Akaroa Treated Wastewater Options
Hearings Panel
MINUTES ATTACHMENTS

Date: Monday 12 October 2020
Time: 9am
Venue: The Gaiety Hall, Rue Jolie, Akaroa

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Agenda

- History of the project
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Akaroa wastewater treatment plant

- Takapūneke - upwards of 200 local pā inhabitants were massacred in 1830 by Te Rauparaha under cover of the British ship Elizabeth
- This was a key incident that led to the Treaty of Waitangi
- Banks Peninsula District Council bought the land in 1964 and built a sewage treatment plant with a short outfall to Akaroa Harbour
- Highly insensitive site for a wastewater treatment plant, both culturally and historically
- Council resolved in 2011 to relocate the treatment plant away from Takapūneke, treat to produce best quality wastewater to enable future beneficial reuse, discharge to the mid-harbour

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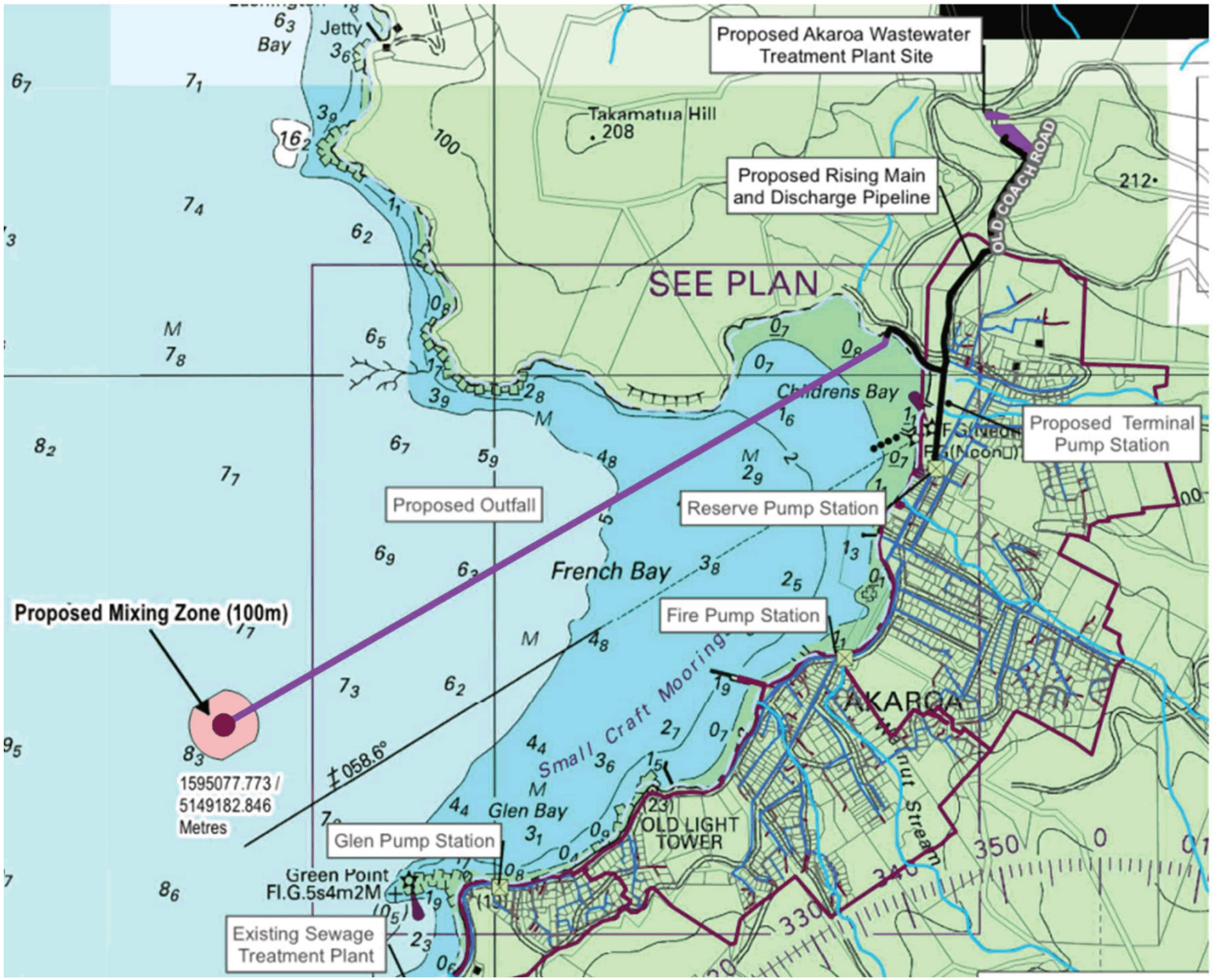

Akaroa wastewater scheme consent application 2014

- Consents granted for new treatment plant and network upgrades
- Consents declined for new outfall – culturally offensive to Ngāi Tahu parties and insufficient consideration of land based alternatives

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Attachment A Item 4

Appeal of decline of outfall consents

- Council lodged an appeal against the decline of outfall consents
- Ngāi Tahu parties joined the appeal
- We have worked closely with the Ngāi Tahu parties in considering alternatives to a harbour outfall
- Council withdrew its appeal in 2019 because it needed to finish its consideration of alternatives
- We have continued to work closely with the Ngāi Tahu parties

See section 10.1 of Beca options report for more detail

Long list options considered but discounted

- Ocean outfall beyond the heads of Akaroa Harbour – too expensive with technical and construction risks
- Tankering wastewater to Christchurch – high operating costs, negative impact on traffic to and from Akaroa, negative environmental effects
- Pumping wastewater to Christchurch – high capital and operating costs, long retention time would lead to septicity issues causing odour issues and corrosion of the Christchurch wastewater network
- Overland flow or a Rakahore chamber before discharging to the harbour – did not meet cultural needs and aspirations of Ngāi Tahu
- Potable (drinking water) reuse – not publicly or culturally acceptable, not used anywhere in NZ, high operating costs

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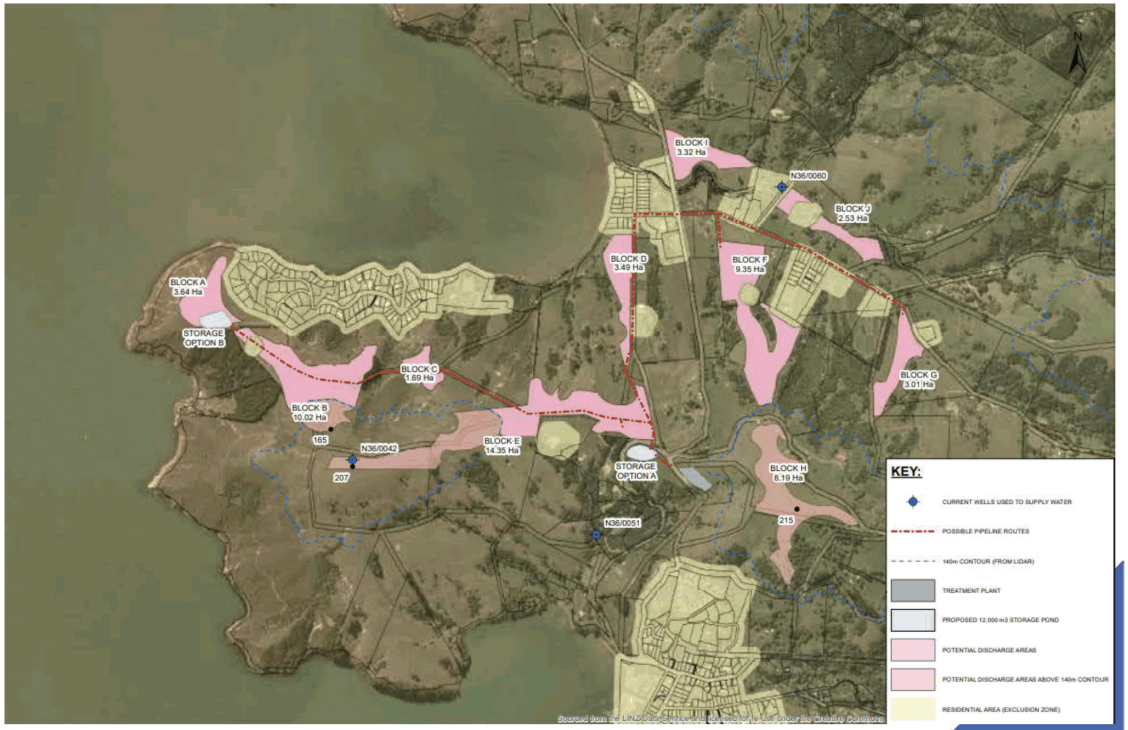
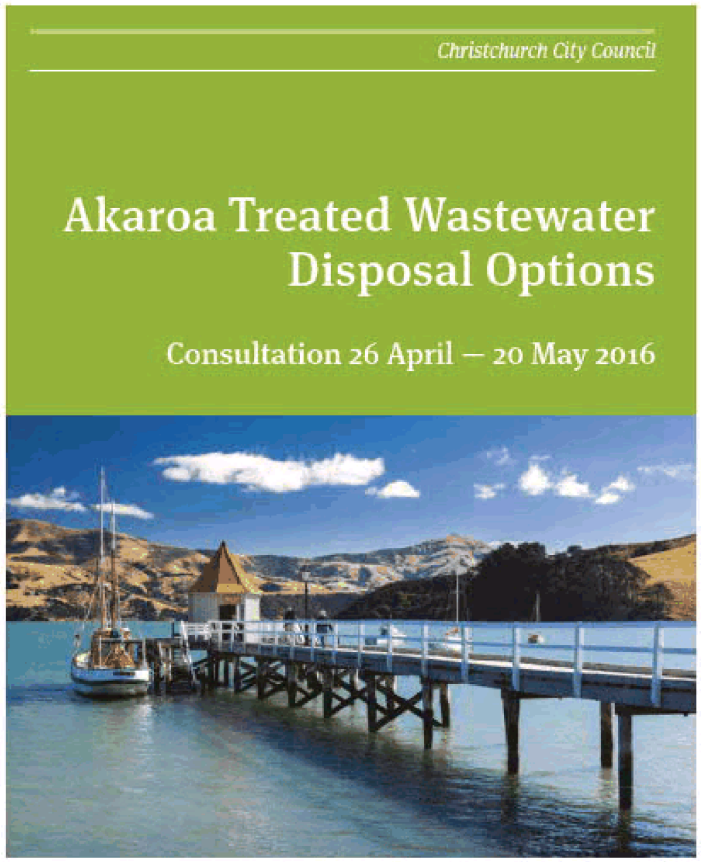
See section 4.5 of Beca options report for more detail

Criteria for irrigation to land in 2015

- Within 2 km of new wastewater treatment plant
- Less than 15 degree slope
- At least 25 metres from a residential area or waterway
- Property size of at least 1 hectare
- Not known to have land stability issues



See sections 3.3 and 4 of Beca options report for more detail



2016 Consultation Options

- Year round irrigation to trees in Takamātua
- Year round irrigation to pasture in Takamātua
- Summer only irrigation with discharge via wetland or infiltration gallery to harbour via coastal gallery
- Subsurface flow wetland and discharge to harbour via coastal gallery
- Infiltration gallery and discharge to harbour via coastal gallery
- Harbour outfall

See sections 3.4 and 3.5 of Beca options report for more detail

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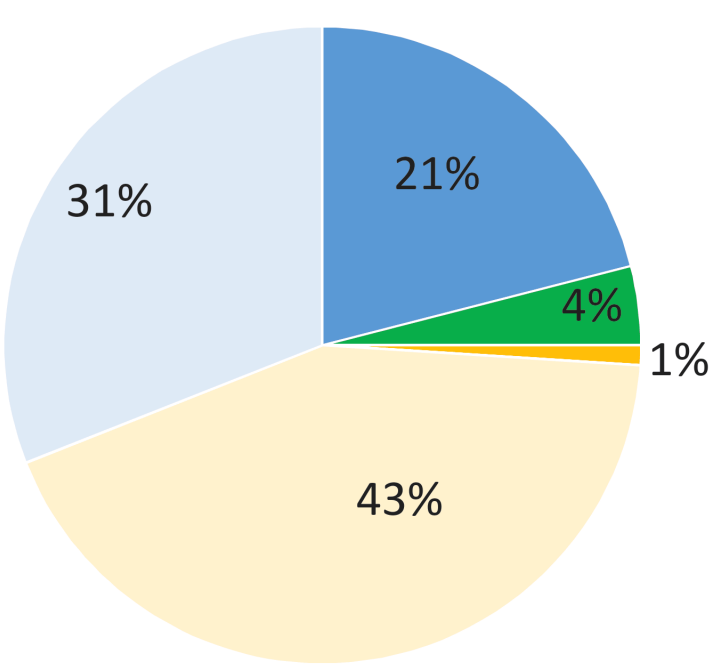
Summary of 2016 consultation responses



- 1. Irrigation to trees
- 2. Irrigation to pasture
- 3. Summer only irrigation
- 4. Wetland
- 5. Infiltration basin
- 6. Harbour outfall
- 7. No preference

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See section 10.4 of Beca options report for more detail

But…

- Geotechnical investigation of potential irrigation area found risk of downslope instability
- Risk of insufficient land for irrigation
- Decided not to proceed with hearing submissions
- Expanded area being considered for irrigation to 10 km

Akaroa Treated Wastewater Reuse Options Working Party

- Established in February 2017 by Banks Peninsula Community Board
- Community members from Akaroa, Takamātua and Robinsons Bay
- Landowner from Pompeys Pillar
- Ōnuku Rūnanga and Te Rūnanga o Koukourarata appointees
- Councillor and community board members

See https://ccc.govt.nz/services/water-and-drainage/wastewater/wastewater-projects/akaroa-wastewater-scheme for minutes of working party meetings and its joint statement

