QLDC Council Workshop

Project: Shotover WWTP Alternative Disposal Project

Date: 04th December 2025

Presented By: Andrew Hill – Senior Project Manager – QLDC

Simon Mason – Operations and Maintenance Manager - QLDC

Purpose: Briefing for Council and Q&A/Feedback.

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Agenda

- Shotover WWTP History, upgrades and process (10 mins)
- Old Disposal Field, Enforcement Order/Emergency Discharge (10 mins)

  Opportunity for Questions (10 mins)

- Shotover WWTP Alternative Disposal Project – Long List Options (20 mins)

  Opportunity for Questions (10 mins)

- Shotover WWTP Alternative Disposal Project – Short List Options (20 mins)

  Opportunity for Questions (15 mins)

- Stakeholder engagement/Consent Pathway/Next Steps (15 mins)

  Opportunity for Questions (10 mins)

Shotover WWTP History, Upgrades and Process

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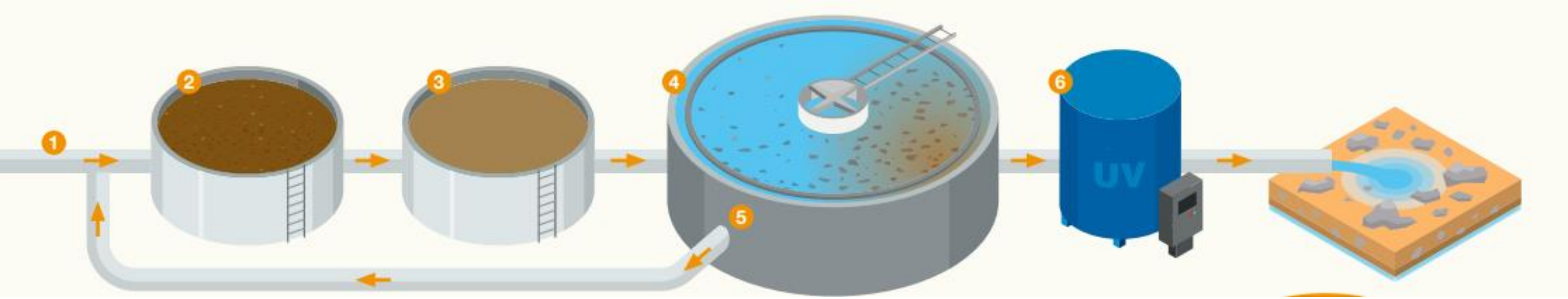
SWWTP Layout

- Prior to 2017, only Oxidations Ponds used and discharged direct to Shotover River.
- Consent granted prior to 2017 had a stepped progression of improved limits as infrastructure is implemented.

SWWTP Stage 1-3 Upgrades

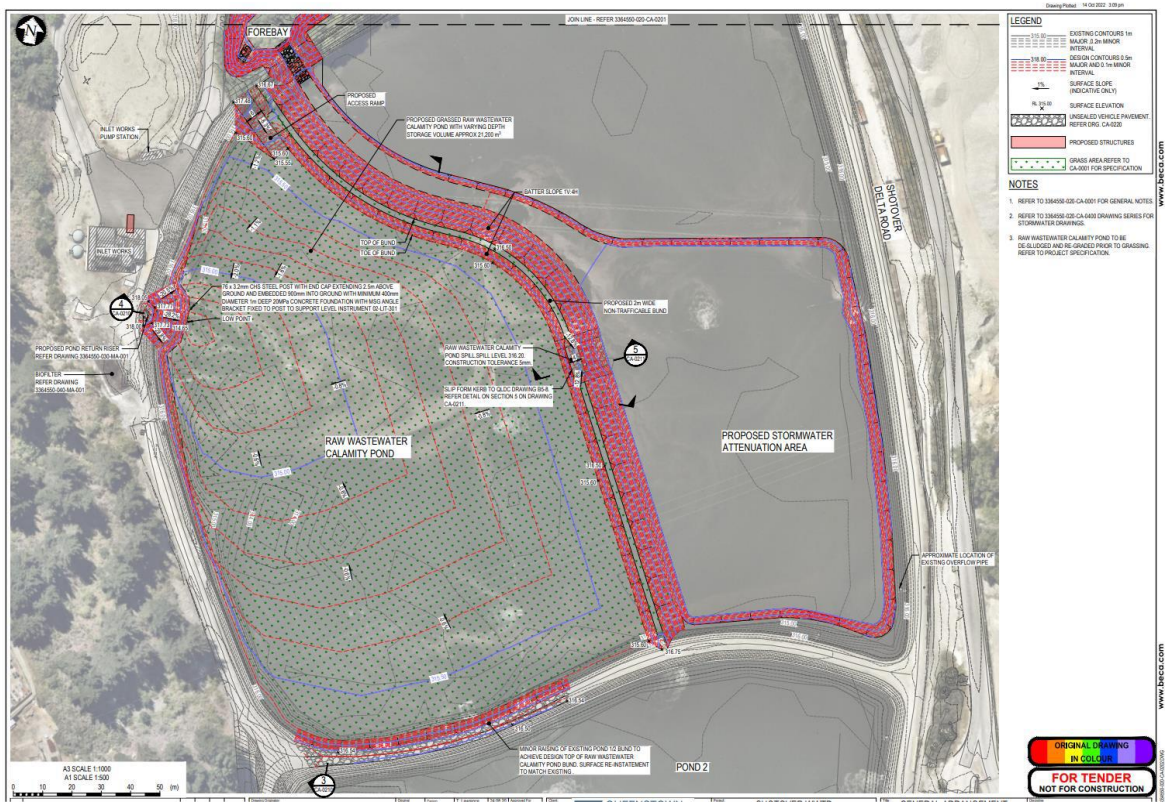
- Stage 1 = Modified Ludzack-Ettinger (MLE1) Activated Sludge Process
  - Constructed 2017
  - Cost circa **$23.5M**
  - Approx 80% of wastewater treated through MLE, 20% through Oxidation ponds.
- Stage 2 – Dose and Drain (DaD) Disposal Field
  - Completed 2019
  - Cost circa **$5.2M**
  - Intended that 100% of treated wastewater would be disposed through the DaD
- Stage 3 – second MLE in parallel (MLE2)
  - Operating from Aug 2025 in unison with MLE1 (Commissioned Oct 25)
  - Treating 100% of Wastewater – designed to 2048 population forecast (2021 estimates)
  - Cost circa **$37.5M**
  - Pond 1 – Raw(untreated) wastewater emergency storage; Site Stormwater collection
- Future Upgrades
  - Treated wastewater emergency storage pond, Inlet Works circa **$20M**

MLE Treatment Process



1. Inlet screen - separate solids
2. Reactor tank 1 – anoxic – starves bacteria of oxygen – bacteria breaks down to produce oxygen to survive
3. Reactor tank 2 – aerobic - oversupply of oxygen – further biological processes, reduces nitrogen concentrations
4. Clarifier – separation of water and biomass
5. Scraper collects surface sludge and returns to reactor tank 1
6. Clear, treated wastewater then receives ultra-violet disinfection treatment
7. Treated wastewater is then disposed of through appropriate discharge.

Stage 3 Upgrade (MLE2)



MLE 2 (**Commissioned Oct 2025**) in Parallel to MLE 1

Pond 1 converted to raw wastewater emergency storage and Stormwater

Improvements in Discharge Through the Years

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> Below slide shows 95th Percentile and Annual Mean over a rolling 12 months.

*90th Percentile

Parameter	<-- 2017	2017-2025	2025-2030	2031 -->
Total Suspended Solids (TSS) (g/m^3)	130/65	50/30	20/10	10/5
Biological Oxygen Demand5 (g/m^3)	100/50	50/30	20/10	10/5
Escherichai Coli (cfu/100ml)	3.5×10^5 / 5×10^4	260*/260	100/10	100/10
TN (Total Nitrogen) (g/m^3)	55/45	35/23	15/10	15/10
TAN (Total Ammoniacal Nitrogen) (g/m^3)	40/35	25/15	5/1.5	5/1.5
TP (Total Phosphorous) (g/m^3)	10/7.5	10/7.5	10/8	5/1.5

> Improvements in wastewater quality are achieved through investment in treatment rather than disposal.

Old Disposal Field, Enforcement Order/Emergency Discharge

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Stage 2 - Dose & Drain (DaD) Disposal Field

- Completed in 2019.
- Provided for land contact for the treated wastewater prior to reaching the river environment.
- Allowed the direct discharge of treated wastewater to the Shotover River to be ceased.

Disposal Field Challenges & Why it Failed

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- High groundwater table
- Clogging of plastic cells
- Maintenance difficulties
- Sub optimal location and orientation.

