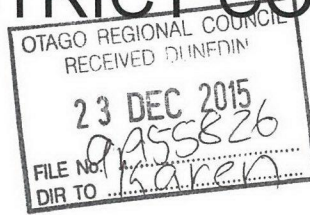




CLUTHA DISTRICT COUNCIL

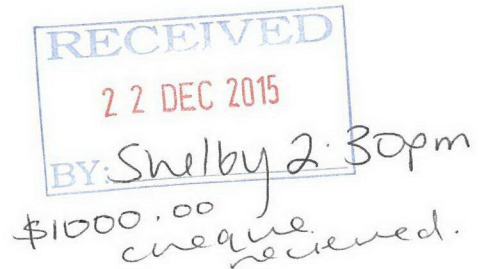
Address all correspondence to:
The Chief Executive

22 December 2013



Our Reference
qA56
A108222

Otago Regional Council
Private Bag 1954
DUNEDIN 9054



Dear Sir/Madam

Waihola Sewage Treatment Plant Discharge to Lake Waihola Outlet Channel: Resource Consent Application

I enclose the above application on behalf of Council, together with Council's cheque for the appropriate deposit.

This application is to replace the current consent, which expires on 1 September 2017. While an application is not required until 1 March 2017 to protect the current right to discharge while a replacement consent is processed, the existing plant does not comply with current consent conditions on many occasions. Council has decided to upgrade the treatment at the site with a long term consent in view, so is seeking a new, long-term consent in order to establish effluent characteristics it must meet.

At the same time, Council has received proposals to upgrade the plant to meet effluent quality limits suggested by this application, but will await the outcome of this application before committing itself to a particular upgrade.

Please read this letter as forming a part of the application for a new consent, taking particular note of the above circumstances.

Please contact me if you have any queries.

Yours faithfully

Peter Ross
PROJECTS ENGINEER

CLUTHA DISTRICT COUNCIL

**WAIHOLA SEWAGE TREATMENT
PLANT**

**Application to Discharge Treated Sewage Effluent
to the Lake Waihola Outlet Channel**

22 December 2015



**APPLICATION FOR RESOURCE CONSENT
PURSUANT TO SECTION 88 OF THE RESOURCE MANAGEMENT ACT
1991**

To: Chief Executive
Otago Regional Council
Private Bag 1954
Dunedin 9054

By: Clutha District Council
1 Rosebank Tce
PO Box 25
Balclutha 9240

Clutha District Council applies for the renewal of the resource consent described below.

1. The **resource consent** sought is a discharge permit to discharge contaminants to water, pursuant to Section 15 of the RMA.

The consent term sought is 35 years.

2. The **activity** to which this application relates is:

To discharge up to **680m³** of treated sewage per day to the outflow channel of Lake Waihola.

Refer to the Assessment of Environmental Effects (AEE) for further details about the proposed activity.

3. The **location** to which this application relates is the true right bank of the Lake Waihola outflow channel, approximately 1.4 km upstream of the State Highway 1 Bridge across the outflow channel.

The grid reference of the discharge point is NZTM 1376557E 4902692N.

The Waihola Sewage Treatment Plant is situated on Titiri Rd approximately 1.9km north of Waihola.

The legal description of the land at the point of discharge is Section 1, Survey Office Plan 24904, or Lot DP 27225, or riverbed. The first is a strip between the second and last, and it is unclear whether the discharge point is within the strip or not. Refer to the AEE for a site plan.

4. The **name and address of the landowner**, to which the application relates, is:

The Crown
Land information New Zealand
c/- Lakes Property Services
PO Box 1586
Queenstown.

5. **No additional resource consents** are required in relation to the proposal.
6. An **assessment of environmental effects** of the proposal is attached.
7. Information required by the Regional Plan: Water for Otago is attached.



.....
Peter Ross
Water Services Engineer (Projects)
Clutha District Council

Date: 22/12/15

Address for Service

Clutha District Council
PO Box 25
Balclutha 9240

Attention: **Peter Ross, Water Services Engineer (Projects)**

Tel: 03 419 0200
Fax: 03 418 3185

Email: peter.ross@cluthadc.govt.nz

1. INTRODUCTION

1.1 Overview

Clutha District Council currently holds Consent No. 2002.046 which authorises the discharge of treated sewage to the Lake Waihola outflow channel. This consent expires on 1 September 2017. This application is to replace that consent and there is no change in the location or purpose of the activity for which consent is sought from that covered by Consent No. 2002.046.

Consent 2002.046 authorises the discharge of up to 680m³ per day as a normal flow and up to 1,020m³ as a wet weather flow.

This application describes the current operation of the plant and details the volume and character of the discharge for which consent is sought.

Further details are provided in the appropriate sections of this AEE.

1.2 Regional Plan Provisions

This is a discharge of human sewage to water which is envisaged by Rule 12.6 of the Regional Plan: Water ("the Plan) which has not been amended by Plan Change 6A. The discharge does not meet any of the permitted activity criteria in Rule 12.6.1, set out in Rules 12.6.1.1 to 12.6.1.4.

Rule 12.6.2.1 of the Plan provides that "*Except as provided for by Rules 12.6.1.1 to 12.6.1.4, the discharge of human sewage to water, or onto land in circumstances where it may enter water is a **discretionary** activity.*"

Accordingly, the discharge is a discretionary activity under the provisions of the Plan.

1.3 Appendices

The following Appendices are attached:

- Appendix 1: Copy of Consent No. 2002.046.
- Appendix 2: Discharge monitoring results.
- Appendix 3: Ryder Consulting, *Waihola Oxidation Pond Discharge to the Lake Waihola Outflow Channel Assessment of Environmental Effects*, February 2014.
- Appendix 4: Webb, Trevor, *Soil Investigation to evaluate Capability of land Surrounding Waihola, Balclutha, Stirling, Kaitangata, Owaka, Clinton, Heriot and Lawrence for Use as Municipal Wastewater Disposal Sites* (Manaaki Whenua Landcare Research, 2007).

2. ENVIRONMENTAL SETTING

2.1 Site Location

The Waihola Sewage Treatment Plant is located on Titri Road, approximately 1.9km north of Waihola. After treatment, effluent is discharged through an outlet pipe which extends 1.7km northwards to the true right bank of the Lake Waihola Outflow Channel. The discharge point is most likely located within Section 1, Survey Office Plan 24904, which is a strip between riverbed and Lot DP 27225. See Figure 3 below for a detail. The treatment plant site itself is Lot 1 DP 20844 and is owned in fee simple by the Clutha District Council. This site is designated for sewage treatment in the Clutha District Council's operative District Plan.

The Waihola Treatment Plant consists of a single oxidation pond approximately 3,800m² in area and a surface flow wetland which has two parallel cells of 1,000m². Sewage is collected within Waihola through a gravity reticulation which conveys it to a pump station situated in the Waihola Domain. From there it is pumped to the treatment plant, with additional sewage being introduced by a small pump station serving properties on the northern extremity of Waihola. The sewage goes through the oxidation pond and wetland in series before being discharged to the outflow channel.

The discharge to the outflow channel is pumped from a small pump station on the treatment plant site, with discharge being limited to the latter half of the incoming tide and the initial half of the outgoing tide. This regime is required by Condition 2(a) of the existing consent, and is designed to prevent conditions where treated sewage might be carried by the tide from the outfall into Lake Waihola.

Metering of the incoming flow is achieved via a meter on the outlet from the main pump station, and also one on the outlet from the small pump station serving North Waihola. Records are available from these meters from early February 2013, since when the flow from the main pump station has averaged 85m³/d and that from the north Waihola pump station 8 m³/d, a total of 93m³/d being conveyed to the sewage treatment plant. The lowest total recorded was 31m³ on 5 May 2015 and the highest 773m³ on 5 June 2015. The effluent flows in series through the oxidation pond and then through one or other of the wetland cells.

Over the same period, the outflow from the plant has averaged 102m³/d, the difference from the inflow being accounted for by rainfall. Peak discharges have occurred when the control system has malfunctioned or pumping was forced for 24 hours a day because of high inflows, as happened in June 2015. The peak recorded has been 369m³ under those circumstances. During times of normal operation, the maximum daily discharge was 192m³.