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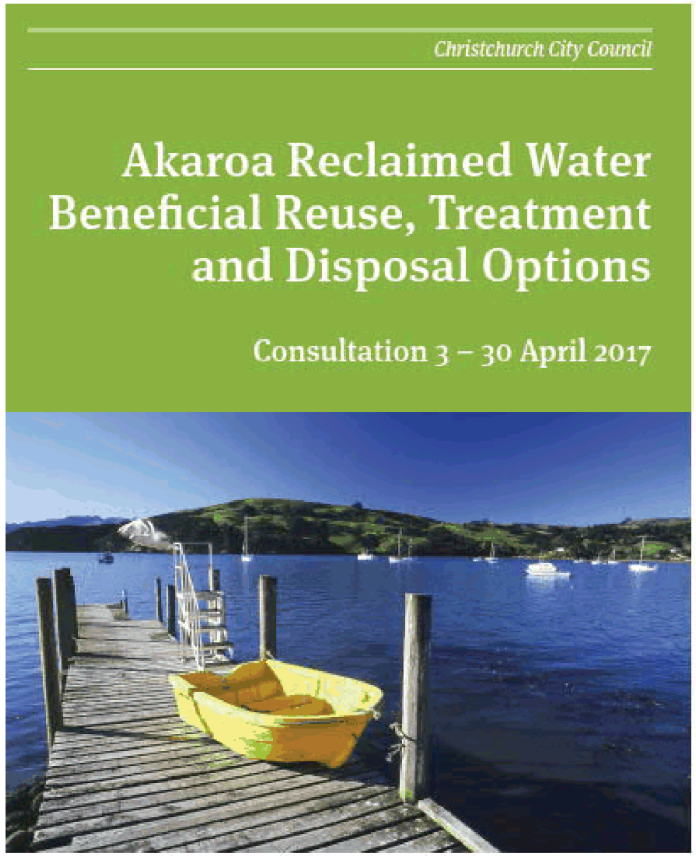

haveyoursay
www.ccc.govt.nz/haveyoursay

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2017 Consultation Options

- Irrigation of trees or pasture in Robinsons Bay
- Irrigation of trees or pasture at Pompeys Pillar
- Irrigation of trees or pasture in Takamātua Valley, in combination with another area
- Non-potable re-use in Akaroa, in combination with another option
- Harbour outfall

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But…

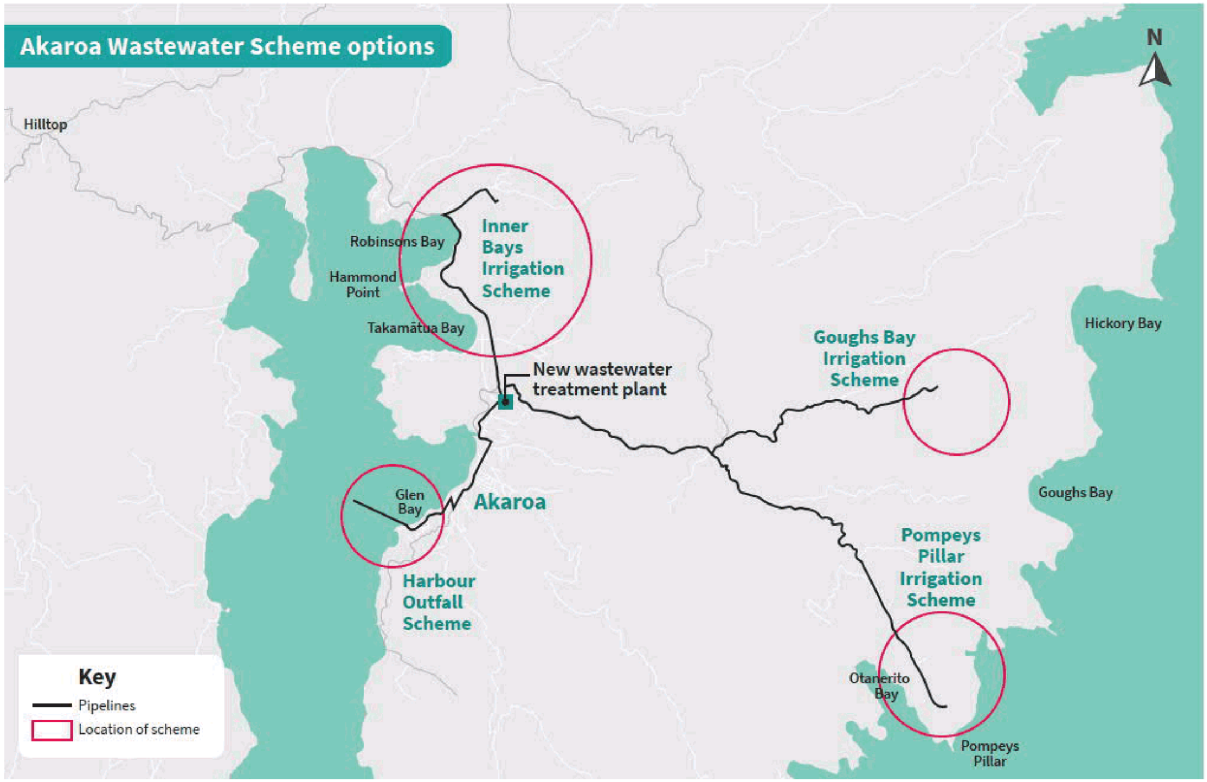
- Analysis of water balance found faulty flow meter at wastewater treatment plant
- Flows double that previously thought, basis for design and costs was incorrect
- Decided not to proceed with hearing submissions
- Expanded area being considered for irrigation to 13 km

Explored and discounted other options

- Deep bore injection – drilled two test bores but rock much less permeable than required
- Managed aquifer recharge – would pose too great a risk to our drinking water supply
- Irrigating a larger area of steeper land at a low rate (e.g. Misty Peaks) – instability risks even with low irrigation rates
- Irrigating Hinewai – survey and geotechnical site visit found the land was too steep, risks of instability

See sections 3.8 and 3.9 of Beca options report for more detail

The four short listed options



- Working with the Akaroa Treated Wastewater Reuse Options Working Party, the Ngāi Tahu parties and technical experts, we have developed three land-based options for public consultation
- All land-based options involve irrigation to new areas of native trees
- The fourth option is a new harbour outfall

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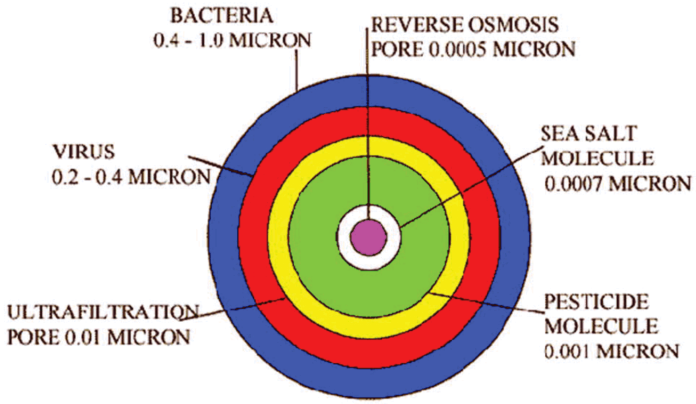
Wastewater treatment – all options

- Wastewater will be treated to a level among the highest anywhere in NZ using ultrafiltration
- 100% of wastewater will be treated with no bypass
- The wastewater treatment plant will remove:
  - Organic material
  - Suspended solids (to be trucked to Christchurch for conversion to biosolids for reuse)
  - Protozoa, bacteria and viruses
  - Nitrogen to a level that is safe for the environment



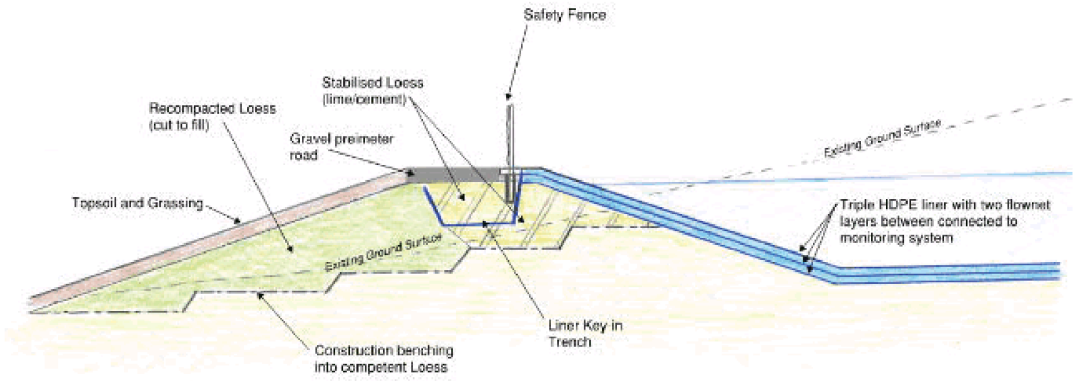
PORE SIZE COMPARED WITH MOLECULES, BACTERIA AND VIRUS
APROXIMATE VALUES AND FIGURE IS NOT TO SCALE

See sections 2.3 and 9.2 of Beca options report for more detail

Treated wastewater storage ponds – all land-based options

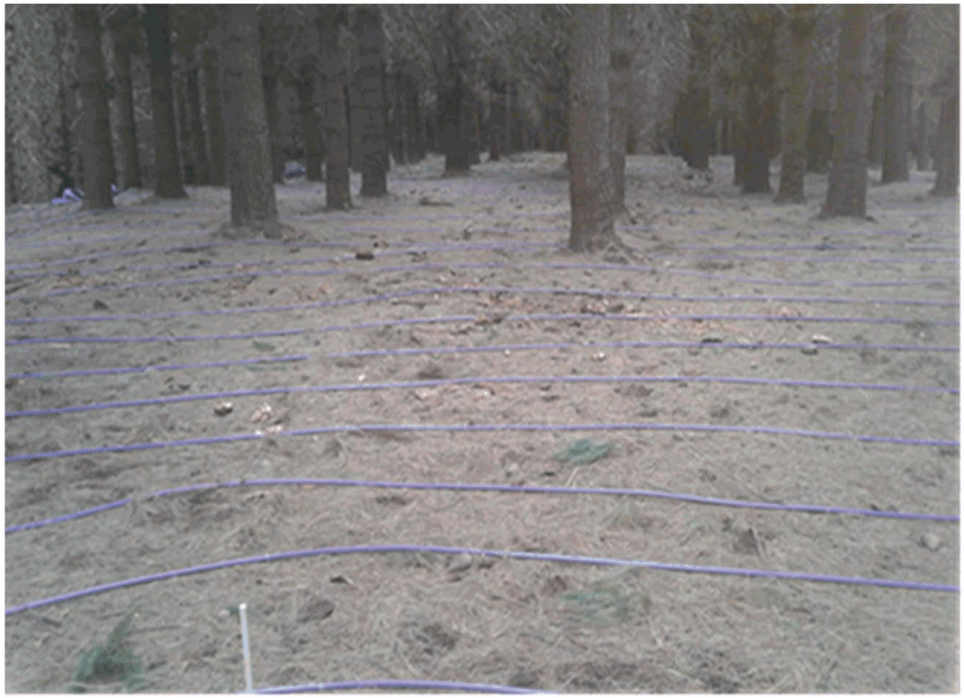
All land-based options require storage ponds to hold treated wastewater when it is too wet to irrigate:

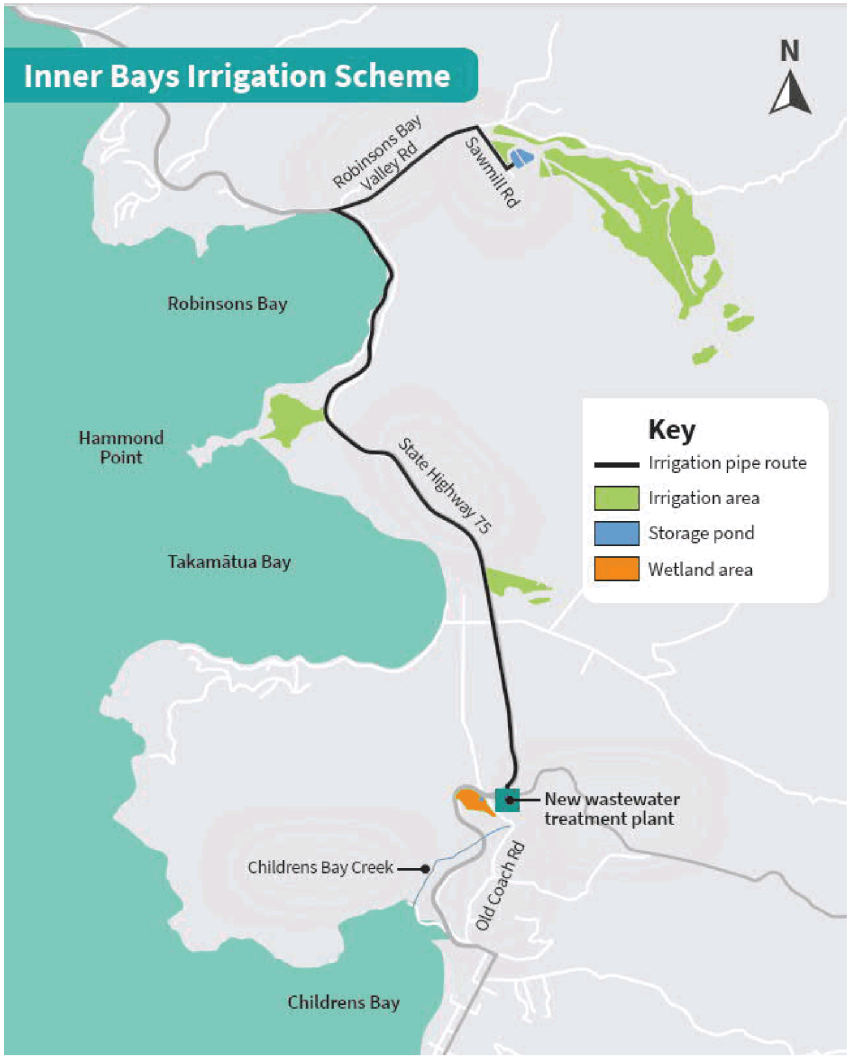
- Storage volume ranges from 19,000 to 36,000 cubic metres depending on the option
- Ponds would need to be designed to meet dam safety standards, including peer review
- HDPE liners with leakage monitoring
- Embankments would use compacted loess with cement or lime stabilised core
- Grassed bank for leakage observation (no other planting)
- Leakage monitoring 24/7 via the Christchurch control room
- If leakage is detected, the pond would be drained and repaired
- Excess water when the ponds are full would be discharged to Childrens Bay



See sections 4.3, 4.4, 5.4, 6.4, 7.4, 9.3 and 9.4 of Beca options report for more detail

Example of drip irrigation – Wainui wastewater scheme





Inner Bays irrigation scheme option

Three areas of new native trees would be irrigated (40 ha):

- A farm on Sawmill Road in the Robinsons Bay valley and a strip of land neighbouring the farm.
- The flat land on the north side of Takamātua Valley, on the east side of State Highway 75.
- Land on Hammond Point, on the west side of State Highway 75 between Takamātua and Robinsons Bay.

