phosphorus, sediment and microbes are all carried with water, particularly during late autumn and winter. Because of the features of this the main risk for this site in regard to water quality is to surface water quality in the Upukerora River and the Whitestone River.

The key contaminant pathways considering the properties of the physiographic zones are through overland flow.

**Risk of effluent discharge to land**

When combining the farm dairy effluent classification with the information provided from the Applicant on soils, physiographic zones, and topography, the predominant risk for the property associated with the discharge of effluent to land is contaminant loss through overland flow on the property to surface water.

### Surface water quality

As discussed, the property is located within the mid to lower reaches of both the Upukerora River and the Whitestone River catchments with unnamed tributaries of the Whitestone River flowing through the proposed discharge area.

The application does not address what, if any, surface and / or ground water monitoring, inspections or audits has been undertaken pursuant to the Applicant's expired effluent discharge consent and if so, what these have shown, including any results regarding water quality. Instead, the application refers to the nearest water quality monitoring sites on the Upukerora River at Te Anau-Milford Road, which is approximately 9.3km downstream of the farm, and on the Whitestone River at Hillside – Manapouri Road, which is approximately 22km downstream of the farm. Fish & Game agrees with the Consent Officer that due to the distance from these water quality monitoring sites to the Applicant's farm it is unlikely that the data will show any trends that can be specifically tracked back to the Applicant's farm.<sup>5</sup>

### Management practices

The Applicant proposes to use the following management practices to address adverse effects arising from the effluent discharge activity:

1. Adherence to 20m buffers in relation to surface water bodies;
2. Use of low rate application; and
3. Use of an effluent storage tank.

In response:

1. The application does not address the following relevant matters:
  - a. The appropriateness of 20m buffers in circumstances where:
    - i. The discharge area is located in the bedrock / hill country zone on land that is described as 'undulating' and contains areas of Category C land (>7°); and
    - ii. The predominant risk for the property associated with the discharge of effluent to land is contaminant loss through overland flow on the property to surface water.
  - b. What, if any, buffers are to be applied around seepages and drainage depressions within the discharge area.
  - c. The risk associated with applying effluent to land with impeded drainage that is underlain with sub-surface drains that discharge to surface waterbodies and what, if any, buffers are to be applied to land overlaying sub-surface drains.

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<sup>5</sup> Sections 95-95G Recommending Report, date 24 May 2018, p. 7.

- d. How soil moisture deficit is to be measured in advance of applying effluent to land.
- e. Whether it has been demonstrated that the slurry tanker, which is the principal proposed application method and generally considered a high rate application system, is capable of applying effluent to land at depths not exceeding 5mm. In this regard the application provides that:
  - i. The depth of effluent applied by the slurry tanker application is influenced by a number of variables, including: the speed of the vehicle towing the slurry tanker, the pressure of the delivery pump and adjustment of the deflector plate; and
  - ii. Best practice for a slurry tanker application is to carry out several application rate tests at varying travelling speeds and then develop an application depth table that sets out the depth applied at various speeds. The Applicant proposes to undertake application rate testing within three months of April 2018.

As presented, the Application does not establish that the slurry tanker is a 'low rate' application system. In response, Fish & Game does not consider it appropriate to grant consent on the basis that the Applicant demonstrates within a specified date of consent being granted that the slurry tanker is capable of applying effluent to land at depths not exceeding 5mm. The Applicant should be required to demonstrate this before consent is granted if the slurry tanker is to be considered a low rate application system. In addition, very little information is provided with respect to the amended proposal to use two low rate application pods and a high rate umbilical system as secondary systems and the extent to which these will be used.

- f. Issues with respect to the sufficiency of existing storage for deferred effluent application until soils have capacity, the location of the existing storage pond (which requires effluent from the dairy shed to be regularly pumped uphill to it) and time frame within which a new 'Kliptank' effluent storage tank is to be constructed.
- g. How compliance with previous consent conditions, including soil moisture deficit prior to and post application and the rate of application, has been determined by the Applicant.
- h. Whether the Applicant has been fully compliant with the terms of their previous effluent discharge consent. This is particularly relevant in circumstances where the existing effluent infrastructure, storage and application method is reliant upon a high degree of continuous management and direct physical involvement.
- i. The practicality of the proposed discharge system, which is principally based on a slurry tanker, in light of the known limitations of limited storage capacity, high level of ongoing physical human involvement required (particularly in relation to application) and the receiving environment.