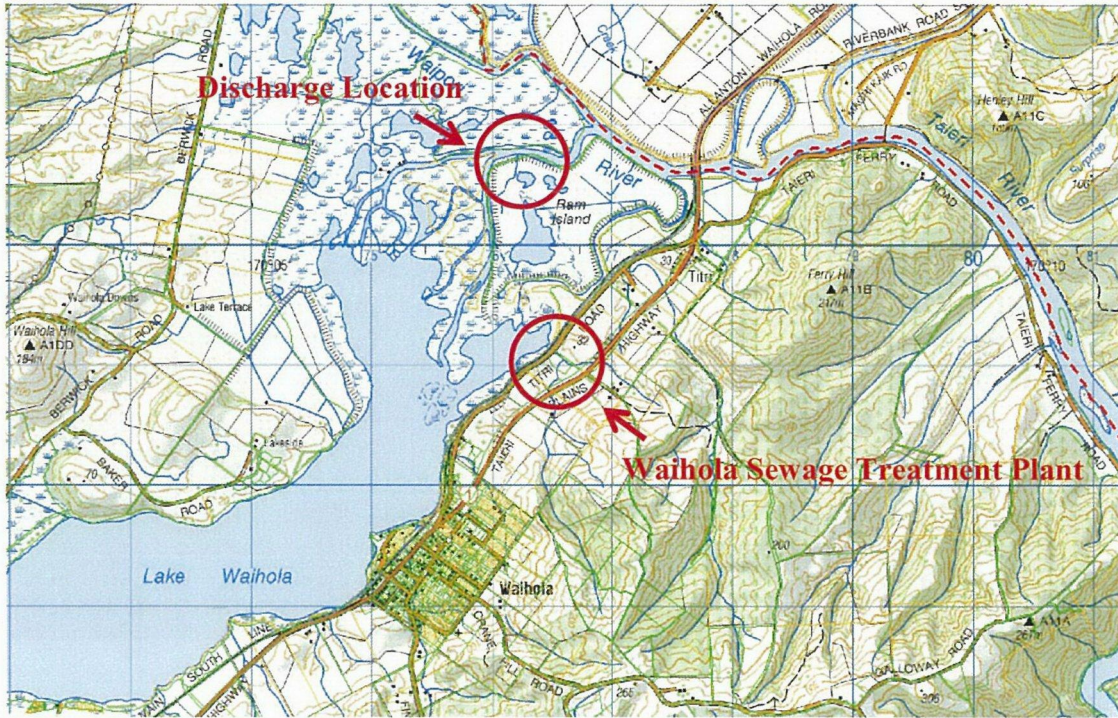


Figure 1: Waiholo Sewage Treatment Plant Location

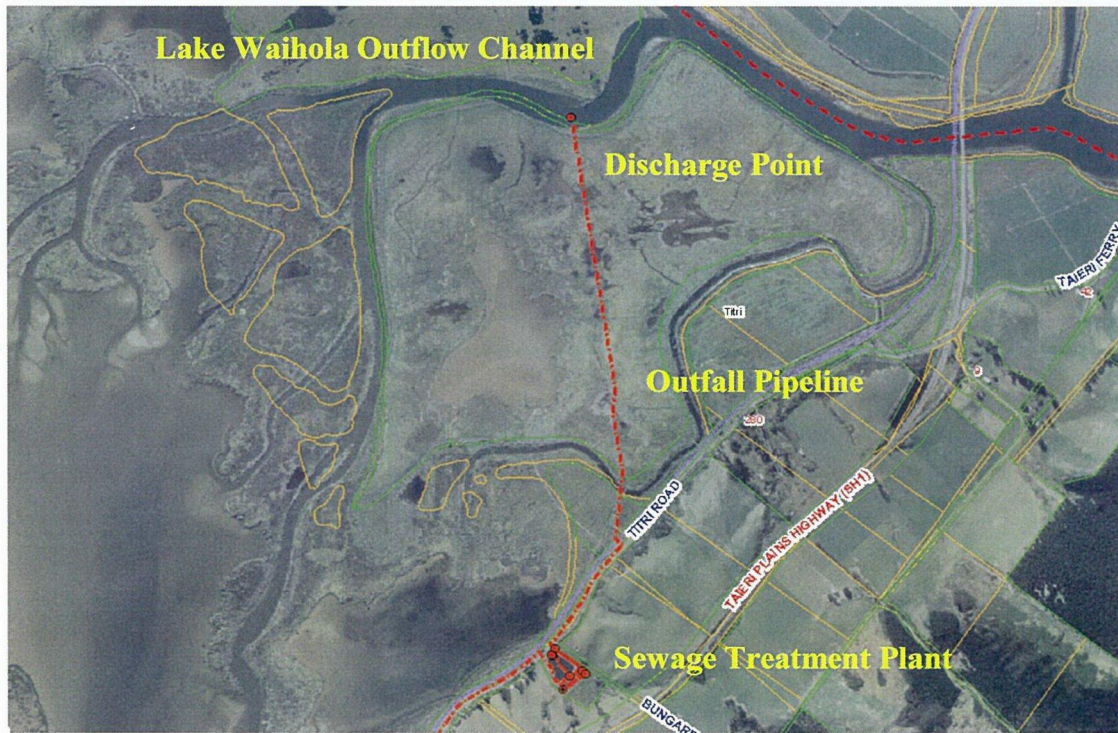


Figure 2: Site Plan and Discharge Point Location

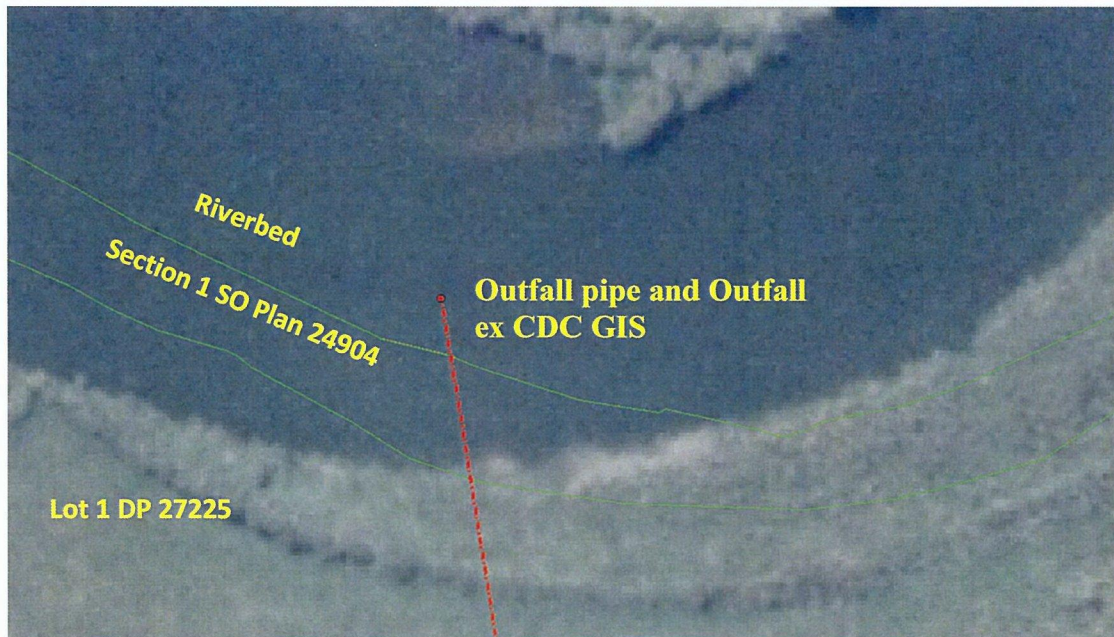


Figure 3: Outfall Location Detail



Figure 4: Outfall Site, Viewed from the Centre of the Outlet Channel (left) and bank (right).

The outfall is a 100mm internal diameter high density polyethylene pipe anchored to the bottom of the channel, extending 24m from the true right (southern) bank. There are seven 40mm diameter ports at 1m centres at the top of the outfall pipe over the last 6.35m of the outfall pipe. The outlet channel is approximately 5m deep at the end of the outfall pipe.

2.2 Flows

Currently there are 172 properties connected to the reticulation, including the camping ground. A further 60 properties pay a half rate and so have a right to connect to the reticulation should they be developed.

Outflows since mid-January 2013 are available, and these incorporate some days of low flow from Waihola and, in June 2015, historically very high flows from the township.

Because the outflow is pumped at specific times, the usual daily maximum is governed by what times are actually pumped and the pump flow itself. The pumping period varies between 6h 9m and 6h 18m depending on the particular tide. At present, the pumped flow is around 3.80 l/s which gives an average total flow per pumping period of 85m³. Some days will have two complete pumping periods, and others will not, so the maximum volume able to be pumped in one day is 170m³ at this pumped flow. Other days with less than two complete cycles will have a lower volume. Pump flows will also be affected to some extent by the level in the Outlet Channel itself – lower levels will produce somewhat higher flows.

The pump is also controlled by the level in the wetland outlet. So, the tide times dominate, but if levels are too low in the wetland, the pump will not operate, or will stop if the low level “stop” is reached during a pumping period. This means that volumes discharged can be less, indeed much less, than those noted above.