There are other areas of land that meet the criteria, but they are less favoured

A new wetland would be build opposite the treatment plant for additional natural treatment

The native tree areas and wetland would increase biodiversity and be open to the public

All landowners willing to negotiate with us

See section 5 of Beca options report for more detail

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Goughs Bay irrigation scheme option

Wastewater would be pumped 11 kilometres over 677 metre high hill to a farm at Goughs Bay

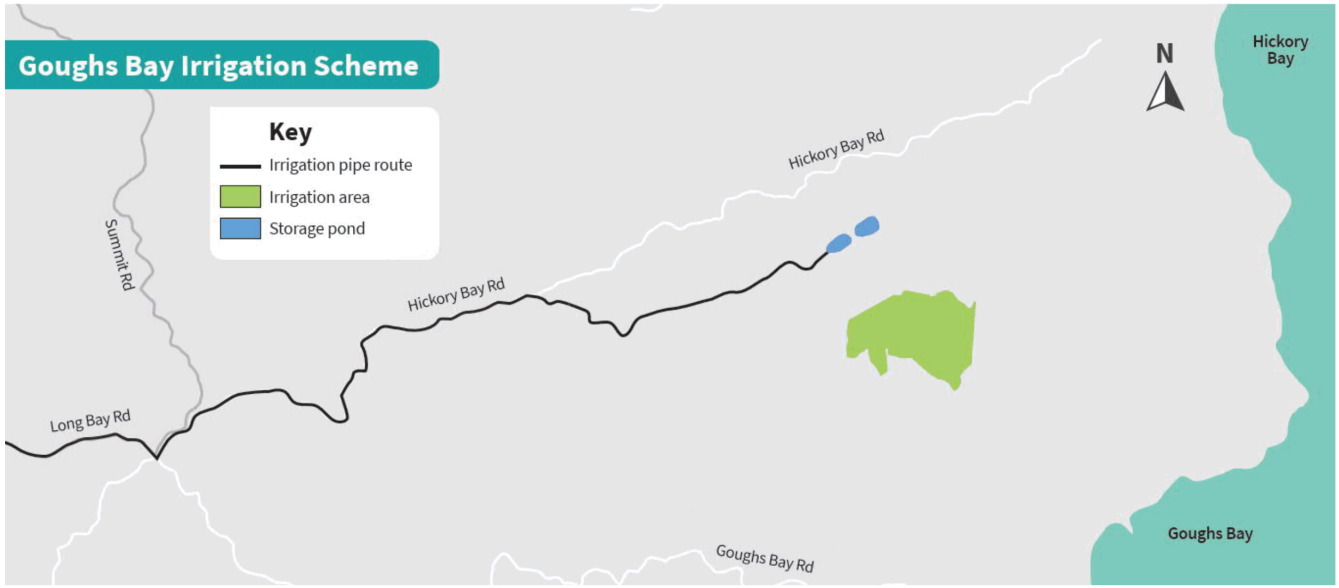
Irrigation to 30 hectares of native trees, storage ponds 30,000 m³ total volume

The native tree area would increase biodiversity

No discharge to harbour except in emergency

Unwilling landowner

See section 6 of Beca options report for more detail



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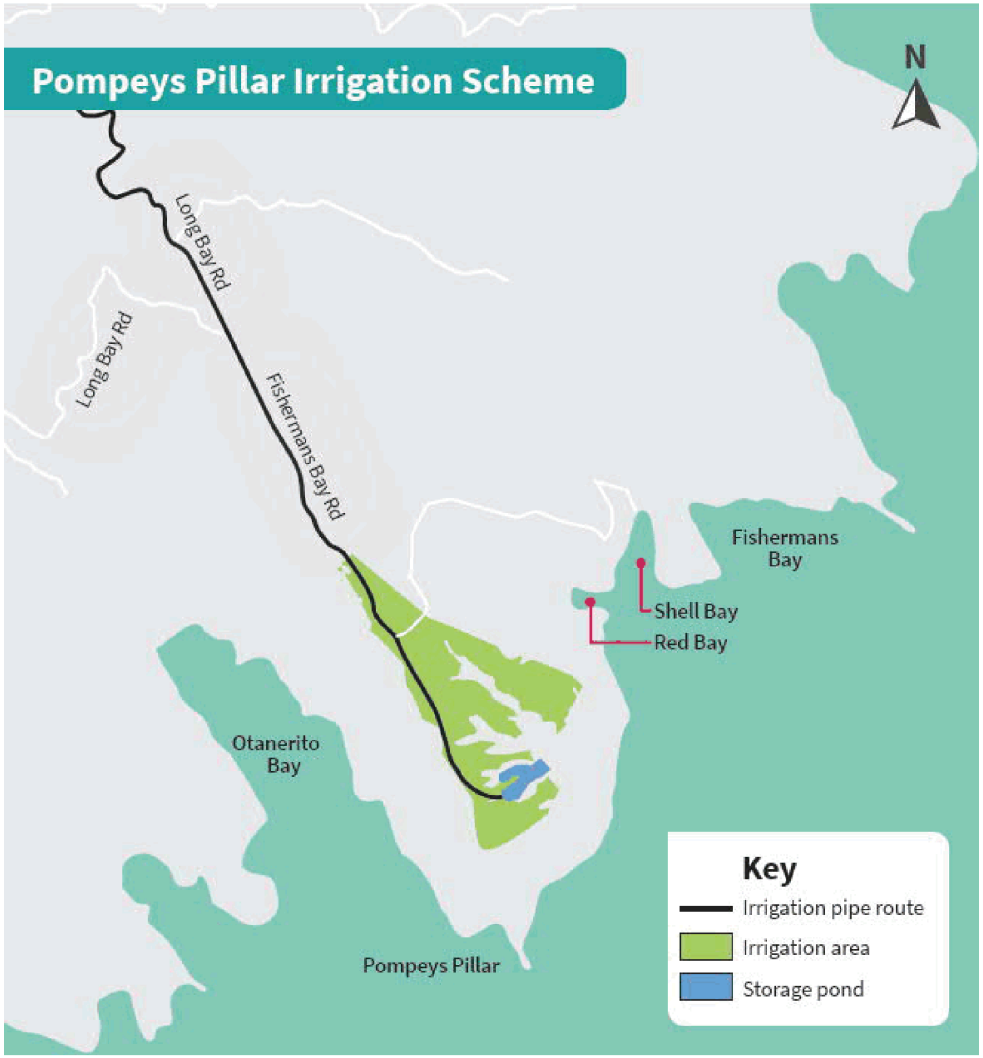

Pompeys Pillar irrigation scheme option

Wastewater would be pumped 13 kilometres over 631 metre high hill to a farm at Pompeys Pillar

Irrigation to 48 hectares of native trees, storage pond 36,000 m³

The native tree area would increase biodiversity

No discharge to harbour except in emergency

Unwilling landowner

See section 7 of Beca options report for more detail

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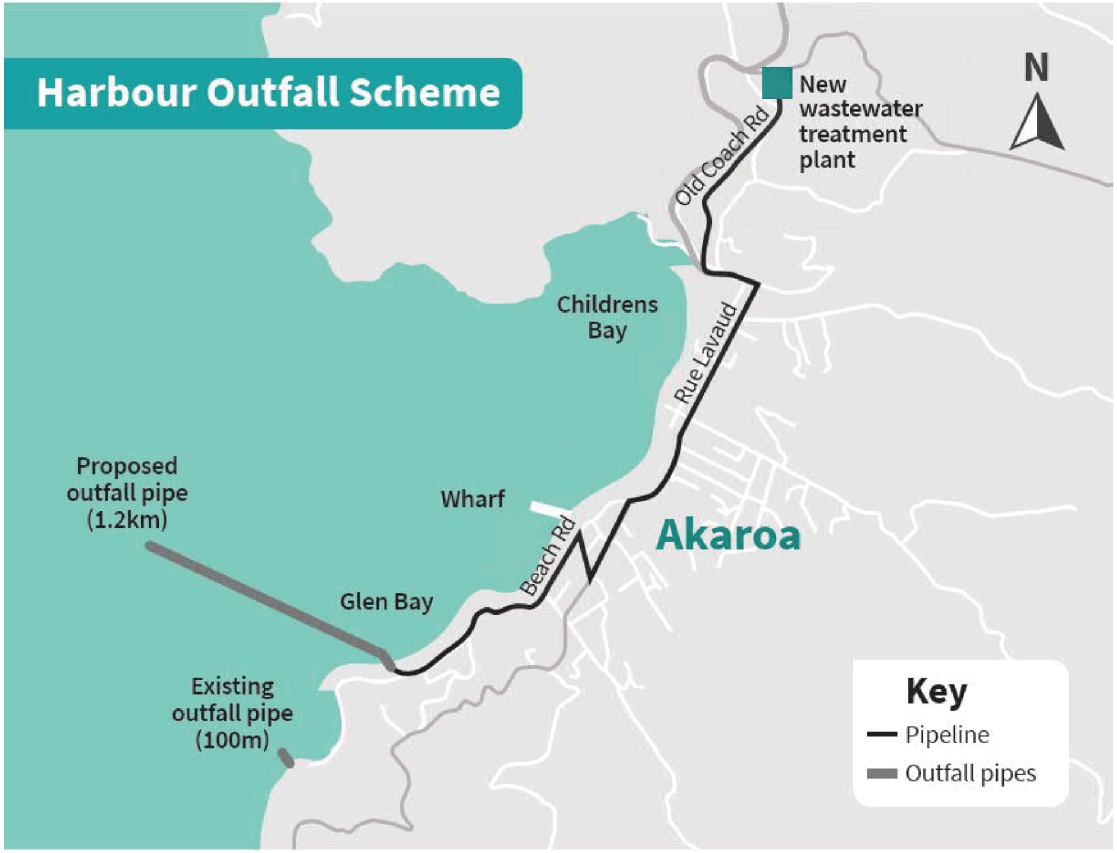

Harbour outfall scheme option

Pipeline through Akaroa and out into the middle of the harbour from the south end of town

Outfall 1.2 kilometre long, 9.5 metres deep

Wastewater diluted at least 78 times before reaching surface

Very low public health risk for recreation and shellfish gathering

High adverse effects on Ngāi Tahu parties' cultural value in gathering fish and shellfish

See sections 1.1 and 8 of Beca options report for more detail

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Comparisons between the four options

	Comparisons			
	Inner Bays Irrigation Scheme	**Goughs Bay Irrigation Scheme**	**Pompeys Pillar Irrigation Scheme**	**Harbour Outfall Scheme**
Capital cost range ($ millions)	$54m to $63m	$61m to $71m	$66m to $76m	$45m to $52m
Operating cost (per year)	$510,000	$580,000	$580,000	$470,000
Carbon impact (over 35 years)	8,900 tonnes stored	4,500 tonnes stored	8,300 tonnes stored	1,300 tonnes emitted
Distance from treatment plant (approximate kilometres)	5.6km	11km	13km	4km

See sections 11 and 12 of Beca options report for more detail

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Non-potable reuse

Use of water for non-drinking purposes (purple pipe scheme) e.g. garden watering, toilet flushing

Canterbury District Health Board and Ministry of Health do not support reticulation to private properties due to lack of regulations

We could irrigate public parks and flush public toilets. We asked submitters if they supported this.

We asked submitters if they would you Council to work on lobbying national government to establish standards and protocols to let us use this water

See section 9.5 of Beca options report for more detail

Legal context

- Tikanga Māori and “English law” are both foundations of the law of New Zealand
- Tikanga Māori cannot be discounted on the basis that it is not “scientific”
- Repugnance of harbour outfall to Māori must be taken into account regardless of biophysical effects
- Māori interests must be taken into account in LGA decision making.
- Discharge into the harbour is consentable under the RMA only if the alternatives have been adequately considered and reasonably discounted, having regard to the repugnance, and adverse effects, in Tikanga Māori, and only if it is not contrary to the objectives and polices of the RMA documents that require adequate consideration of the alternatives.

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Next steps

The hearings panel makes a recommendation to Council about which option to pursue

Council decision to confirm that option or to ask the hearings panel to reconsider

Once the Council has chosen an option, we will start the preliminary design and consenting process, including an assessment of environmental effects

There will be further opportunities for the Rūnanga and the community to have input into whichever option is chosen during the design and consenting phases

Questions?

Legal Services Unit – Corporate Services

Memo

Date: 12 October 2020
From: Brent Pizzey, Senior Legal Counsel and Judith Cheyne, Senior Legal Counsel
To: Akaroa Treated Wastewater Options Hearings Panel

Legal Context of the Ngāi Tahu parties' submission on the Discharge to Harbour Option

1. We are providing this short summary as the Panel are no doubt familiar with the requirements for decision making under the LGA, but perhaps less so under the RMA, and they may not be as familiar with obligations relating to Māori.

Introduction

2. The Ngāi Tahu parties' submission re discharge to harbour:

> 14. The discharge of human sewage (whether treated or untreated) directly into water is abhorrent to the values of Ngāi Tahu. The harbour has its own mauri (life force). When waste water is put directly into the harbour the mauri of the harbour is harmed and destroyed. Discharge of sewage into the harbour is inconsistent with Ngāi Tahu tikanga and incompatible with use of the harbour for food gathering.

3. Another parties' submission: that the Panel take a "scientific and evidence based approach".

4. The Ngāi Tahu position is "evidence". It does not need to be based on "science". We here briefly explain why. These comments are founded in a Court of Appeal decision from April this year: *Trans-Tasman Resources Ltd v Taranaki-Whanganui Conservation Board* [2020] NZCA 86 (CA, 3 April 2020)[1].

5. The Court of Appeal noted that the Second Article of the Treaty guaranteed to the rangitira and hapu of New Zealand "rangatiratanga" (in te reo Māori) and "full exclusive and undisturbed possession" (in English) in relation to their lands, estates, forests, fisheries and "taonga katoa". In the Court's words, *…the exercise of these rights and interests can fairly be described as the most long-standing lawfully established existing class of activities in New Zealand. Those rights were not affected by the acquisition of sovereignty by the British Crown in 1840….* Those rights are interests are existing law - tikanga - in New Zealand.

[1] Off shore mining of iron sand. Point of law appeal against High Court decision on appeal from the decision of the Panel. High Court rejected an appeal submission that the Panel had wrongly limited its assessment of effects on Māori interests to "physical matters".

6. The Court said that the existence, nature and scope of the customary rights and interests are not less deserving of recognition, merely because they do not conform with English concepts. It is not appropriate to attempt to shoe-horn customary rights and interests into an English legal framework. [169]

7. The Court said that it was therefore necessary for the Panel in that case to squarely engage with the full range of customary rights, interests and activities identified by Māori as affected by the proposal, and to consider the effect of the proposal on those existing interests. In particular, it was necessary for the Panel to address the impact of the proposal on the kaitiakitanga relationship between the relevant iwi and the marine environment. Kaitiakitanga is an integral component of the customary rights and interests of Māori in relation to the taonga referred to in the Treaty.[170]

> [174] *In this case the [Panel] needed to engage meaningfully with the impact of the TTR proposal on the whanaungatanga and kaitiakitanga relationships between affected iwi and the natural environment, with the sea and other significant features of the marine environment seen not just as physical resources but as entities in their own right — as ancestors, gods, whanau — that iwi have an obligation to care for and protect.*

LGA Context

8. The Ngāi Tahu parties' submission is:

> 33. In considering the four options through the lens of these requirements, it is clear that while all have been adjudged technically feasible, and therefore worthy of consideration under the LGA, one – the harbour outfall – is incapable of promoting the cultural well-being of the affected community. Rather, it would positively diminish that well-being for Ngāi Tahu. There are also good arguments that it would not promote other well-beings.

