

ORC STAFF RECOMMENDING REPORT

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File No: 2008.238
Application No: RM16.116 2008.242.V1, 2008.243.V1, 2008.238.V2,
RM13.215.03.V1
Prepared For: Staff Consents Panel
Prepared By: Ralph Henderson
Date: 08/03/2017

Subject: Application by Queenstown Lakes District Council to vary discharge permit RM13.215.03, discharge permit RM13.237/2008.238, land use permit 2008.242, and land use permit 2008.243

1. Purpose

To report and make recommendations on the determination of the above application under Section 127 (change or cancellation of consent condition on application by consent holder) and the non-notified provisions (Section 95A) of the Resource Management Act 1991 (the Act).

2. Background Information

The applicant, Queenstown Lakes District Council (QLDC), is seeking to vary a number of consent conditions relating to the operation and upgrade of their municipal wastewater treatment plant and associated works in the Shotover River Delta. In 2008 QLDC obtained consents (2008.238 – 2008.243, 2008.245 – 2008.246, 2008.394 – 2008.395) for the continued operation of the existing Queenstown municipal wastewater treatment plant, proposed upgrades and associated works. These consents recognised the system operating at that time was estimated to reach capacity in 2012 and was unable to cope with the demands of local population growth. These consents included both short (4 year) and longer term (35 year) discharge consents to address the transition between older inefficient treatment and disposal systems and new systems under development. Appeals on these consents were resolved by Consent Order of the Environment Court on 13 May 2010.

In 2013 QLDC sought amendments to the consents obtained in 2008 and to address the expiry of short term consents that were expiring in 2014 (e.g. 2008.240). The 2013 amendments were to enable existing discharges to continue while the upgrade of the WWTP was undertaken in a staged manner, with the following indicative stages:

- Upgrade the existing WWTP to provide partial wastewater treatment to meet mean effluent quality of 30:30:23:260 (BOD:TSS:TN:E.Coli) to be operational by 28 February 2017;
- Install part of the land disposal system between 2017 and 2022 and have all normal flows discharged into land by 31 December 2022;
- When nitrogen load triggers are reached (modelled at about year 2025), implement final WWTP upgrade so that effluent quality meets mean 10:10:10:10 (BOD:TSS:TN:E.Coli) effluent quality; and
- Continue to expand the land disposal system as required to meet flows.

Synopsis of proposed changes

The current proposal by QLDC is to change the design of the disposal system from a LPED to a high rate LPED system operated on a dose and drain (DAD) infiltration basis. The pipe network involved is less intensive than the LPED system originally proposed and would receive higher individual dosing rates but which would occur on an intermittent basis to allow pathogen die-off and resting between doses. The location of the LPED-DAD disposal area is also subject to change and will use natural silts, sands and gravels below ground rather than engineered gravel fill above ground. The new LPED-DAD disposal area will still be located within the QLDC wastewater treatment designation.

The proposal seeks variations to the following consents:

- Consent 2008.242 – the land use consent to place a structure in the bed of the Shotover River for the purpose of constructing an engineered platform and low pressure effluent dosing system.
- Consent 2008.243 – the land use consent to disturb and reclaim the bed of the Shotover River for the purpose of gravel and vegetation removal, depositing gravel as well as constructing an engineered platform and low pressure effluent dosing system.
- Consent RM13.215.03 – the medium-term consent to discharge an average of 11,238 m³/d of treated wastewater to land.
- Consent RM13.237/2008.238 – the long-term consent to discharge up to 45,000 m³ of treated wastewater per day to land.

These changes are discussed in detail in the following sections.

2.1 Description of the activity and proposed variation

QLDC is seeking variations to consents associated with the development and operation of the disposal system for treated effluent processed by the Shotover Wastewater Treatment Plant (WWTP). The WWTP is the primary point of disposal of municipal sewage from urban areas in the Wakatipu basin, including Queenstown, Arrowtown, Lake Hayes and Arthurs Point. The treatment pond system is located within the Shotover River delta and currently discharges directly to the Shotover River.

The treatment pond system located within the Shotover River delta is currently going through Stage 1 of a multi-stage upgrade to achieve a higher level of effluent quality. The upgrade (Stage 1 of the upgrades) has been recently commissioned and was officially opened on 27th February 2017. The variations relate to the construction and operation of the discharge system as opposed to the treatment system itself.

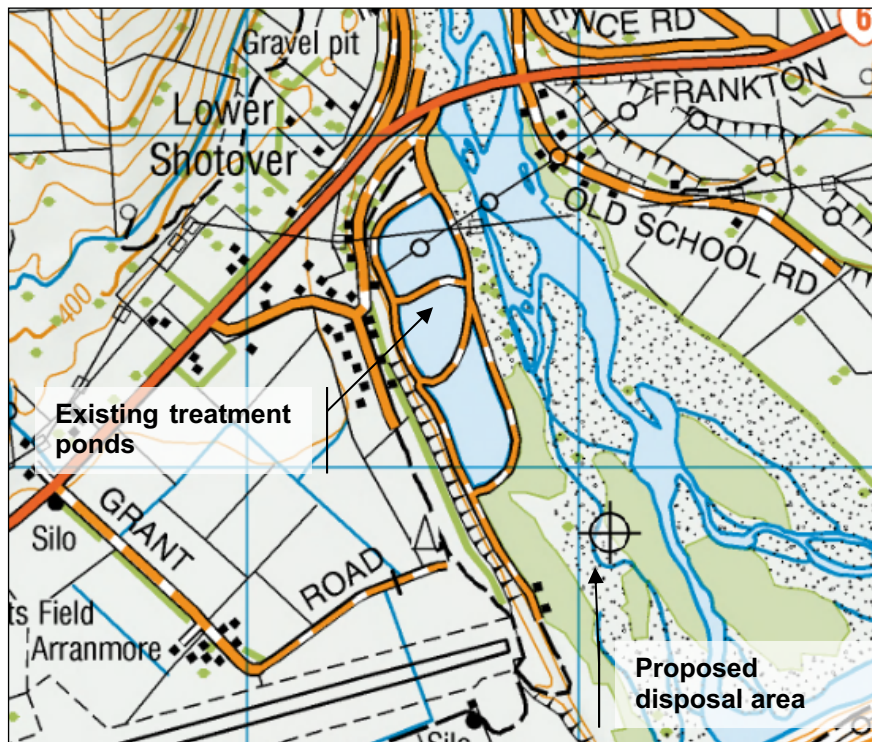


Figure 1: General location of disposal area

Consented Shotover WWTP

The original/consented Shotover WWTP upgrade is staged as follows:

Stage 1

By the end of February 2017 the upgraded WWTP will treat 63% of the projected wastewater (based on projected flows for 2025), with the remaining 37% of wastewater continuing to be processed through the existing treatment ponds. The treated effluent will be combined and disinfected using ultra violet light (UV) to meet 'National Water Quality Standards Band A'. To date the quality of treatment is such that the final effluent does not need to be filtered, as UV transmittance is achieving EC of < 20 cfu/100 mls. The system will continue to be monitored and screening installed if needed.

The blended effluent is intended to achieve a quality of 30:30:23:260 (Biochemical Oxygen Demand: Suspended Solids: Total Nitrogen: E.coli (mg/L: mg/L: mg/L: CFU/100 ml)).

The assessment of effects provided by the applicant for the discharge to land (2008.238) did not rely upon further treatment of contaminants in the treated wastewater after discharge to land as the quality at this stage will meet recreational microbiological guidelines prior to passage through river silts and sands.

Stage 2

Stage Two will begin within the first year of operation of the new WWTP and will involve the staged installation of the land disposal system between 2017-2022 in the location indicated in Figure 2. The intention was for the first year to be run as a trial, with a portion of the LPED installed and to extensively monitor the movement of effluent through the underlying ground system and mounding in groundwater. The current direct discharge to the Shotover River would be phased out as the disposal to ground system was expanded. It was initially intended this would occur by 2022

however QLDC are now proposing to bring forward the phasing of development of the land discharge system so the discharge to water will cease by 2020 or earlier.

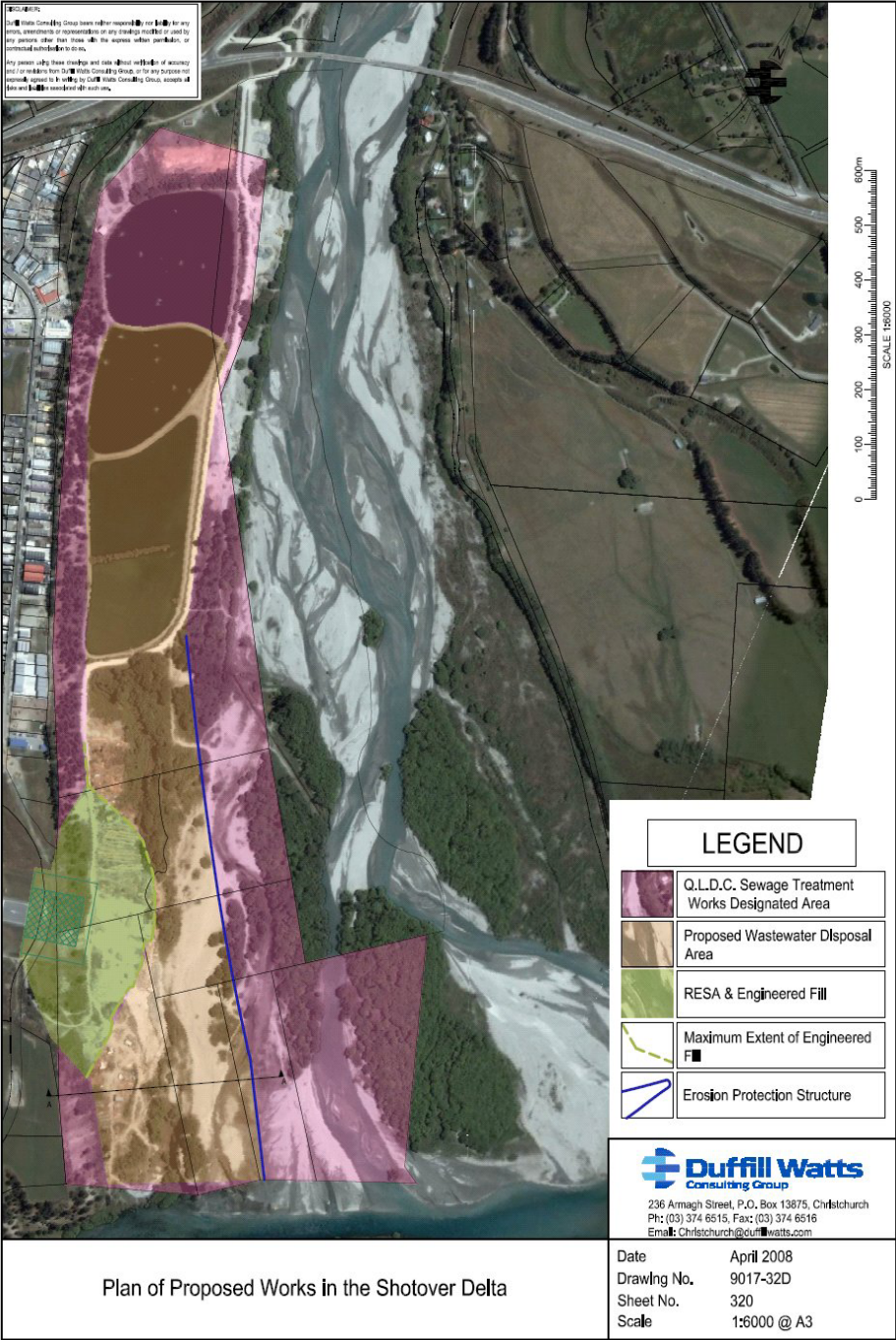


Figure 2: Appendix 1 of consents 2008.242 and 2008.243 – Plan of disposal field in Shotover Delta

Stage 3

Stage 3 of the WWTP upgrade is required when nitrogen load triggers are reached (estimated about 2025). The trigger has been set to give at least two years for the upgrade to be installed before nitrogen loads in the catchment exceed a defined value. Stage 3 will involve the duplication of the Stage 1 upgrade with another high rate advanced system installed. The pond treatment system will be decommissioned although a portion of Pond 1 will be kept and, once emptied and de-sludged, will be

grassed and maintained for emergency and extreme weather flow buffering to avoid the possibility of any discharge of raw wastewater to the Shotover River. The mean effluent quality produced by the WWTP at this stage is anticipated to meet 10:10:10:10 (Biochemical Oxygen Demand: Suspended Solids: Total Nitrogen: E.coli)

Following Stage 3, continued expansion of the land disposal system may occur in phases as required to meet increasing wastewater flows.