The volumes can occasionally be higher if flows to the wetland or pond overwhelm the system. This can happen if stormwater from the surrounding area enters the wetland, which is possible if rainfall intensities are high enough. Equally, high flows can occur from the township itself. On these occasions, the pump operates continuously and the 24 hour flow can reach 330m³ or more.

Flows are summarised in Table 1 below. Note that the theoretical figures are calculations of the flow generated by the town and take no account of rainfall on the pond or evaporation from it. However, 100mm of rain will generate 380m³ of rain on the pond, so while it may be significant on a very wet day, it is not a significant contributor to the average flow. Overall, the annual average rainfall of about 750mm contributes less than 8m³/d averaged across the year.

Parameter	m ³ /d
Measured Average Daily Discharge	102
Maximum Daily Discharge	346 ¹
Minimum Flow	31
Theoretical Dry Weather Inflow ²	67
Theoretical Dry Average Inflow ³	292
Measured Average Inflow	93
Theoretical Maximum Daily Inflow ³	1,942
Measured Maximum Inflow	773

¹ Flows over 400m³ were recorded between 18 and 22 June 2013. These are likely to be due to a telemetry fault rather than be actual flows.

² Based on a permanent population of 335 (2013 Census) and 200 L/h/d.

³ Based on Hamilton City Council, *Hamilton City Design Manual; Volume 2 – Design Guide; Part 5 – Wastewater Drainage*, 2011. The volumes include allowances for an average discharge of 200 L/person/d, infiltration of 2,250 L/ha/d and surface water ingress of 16,500 L/ha/d.

Table 1: Waihola Sewage Flows

The theoretical maximum daily flow has a substantial contribution from surface water ingress. The Hamilton City Council design manual addresses new developments, but is obviously applicable to the general urban environment. However, the density of development contemplated in the manual is certainly much higher than the present density in Waihola, so the theoretical dry weather average flow and maximum flow above will be significantly overstated. The dry weather average flow figure will be inflated because of the lower density of reticulation will mean less infiltration.¹ The maximum flow will be inflated because a much higher proportion of the area in Waihola will absorb surface water than in the usual urban setting, thus reducing the amount of surface water which could enter the sewage reticulation.

This can be seen in the actual density of properties connected to the sewage reticulation. The town extends to approximately 100 ha within which 172 properties are connected to the reticulation. This is 5,800m²/property, approximately three times the 1,900m²/property in Balclutha, for example. In view of the intensity of the event in June 2015, the maximum flow measured in the meter record is likely to be a good representation of the maximum daily flow to the sewage treatment plant..

Sewage flows typically increase in wet weather compared to dry weather, due to the ingress of stormwater to the reticulation. This comes from illegal connections (eg downpipes connected to gully traps) and from surface flow finding its way into the system via gully traps without sufficient surrounds, manhole lids, cleaning eye lids, etc. In addition, groundwater can get into the reticulation through poorly sealed joints, manholes and wetwells, and damaged pipes. This latter source becomes more prevalent as a system ages.

Stormwater cannot be entirely excluded from sewage reticulation, and this is recognised in the typical ratio of wet weather flow to dry weather flow. In a new, well-designed system, the ratio of wet weather flow to average dry weather flow can be expected to be around 3, with action on infiltration indicated when wet weather flow exceeds 5 times the average dry weather flow.

The metered flows above indicate that this ratio reached a maximum of 8.3, but this only applies to a day of exceptional rainfall. There is no indication that investigation and action on infiltration is required: see the discussion in 6. below.

When considering the discharge volumes sought, the question of the possibility of future growth in Waihola needs to be considered. The above discussion indicates that a discharge volume of about 350 m³/d could be appropriate at present.

¹ There will be less pipe length per hectare, so less joins and less opportunity for faults and less manholes, etc, than in a development with a higher density.

To some extent, the actual volume discharged in the future will also depend on the type of additional treatment chosen. Some technologies incorporate a plant with a set treatment capacity, and hence a fairly stable discharge flow, where the existing system is used to buffer the flow. Others will still discharge a wide range of daily volumes. It may also be that additional treatment alternatives may not require the existing wetland in which case the buffering capacity of the system will reduce and the variability discharge volumes increase.

The actual volume that can be discharged is governed by the pump capacity, so a limit applies at present. While it is of a certain capacity at present, it could be replaced with a pump capable of a higher flow, so discharge volumes could increase.

At the present instantaneous flow rate of 3.8 l/s, pumping for two tide cycles gives a daily discharge of 171 m³. On occasions of very high inflows, it has been necessary to pump continuously to prevent the pond or wetland overflowing into the stream skirting the site. At this flow rate, pumping for 24 hours will give a total discharge of 328 m³, consistent with the maximum reported in Table 1, given the variables in the system.

In addition, Waihola is one location within the Clutha District where some growth has occurred and might be expected in the future. This would increase the effluent flow from the township.

Considering these factors and bearing in mind the peak inflow, it is prudent to leave the consent volume at the current "usual" rate of 680 m³/d, hence that is the volume sought.

2.3 Lake Waihola Outlet Channel

The hydrology of the Lake Waihola Outlet Channel is described in Ryder.² It is one of a network of channels connecting Lakes Waihola and Waipori and the Taieri and Waipori Rivers. Groundwater and the Taieri Main Drain also provide water to the system.

The Outlet Channel is tidal, with one third of the volume of Lake Waihola typically displaced in a typical tidal cycle (about 2,400,000m³). The daily net flow can be either upstream or downstream, depending on tides and freshwater inputs. The channel is 60-90m wide and up to 8m deep in the vicinity of the outfall.

There is no flow data for the channel, but the volume and annual hydraulic residence time of Lake Waihola suggests an average outflow of 0.55 m³/s. The present discharge is approximately 0.7% of this flow. While, because of the tidal nature of the channel, it is not simply a matter of considering the

² Ryder Consulting, *Waihola Oxidation Pond Discharge to the Lake Waihola Outflow Channel Assessment of Environmental Effects*, February 2014, 9-10.

discharge against this flow, clearly the volume discharged is minuscule compared to other influences on the channel.

2.3.1 Sea Level Rise

Because the Outlet Channel is tidal, sea level rise will affect the hydraulics of the treatment plant outfall. At the end of the term sought for the consent (2050), sea level is predicted to be 300mm above present levels.³ Without any other change, this is calculated to reduce the flow from 3.80 L/s to 3.70 L/s. This is a minor change, but could easily be accommodated, if necessary, by upgrading the pump to one of a higher capacity. Sea level change will have a less than minor impact on the treatment plant.

2.3.2 Ecological Values

Lakes Waihola and Waipori are identified in Schedule 1A of the RPW as having particular ecological values, which are summarised in Table 2..

Water body	Ecosystem values
Lakes Waipori/Waihola	<p>Large water bodies supporting high numbers of particular species, or habitat variety, which can provide for diverse life cycle requirements of a particular species, or a range of species</p> <p>Access within the main stem of a catchment through to the sea or a lake unimpeded by artificial means, such as weirs, and culverts</p> <p>Silt bed composition of importance for resident biota</p> <p>Free of aquatic pest plants (e.g. <i>Lagarosiphon</i>) identified in the Pest Management Strategy for Otago 2009.</p> <p>Presence of riparian vegetation of significance to aquatic habitats</p> <p>Significant areas for:</p> <ul style="list-style-type: none"> • Trout spawning • Development of juvenile trout <p>Significant presence of:</p> <ul style="list-style-type: none"> • Trout • Eels <p>Presence of a significant range of indigenous fish (including giant kokopu) and indigenous waterfowl (including a breeding population of fernbird)</p> <p>Presence of a significant range of indigenous fish species and waterfowl threatened with extinction.</p>

Table 2: Schedule 1A Values, Lakes Waihola and Waipori⁴

The Department of Conservation identified in 1993 that the Waipori/Waihola Lake – Wetland complex is a coastal system of great ecological importance.⁵

³ *Climate Change 2013: The Physical Science Basis. Working Group I contribution to the IPCC Fifth Assessment Report; Projections of Sea Level Rise, IPCC, 2013, 8.*

⁴ Taken from Ryder, 7

⁵ Department of Conservation, *Lakes Waipori and Waihola Wetland: a natural resources inventory*, Otago Conservancy, Dunedin, 1993. Cited in Ryder, 5.

2.3.3 Cultural Values

Schedule 1D of the RPW identifies the cultural values associated with Otago's waters. Lakes Waihola and Waipori are identified in Schedule 1D of the RPW as having particular cultural values, coupled with the Sinclair Wetlands. These values are listed in Table 3.