9. The requirements that the above submission refers to are various sections of the Local Government Act 2002 (LGA02), and these include some of the principles in section 14. (Sections 10, 14 and 77 are set out in the appendix to this memo.) The submission does not reference section 14(d), which along with other LGA02 provisions, contain express obligations requiring local authorities to establish ways for Māori to contribute to and participate in Council decision-making. While participation of Māori is not an issue in relation to this decision, these provisions in the LGA02 provide background context to the important role of Māori in decision making in this Act.

10. The immediately relevant provision in the LGA02 relating to Māori, for this decision, is section 77(1)(c) of the LGA02. That section states that if any options for a Council decision involve a significant[1] decision in relation to land or a body of water, then Council must '*take into account the relationship of Māori and their culture and traditions with their ancestral land, water, sites, waahi tapu, valued flora and fauna, and other taonga*'.

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[1] Significance and significant are defined in the LGA02 as:
significance, in relation to any issue, proposal, decision, or other matter that concerns or is before a local authority, means the degree of importance of the issue, proposal, decision, or matter, as assessed by the local authority, in terms of its likely impact on, and likely consequences for,—
(a) the current and future social, economic, environmental, or cultural well-being of the district or region: (b) any persons who are likely to be particularly affected by, or interested in, the issue, proposal, decision, or matter: (c) the capacity of the local authority to perform its role, and the financial and other costs of doing so
***significant**, in relation to any issue, proposal, decision, or other matter, means that the issue, proposal, decision, or other matter has a high degree of significance*

11. There is no case law specifically discussing section 77(1)(c) in this type of issue. However, the phrase "take into account" is used in other legislation and has previously been considered. In *Te Rūnanga o Raukawa Inc v Treaty of Waitangi Fisheries Commission*, unreported, High Court Wellington, 7/8/97, Gendall J decisions about the distribution of the leased fishing quota were judicially reviewed. At pages 28-29 of the decision the phrase 'take into account' is compared with 'have regard to':

> *"…The statutory criteria require the Commission to "have regard to" Māori custom, economic considerations and social considerations. Those matters may point in different directions. Provided the Commission genuinely has regard to those complex considerations which are shown to be often the matter of dispute amongst competing Iwi, the eventual decision does not need to accord precisely with the view or claim of one Iwi so as to mirror its contention of one or other of those considerations. As I have said, to "have regard to" does not automatically mean that considerations must be reflected in the final outcome This is particularly the case where the considerations can compete as against themselves and, in this complex area, obviously compete in a comparative way as against the individual component of the group to which the lease quota are distributed. I adopt the remarks of Somers J in R v D [1976] 1 NZLR 436 at page 437.*
>
> > *" … the words 'shall have regard to' [are not] synonymous with 'shall take into account' If the appropriate matters had to be taken into account they must necessarily in my view affect the discretion. … the Court has a complete discretion but that the seven matters, or as many as are appropriate, are to be considered. In any particular case, all or any of the appropriate matters may be rejected or given such weight as the case suggests is suitable."*
>
> *What the Commission is bound to "take into account" is contained in s 8(aa) [of the Maori Fisheries Act 1989], namely to consult with representatives of tribes and to take into account the views expressed in such consultations. That is a different requirement to "having regard to". There is abundant evidence of an extensive consultation process….. The evidence clearly establishes that the Commission consulted and took into account the views expressed in such consultation. It has, so far, fulfilled its obligations under s8(aa) …"*

12. The matters to be taken into account in section 77(1)(c) are clearly a relevant consideration for the decision-maker but the weight to be given to those matters is a judgement for the decision-maker.

13. The section 14 statements of principle, in accordance with which local authorities must act, are not quantifiable requirements. They indicate the spirit and intent of the legislation, and can be useful in interpreting and applying other parts of the Act. No principle carries any greater weight than any other principle.

14. Section 14(2) makes it clear that there can be conflicts between the principles, but that Council decision-makers need to be transparent where there are conflicts. The Council's own strategic framework may assist in reaching a decision where there are conflicts; the three principles in that framework that appear most relevant to this matter are:

3

- Taking an inter-generational approach to sustainable development, prioritising the social, economic and cultural wellbeing of people and communities and the quality of the environment, now and into the future;
- Building on the relationship with Te Rūnanga o Ngāi Tahu and the Te Hononga–Council Papatipu Rūnanga partnership, reflecting mutual understanding and respect
- Ensuring the diversity and interests of our communities across the city and the district are reflected in decision-making

15. In respect of matters raised by Ngāi Tahu with any of the options, there is an enhanced obligation through section 77(1)(c) to show that Ngāi Tahu relationships, culture and traditions have been taken into account by the decision-maker. The weight to be put on these matters is for the decision-makers to consider alongside all other views expressed and relevant information provided.

RMA context – within which an application for discharge to the harbour would again be assessed

16. RMA Section 6 matters of national importance

*In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall **recognise and provide for** the following matters of national importance:*

…

(e) The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga.

…

17. The requirement that decision-makers recognise and provide for matters of national importance implies that these values have a significant priority and cannot be merely an equal part of a general balancing exercise: *Bleakley v Environmental Risk Management Authority* [2001] 3 NZLR 213 (HC).

18. In *Ngāti Kahungunu Iwi Inc v Hawkes Bay RC* [2015] NZEnvC 50 the Court noted that this encompasses the physical and metaphysical elements of the environment. These elements are viewed as inseparable and give rise to the status of the environment as taonga for Māori. In that case the Court acknowledged that culture and traditions are to the fore in the Māori relationship with the environment, especially in relation to water.

RMA Section 7: Other matters

*In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, **shall have particular regard to—***

(a) Kaitiakitanga:

[(aa) The ethic of stewardship:]

(b) The efficient use and development of natural and physical resources:

[(ba) the efficiency of the end use of energy:]

(c) The maintenance and enhancement of amenity values:

(d) Intrinsic values of ecosystems:

(e) Repealed.

(f) Maintenance and enhancement of the quality of the environment:

(g) Any finite characteristics of natural and physical resources:

(h) The protection of the habitat of trout and salmon:

(i) the effects of climate change:]

(j) the benefits to be derived from the use and development of renewable energy.]

RMA Section 8: Treaty of Waitangi

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

19. Those sections – and the protection of tikanga Māori (= Māori law) by the Treaty – are why there is s**ection 105(1)** of the RMA:

105 Matters relevant to certain applications

(1) If an application is for a discharge permit or coastal permit to do something that would contravene section 15 or section 15B, the consent authority must, in addition to the matters in section 104(1), have regard to—

(a) the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and

(b) the applicant's reasons for the proposed choice; and

(c) any possible alternative methods of discharge, including discharge into any other receiving environment.

(2)…

20. In considering the sensitivity of the receiving environment to adverse effects, consideration is not limited to the physical environment. It includes people and communities: *Schmuck v Northland RC* [2019] NZEnvC125. It includes abhorrence to tikanga Māori.

21. That is the context within which the Commissioners who declined resource consent for the harbour outfall in 2015 stated that the Council had not adequately considered alternatives.

The planning documents referred to in the 2015 decision to decline the consent application to discharge wastewater to Akaroa Harbour

The New Zealand Coastal Policy Statement:

Policy 23(2): do not allow:

a) discharge of human sewage directly to water in the coastal environment without treatment; and

b) the discharge of treated human sewage to water in the coastal environment, unless:

i) there has been adequate consideration of alternative methods, sites and route for undertaking the discharge; and

ii) informed by an understanding of tangata whenua values and the effects on them.

257. This is a clear direction that discharge of human waste into the CMA is appropriate only where there has been adequate consideration of alternatives, and by implication there are reasons for those alternatives being rejected. As discussed above under the heading of Consideration of Alternatives, we are not satisfied that the alternative of land disposal has been adequately assessed, so we consider the proposal is contrary to this policy.

Canterbury Regional Coastal Policy Statement 2013

Policy 8.3.9:

'*To ensure that human sewage is not discharged directly into the coastal marine area without treatment and where:*

(1) alternative methods, sites and route for undertaking the discharges have been considered; and

(2) There has been consultation with Ngāi Tahu as tāngata whenua and particular regard had for their value and the effect of discharges on those values;

The human sewage is treated in a manner appropriate to the receiving environment.

266. In our assessment the outfall proposal is in direct conflict with this objective and parts of these policies. The coastal water concerned would not be protected from a significant adverse effect. Again, there is a clear directive to properly investigate alternatives to disposing of effluent into coastal water.

Regional Coastal Environment Plan

Objective 7.1 Enable present and future generations to gain cultural, social, recreational, economic, health and other benefits from the quality of the water in the Coastal Marine Area, while:

'(a) Maintaining the overall existing high natural water quality of coastal waters;

(b) Safeguarding the life-supporting capacity of the water, including its associated: aquatic ecosystems, significant habitats of indigenous fauna and areas of significant

indigenous vegetation;

(c) Safeguarding, and where appropriate, enhancing its value for providing mahinga kai for Tangata Whenua;

(d) Protecting wāhi tapu and wāhi taonga of value to Tangata Whenua;

(e) preserving natural character and protecting outstanding natural features and landscapes, where water quality is an aspect of their value, from reductions in water quality;

(f) maintaining, and where appropriate enhancing, amenity values, and

(g) Recognising the intrinsic values of ecosystems and any finite characteristics of the coastal environment.'

270. The outfall proposal would be in direct conflict with (c) and (d) above.

2015 Commissioners' Conclusion

288. There is a strong policy theme running through all these statutory documents that disposal of even highly treated human effluent into the Coastal Marine Area is no longer to be regarded as a good option. Rather it is to be regarded as an option that may be necessary in some circumstances after other options have been thoroughly investigated. This theme is firmly based on the imperatives in section 6(e), section 7(a), section 7(aa) and section 8 of the Act, which give specific statutory recognition of Māori cultural concerns.

292. In our assessment the fourth component of the application, the Outfall to Akaroa Harbour would not meet the purpose of the Act. As discussed above, the stumbling block for this component is the inadequate consideration of alternatives, which brings it into conflict with several Part 2 of the Act matters, section 105(1)(c) of the Act, and numerous objectives and policies in relevant statutory policy statements and plans.

Brent Pizzey
Senior Legal Counsel
Legal Services Unit

Extension 5550

Judith Cheyne
Senior Legal Counsel
Legal Services Unit

Extension 8649

Appendix- Sections 10, 14 and 77 of the Local Government Act 2002

10 Purpose of local government

(1) The purpose of local government is—

(a) to enable democratic local decision-making and action by, and on behalf of, communities; and

(b) to promote the social, economic, environmental, and cultural well-being of communities in the present and for the future.

14 Principles relating to local authorities

(1) In performing its role, a local authority must act in accordance with the following principles:

(a) a local authority should—

(i) conduct its business in an open, transparent, and democratically accountable manner; and

(ii) give effect to its identified priorities and desired outcomes in an efficient and effective manner:

(b) a local authority should make itself aware of, and should have regard to, the views of all of its communities; and

(c) when making a decision, a local authority should take account of—

(i) the diversity of the community, and the community's interests, within its district or region; and

(ii) the interests of future as well as current communities; and

(iii) the likely impact of any decision on each aspect of well-being referred to in section 10:

(d) a local authority should provide opportunities for Māori to contribute to its decision-making processes:

(e) …

(f) …

(fa) …[These subsections are not relevant to this matter]

(g) a local authority should ensure prudent stewardship and the efficient and effective use of its resources in the interests of its district or region, including by planning effectively for the future management of its assets; and

(h) in taking a sustainable development approach, a local authority should take into account—

(i) the social, economic, and cultural well-being of people and communities; and

(ii) the need to maintain and enhance the quality of the environment; and

(iii) the reasonably foreseeable needs of future generations.

(2) If any of these principles, or any aspects of well-being referred to in section 10*, are in conflict in any particular case, the local authority should resolve the conflict in accordance with the principle in subsection (1)(a)(i).*

77 Requirements in relation to decisions

(1) A local authority must, in the course of the decision-making process,—

(a) seek to identify all reasonably practicable options for the achievement of the objective of a decision; and

(b) assess the options in terms of their advantages and disadvantages; and

(c) if any of the options identified under paragraph (a) involves a significant decision in relation to land or a body of water, take into account the relationship of Māori and their culture and traditions with their ancestral land, water, sites, waahi tapu, valued flora and fauna, and other taonga.

To the Akaroa Wastewater Hearings Panel

Due to a misunderstanding about the process of being able to request the opportunity to speak which possibly happened as a result of the premature closing of the submissions, I would like to take this opportunity to share some further thoughts with you. These support and endorse my submission 34093.

I emailed my submission rather than submitting through the normal channels when receiving information stating the Have Your Say forum for this issue had closed. I then thought there was going to be some contact with everyone to confirm whether they would like to request to speak at the hearings. When this didn't happen I wanted to take this opportunity to make a further statement.

I appreciate the dilemma the Christchurch City Council has in finding an acceptable solution to the wastewater disposal issue facing Akaroa and its residents. I also appreciate that Ngai Tahu reject the harbour outfall option based on their cultural values. What I feel strongly about is that the Robinsons Bay residents also have cultural values around wastewater being disposed of in the way it is planned for in the Inner Harbour option. These are founded on the effects it potentially has on the environment with the risks posed by pests including mosquitos and midges, Canadian geese, offensive odours which can't be completely vilified particularly when the water levels are low during the summer and the consequences of any collapse of or leakage from the ponds and the impact this may have on the local waterways and land use in any affected areas.

The second point I would like to make related to this is the impact this decision is having on the culture and wellbeing of the residents of Robinsons Bay. To read the submissions and hear the concerns of the residents and the effect this is having on their lives is heart rendering. This was also evidenced by those who I heard speak at the hearing on Tuesday.

Christchurch City Council has expressed its commitment to the wellbeing of its residents and ratepayers through its Social Wellbeing Policy which states that it aims to achieve such outcomes as:

- People participate in community life and have [a] sense of belonging and identity.
- Living standards are sufficient to ensure everyone can meet their immediate needs, participate in society, develop their potential and live lives they find fulfilling.
- The Treaty of Waitangi is honoured. Cultural diversity is respected.
- People and communities participate in decision making and political processes.

It is important that these outcomes are evidenced in our community and not published as idealistic concepts only. People need to feel that these are transparent, honest and genuine in terms of seeing these outcomes are a reality.