Proposed Disposal System sought by way of Variation RM16.116

The proposed design has been changed from a LPED to a high rate LPED system operated on a dose and drain (DAD) infiltration basis. The pipe network involved is less intensive than the LPED system originally proposed and would receive higher individual dosing rates but which would occur on an intermittent basis to allow pathogen die-off and resting between doses.

The main differences between that consented discharge and that now proposed is the LPED-DAD system is located outside the Otago Regional Council (ORC) revetment and will be located north east of the land discharge area previously consented (RM13.215.03; RM13.237/2008.238), between the engineered ORC revetment located south of the maturation pond and the Shotover River (see Figure 3). The disposal system will not rely upon additional treatment in ground to improve water quality and will use natural silts, sands and gravels below ground rather than engineered gravel fill raised above ground level.

The size of the new discharge field will initially be approximately 2.8 ha and will be installed to maintain a minimum distance of 50 m to the Shotover River whilst being located entirely within the existing designation for the wastewater system.

No change is proposed to the current consent for discharge of treated sewage to water, as it is proposed that this direct discharge to the Shotover River will be phased out. To this end, QLDC currently holds two consents from the ORC to discharge treated wastewater from its Shotover WWTP to land.

The QLDC proposes to vary the following consents relating to the location where treated sewage effluent will be discharged to land and adapt the loading rates in accordance with the new site's geological and hydrological conditions:

1. medium-term resource consent (RM13.215.03), expiring 31 December 2031 - to addresses the progressive shift from discharge to water to complete discharge to land from Stage 1 of the upgrade of the WWTP.
2. longer-term resource consent (2008.238.V1), expiring 18 March 2044 - address the final situation (after the completion of the long term Stage 3 upgrade of the WWTP) where all treated wastewater from the WWTP will be discharged to land, taking into account the projected population increase.

As a consequence of consultation on this project QLDC have proposed to bring forward their upgrade programme so that all effluent is to be discharged to land by 2020, rather than 2022 (current stage 2 upgrade timeframe). However, QLDC consider that Phase 1 of the LPED system will cater for all flows going forward, and if not, will be expanded as required. Therefore, the water discharge could cease entirely as early as the end of 2017 or early 2018.

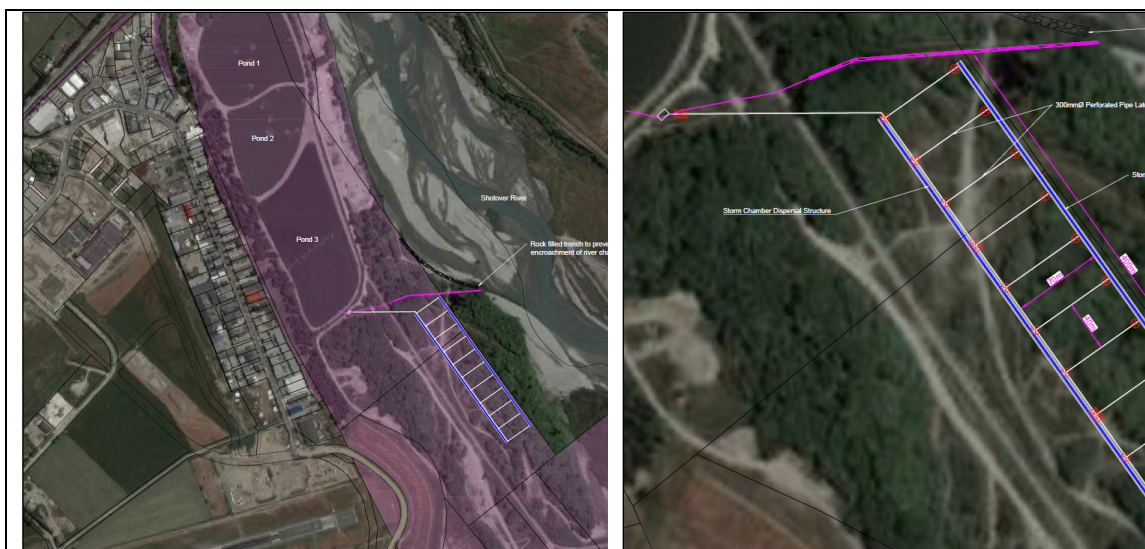


Figure 3: Location of disposal area proposed by current Variations

The current proposal will change the disposal system from a LPED system consisting of multiple small diameter perforated plastic pipe pressure lines to what will still be a LPED system but utilising fewer larger pipes of 300 mm (or similar) diameter, as shown in Figure 4 below. The estimated total length will be approximately 770 m but may be expanded if necessary. The pipes will be located in excavated trenches filled with highly permeable gravels. The pipes will be dose filled at low pressure and will infiltrate through the surrounding gravels, sands and silts and drain to groundwater. Two 400 m long sections of stormwater storage chambers (such as Stormmax) will run parallel to the ORC revetment to allow a large dose of material to be stored and slowly released via infiltration through the underlying natural materials.

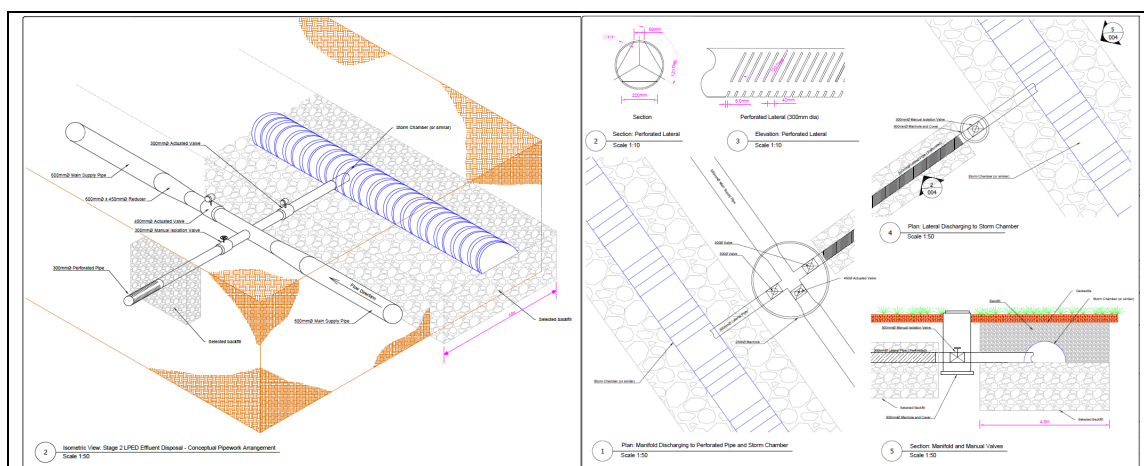


Figure 4: Proposed LPED Design (see Appendix 1)

The proposed system has been designed to accept a maximum discharge of up to 430L/s. This represents the anticipated maximum flow rate for Stage 3 of the proposed development, and is based on the available hydraulic loads and including a safety factor. The peak design rate is approximately 5 m/day on the trench area.

The average loading on the effective trench area will be 1.2 m in Stage 1 and 1.7 m in Stage 3, however the maximum discharge loading rate when averaged across the total area of the disposal field will be 1,000 mm per day. The applicant notes the design of

the disposal field shown in Figure 4 may be subject to further modification during development and the proposed plans should be in general accordance with the designs presented.

The proposed design enables the operator to manage the dosing rate of different sections of the discharge field to respond to variability in the permeability of different areas of the surrounding gravels should this prove to be a problem.

The disposal field is designed to provide for expansion which will occur in response to how well the field is coping with flows and to address projected increases in discharges over time. It is the applicant's stated intention to monitor groundwater mounding and treat this initial disposal field as a full working trial in order to set design parameters for future expansion.

As part of an agreement with Iwi groups the applicant has agreed to undertake planting within the disposal area to enhance biodiversity.

Due to the number of consents and variations over time the consent history of this application is complex. A number of the variations identified in the original application were queried in terms of the numbering and wording of the existing conditions to be varied. To avoid confusion the numbering and wording of the variations originally sought have been amended to reflect the correct numbering and wording of the current conditions as clarified in correspondence with the applicant's consultant R Potts by email on 13 February 2017.

The drawings accompanying the application included a rock filled trench outside the designated area with the description "*Rock filled trench to prevent further encroachment of river channel on downstream area*". The applicant has subsequently clarified that this structure will not form part of this application and as such no further consideration has been given to this matter (email from R Potts 1/2/2017 Document Id: A976981).

The variations to the consents sought in the initial application are as follows:

2.1.1 Variation to Consent 2008.242

Consent 2008.242 is the land use consent to place a structure in the bed of the Shotover River for the purpose of constructing an engineered platform and low pressure effluent dosing system that expires on the 18th March 2031. The applicant seeks to make the following changes:

Condition 6

2008.242 Condition 6	The structure shall be constructed generally in accordance with the application for consent dated 23 April 2008, and further information dated 18 and 30 July and as shown in Appendix 1. If there are any inconsistencies between the application and this consent, the conditions of this consent shall prevail.
Variation Condition 6	The structure shall be constructed generally in accordance with the variation to consent application for consent dated 23 April 2008 xx July 2016 , and further information dated 18 and 30 July xx 2016 and as shown in Appendix 1 <i>Appendix A</i> . If there are any inconsistencies between the application and this consent, the conditions of this consent

	shall prevail.
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Condition 7

2008.242 Condition 7	The structure shall be located within the proposed wastewater disposal area identified in Appendix 1 and sized as identified in Appendix 2 attached to this consent.
Variation Condition 7	The structure shall be located within the proposed wastewater disposal area identified in Appendix 1 and sized as identified in Appendix 2 <i>Appendix A</i> attached to this <i>variation to the</i> consent.

2.1.2 Variation to Consent 2008.243

Consent 2008.243 is the land use consent to disturb and reclaim the bed of the Shotover River for the purpose of gravel and vegetation removal, depositing gravel as well as constructing an engineered platform and low pressure effluent dosing system that expires on the 18th March 2031. The applicant seeks to make the following changes:

Condition 5

2008.243 Condition 5	The works shall be in general accordance with the application for consent dated 23 April 2008, and further information dated 18 and 30 July. If there are any inconsistencies between the application and this consent, the conditions of this consent shall prevail.
Variation Condition 5	The works shall be in general accordance with the <u>variation to consent</u> application for consent dated 23 April 2008 <i>xx July 2016</i> , and further information dated 18 and 30 July <i>xx 2016</i> and as shown in Appendix 1 <i>Appendix A</i> . If there are any inconsistencies between the application and this consent, the conditions of this consent shall prevail.