	Beliefs, values and uses	Explanation
Pomahaka River		
Mana interests	MA1: Kaitiakitanga	The exercise of guardianship by Kai Tahu in accordance with tikanga Maori in relation to Otago's natural and physical resources; and includes the ethic of stewardship
	MA2: Mauri	Life force; for example the mauri of a river is most recognisable when there is abundance of water flow and the associated ecosystems are healthy and plentiful; a most important element in the relationship that Kai Tahu have with the water bodies of Otago
	MA3: Waahi tapu and/or Waiwhakaheke	Sacred places; sites, areas and values associated with water bodies that hold spiritual values of importance to Kai Tahu. (Note: Kai Tahu should be consulted regarding the location of these places, sites areas and values for a river identified as MA3)
	MA4: Waahi taoka	Treasured resource; values, sites and resources that are valued and reinforce the special relationship Kai Tahu have with Otago's water resources
	Access/customary interests	use
	MB1: Mahika kai	Places where food is procured or produced
	MB2: Kohanga	Important nursery/spawning areas for native fisheries and/or breeding grounds for birds
	MB3: Trails	Sites and water bodies which formed part of traditional routes
	MB4: Cultural materials	Water bodies that are sources of traditional weaving materials and medicines
	MB5: Waipuna	Sources of water highly regarded for their purity, healing and health-giving powers.

Table 3: Schedule 1D Values, Lakes Waihola and Waipori⁶

⁶ Taken from Ryder, 8

2.4 Description of Activity

The present activity is the treatment of municipal sewage, comprising almost exclusively domestic sewage, in a single conventional oxidation pond followed by a surface flow wetland in series. This treatment process is simple and robust, and produces an effluent with the characteristics given in Table 4.

Parameter	Geomean	90 th Percentile
BOD ₅ g/m ³	39	100
Total Phosphorus g/m ³	5.90	11.03
Ammoniacal Nitrogen g/m ³	16.5	41.0
Suspended Solids g/m ³	81	239
Faecal Coliforms cfu/100ml	7,006	48,700
pH (geomean and range)	7.44	6.69 – 9.03

Table 4: Waihola Sewage Treatment Plant Effluent Characteristics

These characteristics are taken from the consent monitoring done by Clutha District Council at three monthly intervals from May 2004 to November 2015, plus occasional other sampling in the period, comprising 53 samples all told. The last sample in the record was taken in November 2015. The monitoring results are given in Appendix 2.

The discharge is a 100mm diameter pipe with ports, fixed to the bed of the Outlet Channel as shown in Figure 4 and described in 2.2 above. The volume discharged is small relative to the net Channel flow.

Clutha District Council has not sampled the outlet channel, as this is not required by the current consent. In addition the fact that flow occurs in both directions depending on the state of the tide makes sampling upstream and downstream of the outfall somewhat meaningless as a way of evaluating the impact of the discharge on the Channel. Ryder reports that there is little water quality data for the Channel and suggests that water quality in Lake Waihola itself is the best indicator available for the Outlet Channel. He notes that the lake is supertrophic, saturated in phosphorus and nitrogen. The former has trended up in recent years, while the latter has trended down, but the lake is nitrogen limited. Turbidity in the lake is usually high and the lake has a high percentage of saturated oxygen with low E.coli levels which mean the lake is usually safe for swimming. However, the high nutrient loads can promote algal blooms, when it becomes unsafe for swimming.

3. Consent Term

A 35 year consent term is sought is sought for the following reasons:

- Section 4 of the report below indicates that alternative treatment methods and locations have been considered. Continuation of the present point discharge is the only practicable option.
- Section 5 of the report below confirms that any adverse effects on the Outlet Channel are minor.
- To provide long term security of service at an acceptable cost for the ratepayers who are customers of the service.

4 Consideration of Alternatives

The Fourth Schedule of the RMA requires a description of possible alternative locations or methods for undertaking the activity, where it is likely that an activity will result in any significant adverse effect on the environment. In this case, while there are alternative treatment methods to improve the quality of the effluent, the final disposal will only be to water or to land. Accordingly, these are the alternatives considered.

4.1 Discharge to Land

A discharge to land would require the purchase of suitable land and its development, plus conveyance of the effluent to the site. In 2007, Trevor Webb of Landcare Research Ltd⁷ evaluated land in the vicinity of Waihola for suitability to use for the disposal of treated sewage effluent. The area to be evaluated was defined as all land within a 3.75km radius of Waihola. Disposal of treated sewage effluent to land is governed by the capacity of the land to treat the volume of effluent to be disposed of (its hydraulic capacity) and the capacity of the land to receive the nutrients in the effluent with removal of resultant growth (its nutrient capacity). Webb evaluated both.

He commented that he was “not confident of finding land with permeable soils within the 3.75-km radius.” However, another investigation he had done for Milton had identified a potential land type there and “the fans 4 km to the south-east of Waihola” are a similar type. He thought that an application schedule of “around 23mm applied every 10 days” could be achieved.⁸ This site is approximately 6km from the present sewage treatment plant.

At this application rate and the average flow of 102 m³/d, the area required for disposal is 4.45ha,⁹ in addition to which a buffer zone will be required. A 50m buffer zone all round will add approximately 5.2ha to this, making a total of 9.65ha all told. The location of this area is shown in Figure 5.

⁷ Trevor Webb, *Soil Investigation to evaluate Capability of land Surrounding Waihola, Balclutha, Stirling, Kaitangata, Owaka, Clinton, Heriot and Lawrence for Use as Municipal Wastewater Disposal Sites* (Manaaki Whenua Landcare Research, 2007)

⁸ Webb, 11.

⁹ Webb, 11, identifies an area of 3.7ha is required but this is based on a daily flow of 85m³. The above area is calculated pro rata from this based on the current average daily flow of 102m³.

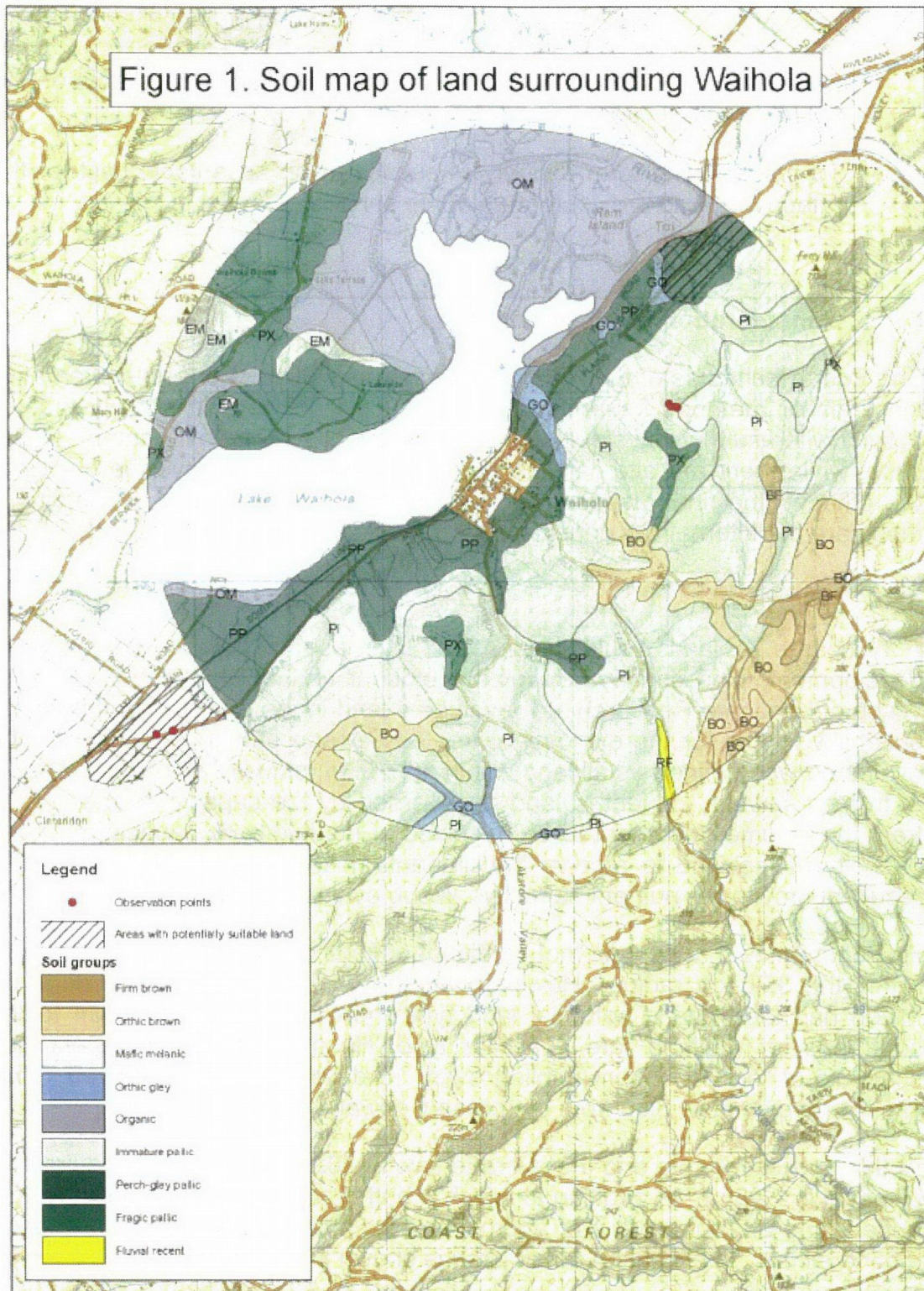


Figure 5: Possible Area for Land-based Disposal from Waihola Sewage Treatment Plant¹⁰

¹⁰ Webb, 12.