When looking at the priorities of this policy, it includes such aspects as:

- Engage citizens and communities
- Enhance community participation
- Support community infrastructure

Again it is vital that the Council practice and deliver on these priorities by hearing the voices of the people. This is crucial in helping to make the best decision for the communities who will be living with the decisions made. It shows the community that their wellbeing is important and of genuine interest to council and is taken into account with any planning and any decision making. If not practiced, it makes the process appear as a token gesture and diminishes the confidence that the

residents and ratepayers have with Council. This is a real risk as I feel Council's role is to hear the people and work with them to develop solutions that are acceptable to all, provide value to the community and are robust in their structure and efficiency.

Finally, I am really saddened to see the impact that the Inner Harbours option is having on the residents of Robinsons Bay. Their lives are being devastated; their wellbeing financially, socially and mentally is being compromised. This option is coming at a huge cost to a community that is strong and adhesive and is a real example of people living and working together to create a strong community that stands beside and supports each other and one I am proud to be part of.

I would like to believe and trust in the Christchurch City Council to find or work towards a solution that is sustainable, adds benefits to the community by addressing needs and not creating a solution that has limitations and is clearly not acceptable to the community.

Thank you for this opportunity to add these final comments to my submission.

Pamela Fisher

33775 Christine Shearer

C-Shearer
33775

Good Morning I am Christine Shearer a resident of Takamatua Valley

In my submission I disagreed with the councils current choice of the inner bays options and whilst most of my personal opinions will be covered later by friends of Banks Penninsula including agreeing with all parties that the storm water infiltration has to be addressed I have further concerns regarding the Takamatua area.

Water shortages in the Akaroa area has been problematic for years and this is a good opportunity to safe guard a resource for the future generations. We may not have the most cost effective way of treating this resource today but who knows what the future brings. By laying purple pipes within the township may prepare for that future. Laying irrigation pipes to plant natives is a total waste of a good resource and a irresponsible use of the land. Hinewai is a perfect example of how native plants grow in a natural habitat without irrigation.

The land being considered in the Takamatua area is expensive prime inner harbour land and the current owners are either not willing sellers or have a very heavy price tag. Should the area owned by the Catholic Church be used for irrigation to natives the risk from nutrients and contaminants building up in the soil or leaching into the Takamatua stream have not been adequately addressed and what effect this will have on the eels and waitbait habitat which many locals have been working to protect

This same stream also provides drinking water to supplement the Duvauchelle water supply when wet weather events contaminate their supply.

To add salt to the open wound the council takes large amount of water out of our stream and now proposes to irrigate the waste water in our community without even offering to provide us with reticulated sewerage and yet as a ch ch rate payer we will also be paying a levy for the new wastewater scheme

40 Hectares of land are allocated for the proposal, but if that scheme proves to be undersized we have been told more land parcels in Takamatua could be considered which is ludicrous considering it was decided back in 2016 that the set backs from the creeks and streams and houses were not enough.

In the last community discussion the council said that the native areas will be open to the public. No consideration has been given to parking of the vehicles nor has any budget been included for the construction of the walking tracks or car parks.

Most importantly though I have been in the Horticultural business for over 30 years growing and supplying plants to a variety of diverse soil types throughout Canterbury and donot believe irrigating natives to this extent is in our best interest nor is it best practice. The trial of planting in the Duvauchelle area is flawed to say the least. Firstly they are planted on flat land, and in a sheltered position. What happens on an exposed slopping hill after just a year of continual drippers then heavy rainfall - slips will bound to happen. By irrigation to a drip line the roots do not go down deep into the earth but stay close to the surface. The planting at the trial is intensive will the plants be planted at the same spacing ? which is not there natural habit.

33775 Christine Shearer

Futhermore The Takamatua land is earmarked for two wastewater schemes and if Duvauchelles show is shifted to the Takamatua area and permanent infrastructure is erected for the Show what other uses will the site be used for ie Car parking, freedom camping .

In conclusion it has been widely published that the council members prefer the Inner bays option but there is still too many variables with this choice and if the water cannot be reduced ,reused, recycled it must go back to the sea.

34066 Akaroa Civic Trust

Akaroa Civic Trust
#34066

Akaroa Civic Trust Oral Submission - October 12, 2020

The Akaroa Civic Trust has worked for more than 50 years to protect the historic character of the town as well as the rural amenity, cultural landscape and heritage values of the surrounding countryside. The Trust has worked in association with Onuku Runanga for more than 20 years to protect and enhance bicultural values and traditions.

In our view the Inner Bays and Land Based Options are contrary to the Local Government Act (LGA) and Council policies and objectives.

The reasons are as following

The BP Community Board Plan states that Our beautiful, dramatic landscapes are a much-loved place for locals, both those living on Banks Peninsula and in Christchurch. Our scenic beaches and bays are also a top destination for visitors from the region. These features are vital for sustainable tourism as well as the environmental, economic, cultural and social health of our settlements. We will respect cultural and community values. The cultural, environmental and built heritage of Banks Peninsula is valued and enhanced.
This matters because: The unique character of each of our communities creates a sense of place that forms part of our identity. Of particular importance are our scenic landscapes, tangata whenua's taonga, local stories and historic buildings. It is important to look after this heritage so we can continue to pass on our shared identity to future generations.
The board will: Support the preservation of our heritage, including buildings, structures, features, historic cemeteries and cultural heritage.

We do not have time to point out all the Council policies, plans and strategies that apply to these proposals but assume that staff are familiar with the documents.
However, it appears little if any consideration was given to them.

Key points from Our Heritage, Our Taonga, Heritage Strategy 2019-2029 (taken as read)

Our heritage, our taonga defines us. It is who we are, where we have come from and it guides what we will become. It contributes to our own personal sense of belonging and identity and anchors us to our communities and our city. Heritage connects us: to this place, to each other, to the past and to those who will follow us. Our heritage is precious and valuable. It has social, cultural, educational, recreational and commercial benefits. It contributes to our cultural wellbeing and brings visitors to the district. We are guardians of our taonga, charged with caring for these treasures and passing them on to our children.
Executive summary
This strategy recognises that the Council has a leadership role in facilitating a collaborative approach with its partners and communities, ensuring a broad range of our built and natural, tangible and intangible heritage is recognised, protected and celebrated.

- Respect for all cultures – this strategy includes and respects all people in the district, their heritage and culture.
- Heritage Conservation Principles – The Council will implement this strategy in alignment with best practice conservation management of heritage places and **the safeguarding of intangible heritage.**

We have all journeyed here, and brought our own stories, traditions, objects and memories. In this place we and those before us have shaped the land, left our mark and created new memories, stories and traditions to be passed on to future generations.

1

34066 Akaroa Civic Trust

Our Heritage, Our Taonga is visible – and includes tangible, physical evidence such as buildings, public spaces, places of worship, monuments, archaeology, objects, artefacts, colours in the landscape, urupā and graveyards, sports grounds, artworks, literature, documents (physical and digitised) and infrastructure.

...**and not so visible** – it may be intangible, or it may be hidden. It includes knowledge, stories, waiata, sounds, oral histories, smells, trails, past landscape features and vegetation. It also includes past events and their associated sites and the people and groups connected with them
It can be a cultural landscape on a large scale.

Our Heritage, Our Taonga includes cultural landscapes.
Usually there are important connections and this can extend to other nearby places and the wider landscapes in which they are located. Most of our landscapes have cultural values as well as natural values, because of **human interaction with the land over time**. Whakapapa is embedded within the natural environment and this relationship is reinforced through the naming of landscape forms, myth and legend.

Our Heritage, Our Taonga is valued for different reasons and is seen through different lenses by different groups within a community. This strategy acknowledges that we need to recognise all values and aims to improve understanding of different viewpoints as there may be multiple heritage values and stories all residing in one place.

With regard to the inner harbour proposal
Consideration and regard have been shown for Maori cultural values.
However, European cultural and heritage values have been ignored or "mitigated" by landscaping with native species and a Heritage NZ archaeological authority.

This demonstrates a profound lack of understanding of both Council and Local Government policies .

- The Council has not given consideration to European associations, spiritual and cultural values in relation to the affected land and areas of water.
- The scheme will significantly alter long established cultural landscapes and heritage features associated with early European traditions and farming practices.
- The scheme does not recognise and is contrary to the purpose and intent of the Environment Canterbury's declared state of Climate Emergency, Christchurch City Council's Climate and Ecological Emergency, Our Heritage, Our Taonga 2019-2019 and the Banks Peninsula Community Board's Plan 2020-2022.
- The Council has failed to recognise the importance of European settlement and farming heritage in the context of a significant rural landscape which forms an integral component of the inner harbour's wider cultural landscape.
- The Council has not given due, if any, consideration to Appendix W, Pavitt Cottage archaeological assessment May 2020.

Robinson Bay and Valley
Robinsons Bay has largely been a working, pastoral landscape. Peninsula families have long and well established histories, cultural associations and relationships as well as having made their livelihoods working the land since their arrival in 1840-50s. Natural resources and the quality of the soil provided a sound basis for farming and timber milling for the early settlers.

Robinsons Bay has been a working, cultural landscape altered over time by traditional farming and sawmilling practices. The hills and valleys can be viewed in a manner similar to reading pages in a book for those who look closely at the landscape.

The rural landscape forms the setting and context for rich oral traditions and family histories.

2

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The Sawmill Road location holds an invaluable range of early European history with visual evidence of how life was lived around the 1850s period. The valley contains a transformed, working landscape as pasture replaced trees. European settlers started small dairy farms, grew cocksfoot grass and grazed sheep. Banks Peninsula's first sawmill opened at this location in 1855 and farming practices and organic production continue in Robinsons Valley to the present time.

Visual Effects The area is listed as a Rural Amenity Landscape.

- The upper Robinsons Bay area is of historic importance.
- View shafts and the visibility of the proposed activity are not restricted to Okains. Bay Road and Highway 75 as stated in the consultation document and staff report.
- The visual impact of the proposal on residents in the area as well as visitors would be significant.
- The new irrigation areas, extensive native tree planting and landscaping will alter to a significant degree the amenity of the existing cultural landscape and may alter and/or destroy important archaeological material and sites.
- It is not possible to "blend" the new activity with existing the open pastural, working landscape by simply planting **native** trees thereby replacing exotic species planted by the early settlers.

The large berm and massive ponds will create an entirely "new activity" as an imposing visual feature in the existing pastoral landscape.

- Native tree planting, intended to visually shield the ponds from view, will impact and alter the existing visual qualities and rural amenity of a working cultural landscape to a highly significant degree.
- The ponds will be visible from numerous viewpoints during dry summer months and winter when trees have few leaves contrary to the visual material presented by the Council.

The visual assessments are those of urban professionals who do not understand rural communities nor the farming traditions of Banks Peninsula.

Heritage Items are not mainly "built features" as claimed by staff and consultants.

(Taken as read) The Council's Our Heritage, *Our Taonga Heritage Strategy 2019-2029* states

- **Our Heritage, Our Taonga is tangible and intangible, built and natural and comprises places, objects, stories, memories and traditions.**
- **Our Heritage, Our Taonga is visible** – and includes tangible, physical evidence such as buildings, public spaces, places of worship, monuments, archaeology, objects, artefacts, colours in the landscape, urupā and graveyards, sports grounds, artworks, literature, documents (physical and digitised) and infrastructure.
- **...and not so visible** – it may be intangible, or it may be hidden. It includes knowledge, stories, waiata, sounds, oral histories, smells, trails, past landscape features and vegetation. It also includes past events and their associated sites and the people and groups connected with them; hidden archaeology, wāhi tapu, wāhi taonga, ingoa wāhi, music, kapa haka, dance and language.
- Tangible and intangible aspects usually co-exist in heritage places and items, and are interwoven.
- **Our Heritage, Our Taonga is culturally diverse**, reflecting
- all the cultures of our communities, and includes places of worship, traditions, customs, folklore, language, festivals, food and clothing. Welcoming visitors and new residents is part of our heritage.

3

34066 Akaroa Civic Trust

- **Our Heritage, Our Taonga is varied in scale and type**. It can be an individual building, place, garden or tree, or it may be an avenue of trees, a neighbourhood, street, area, view or a cultural landscape on a large scale. It ranges from grand masonry public buildings, to humble timber cottages or fragments of a lost building. Our heritage places reflect the broad ranges of themes of the development of the district, including settlement, transport, industry, politics, entertainment, commerce, recreation, business and the arts. Our heritage is contained within our built and natural environment.
- We know these lands and these lands know us. We are in every blade of grass.
- **Our Heritage, Our Taonga includes cultural landscapes**.
- Usually there are important connections between buildings, places and items and their settings, and this can extend to other nearby places and the wider landscapes in which they are located. Ngā Tūtohu Whenua is a heritage concept which conveys the interaction of people with their environment over time, and the connection between culture, nature and landscape and intangible and tangible values within particular areas. Most of our landscapes have cultural values as well as natural values, because of human interaction with the land over time. Whakapapa is embedded within the natural environment and this relationship is reinforced through the naming of landscape forms, myth and legend.
- **Our Heritage, Our Taonga includes built heritage** which represents different styles, materials, designers and eras, and the people, uses and stories associated with them. Our built heritage reflects a variety of traditional English and other international influences and is also unique to this place. The extent of remaining colonial buildings in Akaroa makes it a highly intact township. Original uses for buildings have in some cases continued to the present day, creating a long tradition. Our built heritage also reflects our different cultures, provides us with landmarks and contributes to our distinctive neighbourhoods.

The council promotes passive recreation and visitor attractions.

Cultural tourism brings visitors and residents to Robinsons Valley who walk, hike, cycle and move slowly through the landscape absorbing features that cannot be seen when drving in a car or tour bus of cruise passengers.

View of the historic Pavitt cottage mill house c. 1855-1861 located to the far right as seen from Tizzards Road. The red arrow shows the approximate location of the holding ponds.

Archaeological sites in the area seen in the image above include the original sawmill and flour mill, farm buildings, mill dam, waterwheel, spillway, flume and bridge foundation.

(taken as read) Archaeological assessment of Robinsons Bay Pavitt Family Trust May 2020.
7.6 Robinsons Bay archaeological landscape

4

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The mill cottage is but a small part of the larger cultural and archaeological landscape of Robinsons Bay. While the exact location of the Pavitt/Hughes/Saxton sawmill is not certain, the evidence suggests that it was not far from the present-day location of the mill cottage. At its peak, upwards of 30 people were working at the mill (Jacobson 1914:291) and they (and probably their families) were living in the bay. The sprawling footprint of a Banks Peninsula sawmill such as this in the mid-19th century heyday would have been considerable (see Figure 7-20 and Figure 7-23). Artworks that illustrate the valley in the 1870s suggest numerous structures existed; many of these buildings would have been poorly built and not lasted long after they were abandoned.