Condition 6

2008.243 Condition 6	The works shall only occur within the proposed wastewater disposal area identified in Appendix 1 attached to this consent.
Variation Condition 6	The works shall be located within the proposed wastewater disposal area identified in Appendix 1 and sized as identified in Appendix 2 <i>Appendix A</i> attached to this <i>variation to the</i> consent.

2.1.3 Variation to Consent RM13.215.03

Consent RM13.215.03 is the medium-term consent to discharge an average of 11,238 m³/d of treated wastewater to land (expires on the 31 December 2031). The applicant seeks to make the following changes:

Condition 3

RM13.215.03 Condition 3(b)	The volume of wastewater discharged to the disposal field shall not exceed: (a) An annual average of 11,238 cubic metres per day; and (b) A maximum discharge loading rate for each disposal field bed of 1,200 millimetres per day.
Variation	The volume of wastewater discharged to the disposal field shall not

Condition 3(b)	exceed: (a) An annual average of 11,238 cubic metres per day; and (b) A maximum discharge loading rate for <i>averaged over the each</i> disposal field area <i>bed</i> of 1,000 1,200 millimetres per day, <i>based on the 2.8 ha disposal field.</i>
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Condition 5

RM13.215.03 Condition 5	The wastewater disposal field platform shall be raised above existing ground level such that there is a minimum unsaturated zone between the disposal manifold and permanent groundwater of no less than 600 millimetres.
Variation Condition 5	<i>Delete condition 5</i>

Condition 19

RM13.215.03 Condition 19	No ponding or surface run-off of treated wastewater shall occur as a result of the exercise of this consent.
Variation Condition 19	<i>Delete Condition 19</i>

2.1.4 Variation to Consent RM13.237/2008.238

Consent RM13.237/2008.238 is the long-term consent to discharge up to 45,000 m³ of treated wastewater per day to land that expires on the 18th March 2044. The applicant seeks to make the following changes:

Condition 2

RM13.215.03 Condition 2	The volume of wastewater discharged to the disposal field shall not exceed 45,000 cubic metres per calendar day, at a maximum discharge loading rate over the land disposal area of 1,200 millimetres per calendar day.
Variation Condition 2	The volume of wastewater discharged to the disposal field shall not exceed 45,000 cubic metres per calendar day, at a maximum discharge loading rate <i>averaged</i> over the land disposal area of 1,200 1,330 millimetres per calendar day <i>based on the total area of the disposal field.</i>

Condition 17

RM13.215.03 Condition 17	No ponding or surface run-off of treated wastewater shall occur as a result of the exercise of this consent.
Variation Condition 17	<i>Delete condition 17.</i>

2.2 Description of the environment

2.2.1 Proposed Land Disposal Area

The Queenstown WWTP is located approximately 280 m to the southwest of the State Highway 6 Bridge, on the true right (western) side of the Shotover River. State Highway 6 runs to the north of the site, with the Kawarau River approximately 1.3 km to the south. Frankton Township and the Queenstown Airport lie on the terrace to the west.

The proposed disposal area for the WWTP is located approximately 1 km to the south and is legally described as: Lot 4 DP 421841 and Lot 2 DP 422388. The land is currently owned by Queenstown Lakes District Council and is designated for wastewater disposal purposes.

The area for the proposed disposal field is located to the north east of the land discharge area consented by RM13.215, to the south of the existing maturation ponds and between the ORC flood protection revetment and the Shotover River. The existing disposal channel from the oxidation ponds to the Shotover River is located immediately to the north of the proposed disposal area (Figure 5/Location 1).

The topography in the immediate area is relatively flat, though with elevated areas and depressions resulting from a combination of historical river channels and some more recent earthworks. The area adjacent to the ORC revetment has been planted with willow poles as part of flood protection measures but elsewhere the site is generally covered in a mixture of exotic shrub and tree species. Figure 5 shows the location of photographs of the disposal area, including the current discharge channel to the north of the disposal area.

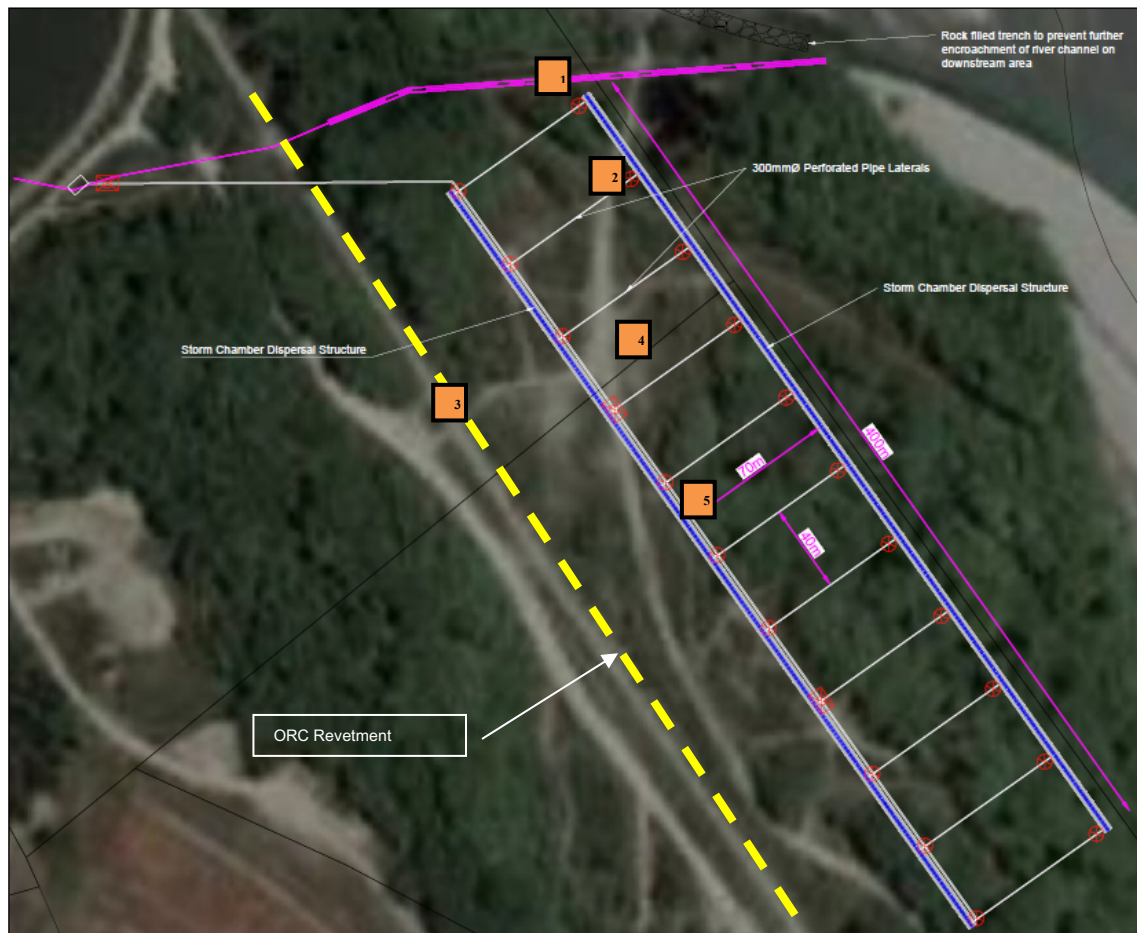
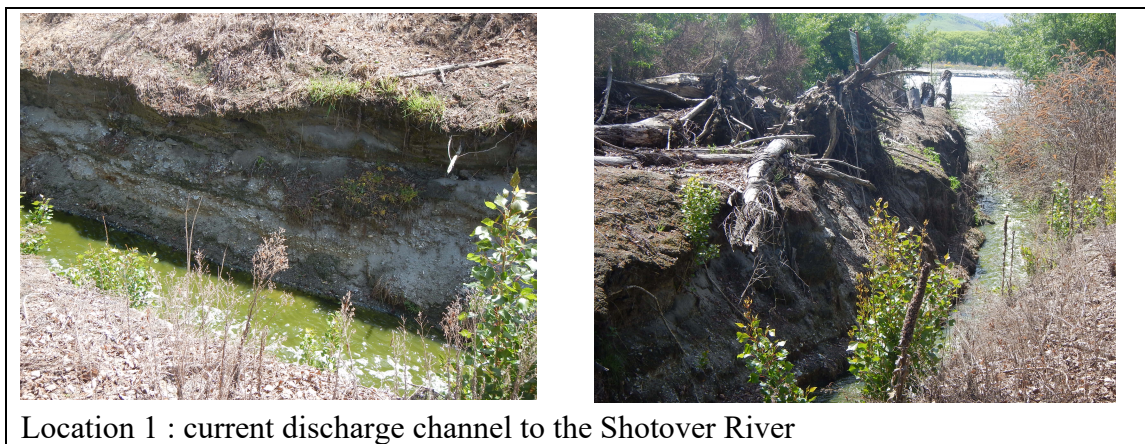


Figure 5: Location of photo points 1-5 and ORC revetment (yellow).



Photographs show the existing, predominantly exotic vegetation and a number of tracks through the disposal area.

The disposal area is within the Shotover River Catchment and overlies the Shotover Alluvial Ribbon Aquifer.

The receiving environment around the proposed discharge location is as follows:

- North – WWTP and existing oxidation ponds, beyond which lies the public road (State Highway 6) and residential area (“*Quail Rise*” subdivision)
- East – river bed and Shotover River, rural residential properties and residential area (“Shotover Country”)

- South - river bed vegetated with predominantly exotic species e.g. willow trees
- West – ORC plantings of willows and flood protection revetment. River bed vegetated with predominantly exotic species e.g. willow trees, commercial and industrial properties, public road and Queenstown Airport on the terrace above the Shotover River.

	
Location 2 : Shotover River at the end of the track	Location 3 : The disposal field site is in the background with the willows
	
Location 4 & 5 : Disposal Field Area	

There is one well (F41/0208) in proximity to the proposed disposal area. The well is located approximately 170 m to the east and was formed for the purpose of providing domestic water supply associated with the use of a saw mill that previously operated in that part of the Shotover Delta. This saw mill is no longer in operation and the water is no longer being extracted from the bore.

2.2.2 Rainfall & Wind Direction

Rainfall and wind records supplied for the 2013 applications are considered equally applicable to the proposed disposal site. The closest recorded meteorological station is at the Queenstown Airport (National Institute of Water and Atmospheric Research (NIWA) Meteorological Station Network Number I58074 (1987 - 2007)), located approximately 2 km from the site.

Table 1 below presents the climate data provided by the NIWA cliflo database. NIWA have also provided an estimate for monthly potential evapotranspiration (PET, using the Penman-Monteith Equation) from the same Queenstown Airport Station. From the climate record, it can be seen that rainfall is relatively constant throughout the year.

PET rates are highest in the summer, with highest monthly average of 155 mm for the month of January.

Mon	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Rain	65	52	56	54	64	73	49	64	60	69	70	76	752
PET	155	122	90	46	25	13	16	32	61	97	120	148	925

Table 1: Mean Monthly Rainfall (1987 – 2007) and Potential Evapo-transpiration (1991 – 2007) Note: Values have been rounded; Units = mm/month

Wind direction and velocity data (in the form of a windrose) from the Queenstown Airport meteorological station was also considered. The windrose indicates the most frequent wind direction expected in the environment where the WWTP is located would be from the west through south-west. Given the location of the site (about two km north-west of the meteorological station site), it is considered that wind directions at the applicant's site should be broadly similar, as there are no landforms in between the two locations that will significantly influence wind direction or speed. It is likely that katabatic (this term describes a wind that moves down a slope as a result of cooling of air at high altitudes) drainage will occur at night, down the Shotover River valley.