Disposal Field Challenges & Why it Failed

- Treated wastewater failed to discharge at the rate expected – led to surface ponding (as shown in the picture) and occasional overflow.
- A number of measures were taken from 2020-2024 to mitigate.
- Continuation of ponding and overflows became more frequent in 2024, continuous by Dec 2024.
- Assessed as unable to meet existing or future demand.

ORC Enforcement Action / Environment Court

- Two abatement notices issued by Otago Regional Council (ORC):
  - Notice One (27 May 2021)
  - Notice Two (18 March 2024)
- January 2025 - ORC Applied to Environment Court for an Enforcement Order. March 2025 - Environment Court mediation and June 2025 agreed Enforcement Order sealed.
- QLDC required to meet the following milestones:
  - MLE2 ompleted by end of 2025 - achieved
  - Treated wastewater emergency storage pond by Dec 2027
  - Long Term Solution Resource Consent Application – May 2026
  - Long Term Solution Engineering design completed – Dec 2027
  - Long Term Solution Disposal System implemented – Dec 2030
- QLDC undertaking regular weekly sampling on the Delta, results displayed on QLDC Web page.

See:

Attachment E 2025-06-09 Environment Court Decision Shotover

Environmental Monitoring – QLDC Webpage

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Shotover WWTP Monitoring Results

Select Parameter

- (•) Ammoniacal Nitrogen
- ( ) Dissolved Oxygen
- ( ) Dissolved Reactive Phosphorus (DRP)
- ( ) E.Coli
- ( ) Nitrate Nitrogen
- ( ) Total Nitrogen (TN)
- ( ) Total Oxidised Nitrogen (TON)
- ( ) Total Phosphorus

Ammoniacal Nitrogen

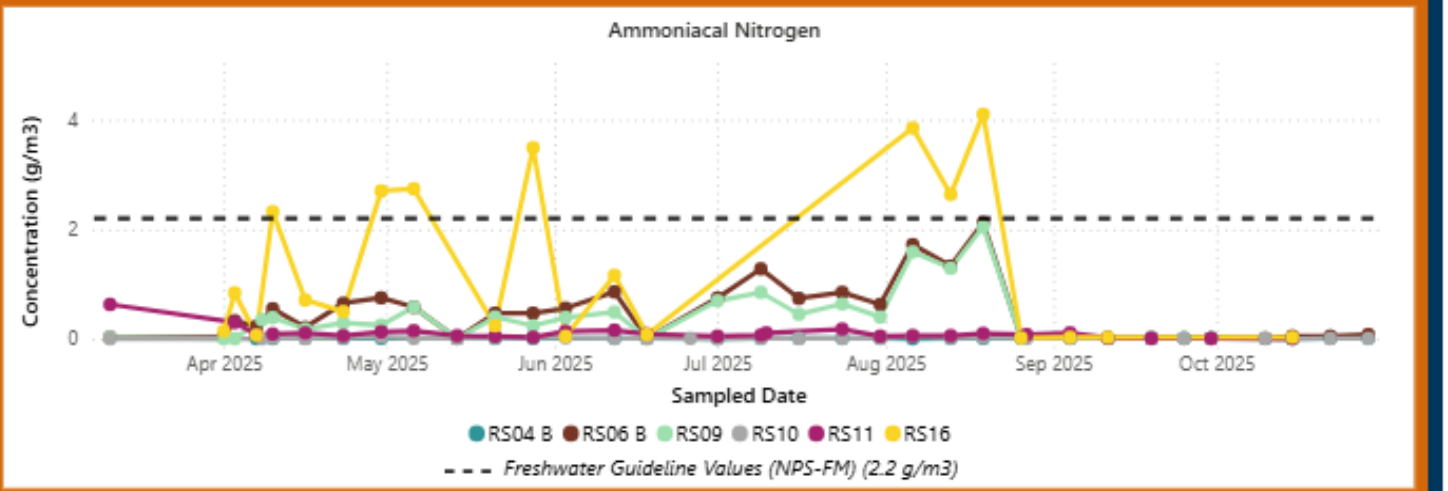
Ammoniacal nitrogen includes both ammonia and ammonium, commonly entering waterways through effluent and fertilizers. Elevated concentrations can be toxic to sensitive aquatic species, affecting fish health and overall ecosystem balance.

NPS-FM guideline: Annual median for rivers should be at or below 0.24 g/m3 (NH_4-N), and the maximum should not exceed 0.4 g/m3 (based on pH 8 and temperature of 20°C).

Plant Discharge | River Monitoring

Select Location

- [x] RS16 | Shotover River immediately downstream from discharge channel
- [x] RS06 B | Shotover River 50m downstream of discharge
- [x] RS09 | Shotover River 300m downstream of discharge site
- [x] RS10 | Kawarau River downstream of confluence
- [x] RS11 | Kawarau River upstream of confluence
- [x] RS04 B | Shotover River upstream of discharge to provide baseline water quality



The Lab processing for results can take 9 days from the day of Sampling.

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Emergency Works

- CE decision to undertake Emergency Works 27/3/25 (RMA Section 330) due to:
  - DaD had failed and was no longer able to accommodate the discharge
  - Increasing risk to aviation associated with bird strike due to continuous ponding and unintended surface water attracting waterfowl, with QAC elevating their concerns in March 25.

- Emergency Works commenced 31/3/25.

- Now under a Resource Consent process.
  - QLDC seeking a Short-Term consent to Dec 2030.
  - Public Notification and Direct Referral to Environment Court.
  - Environment Court hearing expected mid 2026.

See Attachment F – Record of Decision for Emergency Works

See Attachment G - Record of Decision for Direct Referral

Short Term Resource Consents

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> RM25.206 for Discharge of treated wastewater to the Shotover River.

> RM25.177 Consent to divert minor channel (2-2.5m3/s) in the Shotover River.

Questions on the SWWTP History, Disposal Field and Enforcement/Emergency Works?

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Shotover WWTP Alternative Disposal Project – Long List Options