Numerous vestiges of the 19th century European landscape do however remain, including components of the sawmilling infrastructure, trees planted by the early settlers, and a number of other historic structures. In addition to the schoolmaster's house there are easily visible, but unrecorded, structures such as the small derelict 19th century cottage on Lot 2, DP 82749, which is next to the mill cottage. Thanks to limited development over the last 170 years, this lot has retained much of its 19th century character as well as above-ground vestiges of the early industries in the bay.

Further investigation is likely to uncover additional examples of the 19th century European land use throughout the valley. During this assessment, a number of new sites were recorded throughout the valley: the remnants of bridge foundation (Figure 7-49), cocksfooter's camps (Figure 7-43 to Figure 7-46), the remains of what may be 19th century structures (Figure 7-47, Figure 7-48), and a well (Figure 7-50). Further research will be necessary to determine whether they all relate to 19th century activities. There are, for example, 19th century camp sites beside the creeks further up the valley in less accessible areas; these small camps are notable by low stone walls or what were once chimneys, and the presence of 19th century bottle glass and metal artifacts.

Further images relating to the proposed location and scale of the Thacker dam and 2 ponds located in proximity to Sawmill Road and the Pavitt House

Heritage New Zealand views the cultural landscape of the valley as historically important. However, Christchurch City Council does not. CCC Robinsons Bay School Reserve & story trail

5

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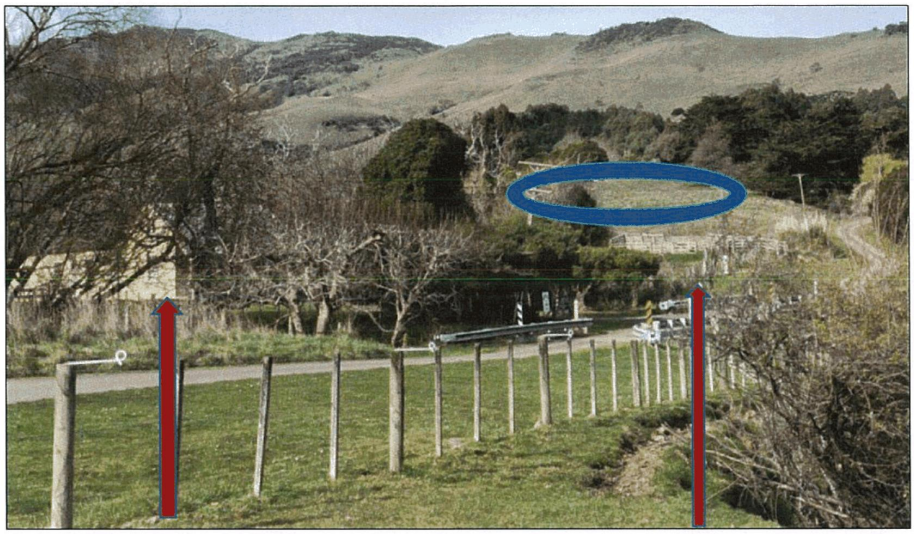
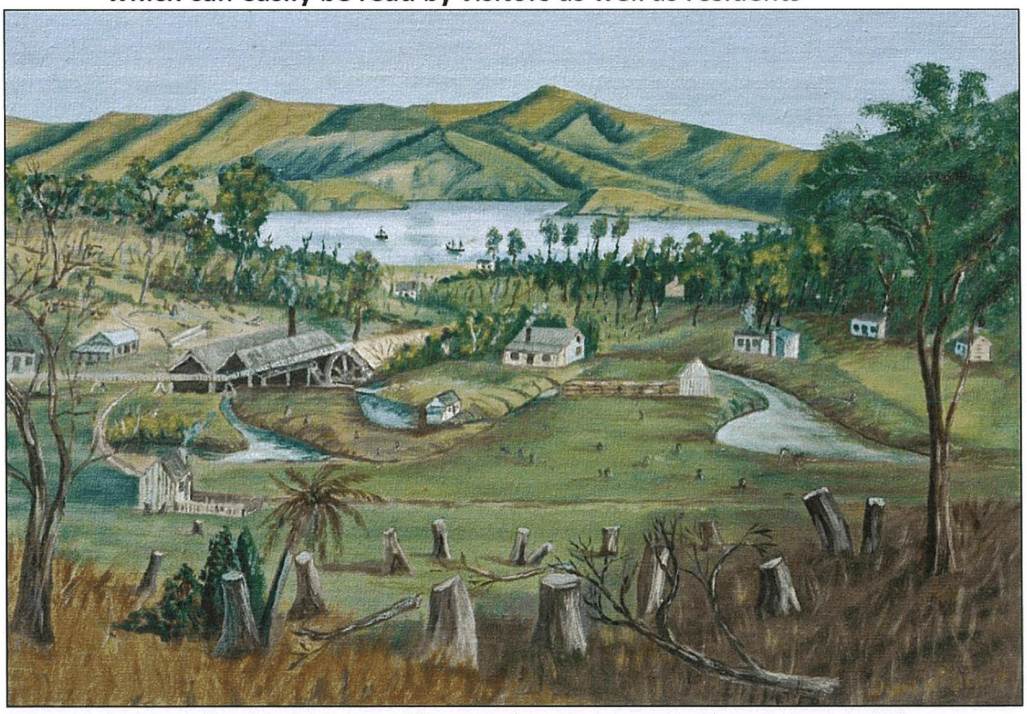


Sawmill Road, August 13, 2020

- The red arrow to the left shows the location of the Pavitt cottage.
- The blue oval is the general location of the two wastewater ponds.
- The red arrow to the right shows the location of the Heritage New Zealand signpost.

The overall site forms an important European Cultural Landscape which can easily be read by visitors as well as residents



Robinsons Bay Sawmill and Cottage, copy of the original painting, Pavitt Family Trust, August 2020.

The painting above depicts the site in the 1870s. The house, waterwheel, blacksmith's shop, school and workers cottages and related details are all visible in the landscape.

6

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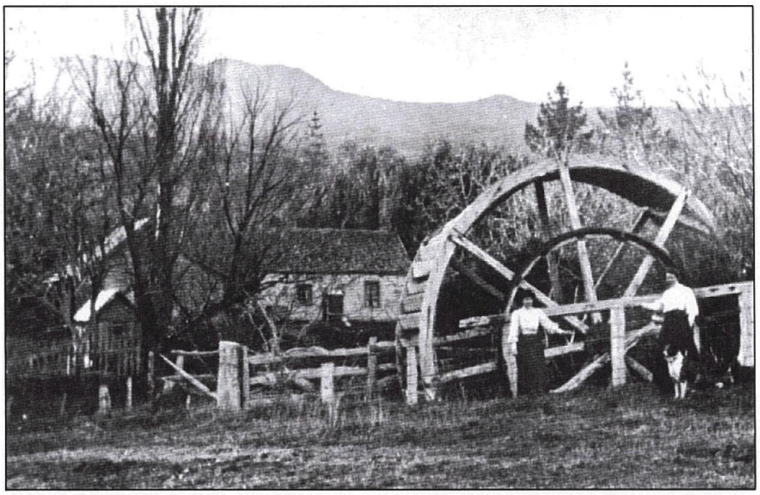
Robinsons Bay Steam Mill operated 1865-1877 when all the accessible timber was cut out. The flume and waterwheel were used for emergencies, the blacksmith shop is to the right. Photos: Orville Williams. Source: Cradle of Canterbury



Farr's water wheel which powered the mill until 1865. The photographs shows the 1856 Pavitt home in the background. During the Matlock Mill era a shop was added. Sarah and Maggie Hayward are standing by the wheel. Photo: Marie Rhodes. Source: Cradle of Canterbury

The above photograph shows the same fence line and location of the 1987 Historic Places Trust interpretative panel that was installed to illustrate the historic importance of the overall site in relation to Canterbury's early settler history.

"After Orville William's death in 1986, Murray Thacker purchased the farm adjacent to the Pavitt Cottage. He planned to preserve all the historic aspects of the old mill site. Robinsons Bay has changed very little with the years. Few communities have such a range of pioneer cottages, dairies, cheese rooms, stables and outhouses in such original condition."
Source: Banks Peninsula, Cradle of Canterbury by Gordon Ogilvie, 2007 published by Phillips and King Publishers.

7

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The following information is contained in ARCHAEOLOGICAL ASSESSMENT OF LOT 1, DP 82749, ROBINSONS BAY, CANTERBURY FOR THE PAVITT FAMILY TRUST, JUSTIN MAXWELL AND JENNIFER HUEBERT SUNRISE ARCHAEOLOGY REPORT NO. 2020-3, MAY 2020. Image below, page 4 Lots 1 & 2. Lot 2 below is the location of the proposed double pond and tree planting.

The red oval is the general location of the embankment, road around the top and the ponds which would obliterate significant archaeological features as would extensive native tree planting.

(Taken as read) 9 Assessment of Effects on Archaeological Features; Archaeological Report, page 59

The sawmill site, recorded through this assessment as Archaeological Site N36/260, is an expansive historical landscape that borders Lot 1, DP 82749, and spans Lot 2, DP 82749 and other neighbouring lots. Any ground-disturbing work in this area is likely to uncover remnants of the old mill, flume, tramway, blacksmith's workshop, and other outbuildings. Earth-moving projects that would modify this landscape will also compromise what remains of the engineering footprint of the water-driven mill operation, including the spillway, dam, and ponds. These features are readily visible on the ground, and in aerial and satellite photographs.

The planting of native species on Lot 2 would significantly alter the existing environmental diversity of an important cultural landscape. Exotics, including oaks, walnuts, macrocarpas and fruit trees, are an important heritage element in this cultural landscape. Members of the public are currently able to view remnants of early 19th century European culture and lifestyle in association with the historic Pavitt Cottage and mill site. It would be inappropriate to introduce the extensive planting of native species in the context of early colonial settlement as well as being contrary to the Council's **Banks Peninsula contextual historical overview and thematic framework** by Louise Beaumont, Matthew Carter and John Wilson, June 2014.

*Please note that the planting of native species may be a Council policy.
However, in this particular context and setting it is inappropriate because it would obliterate European cultural associations and values. The activity is contrary to the Council's report, Banks Peninsula contextual historical overview and thematic framework, June 2014, as stated above.

Akaroa and the outer bays are isolated communities
which often accept a lower level and standard of service than that of city ratepayers

8

34066 Akaroa Civic Trust

Banks Peninsula is not an urban environment
Akaroa water restrictions were put in place early this year

photos: 3 February 2020

Akaroa and the surrounding countryside are experiencing dryer summers with near drought conditions at a time when visitor numbers swell to beyond capacity.

- The Council must take the Climate and Ecological Emergency into account in all decision making and planning for our area.
- Therefore, there is an existing Council mandate to conserve water through reuse and recycling in addition to the Local Government Act requirement for community well-being.

9

34066 Akaroa Civic Trust

In Conclusion

1. The Council must maintain and enhance the historic character, existing rural amenity, heritage landscapes and European cultural values and associations as enshrined in Council and LGA policies.

2. There is a strong need to retain, reuse and recycle treated wastewater for use by the town of Akaroa.

   (Taken as read) Wastewater should be treated to the highest possible standards, reused and recycled as required. Scientific research advises that the east coast of the South Island will continue to become drier as the climate continues to change. Drought conditions may become common over the dry summer months. Leaking pipes and a general lack of maintenance also need to be investigated and remedied by the Council. In our view, the Council needs to reconsider the wastewater treatment system and bring it into line with its 2019 Integrated Water Strategy which includes providing people, communities and future generations with access to safe and sufficient water resources through international best practice. The proposal as presented is contrary to Council policies and objectives and it is inconsistent with the intent and purpose of the Banks Peninsula Community Board Plan 2020-2922.

3. (Taken as read) The Local Government Act, Part 1 Reinstatement of 4 aspects of community well-being Amended Act 2019 Section 3 amended (Purpose)

Replace section 3(d) with:
(d) provides for local authorities to play a broad role in promoting the social, economic, environmental, and cultural well-being of their communities, taking a sustainable development approach.
5 Section 5 amended (Interpretation)
(1) In section 5(1), replace the definition of community outcomes with:
community outcomes means the outcomes that a local authority aims to achieve in order to promote the social, economic, environmental, and cultural well-being of its district or region in the present and for the future
(2) In section 5(1), replace the definition of good-quality with:
good-quality, in relation to local infrastructure, local public services, and performance of regulatory functions, means infrastructure, services, and performance that are—
(a) efficient; and (b) effective; and (c) appropriate to present and anticipated future circumstances (3)In section 5(1), definition of significance, replace paragraph (a) with:
(a) the current and future social, economic, environmental, or cultural well-being of the district or region

- The inner harbour option is incapable of promoting the cultural, economic, environmental and social well-being of affected rural communities.
- The Civic Trust urges the Council to reconsider the wastewater treatment options.
- Neither the land based or harbour outfall are acceptable as options for future generations.
- The proposal should meet the needs of rural communities as well as visitors well into the future based on the Council's 2019 climate change emergency resolution and LGA.
- Building strong community resources will assist in the protection of the historic character and rural amenity of Akaroa and the surrounding rural countryside for future generations.

The Akaroa Civic Trust supports the submission of the Friends of Banks Peninsula
Mike Norris, Chairman; Victoria Andrews, Deputy

10

34048 Ken Shearer

Ken Shearer
34048

Akaroa waste water submission hearing

1. **Declare that we will not be affected with any of the proposals.**

2. **Reason for submitting submission**:
   Standing on the side line watching all this drama play out with different options which are all flawed, I have come to the conclusion that the CCC staff need to relook outside of the crater rim to solve the problem.

3. **The way forward.**

   It has come to my attention that CCC staff did look at piping the waste water to Bromley in the very early days and wasn't considered an option. A more practicable option is now available since then.

   Some times in life it is not possible to solve the problem yourself and you need to ask for help.
   A good example is the rubbish from the Peninsula & Ch. Ch. being disposed in North Canty.

1. **The Answer to the problem**

   - Approach SDC as they have all the infrastructure consents and land suitable on discharging the waste.

   - They not only service the expanding future Satellite city of Christchurch, they also service West Melton, Prebbleton, Lincoln, and Springston.

   - My proposal is as follows:

     - to pump the township sewage, once the stormwater has been eliminated to the head of the bay.

     - Duvauchelles sewage and Wainui in the future can all so be connected.

34048 Ken Shearer

- Install a pipe line to Little River where it would be terminated and a collection depo established.
- Little river township can also connect to the collection depo.
- Road transport to Rolleston, similar to the milk tanker and trailers.
- The carbon foot print on road transport will be reduced \ eliminated in the near future due to alternative methods of energy which research and development is currently under way overseas with two large trucking manufacturers.

5. **Cost benefits:**
   - No treatment plant to build in Akaroa. (Huge saving)
   - No upgrade required Duvauchelles plant (Huge saving)
   - No upheaval to the Golf Club and resighting the show grounds.