2.2.3 Soils and Geology

The application included a report on the soils of the proposed disposal area prepared by Lowe Environmental Impact (LEI) in July 2016. The report included information from 15 test pits down to groundwater and the collection of 26 soil samples for particle size analysis (PSA) testing (see Figure 6).

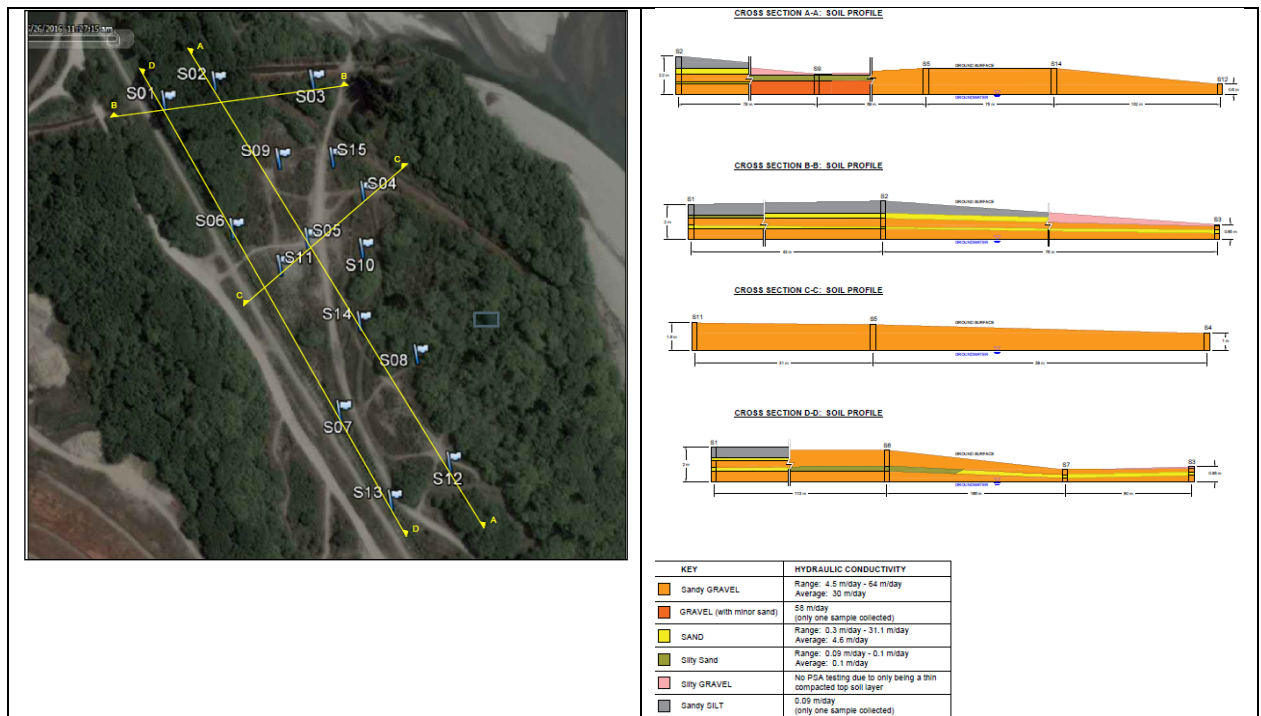


Figure 6: Location of test pits and soil profiles

The PSA results indicate that the soils in the bed of the proposed new disposal are primarily sandy gravels and therefore the hydraulic conductivity is estimated to be within the range of 4.5 m/day to 64 m/day (see Figure 6 and Table 2).

Soil Type	K (m/day)	Comment
Sandy GRAVEL (with minor traces of silt)	Range: 4.5 – 64 Average: 30	
GRAVEL (with minor traces of sand)	58	Only one sample collected
SAND (with minor traces of silt)	Range: 0.3 – 31.1 Average: 4.6	
Silty SAND	Range: 0.09 – 0.1 Average: 0.09	
Silty GRAVEL	n/a	No PSA testing due to only being a thin compacted top soil layer
Sandy SILT	0.09	Only one sample collected

Table 2: Hydraulic conductivity of proposed disposal area

The site investigations undertaken by the applicant indicate:

- The higher elevation areas have an approximate 0.6 m silt top soil layer; however, below this the soils primarily comprise of sands and sandy gravels with a minor trace of silt;
- Within lower elevation areas, the top silt layer is not present and the soils are primarily sandy gravel with an expected hydraulic conductivity within the range of 4.5 m/day – 64 m/day;
- An average K value of 10 m/d would easily be achievable.

2.2.4 Hydrogeology

Groundwater occurrence within the true right side of Shotover Delta Basin is relatively shallow. Based on recordings from the test pits undertaken by LEI, the applicant concluded that groundwater to the north-west and west is approximately 2.0 m below ground level (bgl). Towards the Shotover River (to the south-east and east) the land elevation reduces and groundwater ranged from between 0.6 m – 1.5 m bgl. The lowest recording, 0.6 m bgl, was within a natural depression; however, the average groundwater level in the lower elevation zones was generally between 1.2 m – 1.5 m bgl.

As the site is part of the bed of the Shotover River and is located in relative proximity to the river itself it is recognised that groundwater levels on the site will be subject to fluctuations depending upon rainfall in the immediate vicinity of the site but also with fluctuating river levels.

2.2.5 Surface Water

The proposed disposal area is located in the bed of and adjacent to the Shotover River which discharges into the Kawarau River less than a kilometre downstream. The Shotover and Kawarau Rivers are both used extensively for recreation and form major tributaries of the Clutha River. The Kawarau and Shotover Rivers are protected by the Kawarau River Water Conservation Order (WCO) (1997). The outstanding characteristics meriting potential protection are set out in Section 199 of the Act (see Table 3).

Outstanding characteristics (Section 199(2)(b) and (c) of the Act):

- as habitat for terrestrial or aquatic organisms;
- as a fishery;
- for its wild, scenic or other natural characteristics;
- for scientific and ecological values

- (e) for recreational purposes;
- (f) for historical purposes;
- (g) for significance in accordance with tikanga Maori

Table 3: Outstanding characteristics (Section 199(2)(b) and (c))

The Shotover River is listed in the WCO as a water body to be protected and has the following values identified in Table 4 below.

<i>Waterbody</i>	<i>Outstanding Characteristics</i>	<i>Restrictions and Prohibitions</i>
Shotover River main-stem (at or about grid reference NZMS 260 F41:765680 to E40:662173)	(c) wild and scenic characteristics; (c) natural characteristics, in particular the high natural sediment load and active delta at confluence with Kawarau River; (d) scientific value, in particular the high natural sediment load and active delta at confluence with Kawarau River; (e) recreational purposes, in particular rafting, kayaking and jet boating; (f) historical purposes, in particular gold mining.	(i) no damming allowed; (ii) water quality to be managed to Class Contact Recreation standard.

Table 4: Shotover River values listed in the WCO

The Kawarau River is also listed in the WCO as a water body to be protected and has the following values listed in Table 5 below.

<i>Waterbody</i>	<i>Outstanding Characteristics</i>	<i>Restrictions and Prohibitions</i>
Kawarau River main-stem from Scrubby Stream to Lake Wakatipu control gates (NZMS 260 F41:035-680 to F41:738-667)	(c) wild and scenic characteristics; (c) natural characteristics, in particular the return flow in the upper section when the Shotover River is in high flood; (d) scientific value, in particular the return flow in the upper section when the Shotover River is in high flood; (e) recreational purposes, in particular rafting, kayaking and jet boating.	(i) no damming allowed; (ii) water quality to be managed to Class Contact Recreation standard.

Table 5: Kawarau River values listed in the WCO

The Council must have regard to these values listed in the WCO listed for the Shotover and Kawarau Rivers when considering resource consent applications.

The lower Shotover River in the vicinity of the current WWTP discharge is characterised by several braided channels and a high flood frequency resulting in highly disturbed river habitat. The lower Shotover River flows via a series of braided channels that form a broad delta at its confluence with the Kawarau River. Treated oxidation pond effluent flows along an open excavated channel, passing through willows on the true right bank before discharging into the Shotover River immediately to the north of the proposed disposal area.

Within the broad delta at the confluence of the Shotover and Kawarau Rivers, there are several high flow channels and a backwater. Water quality and ecology were sampled in these areas in December 2007. Annual water quality (physio-chemical parameters

only) and bio-monitoring is undertaken as a current consent requirement at four sites in the vicinity of the WWTP discharge.

2.2.6 Instream Values

The Regional Plan: Water for Otago (RPW) outlines the natural and human use values of various watercourses throughout the Otago Region. The Shotover River is identified in this Schedule 1A for having the following natural and ecosystem values:

- Large water body 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.
- Boulder/gravel/sand/rock bed composition of importance to resident biota.
- Absence of aquatic pest plants identified in the Pest Plant Management Strategy for the Otago Region.
- Presence of riparian vegetation of significance to aquatic habitats.
- Presence of a significant range of indigenous waterfowl.
- Presence of indigenous waterfowl threatened with extinction.
- Outstanding for its wild and scenic characteristics.
- Outstanding for its natural characteristics, in particular the high sediment load and active delta at the confluence with Kawarau River.
- Outstanding for its scientific values, in particular the high sediment load and active delta at the confluence with Kawarau River.
- Outstanding for recreational purposes, in particular rafting, kayaking and jet boating.
- Outstanding for historical purposes, in particular gold mining.
- Areas of importance to internationally uncommon species – black fronted tern, banded dotterel.

The Kawarau River, into which the Shotover River discharges, is identified in Schedule 1A of the RPW for having the following natural and ecosystem values:

- Large water body 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.
- Gravel/rock bed composition of importance to resident biota.
- Significant presence of trout, salmon and eel.
- Presence of indigenous fish species threatened with extinction.
- Absence of aquatic pest plants identified in the Pest Plant Management Strategy for the Otago Region.
- Outstanding for its wild and scenic characteristics.
- Outstanding for its natural characteristics, in particular the return flow in the upper section when the Shotover River is in flood.
- Outstanding for its scientific values, in particular the return flow in the upper section when the Shotover River is in flood.
- Outstanding for recreational purposes, in particular rafting, kayaking and jet boating.

Schedule 1B of the RPW identifies rivers where the water taken is used for public water supply purposes. There are no Schedule 1B values in close proximity to the proposed activity. However it is noted that the QLDC is current seeking consent to take water for the purposes of reticulated supply to the Queenstown urban area from a site approximately 800 m upstream of the proposed disposal area and on the other side

of the river. The proposal by QLDC is to take water from bores close to the river that are hydraulically connected to the Shotover River.

Schedule 1C identifies registered historic places. The Oxenbridge Tunnel and Edith Cavell Bridge, both at Arthurs Point, are both listed as historic places associated with the Shotover River. Kawarau Falls bridge and dam at Frankton and the Kawarau Gorge Suspension Bridge at Gibbston are both listed as historic places associated with the Kawarau River. None of these registered historic places will be affected by the proposed activity.

Schedule 1D identifies the spiritual and cultural beliefs, values and uses associated with water bodies of significance to Kai Tahu. The Shotover River is identified as having the following values:

- Kaitiakitanga: the exercise of guardianship by Kai Tahu, including the ethic of stewardship.
- Mauri: life force.
- Waahi taoka: treasured resource; values, sites and resources that are valued.
- Mahika kai: places where food is procured or produced.
- Kohanga: important nursery/spawning areas for native fisheries and/or breeding grounds for birds.
- Trails: sites and water bodies which formed part of traditional routes, including tauraka waka (landing place for canoes);
- Cultural materials: water bodies that are sources of traditional weaving materials (such as raupo and paru) and rongoa (medicines).