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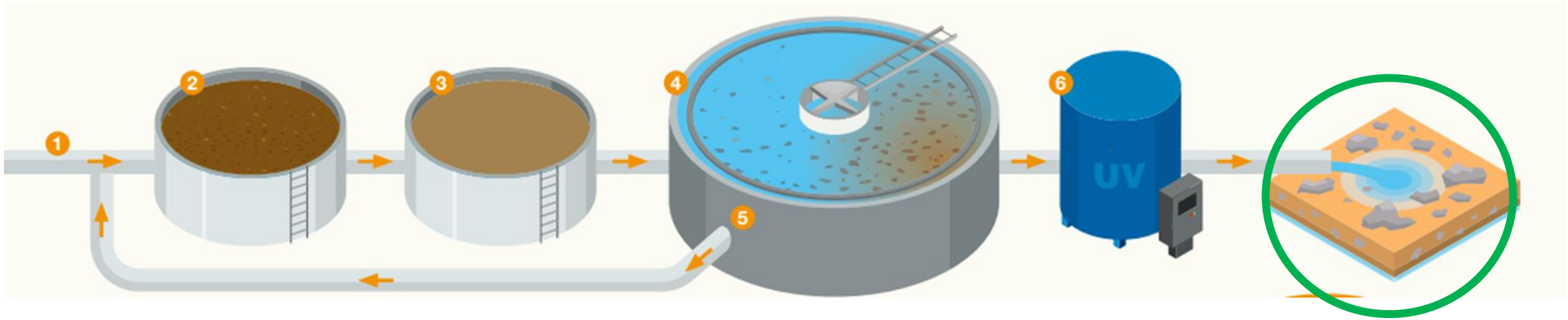
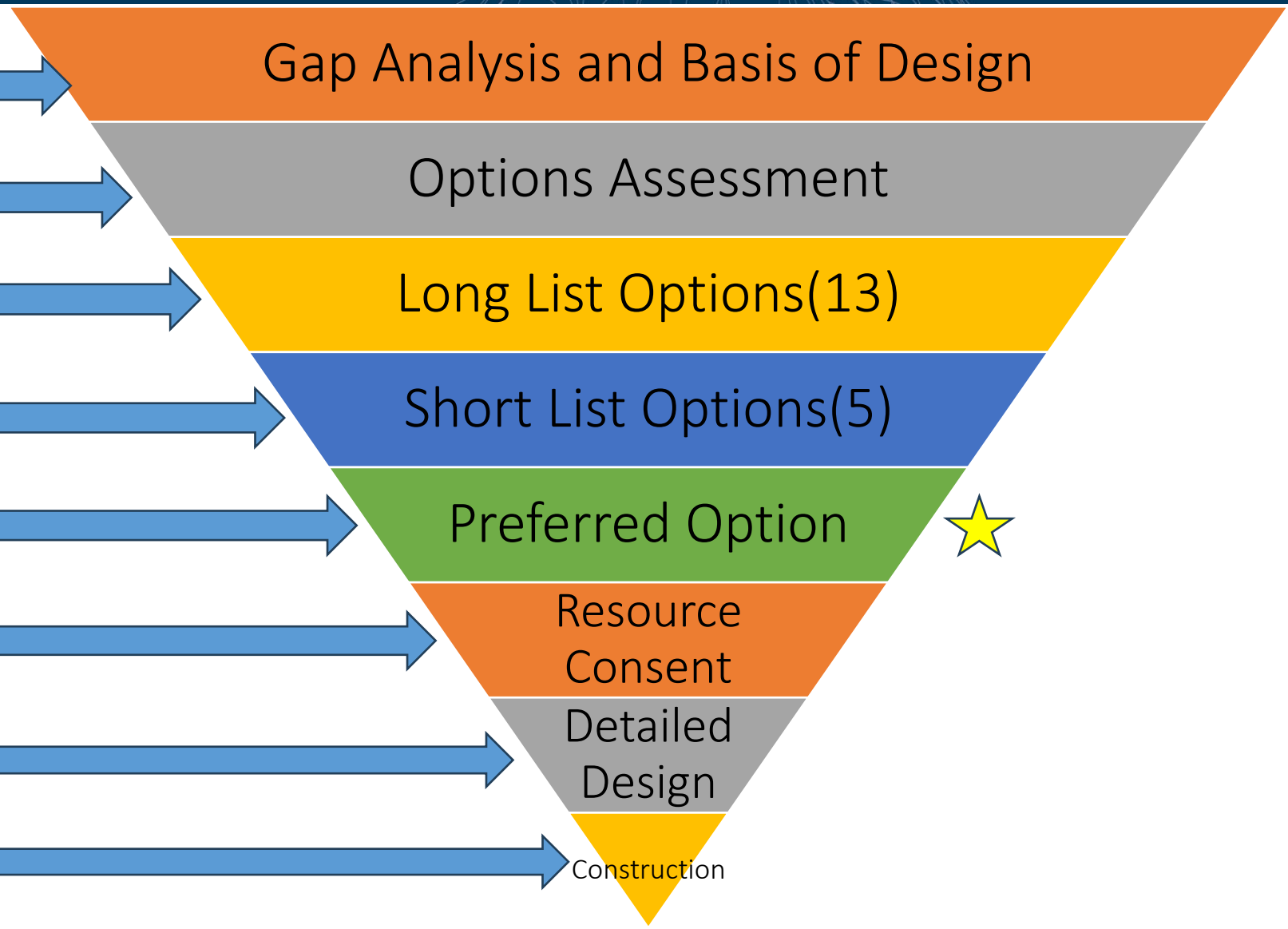
Alternative Disposal Project - Summary

- Project Deliverables: Design, consent, construct & commission a new Treated Wastewater Disposal Solution for the Shotover WWTP.
- Review if additional treatment/filtration is required.
- LTP funding of $77.5M from FY24 – FY30
- Project consenting targets:
  - Gain and comply with new resource consent (35 yrs).



Alternative Disposal Project - Process

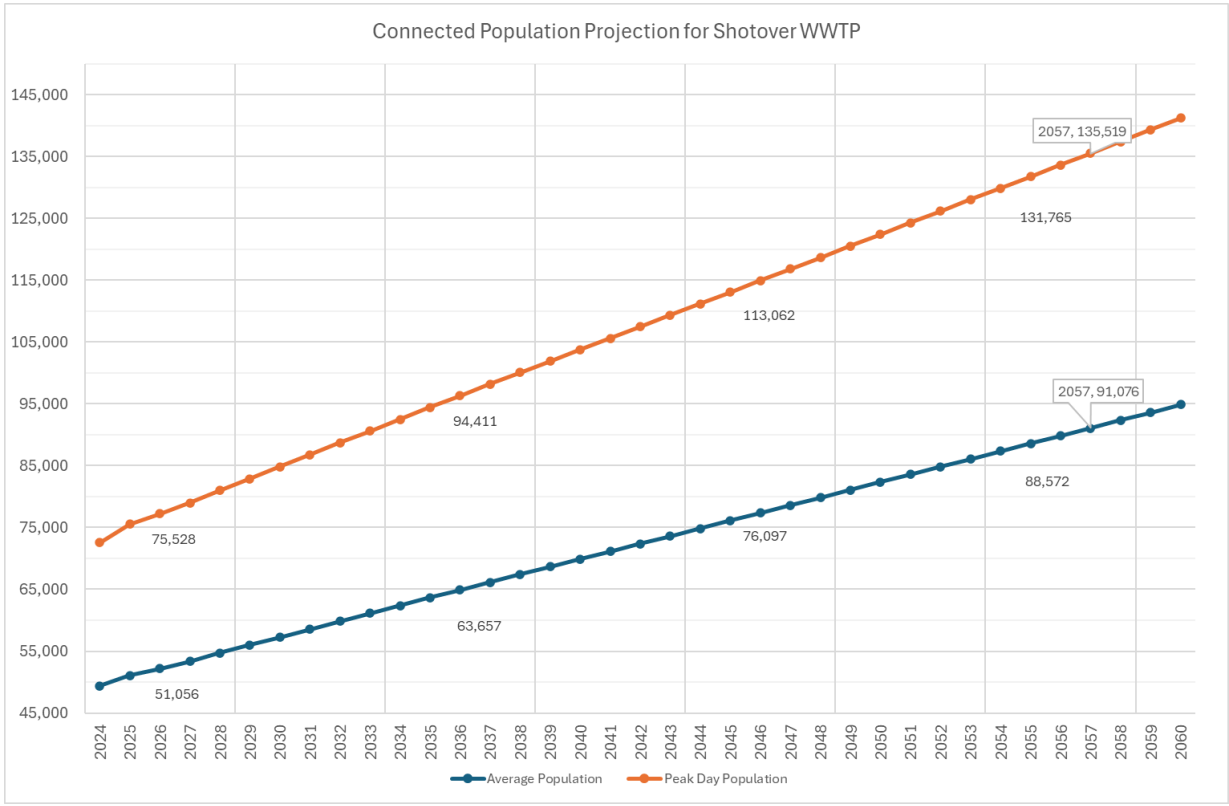
- Oct 24 – Dec 24
- Dec 24 - Jan 25
- Feb 25 – Apr25
- Apr 25 – Sept 25
- Oct 25 – Mar 26
- Mar 26 – Dec 27
- July 26 – Feb 28
- Feb 28 – Dec 30



Alternative Disposal Project - Summary

- Design horizon: 2060 (35 years from 2025).
  - Updated QLDC growth and waste projections (2025)

		Current 2024	Future 2060
Permanent Population		49,000	95,000
Peak Population		72,000	141,200
Average Dry Weather Flow	m^3/day	12,000	26,000
Peak Dry Weather	m^3/day	15,900	31,000
Peak Wet Weather	m^3/day	32,700	60,000



Summary of Long-list Option Assessment

Option	Technical Complexity to build	Complexity of Operation	Land Area Required	Rough Cost Range
Do Nothing, existing disposal field	Not considered a viable or acceptable longer term option			
Option 1 – High-rate land disposal a) delta infiltration basins			10 ha	
Option 1 – High-rate land disposal b) Delta trenches			25 ha	
Option 2 - Moderate rate land disposal a) Airport			70 – 90 ha	
Option 2 - Moderate rate land disposal b) Southern corridor			70 – 90 ha	
Option 2 - Moderate rate land disposal c) Alternate locations across the Shotover or Kawarau River			70 – 90 ha	
Option 3 – Low-rate disposal a) Doc land / Coronet peak			400 – 500 ha	
Option 4 – Land flow path to river a) Shotover			N/A	
Option 4 – Land flow path to river b) Kawarau			Discreet points across the area	
Option 5 – Deep well injections a) Frankton			Discreet points across the area	 No land purchase assumed
Option 5 – Deep well injections b) Bridesdale			Discreet points across the area	
Option 6 – Shallow well injections a) Delta			Discreet points across the area	
Option 7 – Subsurface Wetland on Delta			Up to 10 ha (could be less)	
Option 8 - Well Point or Soak holes			Discreet points across the area	 No land purchase assumed

*Yellow highlight indicates options carried through to Short-List.

Coin pile = circa $40M

5 Short List Disposal Options - Overview

Questions on the SWWTP Long-term Disposal Long List Options?