2. It appears that the current effluent storage (constructed in 2013) and infrastructure system is not fit for purpose. Fish & Game notes the observations of the Consents Officer that:

*“ A site visit was undertaken (refer to file note). At this site visit, it was clear the effluent system for this site is not consistent with current standards. The effluent storage tank is located a significant distance up-hill from the dairy shed which requires effluent to be regularly pumped to this secondary location. The setup of the effluent system requires a higher level of management to operate effectively and this increases the risks of discharging effluent via the proposed system.”<sup>6</sup>*

In addition, the application provides that on average 25.5m<sup>3</sup> of dairy shed effluent is produced per day and that existing effluent storage capacity is 1,100m<sup>3</sup>, which equates to effluent storage of approximately 43 days at the above daily rate.

#### Additional matters

The application does not address:

1. The consent duration sought in relation to the effluent discharge; and
2. Monitoring, inspection and audit requirements on the resource consent sought to apply effluent to land, which matches the high level of risk of adverse environmental effects, the quality of water resources that could be impacted and knowledge of water resources in the area.

If granted, there is a need to match the consent duration and inspection and audit requirements for the effluent discharge activity to the high level of risk of adverse environmental effects, the quality of water resources that could be impacted and knowledge of water resources in the area.

#### **Planning assessment**

As presented, the application is contrary to:

1. The purpose of sustainable management defined in Part 2 of the RMA. Consent conditions proposed by the Applicant do not:
  - a. Safeguard the life-supporting capacity of water and ecosystems; or
  - b. Avoid, remedy or mitigate adverse effects.
2. Matters of national importance outlined in s 6 of the RMA, including: 6(c).
3. Other matters outlined in s 7 of the RMA, including: 7 (aa), 7(d), 7(f) and 7(h) of the RMA.
4. The objectives and policies of the National Policy Statement for Freshwater (2017) , including:

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<sup>6</sup> Sections 95-95G Recommending Report, date 24 May 2018, p. 2.

- a. Objectives A1 and C1;
  - b. Policies A2, A3 and A4 which require Environment Southland to set objectives and limits to assist improvements of water quality in water bodies; and
  - c. Policy C1 which requires integrated management of freshwater and land use.
5. The objectives and policies of the Regional Water Plan for Southland, including:
- a. Objectives 2, 4, 9C and 10;
  - b. Policies 3, 4, 25, 31A, 31C, 41, 42, 43 and Policy A4 of the NPS for FM, which has been inserted in the Regional Water Plan for Southland; and
  - c. Appendix G.
7. The objectives and policies of the Proposed Southland Water and Land Plan, including:
- a. Objectives 1, 6, 13A, 14, and 18;
  - b. Policies 6, 13(2), 15A, 16, 17, 39A, 41, and Policy A4 of the NPS for FM, which has been inserted in the Proposed Southland Water and Land Plan;
  - c. Appendices A and E.
8. The objectives, policies and methods of the Regional Policy Statement for Southland (2017) ('the RPs'), including:
- a. Issues WQUAL .1 – 3 and BIO .2;
  - b. Objectives WQUAL. 1 and .2 and BIO. 1, .2 and .3;
  - c. Policies WQUAL. 1, .2, .3, .5, .6 and .12 and BIO. 2 and .4; and
  - d. Method WQUAL .4 and BIO. 9.

## Summary

Fish & Game agrees with the assessment of the Consents Officer that:

*"The application is clear that it wants to discharge effluent via high rate slurry tanker to a low depth of 5mm on rolling topography and hill country, including areas over 7 degrees in slope, which has a high number of springs, seepages and drainage depressions."*<sup>7</sup>

Fish & Game considers that:

1. The effects on the environment will be more than minor for the following key reasons:

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<sup>7</sup> Sections 95-95G Recommending Report, date 24 May 2018, p. 12.