In order for an area in this vicinity to be developed for land based disposal, the following work will be required:

- Construct new pump station at the sewage treatment plant to convey sewage to the disposal site;
- Construct a new rising main from the sewage treatment plant to the disposal site;
- Construct a new pump station and control system at the disposal area;
- Fence and landscape the disposal area; and
- Install reticulation to a means of disposal (eg spray irrigation).

This assumes that the present effluent can be disposed of to land (Webb comments that tertiary treatment prior to land disposal is best practice¹¹). Further treatment of the present effluent may be required before it can be disposed of, but the cost of this is not included in this brief analysis.

The estimated cost of establishing land based disposal at this site is \$2,110,000. A number of other considerations need attention before this figure can be confirmed. Foremost among these are specific investigations to determine that the area, which Webb described as likely to be suitable, is actually suitable for land based disposal. Other factors also need to be taken into consideration:

- (a) There will be a considerable operating cost in addition to the above capital cost.
- (b) If the soils become saturated, then irrigation will not be possible as ponding or runoff onto other property or into waterways is likely to occur. The only solution to this is to provide storage to bridge such periods.
- (c) Whether further treatment of the effluent is needed to make it suitable for pumping over 7km and being applied over the disposal area.

It is clear that much work is required before this form of land based disposal is shown to be feasible, and even if this is demonstrated, the costs are considerable.

The cost given above does not make any allowance for extra costs for treatment or storage, so may be optimistic. However, even at this level, it is of the order of twice the estimated cost of improved effluent treatment and continuing to discharge to the Outlet Channel. For this reason, this alternative has not been evaluated further.

4.2 Continued Discharge to Water (Lake Waihola Outlet Channel)

The alternative to land based disposal is the continuation of the discharge to the Lake Waihola Outlet Channel. There are no other locations for a point

¹¹ Webb, 9.

discharge which appeal as having advantages over the Outlet Channel. The environmental impact of the discharge has been assessed for Clutha District Council on four occasions, in 1996, 2001 (twice) and 2014. The first was for the purpose of supporting an application for the current consent; the second and third for supporting a review of all Council's treated sewage discharges (also used in support of the 2002 consent application); and the fourth in support of this current application.

In considering the earlier reports, it must be noted that, in a general sense, land use and farm intensities have changed since then. However, there is insufficient water quality data to determine whether this has had an effect on the water quality in the outlet channel.

In contrast, the discharge volume has certainly increased. While no metered volumes are available prior to 2013, the resident population in the census meshblock which covers most of Waihola has increased from 231 in the 2001 census to 300 in 2013, with the number of occupied dwellings increasing from 99 to 141 in the same time. There are a number of properties to the north of Waihola not in the meshblock, which contribute an estimated 35 more residents. At present there are 172 properties connected to the sewer, which includes the school and the camping ground.

The 2002 application estimated flows, giving 66 and 200m³/d as the average "non-summer" and summer flows, with the peak flow estimated as 799m³/d. These compare to the present metered flows (2014-15), which show an average daily inflow of 93m³ and a peak inflow of 773m³. The average daily inflow over December 2014 – February 2015 was 76m³, showing that the assumption that summer flows would be higher due to a higher population made in 2002 was not correct. The average daily outflow is 102m³. The difference between the average inflow and outflow can be accounted for from rainfall on the pond and potential differences in pond and wetland levels.

Compared to the present day, the earlier assessments were considering a lower volume of discharge from a single oxidation pond into receiving water. Hence, the 2014 assessment is the only relevant assessment, although the earlier assessments do hold some interest.

The then Robertson Ryder Ltd considered the issue in 1996.¹² They noted that the "lower Taieri River is the dominant factor affecting the hydrology and water quality of lake Waipori and its outflow channel" and concluded that "The Waihola sewage discharge appears to be having no measurable affect on water quality or aquatic biota in the immediate vicinity of its outfall."¹³

The 2002 consent application reviewed the environmental impacts assessed by the earlier reports, and concluded that the "oxidation pond discharge has a

¹²Robertson Ryder Ltd, *Resource Consent Application: Waihola Treated Sewage Discharge to Lake Waihola Outflow Channel*, 1996.

¹³ Robertson Ryder, 17, 18.

negligible effect on the water quality of the outflow channel, adjacent lakes and the wetland complex.”¹⁴

Ryder Consulting Ltd has completed an assessment to support this application.¹⁵ The conclusion of that assessment is:

*The discharge of effluent from the Waihola oxidation pond to the outflow channel of Lake Waihola has a minor effect on water quality that is restricted to a localised area immediately downstream of the discharge point. This effect is temporary and shifts with the changing tide. The discharge does not appear to adversely affect aquatic plant, benthic macroinvertebrate, fish or bird communities. The minor and localised effect of the discharge on water quality in the outflow channel is expected to have minimal, if any, effects on water quality and aquatic communities in Lake Waihola, the surrounding wetland, or the lower Waipori and Taieri Rivers.*¹⁶

As Ryder notes,¹⁷ there is little water quality data from the outlet channel to support these observations. However, Clutha District Council did obtain eight samples between February 1998 and September 2002 which were analysed for BOD₅, faecal coliforms, enterococci and suspended solids. Table 5 shows the results of that monitoring, expressed as geomeans for each contaminant.

	BOD ₅ g/m ³	Faecal Coliforms cfu/100ml	Enterococci cfu/100ml	Suspended Solids g/m ³
20m Upstream of Outfall	1.4	99	9	23.9
20m Downstream of Outfall	1.6	74	7	27.6

Table 5: Contaminant Parameter Geomeans, Upstream to Downstream

These results need to be treated with care. First, there are only eight samples. Second, while “upstream” in the context of the table means towards Lake Waihola from the outfall and “downstream” towards the sea, no record of the direction of the current at the time of sampling was made. Neither was the actual time of sampling recorded. Thus, any comparison between upstream and downstream results may not be valid, as the current at the time may well have been from the downstream location towards the upstream location.¹⁸

However, the differences between the relative geomeans for each parameter are so small that the only conclusion that can be drawn is that the upstream and downstream water quality measured by these measures is the same. This

¹⁴ MWH, *Waihola Oxidation Pond Discharge Resource Consent Application and Assessment of Environmental Effects*, 2002, 17.

¹⁵ Ryder Consulting Ltd, *Waihola Oxidation Pond Discharge to the Lake Waihola Outflow Channel Assessment of Environmental Effects*, February 2014.

¹⁶ Ryder, 47.

¹⁷ Ryder, 10.

¹⁸ Ryder, 42, makes a similar observation.

is shown by the difference being less than 10% of the standard deviation of the sample population for all parameters except for BOD₅, where the difference is 23% of the standard deviation. It is true that the volume of effluent discharged is likely to be 40% higher now than when the above sampling was done, but such a difference is not expected to have any material impact on the Outlet Channel.

This is before any improvement to the effluent is considered. Clutha District Council is proposing to construct facilities to further treat the Waihola wastewater and has proposed consent limits below which the new facilities will achieve. These consent limits are compared with the present effluent in Table 6.

	pH	BOD ₅ g/m ³	Total Phosphorus g/m ³	Faecal Coliforms cfu/100ml	Ammoniacal Nitrogen g/m ³	Total Nitrogen g/m ³	Suspended Solids g/m ³
Existing Plant	8.27	99.8	11.03	48700	25.9	41.0	208.0
Proposed Limits	6.0 - 9.0	20	10	260	20	35	30

Table 6: Existing Plant Contaminant Concentrations as 90th percentiles Compared to Consent Limits Sought. Note that the bacteriological consent limit proposed is for *E. coli*, not faecal coliforms.

A treatment process has not yet been selected, although two are under consideration at present. Both are anticipated to meet the limits proposed, with the actual 90th percentiles somewhat less than the limits.