The Kawarau River is identified as having the following values:

- Kaitiakitanga: the exercise of guardianship by Kai Tahu, including the ethic of stewardship.
- Mauri: life force.
- Waahi taoka: treasured resource; values, sites and resources that are valued.
- Trails: sites and water bodies which formed part of traditional routes, including tauraka waka (landing place for canoes);
- Cultural materials: water bodies that are sources of traditional weaving materials (such as raupo and paru) and rongoa (medicines).

Representatives of Kai Tahu have been involved in consultation on this project and written approval has been provided by Te Ao Marama Incorporated (TAMI) and Kai Tahu ki Otago (KTKO) on behalf of runuaka exercising kaitiakitanga in this area (see Section 4).

2.3 Consequential Amendments

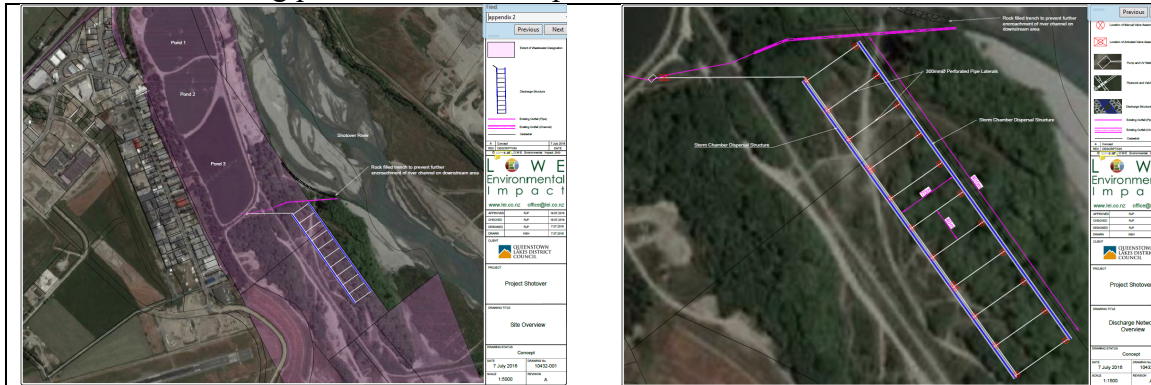
In addition to the variations initially identified by the applicant, a number of consequential amendments are required to address minor changes in consent conditions. As the consents have not yet been given effect, it has not been considered necessary to maintain the current numbering for purposes of consistency.

2.3.1 Variation to Consent 2008.242

The following consequential amendments to Consent 2008.242 are required:

1. To remove reference to the creation of an 'engineered platform' in the purpose of the consent.

2. To amend the location of the consent activity, the legal description of the consent location and the map reference on which the works will occur.
3. To amend condition 1 to refer to any subsequent variations to 2008.243
4. To amend conditions 3(a) and 3(c) to remove references to 'engineered platform'.
5. Appendix 1 will be deleted and replaced with a new 'Appendix 1' containing the following plans of the new disposal area.



Consent 2008.242 – Appendix 1 *as varied*

6. Appendix 2 will be deleted and replaced with a new 'Appendix 2' containing plans of the proposed disposal system

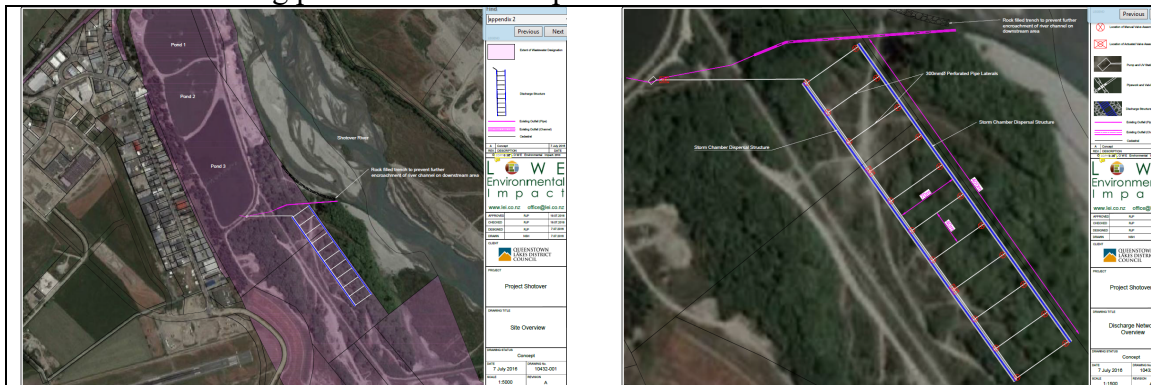
Reasons

The consequential amendments are required as the proposed works are now occurring in a different location and no longer involve the creation of an engineered platform in which the disposal field will be located. The appendices need to correctly show the new location and proposed design of the disposal field.

2.3.2 Variation to Consent 2008.243

The following consequential amendments to Consent 2008.243 are required:

1. To remove reference to the reclamation of the bed of the Shotover River and to remove the reference to the creation of an 'engineered platform' in the purpose of the consent.
2. To amend the location of the consent activity, the legal description of the consent location and the map reference on which the works will occur.
3. To amend conditions 2(a), 2(c), 2(d) and 12 to remove references to 'reclamation'.
4. Appendix 1 will be deleted and replaced with a new 'Appendix 1' containing the following plans of the new disposal area.



Consent 2008.243 – Appendix 1 *as varied*

Reasons

The consequential amendments are required as the proposed works are now occurring in a different location and no longer involve the reclamation of an area of the river bed by creating an engineered platform in which the disposal field will be located. The appendix needs to correctly show the new location of the disposal field.

2.3.3 Variation to Consent RM13.215.03

The following consequential amendments to Consent RM13.215.03 are required:

1. To amend the location of the consent activity, the legal description of the consent location and the map reference on which the discharge will occur.
2. Consequential amendments to update monitoring and reporting conditions.

2.3.4 Variation to Consent 2008.238/ RM13.237

The following consequential amendments to Consent 2008.238/ RM13.237 are required:

1. To amend the location of the consent activity, the legal description of the consent location and the map reference on which the discharge will occur.
2. Consequential amendments to update monitoring and reporting conditions.

Reasons for consequential amendments to RM13.215.03 and 2008.238/ RM13.237

The consequential amendments are required as the proposed discharges are now occurring in a different location. In addition the proposed conditions need to be referenced in the monitoring and reporting conditions.

2.3.5 Administrative amendments to other consents

Consents 13.2.1.5.01-04 need to be amended to update references 2008.238.V1 to reflect the latest variation 2008.238.V2.

3. Status of the Application

This application to vary the consent conditions of an existing permit is pursuant to Section 127 of the Act.

Section 127 (1) of the Act states that the holder of a resource consent may apply to a consent authority for a change or cancellation of a condition of the consent (other than any condition as to the duration of the consent).

Section 127 (3) states that Sections 88 to 121 shall apply, with all necessary modifications, as if:

- (a) *the application were an application for a resource consent for a discretionary activity; and*
- (b) *the references to a resource consent and to the activity were references only to the change or cancellation of a condition and the effects of the change or cancellation respectively.*

The Council may grant or decline the application and, if granted, may impose conditions under Section 108 of the Act.

4. Non-Notification and Written Approvals

As the effects of the proposed variation are considered to be minor (see Section 5 of this report), a provisional decision was made to process this application under non-notified consent procedures, subject to the written approval of affected parties.

Section 127 (4) states that for the purposes of determining who is adversely affected by the change or cancellation, the local authority must consider, in particular, every person who:

- (a) *made a submission on the original application; and*
- (b) *may be affected by the change or cancellation.*

The parties who made submissions on the original application were included as a stakeholder Reference Group established to guide this project. These included:

- Shotover Park Limited (SPL);
- Kauati Limited, representing Iwi in Otago and Southland through TAMI and KTKO;
- Public Health South (PHS).

The Reference Group also included:

- QLDC;
- ORC.

As QLDC is the applicant and the ORC is the consent authority they are excluded from further consideration in this regard.

Early consultation with KTKO and TAMI indicated that Iwi supported the proposal in principle conditional on:

- The staging of land disposal being brought forward; and
- Undertaking biodiversity enhancement over the disposal area and surrounds that includes Papatipu Runanga collaboration.

Following lodgement of the application the written approval of KTKO and TAMI was sought. The unconditional written approval of TAMI was obtained and the written approval of KTKO was obtained, subject to the following conditions:

- That the rock/gravel to be used for the above project is clean and placed rather than dumped into position.
- That monitoring as per current resource consent conditions is adhered to.
- That the Heritage New Zealand Pouhere Taonga Archaeological Discovery Protocol should be adhered to.

These conditions have been accepted by the applicant.

The unconditional written approval of SPL and PHS has also been provided.

As the proposed discharges to land and water are to occur in a Statutory Acknowledgement Area, pursuant to the Ngai Tahu Claims Settlement Act 1998, Te Runanga o Ngai Tahu (TRONT) was advised of the applications. As no response from TRONT was received within the statutory timeframe the application was forwarded for decision.

5. Assessment of Environmental Effects

Consideration of the environmental effects of the proposal are limited to the effects of the proposed changes in conditions, and any associated changes, rather than the consented activity itself. As a consequence, a key consideration in the assessment of the effects of this application has the improvement of overall quality of the discharge.

5.3.1 Ground water

Estimated design flows to the treatment plant and to the disposal field are unchanged by the proposed variation and are shown in Table 6 below. The design criteria for the proposed LPED bed have been based on a figure of 430 L/s, which corresponds to 37,150 m³/ day. This figure is approximately 12.6% higher than the 2044 year peak wet weather flow of 32,979 m³/ day.

	Stage 1	Stage 3
Average Day flow (m ³ /d)	9,960	14,391
Peak Instantaneous WWF (L/s)	552	609
Peak Day Dry Weather Flow (m ³ /d)	14,609	21,137
Peak Wet Weather Flow (m ³ /d)	28,018	32,979
Maximum Discharge rate to LPED (L/s)	430*	430*

Table 6: Estimated design flows to treatment plant and disposal field

The disposal field will have approximately 800m of 4m wide trench (assumed to be 6m for infiltration purposes due to an additional 1m for each side wall), and approximately 770 m of 3 m wide trench (assumed to be 4.5 m allowing for the side wall). This equates to an effective trench area of 8,265 m².

Considering an average flow of 11,238 m³/d (based on Consent RM13.215.03), this would lead to an average load of 1,360 mm/d. The groundwater modelling uses the long term average flow (11,238 m³/day) across the wider discharge area (2.8 ha) which results in an average load of 400 mm/day. The peak wet weather flows from the long term consent (37,150 m³/ d) equate to 1,327 mm/day when averaged across the entire discharge area. The applicant notes that the peak wet weather flow of 37,150 m³/ d differs from that currently consented by 2008.238.V1 (Condition 2) and they have not sought to amend that figure. The applicant notes this difference is a result of a change from the use of a static flow model in the original application to a dynamic flow model in the recent application which resulted in lower peak wet weather flows. However, as the flows were similar and generally within or close to the margin for error of the models. The applicant has not sought to change the maximum peak wet weather flow.

As noted in Section 2.2.3 of this report, investigations of the site indicated that an infiltration rate over the site of 10 m/d was achievable. The applicant has designed to 50% of this figure as a factor of safety.

Council's RSU team compared these figures against the AS/NZS 1547:2012 Standards for On-site Domestic Wastewater Management which recommends the use of a maximum design rate of 50 mm/d for secondary treated effluent in Gravel and Sands and to only use the bottom area of the trenches for calculation of disposal area.

However the applicant notes that AS/NZS 1547:2012 is not an effective standard for assessment of this system as it is intended to set the design standard for individual

* 430 L/sec = 1,550 m³/h = 37,150 m³/d

onsite systems that require minimal operator input monitoring or management, rather than larger community schemes. In addition, AS/NZS 1547:2012 anticipates the use of soil and/or sub soil as part of the treatment system and recommend maintaining a vertical setback distance of 0.6 -1.5 m to the groundwater level.