- a. The discharge of effluent to land is not appropriately mitigated as the volume of effluent storage capacity is insufficient to defer effluent irrigation until there is a soil moisture deficit available, the irrigation method is high rate on rolling hill country topography with land over 7 degrees and there are a number of freshwater springs throughout the proposed effluent discharge area; and
  - b. The receiving environment is sensitive. The proposed discharge area is in the Whitestone and Upukerora River catchments, which have high fish and game values. In addition, part of the proposed discharge area is in the Upukerora River catchment which flows into Lake Te Anau. Lake Te Anau is a statutory acknowledgement area and is classified as a natural state lake.
2. The application is inconsistent with objectives and policies on water quality in both the Regional Water Plan for Southland and the Proposed Southland Water and Land Plan.

**Decision we wish the Council to make**

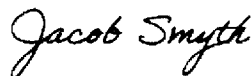
That the effluent discharge application be declined in its entirety.

Fish & Game wishes to be heard in support of its submission at a hearing if needed.

Fish & Game wishes to be involved in any pre-hearing meeting that may be held for this application.

If others make a similar submission, Fish & Game will consider presenting a joint case with them at a hearing.

Fish & Game has served a copy of its submission on the Applicant.



Jacob Smyth  
Resource Management Officer  
Fish & Game New Zealand – Southland Region

Date: Tuesday, 26 June 2018

Cc: Dairy Green Ltd  
PO Box 5003  
Waikiwi  
Invercargill 9843

**Attention: Quinton Scandrett**



27 June 2018



Emily Allan  
Consents Officer  
Consents Department  
Environment Southland  
Private Bag 90116  
Invercargill

Tēnā Koe Emily,

**RE: Submission on Resource consent application-APP-20181247**

Please find attached a submission lodged, on behalf of Oraka- Aparima Rūnaka on Resource Consent applications to discharge dairy farm effluent to land and to take groundwater from a bore being sought by Environment Southland.

We trust the information contained within the submission is sufficient; however, should you wish to discuss any aspect further, please do not hesitate to contact me.

Nāhaku noa nā,

Stevie-Rae Blair  
Te Ao Marama Inc.  
Junior Māori Environmental Officer

## SUBMISSION ON A NOTIFIED RESOURCE CONSENT APPLICATION

**To:** The General Manager  
Environment Southland  
Private Bag 90166  
Invercargill 9840

**Consents Officer:** Emily Allan – Consents Officer

**Name of Submitter:** Oraka- Aparima Rūnaka

**Prepared by:** Te Ao Marama Inc  
PO Box 7078  
South Invercargill  
Invercargill 9844

**Name of applicant:** White Waters Ltd

**Application:** APP-20181247

**Proposal:** Environment Southland has received an application from White Waters Ltd to discharge dairy farm effluent and to take water from a bore within the Te Anau Groundwater Zone.

**Our position:** Oraka Aparima are **opposing** this application and wish to be heard in support of this submission

The Ngāi Tahu submission relates to the whole of the applications

Ngāi Tahu wishes the application to be declined

If others are making a similar submission, Ngāi Tahu will consider presenting a joint case with them at a hearing.

A copy of this submission has been sent to the applicant.

## GENERAL POSITION

1. This submission has been prepared by Te Ao Marama Incorporated on behalf of Te Rūnanga o Oraka Aparima.
2. Te Ao Marama Incorporated is supportive of development within its takiwā, provided activities are undertaken in a way that respects the environment where the activity to be undertaken does not adversely affect Ngāi Tahu cultural values, customs and their traditional relationship with land and water.
3. The Upukerora (Marakura) and Whitestone (Ōtūmatua) Rivers are within the rich Ngāi Tahu cultural landscape<sup>1</sup> of the Waiau Catchment. This landscape includes traditions around the formation of the landscape, wāhi ingoa (place names), wāhi tapu, archaeological sites, Ara/ trails, Māori lands and extensive mahinga kai and freshwater fisheries usage.
4. The Ngāi Tahu ki Murihiku Iwi Management Plan ('Te Tangi a Tauira')<sup>2</sup> has policy that is directly relevant to the management of Discharging effluent and water takes.