There is therefore to be a significant reduction in the contaminant load being discharged to the outlet channel, with the range of reductions from the above table being from 10% (phosphorus) to 99% (bacteriological). Thus, the present minor, localised effect of the effluent will be greatly reduced, if not eliminated.

A suitable plant to further treat the Waihola STP effluent is expected to have a capital cost of approximately \$1,150,000 and annual operating costs between \$40,000 and \$60,000. While still a significant cost for a small community, this is a considerably cheaper alternative than land based disposal, and is to be preferred.

4.3 Conclusion

The preferred alternative is a continued point discharge with additional treatment. Clutha District Council is seeking a consent which specifies effluent quality standards to be met and does not specify any treatment process, but proposes effluent quality standards which are such that a 35 year consent can be granted.

5. Assessment of Effects on the Environment

The RMA requires that the assessment of effects is to be in such detail that reflects the scale and character of the actual and potential effects the activity may have on the environment. The actual potential environmental effects associated with the discharge have been identified as being effects on:

- Water quality;
- Aquatic ecosystems;
- Natural Character and Amenity;
- Cultural values; and
- People and Communities.

In February 2014, Ryder Consulting reported on an assessment of the environmental effects of the current discharge as noted in 4.2 above. A copy of the report is included as Appendix 3 and it should be read in conjunction with this AEE and understood to comprise part of it. The discussion below largely summarises the Ryder report, while expanding on it where appropriate.

The report indicates that the present discharge is having a minor effect on the Lake Waihola Outlet Channel. The proposed improvement in effluent quality and associated consent conditions will reduce this effect.

5.1 Water Quality

The discharge has the potential to adversely affect water quality. Ryder considers that “The discharge’s greatest measured effect on water quality in the outflow channel is an increase in faecal bacteria numbers,” although he also notes that the monitoring results available to him are inconsistent.¹⁹ Even if the effluent discharge is responsible for an increase in faecal bacteria numbers 100m downstream of 18 MPN/100ml, as the November 2013 monitoring suggests,²⁰ the proposed improvements in effluent quality defined by suggested consent conditions will almost completely eliminate any increase in bacterial concentrations in the Outlet Channel due to the discharge, measured by E. coli concentrations.²¹ This will allow the potential for the Outlet Channel water to meet contact recreation standard without being compromised by this discharge.

¹⁹ Ryder 2014, 42.

²⁰ Ibid.

²¹ The current consent requires faecal coliforms to be monitored; it is expected that the new consent will require E. coli, a species of faecal coliform, to be monitored. In practice, concentrations of each are essentially equivalent, although theoretically the numbers of E. coli in a sample should be less than the total numbers of faecal coliforms.

There was little to no impact in the Outlet Channel from other contaminants according to Ryder,²² so the improved effluent will certainly have no impact on the channel.

5.1 Effect on Aquatic Ecosystems

5.1.1 Aquatic Algae and Plants

Ryder comments that there is “no detectable increase in phosphorus or nitrogen in the channel downstream of the outfall” so it is “unlikely that algae and aquatic plant growth will be exacerbated by the discharge.”²³

5.1.2 Benthic Macroinvertebrates

Ryder notes that high ammonia concentrations can be toxic to fish and macroinvertebrates but that ammonia levels are significantly lower than toxic levels specified by ANZECC and ARMCANZ (2000) guidelines downstream of the outfall. pH levels are generally within guideline levels and the suspended solids discharged are unlikely to change substrate conditions in the channel.²⁴

While the bottom of the allowable pH range proposed at 6.0 is somewhat below the mean from Clutha District Council’s monitoring of 7.46, the minimum pH measured in that record is 6.69, so the reduction is not great compared to that. Ryder makes no comment on this specific limit, but Clutha District Council considers that the proposed limit will have no measurable impact on the pH in the Outlet Channel.

Overall, the proposed upgraded Waihola STP effluent discharge is unlikely to have any adverse effect on the macroinvertebrate communities of the Outlet Channel.

5.1.3 Fish

Ryder notes the potential impacts on fish from high BOD₅ concentrations, ammonia toxicity and elevated suspended solids concentrations. However, his assessment is that the existing discharge is having negligible effect on the Outlet Channel in respect of these contaminants,²⁵ so the proposed upgraded discharge will have no measurable effect on fish.

5.2 Natural Character and Amenity

The predominant effect of the discharge on the natural character of the Lake Waihola Outlet Channel is the potential discolouration of water. This reduces the clarity of the water, thus detracting from the visual amenity and there may be potential to bring the clarity below the guideline for recreational use. However, Ryder notes that the clarity in the Channel was slightly below 1m (upstream and downstream of the outfall) in November 2013 monitoring,

²² Ryder, 42-43.

²³ Ryder, 45.

²⁴ Ibid.

²⁵ Ryder, 45-47.

somewhat less than the ANZECC and ARMCANZ (2000) guideline of 1.6m. There was a minimal decrease 50m downstream of the outfall but clarity had recovered by 100m downstream. He suggests the current discharge has little effect on clarity.²⁶

Faecal coliform levels are generally well below the ANZECC and ARMCANZ (2000) guideline for water-contact sports and recreation in the vicinity of the outfall,²⁷ so the discharge is not having an impact on recreation in the Outfall Channel. The great improvement proposed for bacteriological quality in the discharge will only eliminate an already minimal risk to the equivalent quality in the Channel.

5.3 Cultural Values

It is acknowledged that the maintenance of water quality is a paramount resource management issue to Ngai Tahu. The RPW notes that the discharge of contaminants to water bodies is particularly offensive to Kai Tahu, since water is of spiritual and practical importance. Therefore, the degradation of any water body may undermine the relationship that Iwi have traditionally enjoyed and seek to retain with water bodies.

In the context of this application, it is proposed to discharge contaminants directly to the Lake Waihola Outlet Channel. The preferred cultural alternative of disposal to land is not available for reasons of cost and uncertainty over the technical suitability of land for disposal. This leaves only the point discharge. However, as discussed in 4.2, the proposed improvement in treatment will further limit the already minor effects on the Channel. Therefore, it is considered that the adverse effects of the discharge on cultural values will be minor and have been mitigated as far as is practicable.

5.4 Effect on People and Communities

The discharge can affect people and communities in three ways. Firstly, it allows for the efficient disposal of sewage from human habitation, thus greatly contributing positively to human health and wellbeing in Waihola. This is the primary reason for gathering, treating and disposing of sewage in the manner done in Waihola. While suitable on-site treatment technologies are available, the dispersed nature of them and variable management of their efficiency mean that the communal solution is much to be preferred. Human health and wellbeing in Waihola is best served by allowing the discharge to continue and any alternative is not to be countenanced.

Secondly, it can affect human enjoyment of the receiving environment. This can be by detracting from the recreational values of the Outlet Channel. This has been dealt with above.

The third factor is the impact on the community of additional costs imposed, and this is not to be understated. In the past, Clutha District Council has

²⁶ Ryder, 40

²⁷ Ibid.

insisted that all costs lie where they fall: that is, that Waihola pay all the costs of its sewage treatment system. However, this has been changed with all costs now to be met equally by all properties connected to communal sewage disposal systems. 2015-16 is the first year in a six year transitional period in respect of this change.

This means the impact on individual properties of the upgrading works is ameliorated by economies of scale. Nevertheless, the proposal will require an increase in annual sewer rate income of about \$66,000 in the first year of its operation, excluding GST. This is almost a 3% increase in total sewage disposal costs for Clutha District. In today's low inflation environment, this is a distinct impact on ratepayers.

5.5 Conclusion

Overall, the improvements proposed to the discharge will mean that the adverse effects of granting the consent will be less than minor.

6. Monitoring and Consent Limits

Council seeks staged consent conditions:

Stage 1: Prior to the construction of any new treatment system, and

Stage 2: After construction of the new treatment system.

The current consent requires monitoring effluent parameters at six monthly intervals. It is proposed that stage 1 will continue with this six monthly monitoring and stage 2 will require monthly monitoring.

There will need to be a period to allow for selection of the treatment process, design and construction of the new system and finally commissioning of the system. Following this some allowance needs to be made to allow the system to bed in satisfactorily.

Accordingly, a period of four years from the date of consent is suggested as a suitable period to allow these processes to be completed.

It is also suggested that the consent limits be 90th percentiles. Using a percentile will cope well with the natural variation of the discharge. It is also suggested that rather than a bare 90th percentile, which would apply to the whole sampling record, the limits are expressed as "no more than one sample in any 10 consecutive samples" which approximates a 90th percentile. This approach has two other advantages: first that compliance is judged on recent sampling so measures what is happening "now", and second that current compliance cannot be affected by historical samples.

The suggested limits are calculated so that the current discharge will be compliant and are the same as the limits applying to Council's most recently granted treated sewage discharge consents, at Heriot and Kaitangata, save for a small reduction in the bottom of the pH range. They are set out in Table 7 below.