See:
Attachment B - Previous Workshop Presentation - Shotover WWTP Disposal Long Term Solution - Long List Options Assessment – 29 Apr 25
Attachment C - Previous Workshop Briefing Notes - Shotover WWTP Disposal Long Term Solution - Long List Options Assessment – 29 Apr 25
Attachment D - 12645246-REP-Shotover Long List Options Report Rev0

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Shotover WWTP Alternative Disposal Project – Short List Options

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Key Developments for Short List - Legislation Changes

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Legislative Changes

- Local Government (Water Services) Act 2025 amendments (26/8/25) includes a ‘cost effectiveness’ obligation for the provision of wastewater infrastructure and treatment.

Proposed National Wastewater Standards

- Draft standards were consulted on in April and used for assessments.
- Final standards issued 21/11/25 and currently under review to determine if this impacts any assessment.

Extract from Local Government (Water Services) Act 2025

254 Obligation to consider cost-effectiveness of wastewater options

(1) This section applies when a water service provider makes a decision relating to—

(a) options for providing wastewater infrastructure:

(b) options for treating wastewater.

(2) The water service provider must, when making a decision under subsection (1), choose the option it considers to be the most cost-effective option for providing wastewater services over the life of the infrastructure assets required to implement that option.

Key Developments for Short List

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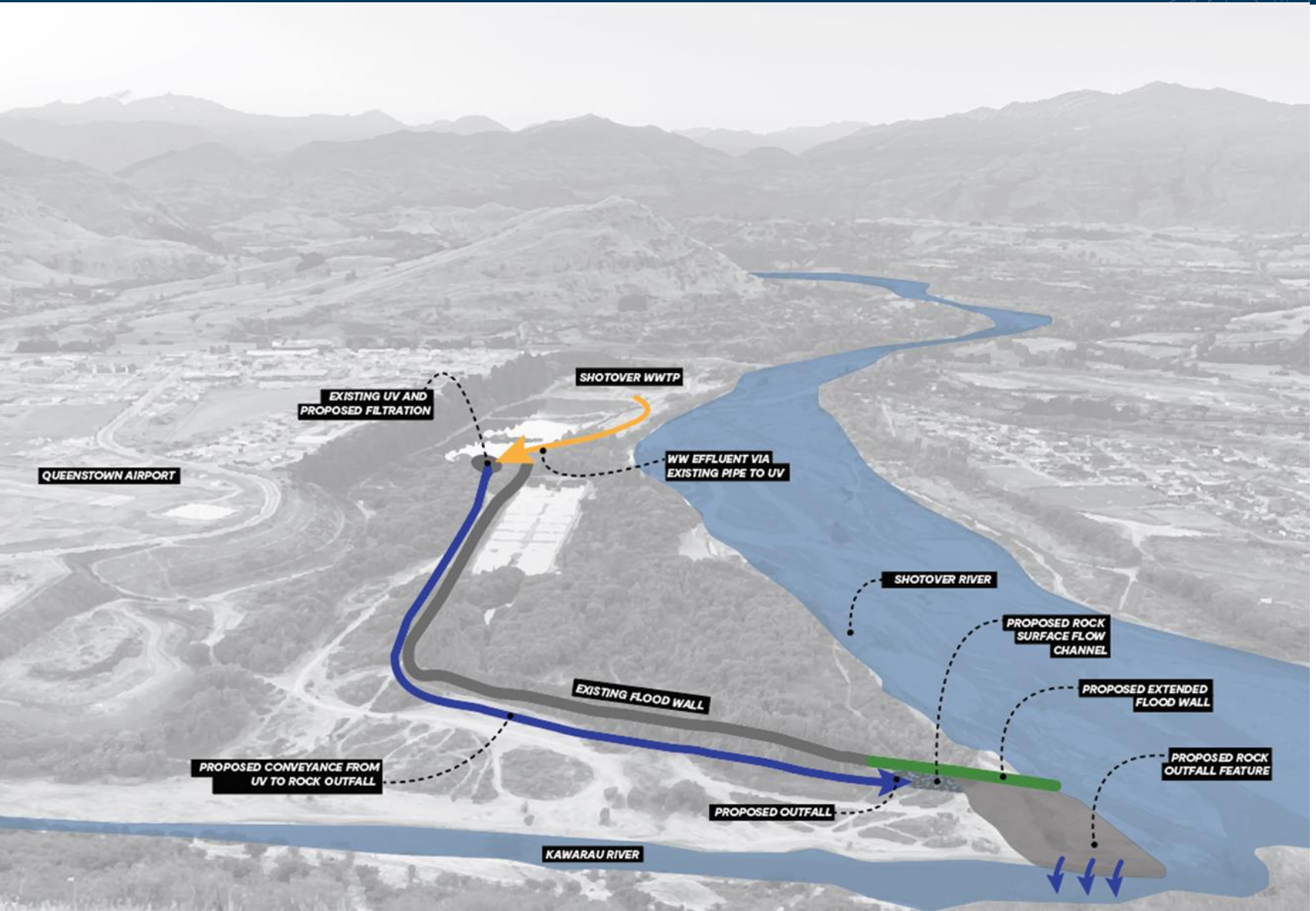
- **Enforcement Order:**
  - Long term consent application to be lodged by end of **May 2026**, solution operational by **Dec 2030**.
- **Land Accessibility:**
  - QAC master planning/development – QAC advised their land is unavailable due to development or operational constraints – focus on QLDC available land.
  - QAC raised significant concerns regarding broader implications of discharge on Frankton Flats.
- **Frankton Flats (FF) Site Investigations:**
  - Due to timeline and cost identified to undertake full site investigations (12-18 months and $3M+) a desktop modelling and design approach is considered appropriate and was undertaken – investigations will be required to progress these options further if deemed the preferred.
- **Frankton Flats Aquifer Capacity Assessment**
  - Identified limitations of FF aquifer capacity to accommodate full treated volumes to 2060.
    - Aquifer assessed max capacity of 20,000m^3/day (26,000m^3/day average required in 2060).
    - Bores 25% chance of achieving 12,500m^3/day; Soak holes 13% chance of achieving 12,500m^3/day.

Evolved Short List Options

Long List Option 4b – Land Flow Path to Kawarau River	No Change	Short List Option A
Long List Option 7a – Subsurface wetland on the delta with discharge to Kawarau River	No change	Short List Option B
Long List Option 5a – Well injections Frankton	Hybrid of well injections to Frankton and Option B	Short List Option C
Long List Option 8a – Soak Holes on Frankton Flats	Hybrid of soak holes to Frankton and Option B	Short List Option D
Long List Option 2a – Moderate Rate Land Disposal – Frankton	Not viable as a standalone option	

Short List Option A – Landflow to Kawarau River



Option A is the land flow path (rock outfall) to Kawarau River. This option is considered the most cost effective and is expected to be consistent with the proposed Wastewater Environmental Performance Standards (subject to review of the new provisions).

The treated discharge is directed into the Kawarau River through a rock outfall. This would be designed to minimise the visual effect of the discharge, and to provide aeration and land contact prior to entering the river. A diffuser in the river is an alternate option for discharge.