### Papatipu Rūnanga

1. Te Rūnanga o Ngāi Tahu Act, 1996 (the TRoNT Act) and the Ngāi Tahu Claims Settlement Act, 1998 (the Settlement Act) gives recognition to the status of Papatipu Rūnanga as kaitiaki and manawhenua of the natural resources within their takiwā boundaries.
2. The consent application proposals relate to a new consent to discharge dairy farm effluent and to take water from a bore. The takiwā of Te Rūnanga o Oraka Aparima.

### Te Ao Marama Incorporated

3. Ngāi Tahu ki Murihiku formed an entity known as Te Ao Marama Incorporated, which is made up of representatives from Waihopai Rūnaka, Te Rūnanga o Awarua, Te Rūnanga o Oraka Aparima and Hokonui Rūnaka. Te Ao Marama Incorporated is authorised to represent the four Southland Rūnanga Papatipu in resource management and local government matters.

## THE PROPOSAL

4. Discharge Permit to discharge dairy shed effluent and calving pad effluent to land from up to 599 cows by slurry tanker at 5mm depth. The proposal is a restricted discretionary activity under Rule 50(d)(ii) of the Regional Water Plan, and is a non-complying activity under Rule 35(d) of the proposed Southland Water and Land Plan (notified version).
5. Water Permit to take up to 40,000 litres per day of groundwater from a bore in the Te Anau Groundwater Zone. The proposal is a restricted discretionary activity under Rule 23(c)(i) of

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<sup>1</sup> Corry and Puentner 1993, Ngai Tahu Claims Settlement Act 1998, TAMI 2008, TAMI nd, Kitson J. 2015. Jericho Wind Farm Cultural Values Report. Kitson Consulting Client Report for Te Ao Marama Inc, Ōraka-Aparima Rūnanga & Pioneer Generation. Invercargill.

<sup>2</sup> Ngai Tahu ki Murihiku 2008.

the Regional Water Plan and a permitted activity under Rule 54(a) in the proposed Southland Water and Land Plan (notified version).

#### REASONS FOR SUBMISSION

6. There are three statutory acknowledgement areas (Ngai Tahu Claims Settlement Act, 1998) that fall within the area of effects for this application. They are Lake Te Ana-au, Schedule 58, Lake Manapouri, Schedule 45 and the Waiiau River, Schedule 69.
7. Te Rūnanga o Oraka Aparima has concerns that the storing of effluent and the discharging of effluent is not effectively mitigated.
8. There are a number of freshwater springs within effluent discharge area.
9. The receiving waters downstream of the dairy farm are natural state waters and have high cultural values.
10. Te Rūnanga O Oraka Aparima believe that the effects of this discharge will be more than minor.
11. Our submission does not relate to the water permit application.

#### DECISION WE WISH COUNCIL TO MAKE

12. That the application is declined.

#### CONCLUSION

13. We wish to be heard in support of our submission.
14. Te Rūnanga o Oraka Aparima wish to be a part of any pre-hearing meeting that may be held for this application.

Nāhaku noa nā



Stevie-Rae Blair

Te Ao Marama Inc.

Junior Māori Environmental Officer

## • Bronwyn Auckram

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**From:** Mikayla Scott on behalf of Facility Manager  
**Sent:** Thursday, 28 June 2018 8:09 a.m.  
**To:** Bronwyn Auckram  
**Subject:** FW: White Waters Ltd submission APP-20181247  
**Attachments:** White waters\_submission\_Discharge of effluent\_ES.docx

Submission 😊

**From:** Stevie Blair  
**Sent:** Wednesday, 27 June 2018 4:53 p.m.  
**To:** Facility Manager  
**Cc:** Emily Allan; Dean Whaanga; Muriel Johnstone; Jane Kitson (ext)  
**Subject:** White Waters Ltd submission APP-20181247

Tēnā koe,

Please find attached a submission prepare by Te Ao Marama Inc. on behalf of Te Rūnanga o Oraka Aparima for the White Waters Application.

Please contact me in the first instance if you require anything.

Ngā mihi,  
Stevie

**CAUTION:** This email and any attachment(s) contains information that is both confidential and possibly legally privileged.

No reader may make any use of its content unless that use is approved by Te Rūnanga o Ngāi Tahu and its subsidiary companies separately in writing.