6. **General benefits**:
   - No pollution into the harbour.
   - This is a long-term fix and will allow for increase growth in the areas where a connection is available.
   -

34048 Ken Shearer

7. General comments

The CCC has caused undue stress and wasted money in not including an option of discharge as I have proposed.

Discharging the treated water into the harbour which appears to be the staff's recommendation, should not be entertained at any cost, this is only placing a band aid on the problem and future generations will end up trying to resolve the problem.

Because the treated sewerage has been allowed to discharge into the harbour in the past, does not mean that it is the correct method for the future.

As the panel will be well aware, recent research has identified microscopic plastic beads are getting into the marine food chain which are next to impossible to remove from the waste water.

Now that you have exhausted all the options within the Akaroa catchment and neither option is acceptable, now is the time to rethink other options:

Until my proposal is investigated & costed out, we will never know how it compares.

My proposal to pumping to Little River is no different to Diamond Harbour where their sewerage is piped across the harbour to Lyttleton.

34048 Ken Shearer

8. My recommendations:

- Place all the options before us today on hold until further investigations are carried out as follows:
- Undertake a cost and feasibility study on my proposal.
- Investigate if establishing a treatment plant at birdlings flat is a feasible option, as the water could be used for irrigation on the surrounding area.

33898 Ken and Fiona Paulin

#33898
Ken+Fiona Paulin

AKAROA TREATED WASTE WATER SPEAKING TO SUBMISSION

After almost 50 years living, and working as a Local Govt Engineer on Banks Peninsula, I have observed a number of things.

1. We had wet winters in the 1970s when there were slips everywhere. However scientist tell us we are heading for more unpredictable weather, with severe storms, very wet seasons, and very dry ones.
2. Fashions change. Land disposal of effluent is popular now, but 40 years ago when the Akaroa County Council was considering small sewerage schemes for Tikao and the Wainui subdivision, the Regional Authority would not hear of it , and required the effluent to go into the harbour, where there was a large body of water and good dilution. 30 yrs ago there was the same thinking when the Duvauchelle, Diamond Harbour, Governors Bay and Lyttelton schemes were developed.
3. With the likelihood of very wet seasons, and the Banks Peninsula soils and topography, I consider the present discharge of highly treated effluent into the deep water of the harbour is the best option. If kai gathering is the issue, a controlled discharge, is better than a discharge through a wetland onto the foreshore of Childrens Bay during emergency situations.
4. However in the long run, we should plan to use the effluent, not just get rid of it.

I would recommend the following

a. Push the Health Authorities to accept the Purple Pipe for public use initially (toilets,gardens, and parks), but extend this to new residential developments, and where there is community interest in its use.
b. With the treatment plant at the north end of the harbour, there is the future option to discharge it into regenerating native bush on either side of the Long Bay Rd, to recharge the Takamatua and Grehan Valley streams. This would not be acceptable now, but in 40years time following severe drought, and water supply shortages, and improvements in potable water treatment, it may be an acceptable option.

For the above reason , if land disposal is the only acceptable option, we favour one of the Outer Bays disposal systems. However our strong opinion is that it should be piped into the deep water of the harbour where there is good dilution and mixing. Then, work diligently to reduce the ground water infiltration into the sewage reticulation , and use of the treated effluent to supplement the water supply, in various ways.

Ken and Fiona Paulin

12/10/20

34104 Brent Martin

Akaroa Wastewater Hearings: personal oral submission Brent Martin

1. The main issue for the panel is not whether or not to consider the cultural needs of Ngai Tahu, but rather will the solution chosen achieve what is intended. There are three aspects:
    a. Have the risks with each option been adequately addressed to the extent that you are confident the proposed solution will work as designed?
    b. Are the stated benefits of each option real and consequential, or are they in doubt or over-stated?
    c. Have other alternatives been reasonably considered?
2. Regarding risk: the land-based options have several aspects that add significant risk:
    a. They will be a first for New Zealand; there are no exemplars to verify they will work.
    b. There are several design factors that make these proposals unique, and they are critical to their success
    c. There is no fall-back position included if a land-based disposal is built but fails to perform as designed
    d. Friends of Banks Peninsula will expand on these issues.
3. Regarding benefits: we believe they are over-stated:
    a. The sequestration of up to 8000 tonnes (net) of CO2 is a benefit, but is very small (about 10 households worth) for the high cvost of around $10 million extra, or $1000+ per tonne. There are much more effective ways to achieve carbon neutrality, including spending the $10 million on 4000 ha (four Hinewais) of unproductive land and managing it for natural regeneration.
    b. Several submitters consider the land-based options will “protect the harbour” but this will only happen if they contain all contaminants and nutrients. If not, they will return to the harbour, but in shallow poor-draining bays instead of to the middle of the harbour where they flush out to sea. This would be a *worse* outcome for the health of the harbour
4. Regarding other options: these have not been adequately explored. For example:
    a. Wetlands and other similar treatments were not supported in the 2016 consultation because they included a coastal discharge (infiltration gallery), and submitters were unhappy about treated wastewater being discharged on the beach. The concept of wetland treatment in its own right has not been explored.
    b. The costings and other issues put forward by staff appear to be very out of date, and overstate the issues. Friends of Banks Peninsula will speak to this issue further.
    c. Managed Aquifers Recharge (MAR) was rejected on the basis of potential water supply contamination. This ignores that the water was proposed to be treated to potable standard, so there would be no contamination issue.
5. I urge you to consider these aspects when reaching your decision.

34081 Suky Thompson

Suky Thompson Oral submission to Akaroa Wastewater hearing panel. 12 Oct 2020

My name is Suky Thompson. I have lived in Robinsons Bay for 30 years and work in heritage, parks, recreation and tourism.

I served 4 years on the Akaroa Wastewater Working Party. It was useful in terms of understanding the Council options, but disappointing in terms of getting a better outcome for my community.

Genuine discussion on how mana whenua cultural values could be addressed while avoiding the impacts on our communities never took place.

Instead meetings were dominated by the staff focus on the Inner Bays scheme and different ways to squeeze the storage dam and irrigation onto the Thacker land in Robinsons Bay where they had a willing seller. In the end, it couldn't be done and extra pieces of land and the wetland at Childrens Bay had to be added.

In the meantime, minimal effort was put into the Outer Bay options even though landowners were initially willing to use the water to irrigate their very remote farms. The current options based on native trees at Goughs Bay and Pompey's Pillar were introduced to replace pasture based options at the last minute after the landowner at Goughs Bay became fully aware of the compliance stand-down periods and pulled out considering it too risky, as the Pompey's Pillar landowners had done earlier. In neither case did Council offer to shoulder or share the risk.

The lack of acknowledgement of risk with the land based schemes is at the heart of the problem. In the case of the Inner Bays, the risks to the people, heritage and environment of Robinsons Bay and Takamatua have been consistently ignored. Every design parameter is pushed to its limits to make the Inner Bays option fit. The storage pond is as close to houses and streams as the selection criteria permitted. It has been divided into two cells and with bunds below because of the dam break risk, but it still has earthworks reaching down into a gully that runs hard in storm conditions and close to the main valley stream that can rampage. My written submission refers to the Historical Flooding Research and mapping work that I carried out for the Council a number of years ago. This alongside the Tonkin and Taylor report based on it is referenced in LIM requests for the area. The report identifies that some of the worst floods have been caused by debris washed down by swollen streams getting trapped at a constriction point such as a bridge, and backing up causing a flash flood when released. The community have good reason to be concerned about the risks of flooding to the lower valley, given that Beca identify an increased risk of stream banks slumping due to the irrigation and that the stream could back up under the dam face if the Sawmill Road bridge blocks in a storm.

The consultation document paints a lovely picture of native forest areas, but doesn't acknowledge or even show on the maps that the Inner Bays option involves placing wastewater infrastructure close to houses. The photo montages don't show what the dams will really look like –mostly empty and revealing their plastic linings – not pretty duck ponds. These issues were identified when the Working Party reviewed the draft and the consultation should have presented a fair assessment of the impacts.

I hope that you will use your site visit to appreciate just a couple of these impacts and risks. Section 9.1.5 in the Officers report states that there will not be negative effects on the historical sites. When you are on site, consider how close the huge storage dam will be to the Pavitt Cottage. Consider that the historic sawmill site surrounding it will be planted over, divorcing the cottage from its heritage setting. Please take time to walk to the edge of the proposed dam walls to see how close they will be to the main stream on the eastern side and the ephemeral stream gully to the west, and take a look at the bridge across Sawmill Road.

34081 Suky Thompson

Gordon Ogilvie considered the Sawmill site so significant that he featured it on the back cover of his seminal reference book, "Banks Peninsula Cradle of Canterbury". The site has been marked since the 1980s, and a well-researched book *"The Old Waterwheel"* published in 1990. The cottage was purchased in the late 1990s by descendants of the original owners and fully restored. Most recently a thorough archaeological report has been produced. The cottage and sawmill site are the turangawaewae of our community and we hold them in the highest respect.

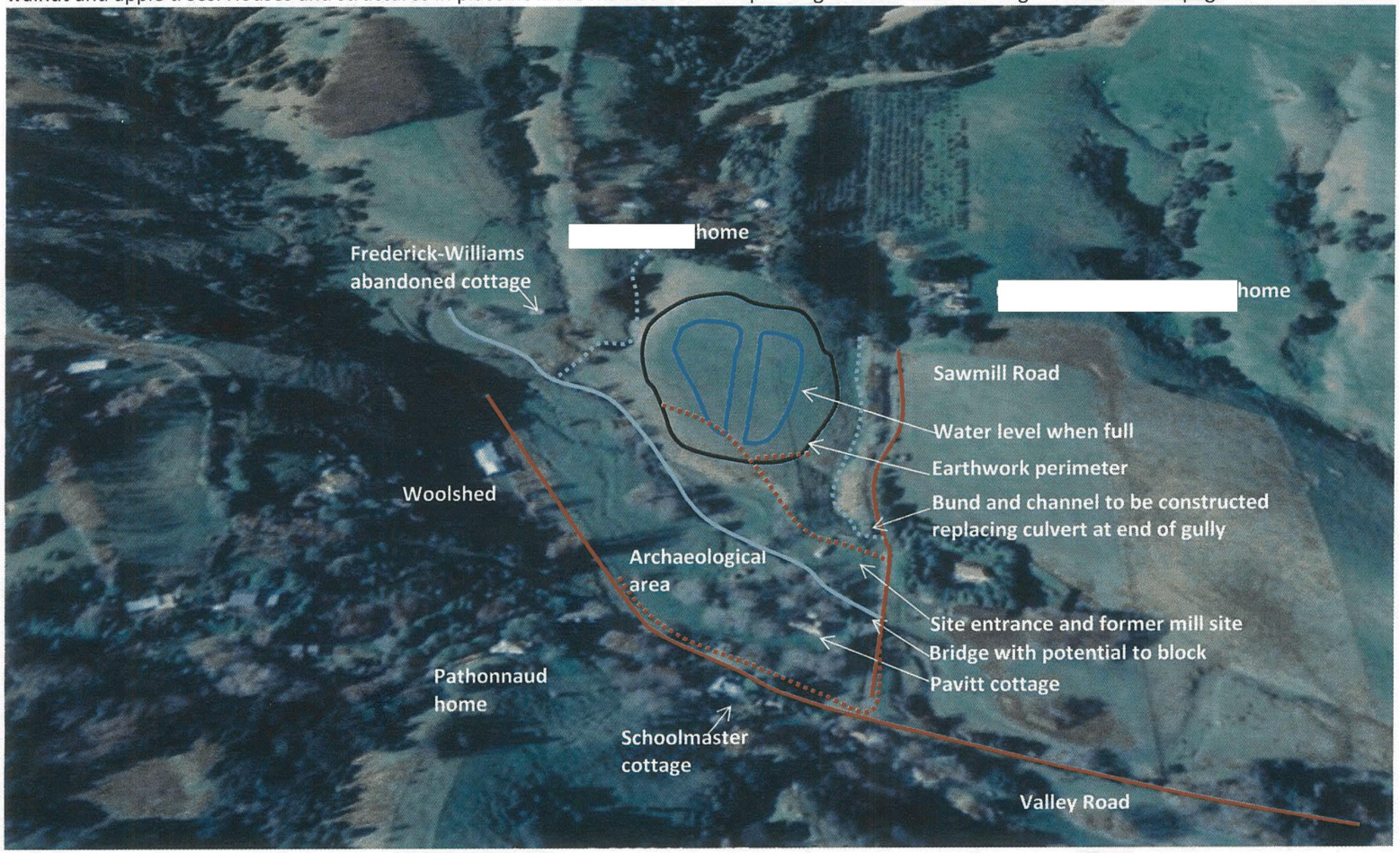
I am providing you with copies of the Old Waterwheel book and the archaeological report so that you can better appreciate the heritage significance, plus a map with some points to look out for on your site visit. You would also be welcome to visit during Heritage Week when the cottage will be open to the public.

I request that you decline the Inner Bays option. If this experimental system fails, the Council will have spent an incredible amount of money and have nowhere to go. The ongoing impacts on this community and the environment could be terrible.

I will be speaking tomorrow on behalf of Friends of Banks Peninsula. I am proud of the way that so very many and very different members of this community have come together and supported the Friends of Banks Peninsula environmental society to develop a future focussed climate resilient solution and urge you to consider this alternative instead.

Figure 1 Google Earth view of Upper Robinsons Bay and Thacker Site annotated to show significant features and storage dam

Follow the red dotted route to enter the Thacker property across the mill site with the heritage sign and up onto proposed storage dam area. Follow the red dotted route down Sawmill Road past the Pavitt Cottage and walk a short way up the Valley Road toward the Woolshed to appreciate the site behind the cottage – with its heritage walnut and apple trees. Houses and structures in place now are marked below. A painting of the site in 1870 is given on the next page.



34081 Suky Thompson

Robinsons Bay Site Visit – see site map overleaf.

Here are some important items to look out for:

On Site

1. The entrance to the Thacker land is through the site of the Mill itself. This will be significantly damaged preclude its future potential as a heritage interpretation site. The old sagging shed is not a heritage feature. The waterwheel axle near the Historic Places Trust sign is.
2. Follow the track up the bank and onto the pond site
3. Note how this area is surrounded by main stream gullies on the east and a stream gully on thewest sides and the proximity of the main stream below.
4. Envisage the 4m high dam wall to be constructed at the lower end of this site, and how it will impact on the Pavitt Cottage and valley below and the risk to that frail cottage should the dam fail during a heavy storm or an earthquake.
5. Earthworks extend nearly to the upper boundary of the site close to house and house. The minimal setback from houses of 100m is only met by measuring from the water in the ponds not the extensive earthworks.