Short List Option B - Discharge via Subsurface Wetland

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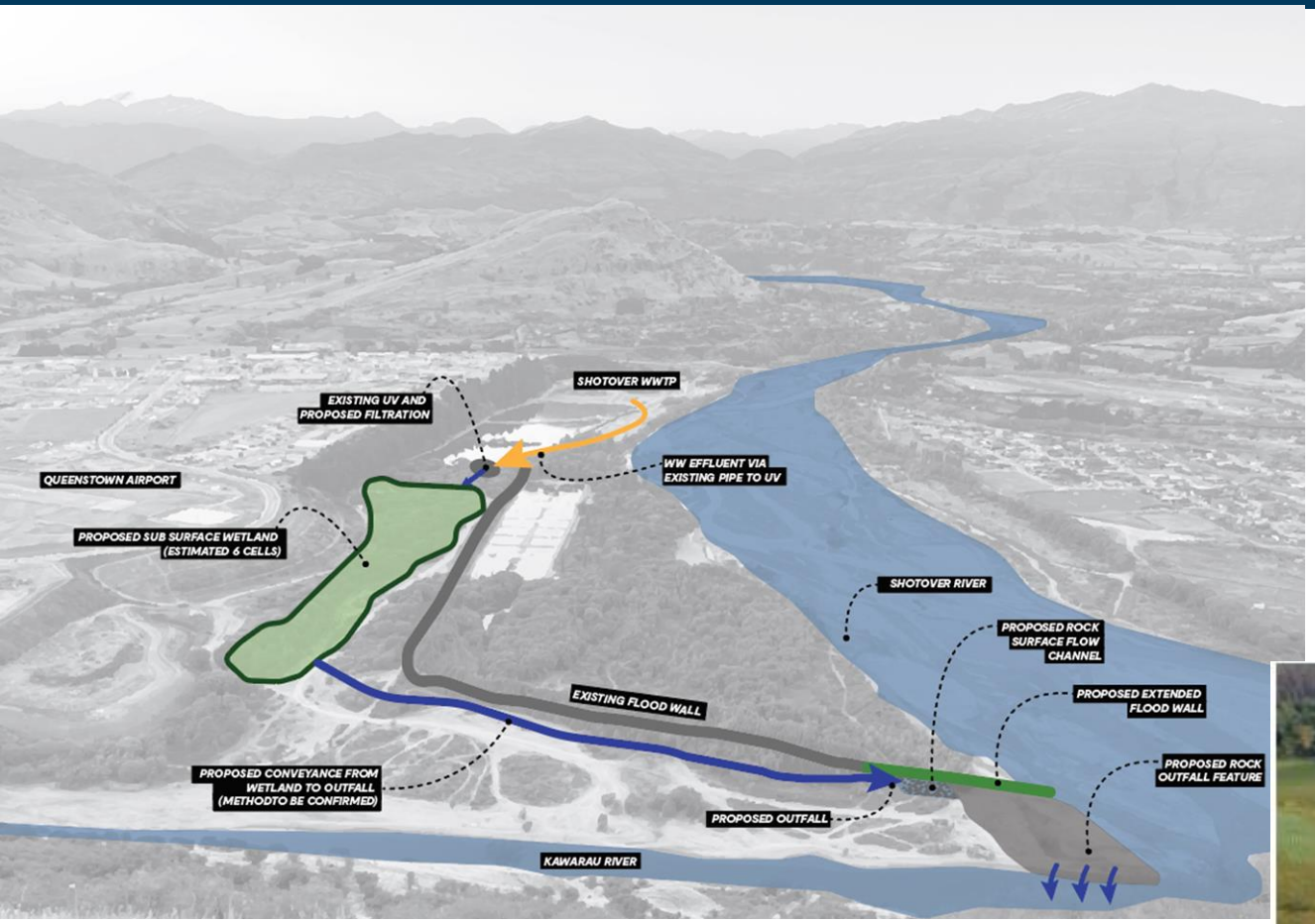
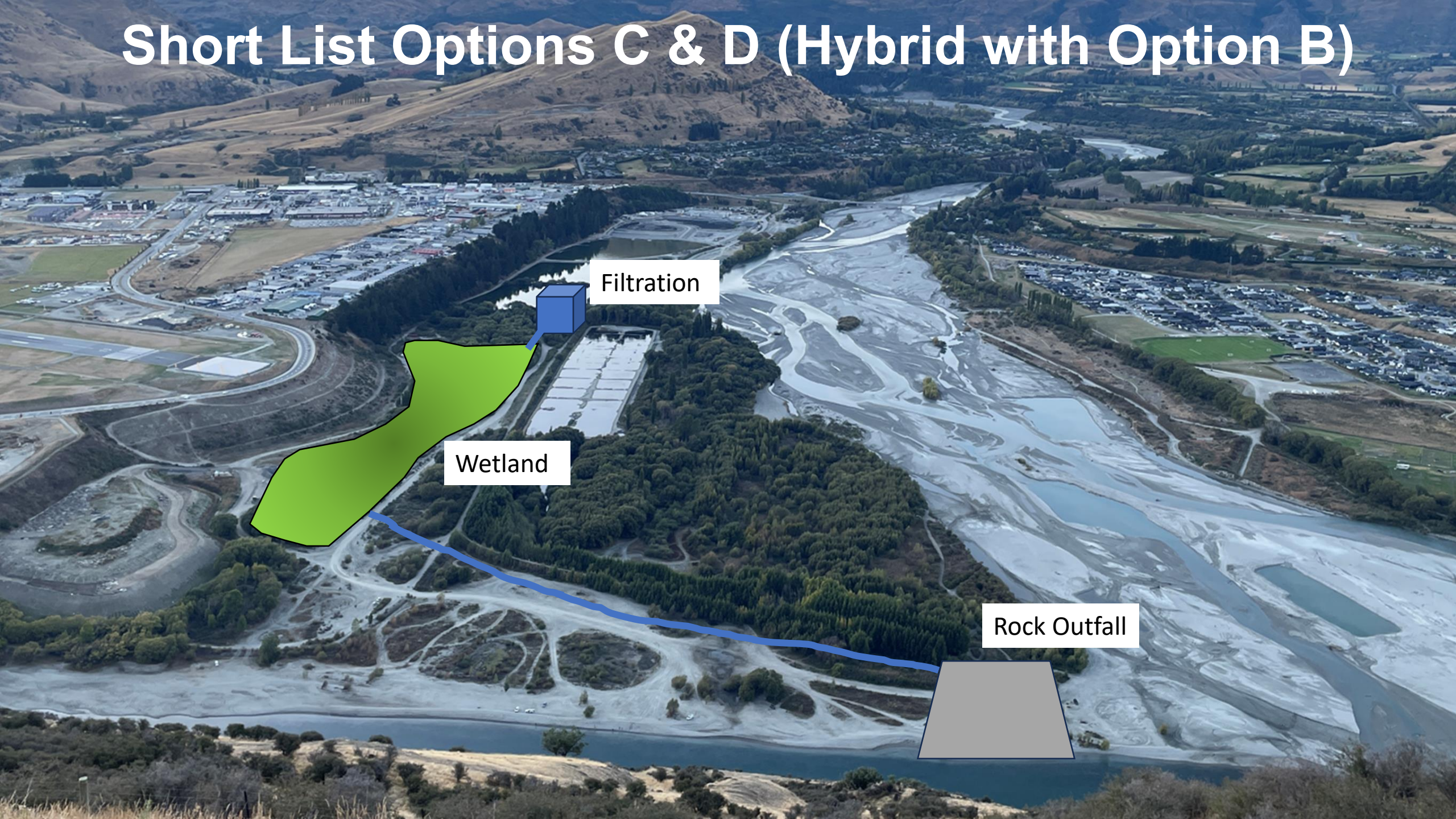
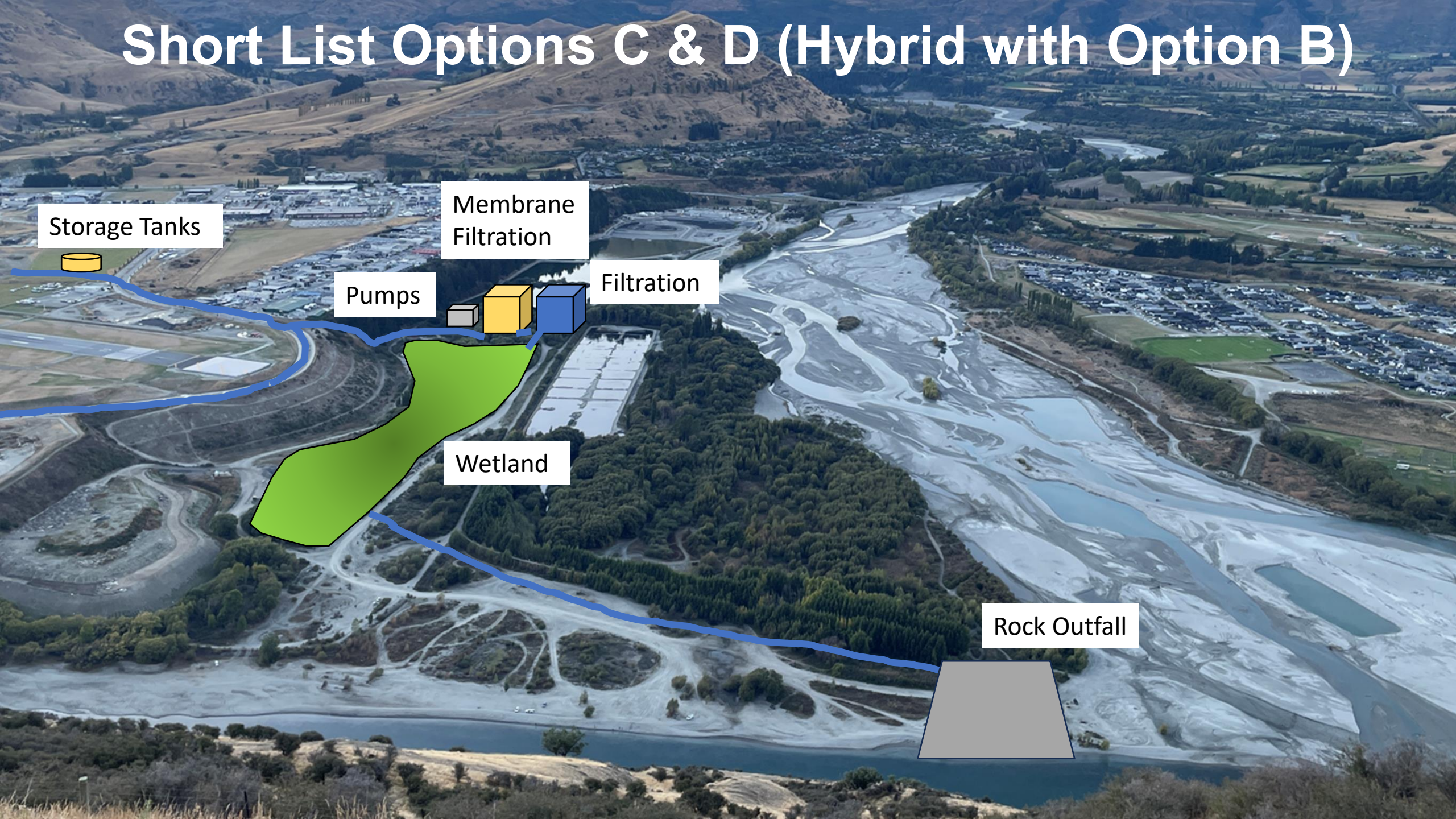