Any opinion, advice or information contained in this email and any attachment(s) is to be treated as interim and provisional only and for the strictly limited purpose of the recipient as communicated to us.

Neither the recipient nor any other person should act upon it without our separate written authorization of reliance. If you have received this message in error, please notify us immediately and destroy this message.



## **SUBMISSION ON AN APPLICATION FOR RESOURCE CONSENT UNDER SECTION 95 (a) OF THE RESOURCE MANAGEMENT ACT 1991**

To: Environment Southland  
Cnr North Rd and Price St  
Waikiwi  
Invercargill 9810

Submitters name: Public Health South on behalf of Southern District Health Board

1. The application is by White Waters Ltd for a resource consent to discharge dairy farm effluent from up to 599 cows to land during the milking season (25 August to 31 May) via slurry tanker (primary irrigation method), low rate pods and umbilical system; to discharge calving pad effluent from up to 5 cows during August, September and October each year via the above mentioned effluent discharge system; and to take 40,000 litres of water per day for stock drinking and shed wash-down water.
2. This submission relates to the effluent discharge and storage facility.
3. Public Health South notes the applicant proposes to store effluent in a pond that may not be capable of suitably holding the effluent. We also note that the topography of the land creates a risk of water contamination.
4. Sustainable Development Goals (SDGs) were created by the United Nations General Assembly in an effort to end poverty, to protect the planet and ensure prosperity for all. SDG 6 “Preventing Disease through Safe Water and Sanitation for all” and SDG 15 “Promoting Health and Preventing Disease through Healthy Natural Environments” apply to this submission.
5. The proposed Southland Water and Land plan (pSWLP)

*“..... has been developed by Environment Southland under the Resource Management Act 1991 (RMA). This Plan is intended to provide direction and guidance regarding the sustainable use, development and protection of water and land resources in the Southland region. This Plan fits within, and is influenced by an RMA framework of national, regional and local policy documents”.*

There are 18 objectives outlined in the pSWLP and attention is drawn to objectives 1 and 8 outlined here for ease of reference:

### **Objective 1**

*Land and water and associated ecosystems are managed as integrated natural resources, recognising the connectivity between surface water and groundwater, and between freshwater, land and the coast.*

### **Objective 8**

*(a) The quality of water in aquifers that meet both the Drinking-Water Standards for New Zealand 2005 (revised 2008) and any freshwater objectives, including for connected surface waterbodies, established under Freshwater Management Unit processes is maintained; and Proposed Southland Water and Land Plan Page 23.*

*(b) The quality of water in aquifers that have been degraded by land use and discharge activities (with the exception of those aquifers where ambient water quality is naturally less than the Drinking-Water Standards for New Zealand 2005 (revised 2008)) is improved.*

### **Effluent Pond**

6. Contaminated and poorly managed water sources can contain chemical or microbiological hazards that can lead to sickness<sup>1</sup>. Effluent leaching into groundwater can cause an increase of microbiological burden such as giardia, cryptosporidiosis, E.coli and salmonella and if it is not controlled could be at risk of infiltrating aquifers or entering nearby water ways (Whitestone River and Upukeroa River Catchments).
7. There is typically higher Nitrogen concentrations in the soil when there is increased rainfall and rising water table levels. Uncontrolled leaching of effluent into the groundwater can increase this risk.
8. It has been noted in the document *“Recommendation and Decision on Notification of Resource Consent Application(s) Under Section 95-95G of the Resource Management Act 1991* that the current effluent storage system is not fit for purpose and carries increased risk of uncontrolled discharge of effluent.
9. As intentions of any upgrades to this effluent system is currently put on hold, Public Health South carries doubt as to whether the effluent will be managed and stored appropriately.