Parameter	48 Months after date of consent, 9 of any 10 consecutive samples not to exceed	From 48 Months after date of consent, 9 of any 10 consecutive samples not to exceed
pH (range)	6.0 – 9.0	6.0 – 9.0
BOD ₅ g/m ³	140	20
Total Phosphorus g/m ³	12	10
Ammoniacal Nitrogen g/m ³	40	20
Total Nitrogen g/m ³	No Limit	35
Total Suspended Solids g/m ³	300	30
E. coli cfu/100ml	100,000	260

Table 7: Proposed Consent Limits

In addition to these limits, a condition related to stormwater infiltration could be considered if the peak flow is excessive compared to the average flow. Reducing flows if this is the case can have a benefit for treatment systems and reduces the volume discharged to the Outlet Channel.

However, stormwater infiltration is only considered excessive if the peak flow is more than five times dry weather flow. At Waihola, the flow record covering 793 days from February 2013 to June 2015 shows an average daily inflow of 91 m³ and a maximum daily flow of 773m³. However, the flow exceeded 400m³ on only 7 days in the period, 18-22 June 2013 (five days, maximum 507m³) and 4 and 5 June 2015 (maximum 773m³). The latter rainfall was exceptional and those flows cannot be taken as indicative of the condition of the reticulation in respect of stormwater infiltration. Accordingly, with the peak to average flow ratio only a little over 5 for the remainder of the record, the conclusion is that stormwater infiltration is within acceptable limits and no condition of the kind noted above is warranted.

Condition 2(c) of the present consent requires that:

The consent holder shall undertake an investigation into the options for minimising the backflow of effluent into Lake Waihola. This investigation shall

specifically assess the possibility of reducing the period of time effluent is discharged. The consent holder shall provide a final report on this investigation to the Consent Authority prior to the expiry of this consent (1 September 2017). The report shall detail the time frame for implementing any proposed changes to the disposal regime.

This report has not yet been done. Accordingly, a consent condition requiring the same report be finalised and forwarded to the Otago Regional Council by 1 September 2017 is suggested.

Statutory Considerations

7.1 Introduction

This section sets out the statutory planning framework that applies to this application. Relevant documents are the Resource Management Act 1991 ("RMA"), the National Policy Statement on Freshwater Management ("NPS"), the Regional Policy Statement ("RPS") and the Regional Plan: Water ("RPW").

7.2 Resource Management Act

Section 5 of the RMA seeks to promote the sustainable management of natural and physical resources. Furthermore, it states that activities must be mitigated so that adverse effects on the environment are avoided, remedied or mitigated. Section 6 sets out those matters of national importance that are to be recognised, while Section 7 sets out "other matters" that Council is to have particular regard to. Finally, Section 8 requires all persons acting under the RMA to take into account the principles of the Treaty of Waitangi.

For the reasons detailed in Section 5 above, it is considered that the discharge will not adversely affect the matters outlined on Sections 5-8 of the RMA. The discharge will have little or no adverse effect on the life-supporting capacity of the Lake Waihola Outlet Channel and any ecosystems associated with it. Accordingly, it is considered that the granting of consent for the continued discharge, with appropriate conditions, will achieve the purpose of the RMA.

7.3 National Policy Statement

The NPS was gazetted on 14 May 2011 and took effect from 1 July 2011. It sets out objectives and policies that direct local government to manage fresh water in an integrated and sustainable way, while providing for economic growth within set water quantity and quality limits.

The NPS consists of eight objectives and fifteen policies, which focus on water quality, water quantity, the role and values of Tangata Whenua, and the progressive implementation of the NPS. The objectives and policies of greatest relevance to this application are commented on below.

Objective A1 requires that the life-supporting capacity, ecosystem processes and indigenous species, including their associated ecosystems, be

safeguarded in sustainably managing the use and development of land, and of discharges of contaminants.

Objective A2 requires the overall quality of freshwater within a region to be maintained or improved, while:

- (a) Protecting the quality of outstanding freshwater bodies*
- (b) Protecting the significant values of wetlands and*
- (c) Improving the quality of freshwater in water bodies that have been degraded by human activities to the point of being over-allocated.*

Policy A4 directs all Regional Councils to amend Regional plans, to the extent needed, to include the following policy:

- 1. When considering any application for a discharge the consent authority must have regard to the following matters:*
 - (a).the extent to which the discharge would avoid contamination that will have an adverse effect on the life-supporting capacity of fresh water including on any ecosystem associated with fresh water and*
 - (b).the extent to which it is feasible and dependable that any more than minor adverse effect on fresh water, and on any ecosystem associated with fresh water, resulting from the discharge would be avoided.*

The RPW has been updated so as to be consistent with the policy outcome addressed under Policy A4 of the NPS.

The Assessment of Environmental Effects indicates that the discharge will not alter or have a more than minor adverse effect on the life-supporting capacity of the lake Waihola Outlet Channel and its associated ecological values. Further, the discharge will not have a more than minor adverse effect on the river's ecosystems and their ability to be sustained. This is particularly so once the proposed treatment upgrade is in place. This accords with Objective A1 and Policy A4 of the NPS.

Part D of the NPS relates to the roles and interests of Tangata Whenua. The objective seeks to provide for the involvement of iwi and hapu and to ensure that the values and interests of Tangata Whenua are reflected in the management of fresh water.

Clutha District Council recognises the interests of Tangata Whenua and their concerns associated with this and similar discharges. It has operated for many years a Wastewater Working Party which is a formal Committee of Council on which appropriate local iwi are represented. This gives an opportunity for local iwi to contribute to the application process in order to determine how best to ensure their requirements are met, an opportunity which has worked very well in the past. This application has not yet been considered by the Wastewater

Working Party, but is of the same scale and character as the previous seven applications for the discharge of treated sewage made (or modified) by the Clutha District Council since 2009 which were approved by the Wastewater Working Party. Council therefore considers that iwi interests have been satisfactorily taken into account, but will be convening a meeting of the Wastewater Working Party in early 2016 where there will be an opportunity for this application to be considered. Of course, iwi may have the further opportunity to consider the application formally through any notification process considered necessary by the Otago Regional Council.

7.2 Regional Policy Statement for Otago

The Regional Policy Statement for Otago (RPS) sets the direction for the future management of Otago's natural and physical resources, in accordance with the purpose and principles of the RMA. The objectives and policies of particular relevance to the discharge are Objectives 6.4.2, 6.4.3 and 6.4.4 as well as Policies 6.5.1 and 6.5.5.

In respect of Otago's water resources:

Objective 6.4.2 aims to maintain and enhance their quality so as to protect their capacity to meet the needs of Otago communities;

Objective 6.4.3 aims to safeguard their life-supporting capacity by protecting their quantity and quality;

Objective 6.4.4 aims to maintain and enhance their ecological, intrinsic, amenity and cultural values;

Policy 6.5.1 aims to recognise and provide for the relationship Kai Tahu have with them; and

Policy 6.5.5 aims to reduce the adverse effects of contaminant discharges into them.

As discussed above, the treated sewage discharge, particularly once treatment is upgraded, will not adversely affect the life-supporting capacity of the Lake Waiholo Outlet Channel. Neither will it adversely affect the ecological or amenity values associated with the Outlet Channel except to a minor degree. It will continue to contribute to the health and wellbeing of the Waiholo community by providing safe and hygienic disposal of human sewage, thus creating a life-supporting value associated with the Outlet Channel.

As shown above, the alternative of land-based disposal to achieve these objectives and policies is not feasible.

7.3 Regional Plan: Water

The RPW covers the use, development and protection of fresh water resources, the beds and margins of water bodies, and the issues associated with that use, development and protection. The policy framework of the RPW has been significantly modified by Plan Change 6A. While the Plan Change is

focused on addressing the effects of non-point discharges, it does signal a move away from policy support for the assimilative capacity of water bodies. However, Chapter 7 still provides policy support for the use of mixing zones (Policy 7.B.6)

The objectives and policies of the RPW most relevant to the discharge are assessed to be Policy 5.4.2, Objectives 7.A.1, 7.A.2 and 7.A.3, and General Policies 7.B.1, 7.B.2, 7.B.3, 7.B.6, 7.B.8, 7.C.1, 7.C.2 and 7.B.6.

Policy 5.4.2 promotes the avoidance of adverse effects, but only as a first preference as remediation and mitigation are also enabled. The outcome being sought is for the values of significance to be given the appropriate degree of protection. The discharge proposed will maintain the quality of the receiving water and so not adversely affect the values listed under Schedule 1. Consequently, it does not cut across the outcomes sought in the RPW.