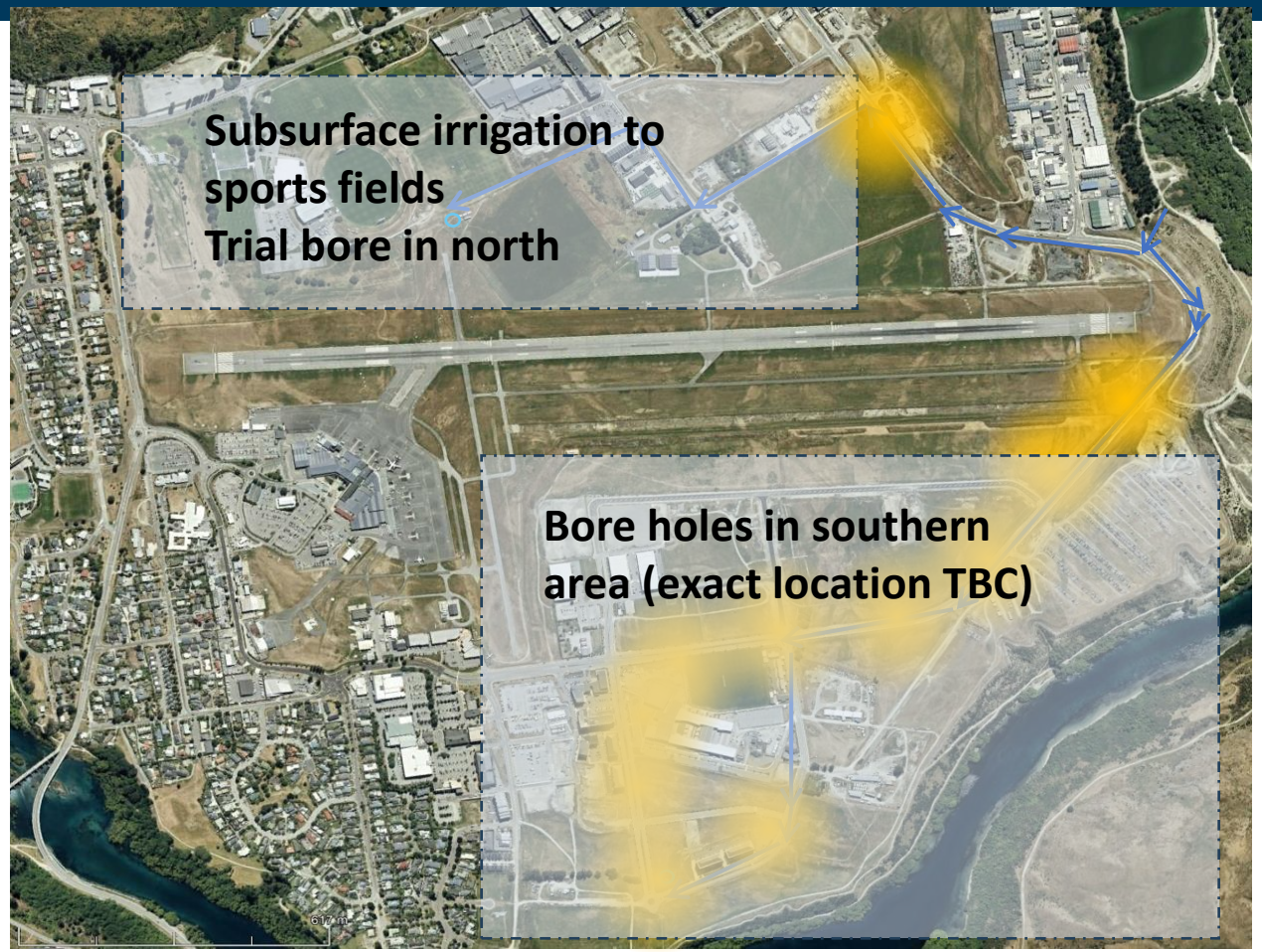
Short List Options C & D (Hybrid with Option B)



Short List Options C & D (Hybrid with Option B)



Option C Partial Discharge to Deep Bores



Features:

Estimate of 10 bores required.

Approximately 100m deep and 300 mm diameter.

Spaced approximately 100 – 200 m apart.

Located on Council owned land and/or road corridors.

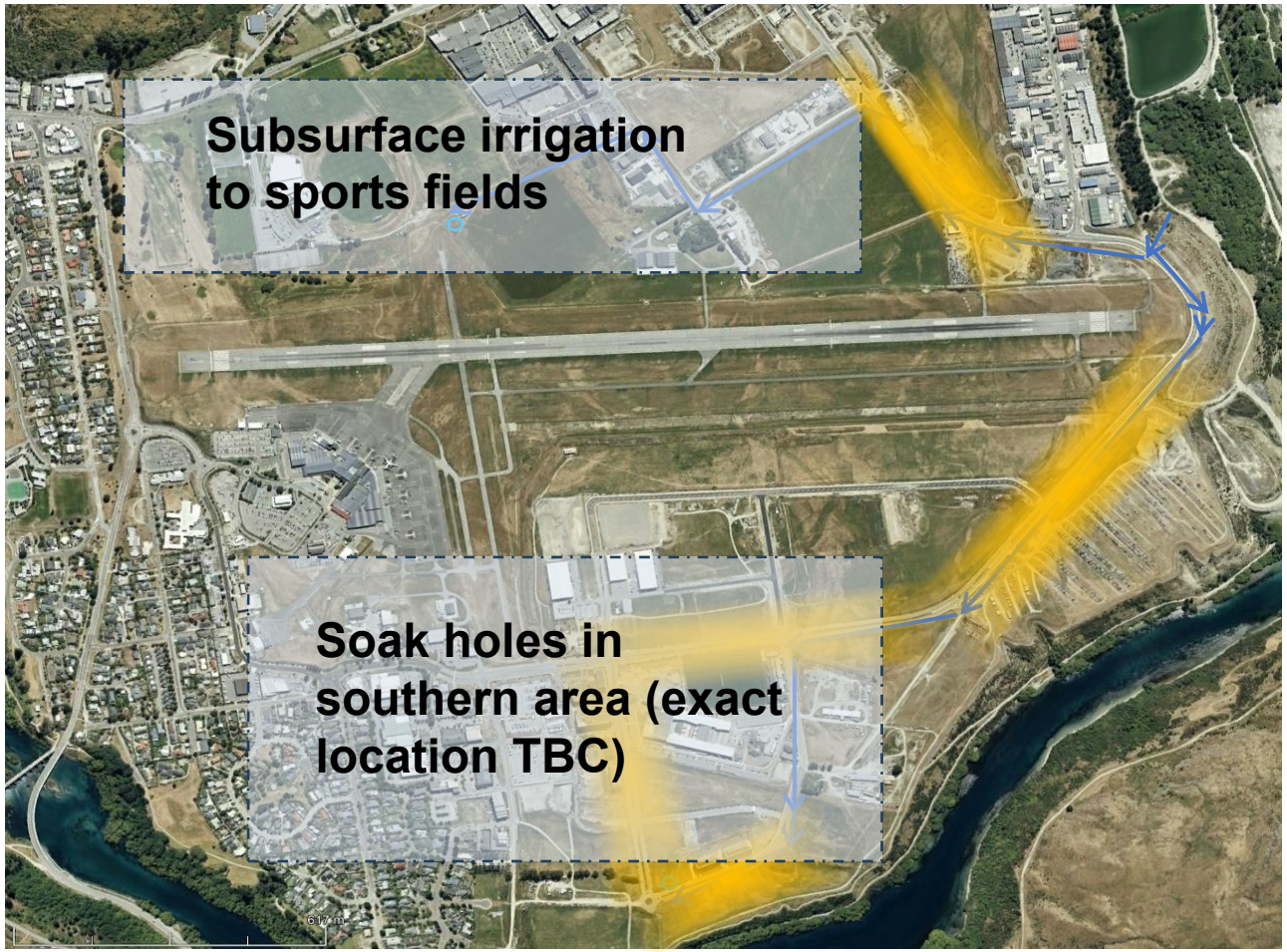
Below ground headworks to minimise visibility.