### **Discharge of Effluent**

10. We note the applicant proposes to apply effluent to land at a maximum depth of 5mm by a slurry tanker at a fast rate. We also note that data available to determine the average nitrate nitrogen level from bores in a 1km radius of this application is non existent nor is there data available at an appropriate distance downgradient from the location. The applicant has mentioned that the site is in the worst 50%-25% of upland sites for Nitrogen and Oxidised Nitrogen.
11. The topography of this land consists of rolling hills and is prone to waterlogging due to the soil types present. The land also has a variety of springs, seepages, drainage depressions and tributaries. The area has high rainfall due to its elevation. The combination of these factors create a greater risk for microbial and nutrient contamination into groundwater and nearby water bodies.
12. Without baseline data available it is difficult to assess the impact this activity has had on the water quality to date and there is uncertainty that this activity will not adversely impact the area.
13. This submitter is neutral and neither supports or opposes this application. We are only concerned that adequate conditions relating to the effluent pond and the application of effluent to land are applied so as to minimise the effects on groundwater quality in the area and that these conditions are adequate to protect public health.
14. The decision sought in the event that consents are granted, is the imposition of adequate conditions related to the mitigation of potential human health risks as described:
  - (i) Ensure the effluent pond storage is upgraded to a point where it can contain effluent while environmental conditions are not adequate for discharge.
  - (ii) A different discharge method is used that is of a slower rate.
  - (iii) Monitoring downstream sites to occur 6 meters downstream of the site at both rivers before any changes are made. Monitoring to continue afterwards to assess the impact the discharge has to the waterbodies.
  - (iv) Monitoring the bore onsite to assess groundwater conditions.

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<sup>1</sup> Ministry of Health. 2014. *Water Safety Plan Guide: Surface and groundwater sources, version 2, ref s1.1*. Wellington: Ministry of Health.

15. The reasons for this submission are to promote the reduction of adverse environmental effects on the health of people and communities, and to improve, promote and protect their health pursuant to the New Zealand Public Health and Disability Act 2000 and the Health Act 1956. These statutory obligations are the responsibility of the Ministry of Health and in the Southern district the obligations are carried out under contract by Public Health South (under Crown funding agreements, on behalf of the Southern District Health Board). The Ministry of Health requires Public Health South to reduce any potential health risks by means including submissions, on resource consents to ensure the public health significance of effluent discharge and the effect on ground water is adequately considered by consent authorities. This application has the potential to create adverse effects from contamination of ground water on the health of people and communities.
16. This submitter is not a trade competitor of the Applicant for the purposes of s.308 of the Act.
17. This submitter will wish to be heard in support of this submission.

Dated: 26 June 2018

Signed:



**Renee Brown**

**For and on behalf of** Public Health South, Southern District Health Board

**Address for service**

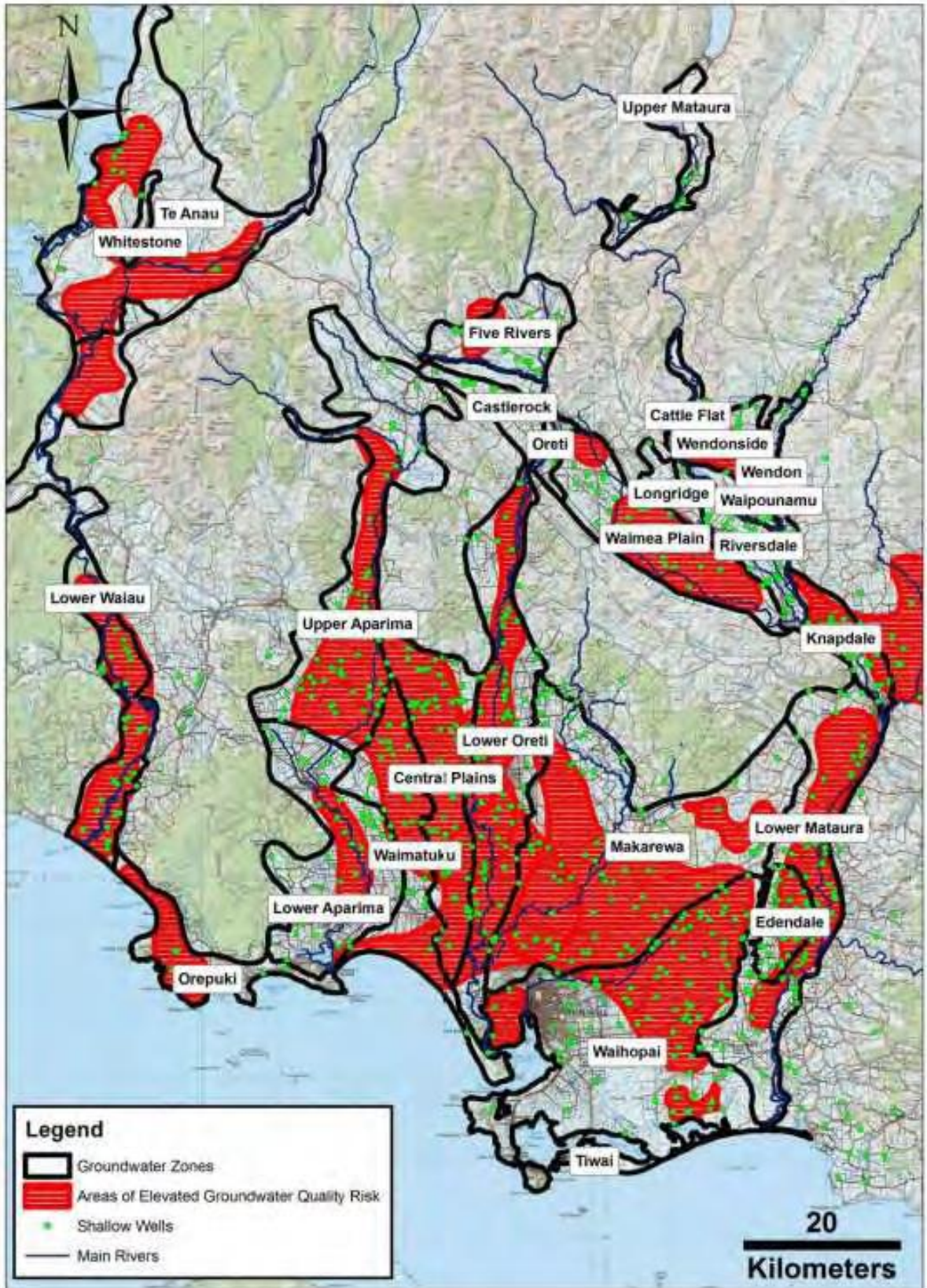
**Attention: Renee Brown**

**Email:** renee.brown@southerndhb.govt.nz

**DDI:** 03 211 8636

**Fax:** 03 211 8500

Appendix 1  
Nitrate Affected Groundwater in Southland



Appendix 2  
Disease Notifications 2015 - 17

**Number of Cases for each Territorial Authority**

Reporting Period: 1/01/2015 - 31/12/2015  
Public Health Service: Public Health South  
Office Selected: All

Disease Name	Territorial Authority								Total
	Waikato District	Central Otago District	Queenstown-Lakes District	Dunedin City	Clutha District	Southland District	Gore District	Invercargill City	
Campylobacteriosis	41	38	53	149	44	83	30	74	512
Chikungunya fever	1			1			1		3
Cryptosporidiosis	8		3	10	3	20	6	11	61
Dengue fever	1		1	2					4
Gastroenteritis - unknown cause			1	9				1	11
Gastroenteritis / foodborne intoxication				1					1
Giardiasis	2	11	39	11	1	5		3	72
Hepatitis A				1	1			1	3
Hepatitis C				3					3
Hepatitis NOS								1	1
Invasive pneumococcal disease	3	1	1	12	5	3		6	31
Legionellosis	1	1		9				1	12
Leprosy								1	1
Leptospirosis				1	1	4		2	8
Listeriosis				1					1
Malaria				1					1
Meningococcal disease			2	1		1			4
Paratyphoid fever			1	1					2
Pertussis	11	21	101	28	1	2		5	169
Ross River virus infection						1			1
Salmonellosis	9	19	13	59	2	14	5	15	136
Shigellosis	3		1	3					7
Tuberculosis disease - new case				2				4	6
Tuberculosis infection - on preventive treatment				1					1
Typhoid fever			1	1				1	3
VTEC/STEC infection	1	3	2	5	1	3		1	16
Yersiniosis	3	1	6	14	4	3		7	38
<b>Total:</b>	<b>84</b>	<b>95</b>	<b>225</b>	<b>326</b>	<b>63</b>	<b>139</b>	<b>42</b>	<b>134</b>	<b>1108</b>

## Number of Cases for each Territorial Authority

Reporting Period: 1/01/2016 - 31/12/2016  
 Public Health Service: Public Health South  
 Office Selected: All