The quality of the proposed discharge from the Project Shotover treatment plant does not require additional treatment and the disposal to land is primarily being undertaken to address cultural concerns over a direct discharge to surface water.

The applicant notes that the currently consented disposal system (2008.242) would not meet AS/NZS 1547:2012. Although the LPED system was to be installed in an engineered platform above the permanent groundwater level, temporary mounding would be above the pipelines, although it would be unlikely to break the ground surface. As such, the applicant considers the variation similar to the proposed system currently consented by 2008.242, but without requiring the construction of the elevated platform. The applicant intends to excavate the ground to install the proposed dosing system within the permeable gravels above the groundwater level. The trenches in which the pipes will be located will be filled with permeable gravels to aid infiltration and storage within voids. However, Councils RSU team note the detail of the volumes to be excavated and the remaining thickness of sediments overlying the groundwater have not been defined precisely. Of more particular concern is the north east part of the disposal field with silty material and shallow groundwater levels encountered during the May 2016 investigations.

In their review, RSU note they accept AS/NZS 1547:2012 may not be an effective standard for assessment of the proposed system and the proposed safety factor built into discharge design rates. However they note that the groundwater mounding calculations are quite limited and a groundwater model would have helped to better understand the effects of the discharge. A mounding model of this nature was developed for 2008.242 to allow dispersion of the treated effluent without groundwater mounding and surface breakout. As a consequence of the lack of such modelling and the variability of the infiltration rate across the site, RSU consider the maximum discharge loading rate for each disposal trench should be adjusted regarding the soil permeability to avoid effluent/mounded groundwater to break-out into the surface and has concerns regarding the removal of conditions relating to ponding or surface run-off.

The applicant has acknowledged that infiltration rates may vary across the disposal field according to the location and the characteristics of the underlying sediment. As a consequence the applicant seeks to use an average loading rate value over the disposal field area rather than a constant rate. The applicant will use the higher loading rates in area with high conductivities to compensate for the lower rates in areas with silty less conductive sediments. This is reflected in the proposed variations to condition 2 of consent 2008.238.V1 and condition 3 of RM13.215.03, which lowers the maximum discharge loading rate from 1,200 mm/day to 1,000 mm/day but also results in an averaging of the loading rate across the entire disposal field.

In addition to this the applicant also notes that in order to reduce variability in hydraulic conductivity and transmissivity in places, silty patches and areas will be excavated and silt will be replaced with gravels.

Soil investigations of the proposed disposal area indicate groundwater at a minimum depth of 1.2 m bgl, a maximum depth of 2.0 m bgl and an average depth of 1.5 m bgl. Low points across the disposal area are proposed to be filled to ensure a minimum initial depth of 1.5 m bgl and to reduce the risk of surface breakout.

A groundwater mounding assessment was undertaken using a drainage porosity range from 0.1 to 0.25. The mounding analysis shown in Table 7 indicates ponding is unlikely to occur based on average annual flows. However the applicant acknowledges this cannot be guaranteed, as the ground and aquifer sampling that the model is based on may not be representative of the entire site, and there may be the potential for ponding to occur during peak wet weather flows, particularly if they coincide with prolonged localised rain and the soils are saturated.

	Stage 1	Stage 3
Average Daily Flow in m ³ /d	9,960 m ³ /d	14,391 m ³ /d
Average Daily Flow in L/s	115 L/s	167 L/s
Average Loading	356 mm/d	514 mm/d
LPED bed design flow	430 L/s	430 L/s
Mounding Effect Centre (Sy0.25)	+ 0.98 m	+ 1.39 m
Mounding Effect Centre (Sy0.1)	+ 1.09 m	+ 1.56 m
Mounding Effect Edge (Sy0.25)	+ 0.83 m	+ 1.17m
Mounding Effect Edge (Sy 0.1)	+ 0.93 m	+ 1.32 m

Table 7: Groundwater mounding assessment of disposal area

The applicant has tried to address this through the inclusion of a 50% safety factor applied to the infiltration rate calculations. If localised areas of low permeability result in ponding or wet patches occurring at the surface, the proposed disposal system enables operators to respond by reducing the duration of loading of these areas to shorter periods. The applicant also notes that peak wet weather flows are generally of limited duration in this area and the storage capacity within the LPED system and the buffering capacity of soil and groundwater will greatly reduce the likelihood of groundwater mounding.

RSU have concerns regarding the limited nature of groundwater mounding calculations and consider a groundwater model would have helped to better understand the discharge. They recommend requiring the discharge loading for each disposal trench to be adjusted in response to the soil permeability to avoid effluent/ mounding groundwater to breakout to the surface. This condition could be reviewed and a suitable discharge loading rate could be added after a period of operational monitoring.

The applicant responded to these concerns and noted they propose to build the entire disposal field at the same time and as a consequence, the disposal system will have ample capacity to discharge initial flows. However the applicant does not propose to operate the entire disposal field at once but to undertake a full working trial on a portion of the initial disposal field and to expand operations as required. In the event of recurring and nuisance ponding, operations could extend into an unused section of the disposal field. Although the applicant's calculations indicate the disposal field is appropriately sized there is significant space within the designated area to the south of the proposed disposal area to provide for future expansion of the disposal area if the system is operating less effectively than predicted or if operational requirements increase.

The applicant volunteered conditions to this extent, including a review of conditions relating to surface break through or run off after a 5-year trial period for the purposes of dealing with any mounding issues, such as reassessing the area of acceptable mounding, testing the quality of mounded water to determine risk, or assessing the need for fencing and/ or signage. Additional conditions volunteered include monitoring of groundwater in and around the disposal area and notification of the expansion of the disposal area and annual reporting of groundwater information.

As a consequence of the potential for groundwater mounding and surface breakout, the applicant sought the deletion of condition 5 of RM13.215.03, which required the wastewater disposal field be raised above the existing ground level to the extent that a minimum unsaturated zone of 600 mm is maintained between the disposal manifold and permanent groundwater. This condition cannot be met given the location and design of the new disposal system, the depth to groundwater, and variability of groundwater levels due to the location of the disposal system in the river bed, as discussed above.

In their review of the application Council's RSU team noted that as Stage 1 is meeting bathing water standards (both median and 90 percentile) prior to disposal to ground and the quality of discharge from both Stage 1 and 3 at the WWTP does not rely on further treatment in the soil the deletion of this condition may be appropriate.

As noted above, in addition to the inability to maintain an unsaturated zone between permanent groundwater and the disposal field, an additional issue associated with the proposed change in the location of the location and design of the disposal system is the potential for ponding or surface breakout. The applicant acknowledges the potential for groundwater mounding to occur should peak river flows coincide with high rainfall or saturated soils in the disposal area and notes "*Whether it will break the surface and create ponding is a little unknown.*" As a consequence the applicant initially sought the deletion of condition 17 of consent 2008.238.V1 and condition 19 of consent RM13.215.03 which stated that:

"No ponding or surface run-off of treated wastewater shall occur as a result of the exercise of this consent."

The rationale for the removal of these conditions included the following points:

- As the discharge will meet the standard for contact recreation the occurrence of ponding is not a health issue.
- Due to the soil type and weather, it is likely that ponding could occur when high river levels result in groundwater mounding and/ or as a consequence of high rainfall events.
- Public access is less likely in times of wet weather and river flooding and the area will be planted to enhance biodiversity in the area.

LEI concluded that ponding to surface due to effluent discharges is unlikely under normal circumstances, although possible but the effects of this are considered to be less than minor for the reasons identified above.

The applicant volunteered the following conditions:

- There shall be no surface breakthrough or runoff of mounded groundwater as a result of the exercise of this consent over a total cumulative area of 100 m² over the entire disposal area for more than 48-hours in any one event.

- No ponding or surface run-off of treated wastewater shall occur as a result of the exercise of this consent. In addition, mounding of groundwater above the ground surface shall not occur in cumulative area greater than 100 m² over the entire disposal area for more than 48-hours in any one event.
- There shall be no surface breakthrough of mounded groundwater as a result of the exercise of this consent beyond the initial 5-year mounding trial period following commissioning of the disposal system.
- Condition 17 shall be reviewed after a 5-year trial period for the purposes of dealing with any mounding issues, such as reassessing the area of acceptable mounding, testing the quality of mounded water to determine risk, or assessing the need for fencing and/or signage.
- The Consent Holder shall advise the consent authority within 3-months of any changes to the extent of the operational disposal area.
- The Consent Holder shall install at least three piezometers in the area of the disposal area for the purpose of monitoring groundwater levels.
- Groundwater levels in the piezometers (Condition X) shall be recorded monthly during the initial 5-year trial period and an annual report provided to the consent authority by 31 March each year identifying any trends in groundwater mounding, any areas of mounding concern and outlining any changes to the system or operation to mitigate concerns.
- The consent holder shall maintain records of any groundwater mounding above the ground surface within the operational disposal area that remains for over 48 hours. Records should include but not be limited to:
 - Photographic record;
 - Sampling of mounded water to determine presence of treated effluent;
 - Consent authority to be notified in writing of occurrences of mounding breakthrough;
 - Records to be supplied to consent holder annually.

RSU notes the deletion of these conditions would allow the ponding or run-off of treated effluent. This is inconsistent with Council's position and general conditions for wastewater disposal systems that there should be no surface discharge of treated effluent.

Conditions requiring the avoidance of surface discharge are effective for compliance monitoring and provide measures to protect the public from health and safety effects of system failure or the discharge of untreated pollutants such as heavy metals or viruses. This is particularly of concern if access to the area of discharge is not restricted.

Further concerns relates to the negative perception of water quality and natural character that may result from ponding above an effluent disposal system in an outstanding natural landscape and beside a river recognised for its natural values. RSU recommend retaining the conditions in relation to surface ponding of wastewater as this for the reasons identified above but recommends the adoption of a number of the conditions volunteered. This will maintain a high standard in terms of the discharge standards and will not restrict the ability of Council to take enforcement action in the event of a system failure or similar event that results in the discharge of treated effluent to the surface.

However, it distinguishes between treated effluent and mounded groundwater enabling the applicant some flexibility in terms managing the risk of surface outbreaks of

mounded groundwater while testing the operating parameters of the system during the commissioning of the system. The applicant offered a number of specific new conditions to address these issues, however where possible these have been incorporated into existing conditions in the consents to avoid potential conflict or confusion between similar conditions.

Council's RSU unit have proposed the monitoring of groundwater be undertaken to determine potential impacts on groundwater quality and levels. RSU recommend a monitoring layout generally consistent with that shown in Figure 7. Monitoring upstream will provide a baseline in terms of groundwater height and quality. The orange and green markers are considered a minimum requirement but the blue markers would be advisable given it is anticipated that the proposed disposal field will be expanded in stages.

The layout of the monitoring bores will be agreed with Council as part of the requirements of Consent 2008.238.V1 and RM13.215.03 to provide an Operations and Management Manual outlining how the system will be managed and monitored to the satisfaction of the Consent Authority, and to provide an annual report of operations.