Objective 7.A.1 aims to have good quality water in Otago's water bodies and enhance that quality where it is degraded. Objective 7.A.2 aims to enable the discharge of contaminants to water in a way which maintains good quality water and supports natural and human use values ("good quality water" is defined in Schedule 15). As set out above, the proposed discharge will not adversely affect the quality of the water in the Lake Waihola Outlet Channel.

Objective 7.A.3 aims to ensure that communities and individuals recognise and manage the effects of activities on water quality, including cumulative effects. As set out above, the proposed discharge does contain contaminants that have the potential to reduce the water quality in the Outlet Channel. Having considered the nature of the proposed discharge, particularly after the proposed treatment upgrade, it will not result in more than minor adverse effects, cumulative or otherwise. This is largely due to the proposed effective removal of bacteriological contamination from the discharge.

Policy 7.B.1 aims to ensure that water is of good quality by the target dates given in Schedule 15 by avoiding discharges of contaminants with noticeable effects and allowing those which have minor effects or are short term. The policy does not refer to the assimilative capacity of water bodies or mixing zones and whether the noticeable effects occur prior to reasonable mixing. Clutha District Council considers the policy can be and should be interpreted to apply after reasonable mixing. The proposed discharge will not result in other than minor effects after such mixing, and there will be no visual impact on water quality, so would achieve the good quality water parameters given in Schedule 15. This is particularly so when Policy 7.B.6 is considered.

Policy 7.B.2 seeks to avoid objectionable discharges that degrade natural and human use values, to Otago waters. This discharge is not objectionable so meets Policy 7.B.2.

Policy 7.B.3 specifically allows discharges to water which have minor effects. As demonstrated above, this discharge has minor or less than minor effects so meets this policy.

Policy 7.B.6 outlines matters to consider when assessing the need for any mixing zone. The extent of any mixing zone in the Outlet Channel is difficult to measure because of the nature of the discharge and the receiving environment. However, any zone will be small and Clutha District Council considers it appropriate to allow a mixing zone in view of the less than minor effects on the outlet channel beyond any mixing zone.

Policy 7.B.8 encourages the adaptive management and innovation to reduce the discharge and impact of contaminants on water quality. The proposed improvements to treatment will greatly reduce the contaminant load getting to the Outlet Channel and are proposed in recognition of the possible impacts of the discharge on the river.

Policy 7.C.1 encourages enhancement of the water quality of degraded water bodies. Clutha District Council does not accept that its present discharge contributes significantly to any degradation of the Lake Waiholo Outlet Channel water quality that may have occurred, beyond the limited impact immediately at the point of discharge and the possible elevation of bacteria levels. Consequently, it proposes to upgrade the treatment to effectively eliminate bacteria from the effluent before it is discharged.

Policy 7.C.2 requires that when considering applications for consents to discharge contaminants to water that the Regional Council give regard to the nature of the discharge and the sensitivity of the receiving environment to adverse effects; the financial implications and comparative environmental effects of other alternatives; and the current state of technical knowledge and the likelihood that the proposed method of discharge will be successful.

The alternatives and their impacts are considered under Sections 4 and 5 above. The conclusions drawn there indicate that the proposed discharge is the best practicable option and is appropriate to the receiving environment.

This conclusion is reliant to some extent on reasonable mixing occurring in the channel to integrate the discharge into the Outlet Channel. Policy 7.B.6 aims to limit the extent of a mixing zone to take account of a number of factors. The proposed discharge will not result in a mixing zone that will diminish or adversely affect the values set out in the Policy, particularly as the extent of the actual mixing zone is difficult to determine (that is, it is small and variable in extent). The mixing zone sought is therefore aligned with this policy direction and is appropriate.

The term of the consent sought is covered in Policy 7.C.4, which states that the duration of any new resource consent for an existing discharge of contaminants will take account of the anticipated adverse effects of the discharge on any natural and human use values supported by an affected water body, and:

- (a) *Will be up to 35 years where the discharge will meet the water quality standard required to support that value for the duration of the resource consent;*

- (b) Will be no more than 15 years where the discharge does not meet the water quality standard required to support that value but will progressively meet that standard within the duration of the resource consent.
- (c) Will be no more than 5 years where the discharge does not meet the water quality standard required to support that value; and
- (d) No resource consent, subsequent to one issued under (c), will be issued if the discharge still does not meet the water quality standard required to support that value.

Clutha District Council requests a 35 year term. In relation to policy 7.C.4 (a) of the RPW:

- The application is for a new consent for an existing discharge with a significant improvement to the quality of the discharge; and
- The Schedule 1 values associated with the Lake Waihola Outlet Channel were summarised in Section 2.2 above. For the reasons given in Section 5 above, the discharge will not adversely affect the amenity values of the Outlet Channel or the natural and human use values identified in Schedules 1A, 1B and 1D of the RPW.

Plan Change 6A deleted reference to anticipated environmental results previously set out in Section 7.9 of the RPW. As such, there are no anticipated environmental results now prescribed supporting the policy framework contained within Chapter 7 of the RPW.

Plan Change 6A imposed receiving water quality standards and discharge water quality limits which are set out in proposed Schedules 15 and 16 respectively. The Lake Waihola Outlet Channel is not scheduled, but Lakes Waipori and Waihola are, with the limits set out in Table 8.

	Total nitrogen (mg/l)	Total phosphorus (mg/l)	Ammoniacal nitrogen (mg/l)	<i>Escherichia coli</i> (cfu/100 ml)	Turbidity (NTU)
Receiving water:	0.55 (31 March 2025)	0.033 (31 March 2025)	0.1 (31 March 2012)	126 (31 March 2012)	5 (31 March 2025)
Permitted Activity Discharge Limits	1.0 (Nitrate-nitrite nitrogen, 1 April 2020)	0.035 (Dissolved reactive phosphorus, 1 April 2020)	0.2 (1 April 2020)	550 (1 April 2020)	NA

Table 8: Water quality standards and permitted activity discharge water quality limits from Schedules 15 and 16 respectively of the ORC Regional Plan: Water for Otago (2015). Timeframe for each parameter in brackets.

The proposed discharge does not comply with the limit for ammoniacal nitrogen and will not comply with the dissolve reactive phosphorus limit based on total phosphorus monitoring results. However, once upgraded, it will comply with the E. coli limit. These limits apply for permitted uses so they are not relevant in any determinative way in respect of this application. What is relevant is that the assessment of effects shows that the effect on the Lake Waihola Outlet Channel of the discharge will be no more than minor.

7.4 Kai Tahu ki Otago – Natural Resource Management Plan 2005

The objectives and policies most relevant to the discharge are:

- Objectives 5.3.3.iii and 5.3.3.iv. The former seeks no discharge of human sewage directly to water and the latter seeks a reduction in contaminants discharged to water; and
- Policies 5.3.4.8 and 9. The first requires land based disposal for human effluent and the second the consideration of alternatives in renewals of discharge consents.

For the reasons given in Section 5 above, it is considered that discharge to land is impractical at Waihola, which leaves only a discharge to water as an alternative. However, the proposed treatment will improve effluent quality and so any adverse effects of the discharge on the Lake Waihola Outlet Channel will be no more than minor. Consent conditions and any continuing receiving water monitoring will confirm that the effects of the discharge will continue to be minor.

8. Consultation

Council has not made this application available to local Iwi, Fish and Game Otago or the Department of Conservation through its Wastewater Working Party process but it is similar in approach and scope to all its recent applications. Hence there was assessed to be no need for consultation through the Wastewater Working Party in this instance. However, it is intended to convene a meeting of the Wastewater Working Party in the new year when this application will be considered. From the Assessment of Environmental Effects, the impact of the discharge, particularly once upgraded, will be no more than minor, so any further consultation is not required.

9. Conclusion

9.1 Proposal

The proposal is that the present treated sewage discharge to the Lake Waihola Outlet Channel continue with the addition of further treatment to reduce the contaminant load discharged to the channel, with consent granted

for a 35 year term. The above assessment shows that the activity will have no adverse effect on the environment, particularly once further treatment is in place.

This has been identified by reviewing the effluent and receiving water monitoring results and through an Assessment of Environmental Effects done by Ryder Consulting. Once the proposed additional treatment is in place, the impact on the Outlet Channel will be no more than minor, so consent can be granted for the discharge to continue.

9.2 Notification

As this is an application for the renewal of an existing activity, Clutha District Council does not consider there are any circumstances which require that it be publically notified. Council instead considers that if the Otago Regional Council considers interested parties need have the opportunity to comment, then the most effective and timely way of proceeding is through limited notification and so requests that this application be dealt with in that fashion in those circumstances.

10. References

- *Climate Change 2013: The Physical Science Basis. Working Group I contribution to the IPCC Fifth Assessment Report; Projections of Sea Level Rise*, IPCC, 2013.
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