### Territorial Authority

Disease Name	Waikato District	Central Otago District	Queenstown-Lakes District	Dunedin City	Clutha District	Southland District	Gore District	Invercargill City	Total
Campylobacteriosis	54	42	63	164	53	81	28	82	567
Chikungunya fever		1							1
Cryptosporidiosis	10	5	7	19	4	8		6	59
Dengue fever	1	1	3	5					10
Gastroenteritis - unknown cause	1		2	10	1				14
Gastroenteritis / foodborne intoxication				2					2
Giardiasis	6	3	29	35	5	5	2	5	90
Hepatitis A		1	1	1					3
Hepatitis B			1	1					2
Hepatitis C				3					3
Invasive pneumococcal disease	2	2	3	7	1	4		6	25
Latent tuberculosis infection				3				1	4
Legionellosis			1	8		2		3	14
Leptospirosis				2		3		1	6
Listeriosis	1								1
Listeriosis - perinatal								1	1
Measles			1						1
Meningococcal disease	1		7	9		2			19
Mumps		1							1
Paratyphoid fever			1	2					3
Pertussis	2	1	9	35	5	3		7	62
Rheumatic fever - initial attack					1				1
Salmonellosis	10	9	23	32	6	9	5	14	108
Shigellosis		2	1	4					7
Tuberculosis disease - new case		1			1		4	1	7
Typhoid fever				1					1
VTEC/STEC infection	1	2	4	6	3	6	3	6	31
Yersiniosis	6		7	30	3	1		9	56

EpiSurv data as at 19/01/2018 11:00:29 a.m. Generated by mcallaghan

P016

Page 1 of 2

\* Excludes "Not a case"

Version 2

## Number of Cases for each Territorial Authority

Disease Name	Waikato District	Central Otago District	Queenstown-Lakes District	Dunedin City	Clutha District	Southland District	Gore District	Invercargill City	Total
Zika virus		1		1					2
Total:	95	72	163	380	83	124	42	142	1101

## Number of Cases for each Territorial Authority

Reporting Period: 1/01/2017 - 31/12/2017  
 Public Health Service: Public Health South  
 Office Selected: All

### Territorial Authority

Disease Name	Waikato District	Central Otago District	Queenstown-Lakes District	Dunedin City	Clutha District	Southland District	Gore District	Invercargill City	Total
Campylobacteriosis	61	55	103	227	72	104	39	83	744
Cryptosporidiosis	30	9	11	42	27	18	3	7	147
Dengue fever			1				1		2
Gastroenteritis - unknown cause				4			3		7
Gastroenteritis / foodborne intoxication				3		1		1	5
Giardiasis	6	3	39	23	5	9	4	4	93
Haemophilus influenzae type b								1	1
Hepatitis A				1				1	2
Hepatitis B				3					3
Hepatitis C	1			1	1				3
Hydatid disease						1			1
Invasive pneumococcal disease	2	2	2	12		3	1	10	32
Legionellosis	1	2		7	2	1		5	18
Leprosy	1								1
Leptospirosis				1		4		2	7
Malaria				2					2
Meningococcal disease	1		3	2				1	7
Mumps	7	6	1	33				1	48
Pertussis	4	32	45	81	5	10	3	55	235
Rheumatic fever - initial attack	2								2
Ross River virus infection			1						1
Salmonellosis	10	4	9	29	10	17	6	15	100
Shigellosis			7	8	1	1			17
Taeniasis				1					1
Tuberculosis disease - new case	1		2	3	1	1		1	9
Typhoid fever			1	1		2			4
VTEC/STEC infection	12	17	17	49	22	9	5	8	139
Yersiniosis	6	3	13	18	5	5	2	2	54

EpiSurv data as at 19/01/2018 11:00:29 a.m. Generated by mcallaghan

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\* Excludes "Not a case"

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## Number of Cases for each Territorial Authority

Disease Name	Waikahi District	Central Otago District	Queenstown-Lakes District	Dunedin City	Clutha District	Southland District	Gore District	Invercargill City	Total
Zika virus			2						2
<b>Total:</b>	145	133	257	551	151	186	67	197	1687