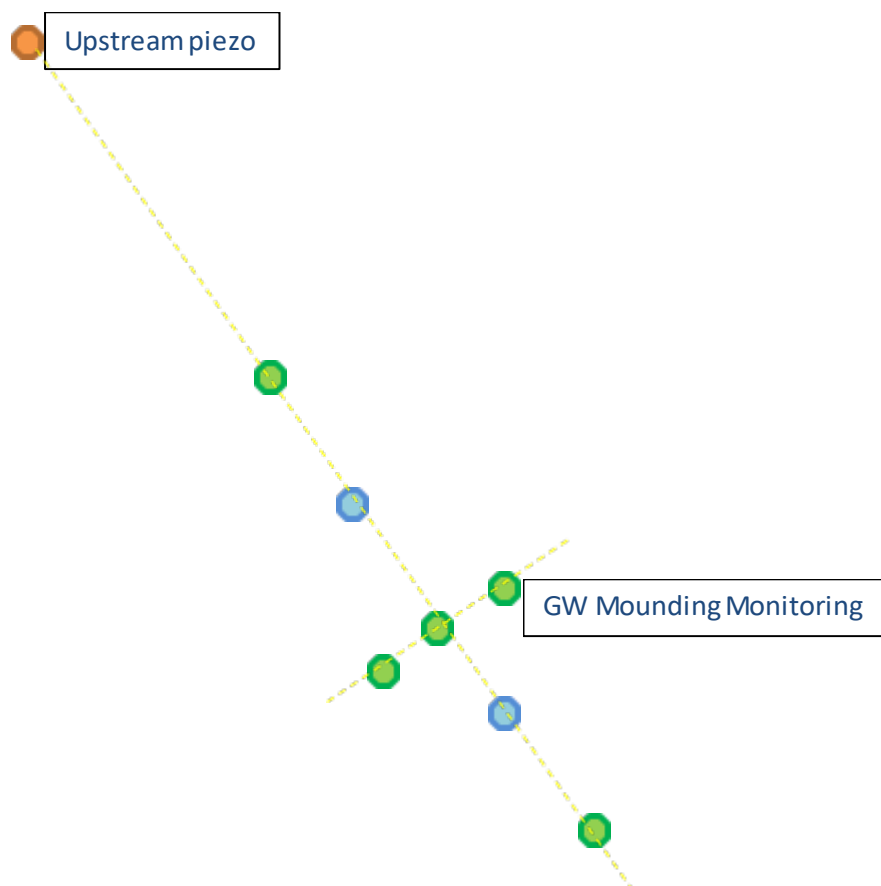


Figure 7: Proposed groundwater monitoring

5.3.2 Surface water

Impacts on surface water associated with the proposed discharge to land may occur when the treated effluent discharged to land mixes with surface water, either after travelling laterally through the gravels in the river bed and mixing with surface water downstream of the point of discharge or through surface mixing either by way of ponding and run-off or potentially during time of flood and inundation of the site.

The proposed variation shifts the location of the discharge system closer towards the current location of the wetted bed of the Shotover River, but still within the area that has been designated as appropriate for wastewater treatment. However, in considering both these consents it has been recognised that due to the high sediment load carried by the Shotover River it is highly mobile within the wider bed of the river and the current location of any channels is subject to change.

The applicant currently has consent to discharge treated effluent to water, RM13.215.02 expiring February 2017, and RM13.215.04 expiring December 2022. The proposed variation will result in the phasing out of the discharge of treated effluent directly to water as the disposal to ground system is expanded. By way of the variation, the applicant has brought forward this process so that the discharge to water will cease by 2020 and the disposal system will achieve a higher quality of output earlier than previously consented. The discharge of treated effluent to land will be at a higher localised rate than is currently consented, i.e. the rate will be higher in each trench system, but the overall loading rate of the application area is similar. The quality of the discharge proposed does not require additional treatment through the process of discharging to land, although it is recognised some additional beneficial polishing may occur through this process. The recommending report for discharge permit 2008.238 noted:

“The proposed high quality treatment will reduce numbers of bacteria in the wastewater to a large degree, and the diffuse discharge will allow rapid dilution and dispersion of nutrients entering the Shotover and Kawarau Rivers. Contaminant loads are also expected to decrease markedly, except for total phosphorus and dissolved reactive phosphorus. The RSU also noted that the applicant has proposed periphyton monitoring which will monitor whether increasing dissolved reactive phosphorus is causing nuisance periphyton growths.”

The location of the proposed site is potentially more likely to be subject to flooding due to its location to the east of the flood revetments; however, RSU's comments on consent 2008.238 are again pertinent:

“...if the disposal field is flooded it can be assumed that the quality of effluent entering the Shotover River will be of a lesser quality. However, the flow in the Shotover and Kawarau Rivers will provide excessive dilution should this occur. The RSU concluded that the proposal will have a less than minor effect on surface water quality.”

The applicant considers the proposed variation and the higher level of treatment now resulting from the Waste Water Treatment Plant (WWTP) may actually have positive effects of reducing risk of periphyton growth, which was previously considered to be minor. In addition, the upgrades to the WWTP will result in a higher level of

treatment and reduced numbers of faecal indicator bacteria and other microbial pathogens will be significantly reduced. The UV disinfection that will be operative as tertiary treatment by February 2017 should reduce the numbers of viruses and protozoa in the treated wastewater to bathing water standards prior to discharge. The applicant notes there may be some additional die-off of these pathogens in the rapid infiltration beds due to unfavourable conditions, such as wetting, drying and filtration but this has not been relied upon as a component to achieve water quality.

It is considered that the location of the proposed disposal field is substantially similar to that of the disposal field currently consented in terms of the environmental values identified in Section 2 and potential environmental effects resulting from the discharge and these have been adequately addressed by existing consent conditions. As a consequence, it is considered that effects on surface water quality in the Shotover or Kawarau River catchments associated with the proposed variation will be minor.

5.3.3 Effects on Human Health/Recreation

Human health may be adversely affected by contact with discharged wastewater. Contact with the discharges from the proposed plant may potentially occur through use of the area where discharge is occurring or through contact with surface water contaminated by the discharge.

As noted in Section 2.2.5, the Kawarau and Shotover Rivers are protected by the Kawarau River Water Conservation Order (WCO) which refers to the water quality standards for contact recreation (CR). The RMA has three conditions relating to class CR water, including visual clarity for bathing, suitability for bathing related to the presence of contaminants, and undesirable biological growths. The improved treatment resulting from the current Stage 1 upgrade of the Shotover WWTP is discussed in Section 5.3.2 of this report, and will result in improvements in the discharge of total suspended solids (TSS) and algae and a reduction in *E.coli*. The applicant notes these changes will reduce the public health risk posed by bacteria and viruses and will improve conditions relating to CR conditions. While the potential for contamination of surface water, and as a consequence affecting human health and recreation is acknowledged, it is considered that this has been adequately addressed in section 5.3.2 above.

The proposed disposal area is open to use by the public, and although it is considered the level of use is relatively infrequent, the area can be used by people for activities such as walking, dog walking, biking and motorcycling. Although the area is relatively overgrown with weed species the presence of a number of trails means passage through the area is relatively easy.

Under normal operations of the disposal field the use of this area will not result in contact between people using the area for such purposes, however should ponding or runoff of treated wastewater occur there is the potential for people to come into contact with treated wastewater. The concerns of RSU and the ORC in general regarding ponding of treated wastewater are discussed in Section 5.3.1. Avoiding direct contact between people and treated wastewater is considered a practical and reasonable step to avoid adverse effects on human health or recreation.

The potential for contact with effluent could be reduced by providing people with information about the risk to encourage them to avoid areas where contact may occur

through signage and/ or restricting access to areas where the discharge may occur by way of fencing. The applicant has indicated that they do not wish to include signage or fencing of this area as they do not consider it necessary and maintaining fencing may create a problem due to potential flooding. The applicant has suggested that the proposed biodiversity planting agreed with to address Iwi concerns may discourage use of this area, however the logic of this is unclear as this planting is likely to positively enhance the amenity of the disposal area and is unlikely to be sufficiently dense to restrict access in a manner that would discourage people from entering it.

Should effluent ponding or ongoing issues with groundwater monitoring the review of consent conditions may consider the need for fencing and signage of the disposal area to avoid adverse effects on human health, recreational values or amenity.

5.3.4 Ecology

Discharges of contaminants such as wastewater can adversely affect ecological values. However, as noted in Section 5.3.2 on surface water, the proposed variation does not result in an increase in rate or volume of discharge but the quality of wastewater discharged will be improved. Although the proposal results in a change in the location and method of discharge to land, the location is close to the currently consented disposal area and is not significantly different in characteristics. Effluent discharged to land will be percolating through existing sediment in the area before entering groundwater or potentially surface water downstream and will be dispersed and diluted through this process.

The potential for change in nutrient concentrations as a result of the discharge of dissolved reactive phosphorous (DRP) are possible, however monitoring of the Shotover River has indicated DPR concentrations in the river are low and increased nutrient concentrations are unlikely to result in nuisance growths. The effects of the change in disposal field location or design are unlikely to be significantly different those currently consented.

The applicant has reached an agreement with Iwi to undertake biodiversity planting in the disposal area. Details of the nature of biodiversity planting proposed and subsequent management can be provided as part of requirements to prepare a landscaping and maintenance plan required by Consent 2008.242 condition 4 and Consent 2008.243 condition 3.

5.3.5 Natural Hazards

Council's Environmental Engineering and Natural Hazards Unit (EENHU) were contacted for comment on any potential natural hazard issues associated with the proposed variation, however none were identified.

The applicant has indicated the proposed works may require some clearance of willows planted by the Otago Regional Council for the protection of the flood revetment works. Details of the restoration and subsequent management of these plantings can be addressed as part of requirements to prepare a landscaping and maintenance plan required by Consent 2008.242 condition 4 and Consent 2008.243 condition 3.

5.4 Proposed Consent Conditions

The applicant proposed a number of consent conditions in the original application and in subsequent memos dated 12 October 2016 and 7 November 2016. A number of these conditions have been adopted and incorporated directly or into the draft consents appended to this report. An associated consequence of these changes will be the renumbering of the conditions. As these consents have yet to be given effect to it is considered the renumbering will not create any issues in terms of compliance or monitoring.

6. Statutory Considerations

Section 104 of the Act sets out the matters to be considered when assessing applications for resource consents. Those matters which should be considered for these applications, include Part 2 (Sections 5-8) of the Act, Section 104(1) of the Act, the Regional Policy Statement, the Regional Plan: Water for Otago, and Section 105 and Section 107 of the Act. However, the context in which these documents are to be considered is limited to how the proposed changes to the conditions meet the purpose of the Act and relevant policy documents, rather than the activity itself.