Water level and flow monitoring.

Submersible pump per bore to allow backwashing to manage clogging.

Requires 3 x 400 m3 storage tanks.

Option D Partial Discharge to Soak Holes



Yellow areas show indicative location for the soakholes.

Features

- Estimate of 50 soak holes required.
- Approximately 20m deep and 300 mm diameter.
- Spaced approximately 10m apart.
- Located on Council owned land and/or road corridors.
- Below ground headworks, manhole cover size.
- Automatic valve and soakhole water level monitoring.
- Resting required.
- Soak holes will degrade and require replacement. Allowed for in operating costs.
- Requires 3 x 400 m3 storage tanks to buffer flows.

Options C & D Staged Development – Hybrid

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> Consent and Construct Option B

> In Parallel on Frankton Flats.

- **Trial stage - Site Investigations** – confirm assumptions and design, consents. Test disposal rates with fresh water. 1-2 years. If successful, move to trial stage 2.

- **Trial Stage 1** – Install 2 bores/2 soak holes, pipework, pumps and Membrane filter. Approx 10-20% of flows. 2-5 years. If successful, move to Future Stage.

- **Future Stage 2** – install remaining bores/soak holes. Upgrade pumps and pipes, membrane filter and storage tanks. Supplementary disposal as agreed.

Environmental Impacts – All Options

- After mixing with the river, the influence of wastewater disposal is approximately the same across the various options being considered.
- Investigations have shown that very little improvement of nutrient concentrations was achieved by disposal to ground via the failed DAD.
- Far-field effects on water quality (downstream of mixing area) are expected to be less than minor.
- Managing the near-field effects on water quality (within the mixing area) is where the disposal method becomes important (rock outfall v's diffuser).
- Improvements in treatment can work to balance increases in discharge volumes.

Iwi Input & Position Statement

Iwi representatives have been involved in the optioneering stage from early in the project. At the conclusion of the Short list options development, with it becoming clear that all short list options had some form of discharge to water (not supported by Iwi), the representatives elected not to take part in the short list options scoring and instead provided a Position Statement for inclusion in the Short List Report.

A summary of key Points from the Iwi Position Statement are as follows:

- Kāi Tahu consider the direct discharge of human waste to natural water unacceptable from the perspective of cultural values.
- The Kawarau and Kimiākau/ Shotover rivers are culturally significant to Kāi Tahu, with long held associations reflected in ancestral trails, mahika kai and nohoaka entitlements.
- Since at least 1998 Kā Rūnaka have expressed:
  - their opposition to wastewater discharges to the Kimiākau/ Shotover River;
  - their preference for land-based discharge; and
  - their view that the Shotover Delta is an unsuitable location for land disposal.
- The position of Kā Rūnaka is that a more holistic investigation of wastewater needs and alternatives for Queenstown is required that is not constrained by continuing to rely on treatment at this location.

- *Full Iwi Position Statement provided as part of Options Analysis – Refer to Section 9 of the Short List Options Report (Attachment H)*

Preliminary Capital Costs – (Provisional)

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	Option A Rock outfall	Option B Wetland	Option C Bores	Option D Soakholes
Construction cost Stage 1	$33M to $38M	$64M to $73M	$97 to $111M	$96M to $109M
Implementation cost Stage 2	-	-	$51 to $58M	$70M to $80M
Consent, investigations, and design	$6M	$7M	$17M	$17M
TOTAL	**$39M to $44M**	**$71M to $80M**	**$165M to $186M**	**$183M to $206M**

Preliminary capital cost estimates for the options have been collated based on the conceptual sizing of different components. Costs are based on recent project rates extrapolated for the project requirements. These cost estimates are intended for the purpose of options comparison. Further design input (e.g. preliminary and detailed design) will be undertaken of the selected option to develop the level of cost accuracy suitable for planning and budgeting purposes.

Operating Costs and Whole of Life Costs (NPV)

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	Option A Rock outfall	Option B Wetland	Option C Bores	Option D Soakholes
Estimated Operating Cost (related to disposal only, includes allowance for contingency and asset renewal)	$320k to $460k	$430k to 620k	Stage 1 (Trial): $790k to $1.1M Stage 2 (Future): $1.4M to 2.1M	Stage 1 (Trial): $740k to $1.1M Stage 2 (Future): $1.5M to 2.2M
Net Present Value - 30yr timeline - (Circa)	$48M	$85M	$188M	$209M

Preliminary operating costs have been estimated based on expected power, pumping, and operator requirements. The cost of civil and mechanical maintenance and renewals is included. Excluded are the cost of asset depreciation.

NPV estimates are indicative only. Ongoing maintenance costs may vary significantly between options. Comparison primarily reflects capital cost differences.

Questions on the SWWTP Short Term Options?

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Shotover WWTP Alternative Disposal Project – Short List Options Assessment

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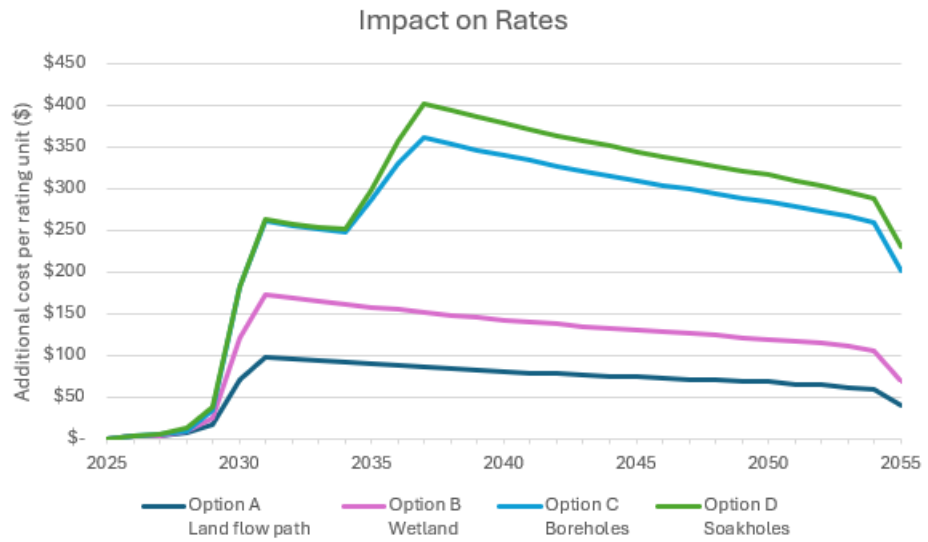
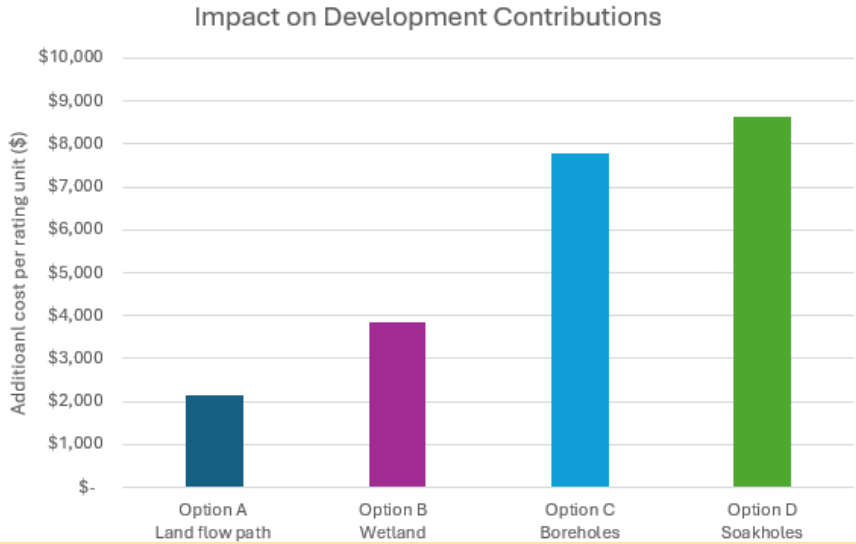
Indicative Rates/Development Contributions Impact

	Option A Rock outfall	Option B Wetland	Option C Bores	Option D Soakholes
NPV (Circa)	$48M	$85M	$188M	$209M
Rates Impact (P/A) up to	$98 / 12%	$170 / 21%	$360 / 44%	$400 / 49%
Development Contributions Increase	$2,100	$3,900	$7,800	$8,600





- Rates Impact are current estimates of the increase to the Sewerage levy on a per annum basis.
- Option A&B rates are expected to build to this level with maximum impact in 2031 with values reducing thereafter.
- Option C&D rates are expected to build to maximum impact in 2037 with values reducing thereafter.
- Rates percentage increase is based on average Sewerage Levy for a Queenstown connection of $823.03 in 2025.
- Development Contributions are based on the increase to the Wastewater contribution per residential property. This is currently $12,542 for Queenstown, Frankton Flats, Arthurs Point and $13,547 for Ladies Mile.