The proposed Regional Policy Statement (pRPS) was notified on 23 May 2015 and a decision was released 1 October 2016. The pRPS is currently under appeal. As the pRPS had not been released at the time the original consents were issued appropriate consideration needs to be made, although weighting principles will apply. The relevant provisions of the pRPS include:

- Achieve integrated resource management (Policy 1.1.1)
- Provide for economic wellbeing (Policy 1.1.2)
- Provide for social and cultural wellbeing and health and safety (Policy 1.1.3)
- Taking the principles of Te Tiriti o Waitangi into account (Policy 2.1.2)
- Managing the natural environment to support Kāi Tahu wellbeing (Policy 2.2.1)
- recognising and protecting important sites and values of cultural significance to Kāi Tahu (Policy 2.2.2)
- managing for freshwater values including
 - Maintain or enhance ecosystem health in all Otago aquifers, and rivers, lakes, wetlands, and their margins
 - Maintain or enhance the range and extent of habitats provided by fresh water, including the habitat of trout and salmon
 - Maintain good water quality, including in the coastal marine area, or enhance it where it has been degraded
 - Maintain or enhance the natural functioning of rivers, lakes, and wetlands, their riparian margins, and aquifers
 - Maintain or enhance the quality and reliability of existing drinking and stock water supplies
 - Recognise and provide for important recreation values
 - Maintain or enhance the amenity and landscape values of rivers, lakes, and wetlands
 - Control the adverse effects of pest species, prevent their introduction and reduce their spread
- Manage the beds of rivers, lakes, wetlands, their margins, and riparian vegetation to achieve all of the following
 - Maintain or enhance their natural functioning
 - Maintain good water quality, or enhance it where it has been degraded
 - Maintain or enhance ecosystem health and indigenous biological diversity
 - Maintain or enhance natural character
 - Maintain or enhance amenity values
 - Control the adverse effects of pest species, prevent their introduction and reduce their spread

- Avoid, remedy or mitigate the adverse effects of natural hazards, including flooding and erosion
- Maintain or enhance bank stability (3.1.2)
- Identify and protect outstanding freshwater bodies (Policy 3.2.13 & 3.2.14)
- Assess the consequences of natural hazard events (Policy 4.1.3)
- Give preference to risk management approaches that reduce the need for hard protection structures or similar engineering interventions, and provide for hard protection structures only when all of the following apply:
 - Those measures are essential to reduce risk to a level the community is able to tolerate;
 - There are no reasonable alternatives;
 - It would not result in an increase in risk to people and communities, including displacement of risk off-site;
 - The adverse effects can be adequately managed;
 - The mitigation is viable in the reasonably foreseeable long term (Policy 4.1.10)
- Enable the location of hard protection structures or similar engineering interventions on public land only when either or both of the following apply:
 - There is significant public or environmental benefit in doing so;
 - The work relates to the functioning ability of a lifeline utility, or a facility for essential or emergency services (Policy 4.1.11)
- Managing hazard mitigation measures, lifeline utilities, and essential and emergency services (Policy 4.1.12)
- Managing infrastructure activities
 - Maintain or enhance the health and safety of the community
 - Reduce adverse effects of those activities, including cumulative adverse effects on natural and physical resources
 - Support economic, social and community activities
 - Improve efficiency of use of natural resources
 - Protect infrastructure corridors for infrastructure needs, now and for the future
 - Increase the ability of communities to respond and adapt to emergencies, and disruptive or natural hazard events
 - Protect the functioning of lifeline utilities and essential or emergency services (Policy 4.3.1)
- Maintaining and enhancing public access (Policy 5.1.1)
- Manage discharges that are objectionable or offensive to Kāi Tahu and/or the wider community (Policy 5.4.1)
- Apply an adaptive management approach, to avoid, remedy or mitigate actual and potential adverse effects that might arise and that can be remedied before they become irreversible (Policy 5.4.2)
- Apply a precautionary approach to activities where adverse effects may be uncertain, not able to be determined, or poorly understood but are potentially significant (Policy 4.4.3)

The existing consents to disturb the bed (2008.242) and place a structure in the bed of the Shotover River (2008.242) have been thoroughly assessed against the provisions of the Act and the Regional Plan: Water.

The proposed variations to discharge permits to discharge treated wastewater to land for a term expiring 2031 (RM13.215.03) and for a term expiring 2044 (2008.238.V1/RM13.237) do not result in a decrease in the quality of the discharge and will no longer rely upon discharge to land to provide a component of the treatment.

The assessment of the effects of the proposed changes in the location and nature of the disposal field identify the area in which they will be located as an area containing significant natural and recreational values and an area of significance to Iwi. However,

these values were also present in the site currently consented for this purpose and the differences in the effect of the existing consent to the proposed variation in terms of the impacts on these values is considered to be minimal subject to the imposition of the conditions of consent proposed. Further, key participants in the original consent, including Iwi and Public Health South have been consulted and provided written approval of the proposed variation.

In conclusion, it is considered that the proposed variation to the activity remains consistent with Sections 5, 6, 7 and 8 of the Act, the RPS and the pRPS, and the Regional Plan Water for Otago.

7. Recommendations

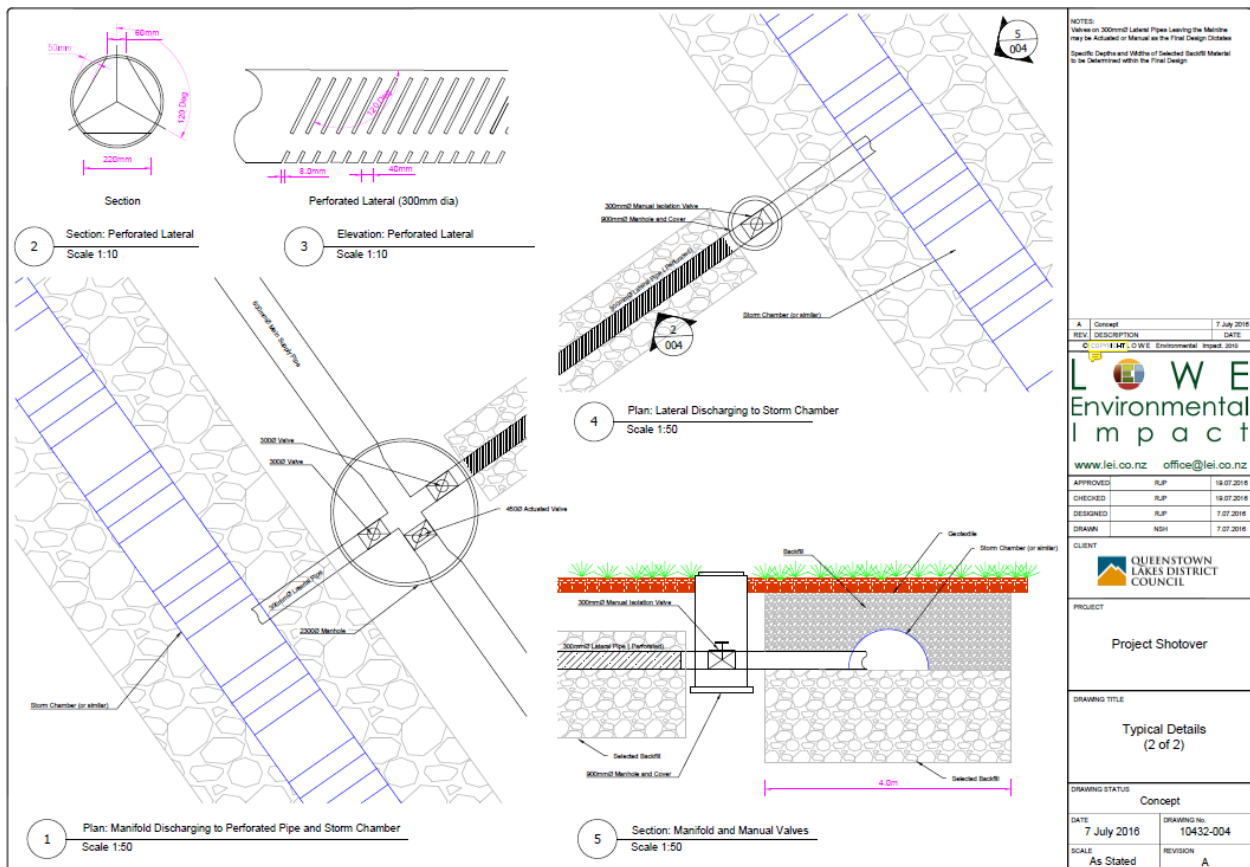
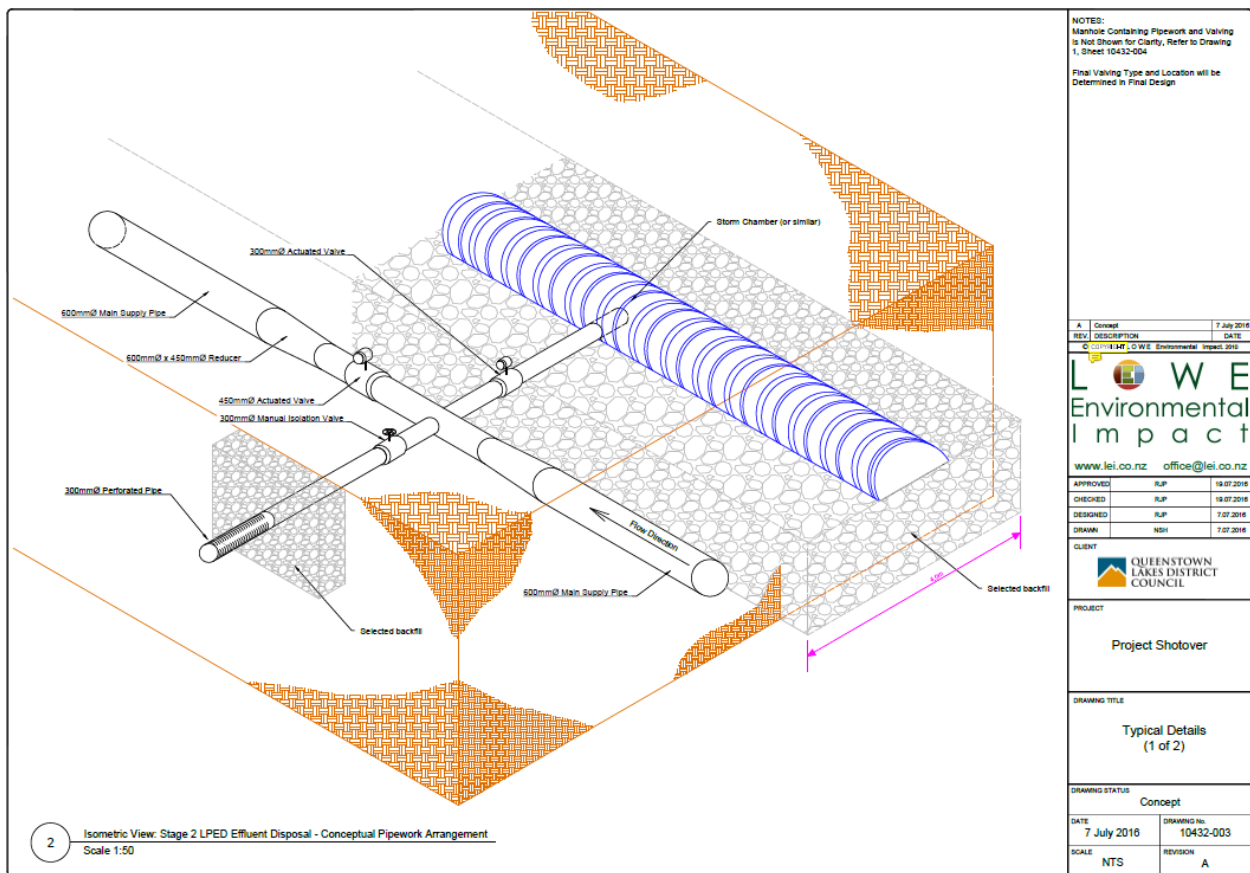
That Otago Regional Council grants to Queenstown Lakes District Council, a variation to discharge permit RM13.215.03, discharge permit RM13.237/2008.238, land use permit 2008.242, and land use permit 2008.243, subject to the terms and conditions as set out in the attached consents.

7.1 Reasons for recommendation

- (a) That it is expected that the adverse effects on the environment will be minor, and can be adequately addressed through the recommended consent conditions.
- (b) That the application meets the requirements of Section 127 of the Act and the non-notification requirements of Section 95A of the Act.
- (c) That the proposed activities are consistent with all other relevant requirements of the Act and Council policy.

Ralph Henderson
Senior Consents Officer

Appendix 1: Proposed Project Shotover LPED Wastewater Disposal System



Appendix 2: Proposed variations to land use permit 2008.242, and land use permit 2008.243, discharge permit RM13.215.03 and discharge permit RM13.237/2008.238

Additions in *italics*

Deletions ~~striketrough~~

See document titled “Recommending Report RM16.116 - Appendix 2 - draft variations to 2008.242.V1, 2008.243.V1, RM13.215.03.V1 & 2008.238.V2” Document Reference: A983772