MCA Scoring Summary

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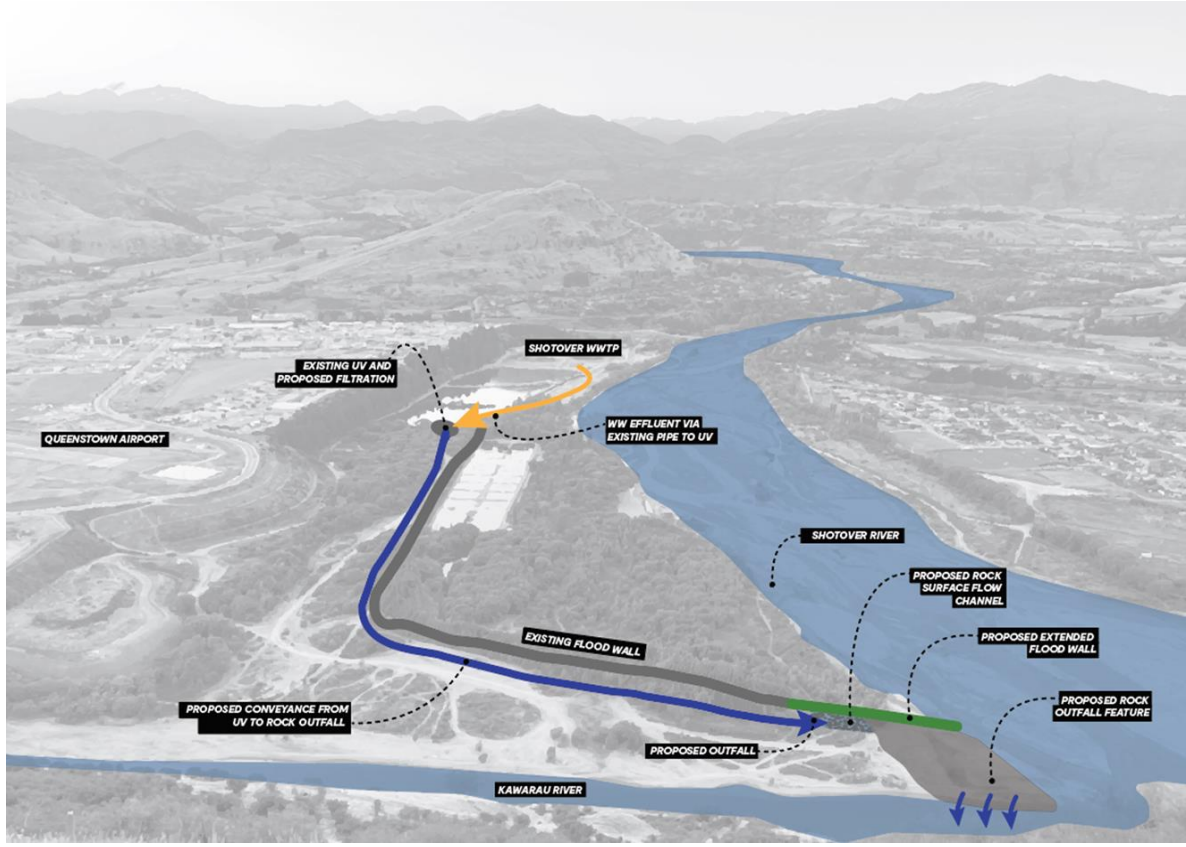
Criteria	Base Case Current short-term discharge to Shotover River	Option A Land flow path to river via Kawarau	Option B Wetland on Delta + Land Flow Path to Kawarau	Option C Boreholes at Frankton (+ Option B)	Option D Soakholes at Frankton (+ Option B)
Investment Objectives					
The health and well-being of waterways	0	2	2	3	3
Alignment with tikanga	No score	No score	No score	No score	No score
Ability to service future wastewater needs	0	2	2	2	2
Environmental and Social Impacts					
For us and our children after us	No score	No score	No score	No score	No score
Cultural impacts	No score	No score	No score	No score	No score
Impacts to the surrounding environment	0	2	2	2	2
Environmental impacts	0	2	2	1	1
Visual effects	0	-1	0	-1	-2
Amenity effects	0	0	1	1	1
Impacts to the surrounding environment					
Constructability and technical feasibility	0	0	0	-2	-3
Sustainability	0	-1	-2	-4	-4
Operational reliability and maintainability	0	1	0	-2	-3
Property difficulties and impacts	0	0	0	-2	-3
Achievability of Indicated outcomes	0	2	2	-3	-4
Consent, design, construction, and implementation timeframe	0	1	-1	-3	-3
Costs and affordability	0	-1	-2	-4	-5

Technically Preferred Option – Option A

Option A – Discharge to Kawarau

- Greater certainty for accommodating future flows.
- Lowest risk, simplest design and operation.
- Leverages existing QLDC Land and designation.
- Lowest capital, operating and WOL Costs.
- Expected to be consistent with latest legislation and achievable within timelines set down in Enforcement Order.
- Improved environmental outcomes from current and previous discharges.
- Ability of treatment upgrades to be allowed for.



Questions on the SWWTP Short Term Options Assessment?

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Stakeholder engagement/Consent Pathway/Next Steps

QUEENSTOWN LAKES DISTRICT COUNCIL

Consenting Strategy Outline

- A consenting strategy is under development which will be applicable to all the short-listed options – this will be presented in early 2026.
- This strategy will provide:
  - A summary of the legislative framework including the Local Government Act, upcoming Wastewater Standards, RMA (and its draft replacement), NPS-FM (and any replacement), Otago Policy Statements, Otago Regional Plan: Water;
  - Options for consenting pathway with pros and cons, including the impact on timeframes (e.g. standard consenting through ORC, direct referral, fast track etc);
  - Required and recommended consultation with reference to QLDC's Significance & Engagement Policy

Planning Considerations

- Key Planning Considerations include:
  - Kawarau Water Conservation Order
  - Wastewater Environmental Performance Standards
  - National Policy Statement for Freshwater Management (being updated)
  - RMA changes mean consents will have to be granted for 35 years.
  - ORC Policy Statements and Regional Plan

Refer to Section 5 of the Short List Options Report (Attachment H)

Iwi & Community Engagement

> Iwi Engagement Strategy being developed for consenting stage.

- Engagement with Aukaha and Te Ao Mārama Inc throughout the optioneering process.
- Current position is we don't have Iwi support for any of these options; however we understand and acknowledge their concerns.
- Future strategy will ensure Iwi continue to be involved at each step, continuing to build on the relationship, maintaining transparency, keep Rūnaka fully informed.
- Includes options for Rūnaka to visit Queenstown, briefing and visit site.
- Rūnaka have expressed an interest in briefing Councilors directly.

Community Engagement plan includes:

- Web updates to inform community of options, assessment and outcomes.
- Providing info to the public as we are in the position to do so.
- Community engagement prior to seeking Council decision in early 2026.

Upgrades Summary

- Stage 3 (underway)
  - MLE 2
  - Raw wastewater emergency storage (Pond 1)
- Additional Filtration
- Oxidation Ponds decommissioning
- Treated Wastewater emergency storage Pond (pond 3b)
- Inlet Works Upgrades
- New treated wastewater disposal solution

Pathway to Delivery

Council Workshop	4 December 25
Community Engagement	December 25 – January 26
Council Meeting to Confirm Option to Consent	February 26 (Target)
Business Case Approval of Preferred Option	May 26
Lodge Consent for Preferred Option	May 26 (Target)
Engineering Design Completed	Dec 2027 (Subject to Consent)
Construction Completion of Preferred Option	December 2030

Questions and Feedback?

QUEENSTOWN
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