Along Sawmill Road

6. The Historic Places Trust sign marking the water wheel and sawmill site near the site entrance was erected in 1987 and *"The Old Water Wheel"* book by Jessie Mould published in 1990.
7. The significance of this site is that it was the first power sawmill in Canterbury. Today we mourn the loss of the native forest, but at the time the enterprise shown here in developing a water wheel powered mill was outstanding and with far reaching influence. Many local families started their association with Banks Peninsula at this site and it stands in testament to their times.
8. Sawmill Road bridge – Refer to Figures 2 and 3 below to see the stream in flood. Consider the potential for logs and storm debris to block the flow under the bridge causing water to back up below the dam face.
9. Historic Pavitt Cottage dates from 1856 – one of the Peninsula's oldest buildings. The long extension at the back was added when the mill belonged to the Saxton and Williams families and housed a butcher shop.

Up the Valley Road to the Woolshed

10. Opposite Pavitt Cottage on the Valley Road is the historic School Masters house, now belonging to the This was constructed at a similar time to the rear extension to Pavitt Cottage. A school was located between the two, adjacent to the Pavitt Cottage.
11. Further up the Valley Road, just past the road fork is where the Wynn-Williams painting was done. Here you get a good sense of the lower valley areas containing archaeological sites currently that will form the irrigation field. A dense forest is to be planted within 5m of the cottage boundary. meaning the connection between the cottage and the heritage area behind is lost and precluding its development as a heritage interpretation site.
12. Pavitt Cottage was part of this site until 2000, when Murray Thacker subdivided it off so that Pavitt descendant John Fernyhough could restore it and respect its important history. Had the cottage not been subdivided at that time, the heritage listing in the District Plan would include the Thacker Site.
13. Note how on the surrounding hillsides natural regeneration of native forest is occurring rapidly. It does not need irrigation for reforestation to occur here. Robinsons Bay residents appreciate native forest but want to keep their special heritage sites clear.

34081 Suky Thompson

Figure 2 Looking under Sawmill Road bridge in normal conditions from the Thacker site

Figure 3 Sawmill Road bridge looking downstream in normal and flood conditions

34081 Suky Thompson

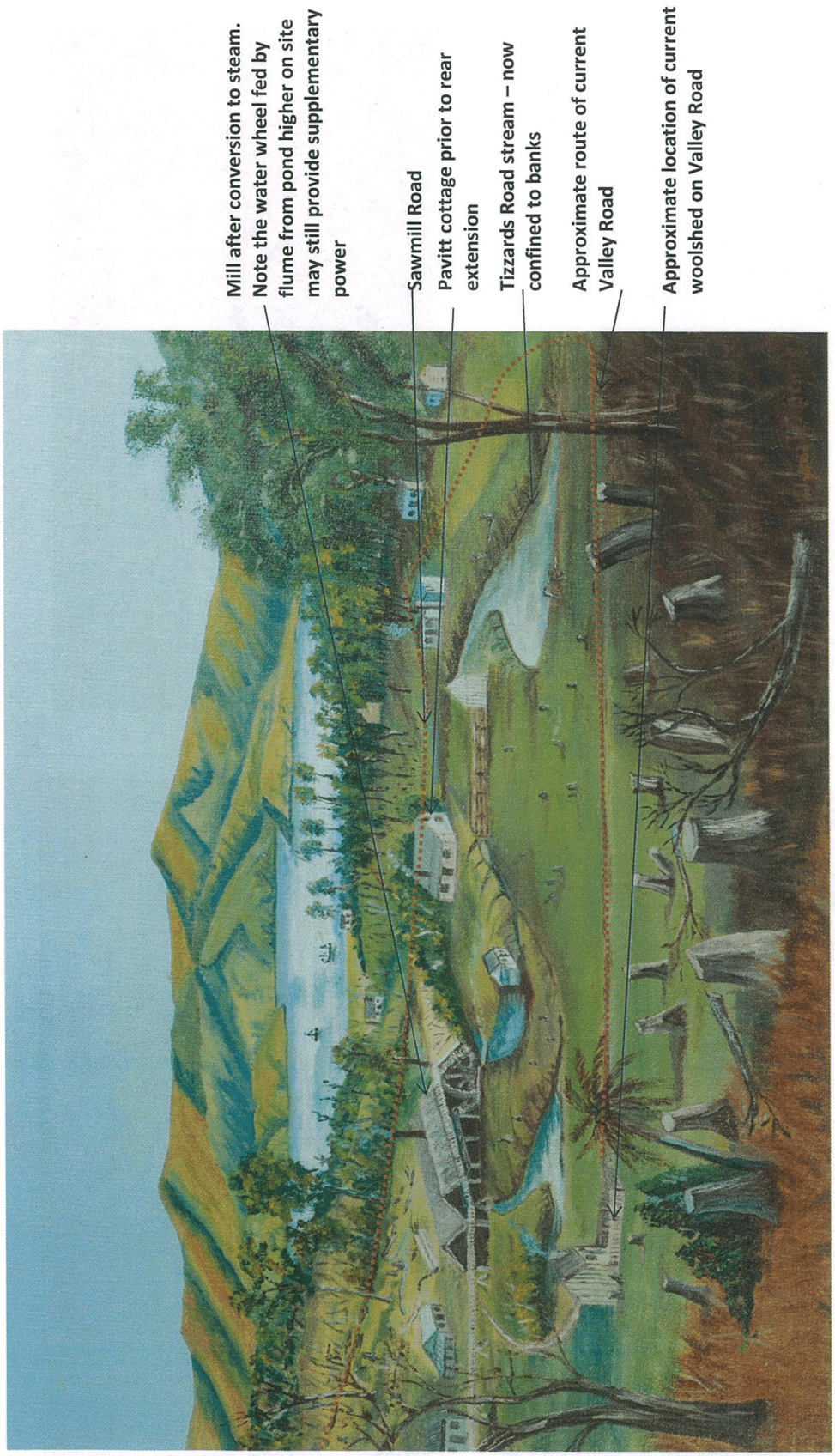


Figure 4 Annotated painting

34103 Jan Cook and 34132 David Brailsford

#34103 Jan Cook +
#34132 David Brailsford

Christchurch City Council
To the Hearing Panel - Akaroa Treated Wastewater Options **12 October 2020**

Submission of Jan Cook # 34103 & David Brailsford #34132
I wish to expand on our written submissions.
I have read all of the submissions and the Officers' Report and Recommendations.

'Have Your Say' submission form.
Question 1 asked people to tick a box to indicate whether Akaroa's treated wastewater should be discharged to land or into Akaroa Harbour.
179 ticked 'to harbour' and 107 ticked 'to land'
55 submissions did not tick either option, however the written content of 45 of these shows a clear opposition to land disposal.
The problem with asking such an either/or question is that it does not provide information about submitters' views of the other option. If someone ticks 'to the harbour' might they also be somewhat supportive of ' to land' or are they completely opposed to it? – and vice versa.

Question 2 asked people to rank 3 land options, with 1 being preferred and 3 being least preferred.
How should these be interpreted? Does 3 indicate some degree of support (but least preferred), or strong opposition? What weight should be given to a 2 ranking?

Inner Bays received 92 x 1 rankings, but only 3 x 2 rankings and 59 ranked it 3.
Goughs Bay had 46 x 1 rankings, but 82 x 2 rankings and only 19 x 3 rankings.
This shows an overall greater degree of support for Goughs Bay and less opposition to it (if a 3 ranking is interpreted as opposition)

Importantly, 166 submitters (49%) didn't rank any of the options. A high proportion of these provided detailed additional explanatory comments in their submissions.

It is difficult to see how staff could have arrived at the statement (Officer Recommendations, Attachment A) that the Inner Bays scheme '*was the most preferred location for the land-based options in submissions'.*
If the 2 and 3 rankings are to be ignored then submitters should have been asked to indicate only their most preferred option.

42 (39%)of the those supporting Land did not give any additional comment.
67 (63%) gave an address outside of the Akaroa Harbour area. This is not to say that these submitters do not have a rightful interest in this area, but they do not live in the communities affected by the land proposals and the consultation document does not provide any information about community concerns.
80% of the submitters supporting Land also supported irrigation to public parks and purple pipe in Akaroa. However neither of these are part of the land proposals and would require

34103 Jan Cook and 34132 David Brailsford

substantial extra funding. It is not known how many of these submitters would be less supportive of land disposal if there was to be little or no reuse in Akaroa.

I ask the Panel to give little regard to the 'box ticking' results - they are not a reliable or useful poll of public opinion. The focus must be on the substance of submissions and the information gained at this hearing.
Public input and local knowledge are important, but for a project as expensive, complex and critical as this one, it is essential to use the best scientific knowledge to avoid risk and provide a solution that is sustainable well into the future.

I say this because provision of sewer disposal is an essential service that cannot be just be switched off and moved if the wrong choice has been made and system is not functioning as hoped. The current plant at Takapuneke has breached faecal coliform conditions every year for decades now. In 1994, 1998 and in the early 2000s I was involved in hearings to extend the consent for Takapuneke. In each case the decision stressed that the extension must be the last and that the Council must replace the plant. Now several decades later I understand that the Council is applying for an extension until 2028.
If consent conditions are not achieved, communities, and the environment, simply have to put up with effects while a solution is worked on.

Inner Bays Scheme
The 'Have Your Say' booklet devotes 6 pages to the Inner Bays option preferred by staff. It paints a picture of native reafforestation, public walkways, carbon sinks and landscaped ponds and wetlands.
The 'pond' will be 2 hectares in size, lined with plastic and the embankments will be kept clear of vegetation to enable detection of any leaks. This 'pond' will be kept as empty as possible at all times so that it has capacity to accept the wastewater during peak flows. It is a water storage facility, not a pond. The wetland will be constructed and lined with plastic.
I ask you to visit the tree trial plot at Duvauchelle and consider its ecological value and just how attractive such an area would really be for public recreation.

Given our increasing incidence of catastrophic wildfires, we must re-examine the wisdom of establishing native shrubland in populated areas. Kanuka and Manuka are highly flammable species and many other native species burn very readily. Frankly, the impression on page 9 of the booklet showing proposed continuous vegetation along Robinsons Valley really scares me.

Where would the wastewater go if the irrigation fields fail because the soil becomes saturated, or vegetation does not thrive or is destroyed by fire, or if volumes increase because of more extreme rainfall events? Into the streams at Robinsons Bay and Takamatua and down to the mudflats? Into Children's Bay?
Staff say this is the least expensive option – I suggest you question that very carefully.

34103 Jan Cook and 34132 David Brailsford

Water Supply.

72% of submissions support using wastewater to irrigate parks in Akaroa and 74% supported a purple pipe scheme. Many submissions however want much more extensive reuse in Akaroa. They express serious concern about Akaroa's water supply and the increasing effects of climate change.

Akaroa had extreme water restrictions in place for 5 months last summer. Convoys of army trucks tankered water from Christchurch to augment the Duvauchelle water supply.
We have just had a very dry winter. I ask you to take a look at the streams in Akaroa and around the bays. We are only at the beginning of spring, but the stream levels already look like they do at the end of a hot, dry summer and soil moisture levels are extremely low. I fear that we could be facing even more serious drought conditions this summer.

We are facing global climate, health and economic crises. Climate change is real and it is here.

The actions needed are already laid out in your Integrated Water Strategy

Reduce - Fix I&I
- Encourage household water conservation (carrot and stick)

Reuse - parks, gardens, toilets

Recycle - return to Akaroa's water catchment

Move on from the wasteful disposal mentality of the past and set an exemplar for NZ with a sustainable, resilient, efficient 21st century integrated system.

34074 John Thomson

#34074
John Thomson.

AKAROA WASTE WATER QUESTIONS TO COUNCIL

JOHN THOMSON SUBMISSION, OCTOBER 13 2020

FRESH WATER:

THERE ARE AN ESTIMATED 50 IN USE SPRINGS IN THE ROBINSON BAY , TAKAMATUA VALLEY AREA. THESE ARE WELLS /SPRINGS FOR FRESH POTABLE WATER FOR HOUSEHOLDS AND STOCK WATER, MOST ARE UNFILTERED. IT IS ESTIMATED THAT 50% OF THESE WELLS / SPRINGS ARE USED FOR POTABLE OR DRINKING WATER TO FAMILIES. WATER SUPPLIES ARE DWINDLING.

IT HAS BEEN SHOWN BY MASSEY UNIVERSITY THAT FERAL CATS, POSSUMS, PUKEKO AND DOGS CAN TRANSMIT GUARDIA, COVID19 AND CAMPYLOBACTER. THE COUNCIL HAVE TO SHOW THAT ANY LAND BASED SYSTEM HAVE 1 MICRON FILTERS TO PREVENT CONTAMINATION OF SPRING WATER CATCHMENTS FROM GIARDIA.

THE OTHER PATHOGENS / PHARMACEUTICALS IN WASTE CANNOT BE FILTERED EFFECTIVELY EXCEPT WITHOUT EXPENSIVE REVERSE OSMOSIS EQUIPMENT; NOT A COST EFFECTIVE METHOD HERE

THE HAVELOCK NORTH DISASTER WAS DUE TO SIMPLY A HEAVY RAIN EVENT WASHING INTO THE SPRING AQUIFER. IN OUR CASE THE COUNCIL ARE DEALING WITH WATER ALREADY CONTAMINATED WITH CAMPYLOBACTER / GIARDIA / COVID19 / PHARMACEUTICALS .

THE HAVELOCK NORTH EXPERIENCE IS SURELY ENOUGH EVIDENCE OF HOW FRESH WATER CAN BECOME CONTAMINATED. A TOTAL OF 8000 RESIDENTS WERE INFECTED WITH CAMPYLOBACTER OUT OF A TOTAL OF 13,000 TOWN POPULATION. THERE HAVE BEEN THREE DEATHS ATTRIBUTED TO THIS DISASTER

QUESTION: (1) HOW IS THE COUNCIL GOING TO PREVENT CAMPYLOBACTER AND COVID19 GETTING INTO OUR SPRINGS IN A LAND BASED OPTION.?

QUESTION: (2) ONCE CONTAMINATED, THE COUNCIL WILL HAVE TO FIND ALTERNATE FRESH WATER SOURCES FOR FARMS AND HOUSEHOLDS, AND FROM WHERE.?

QUESTION: (3) HAVE THE COUNCIL INCLUDED IN THEIR COST ANALYSIS THE LEGAL COSTS OF LOCAL WELL POISONING.?

QUESTION :(4) DOES THE COUNCIL HAVE A METHOD OF DEALING WITH WASTE SYSTEM FAILURE LIKE PUMP/POWER FAILURE AND THE SUBSEQUENT POTENTIAL OVERFLOW.?

QUESTION: (5) IS THEIR EMERGENCY ACTION TO FLOW UNTREATED WATER TO THE INNER HARBOUR VIA EXISTING NATURAL STREAMS UNTIL THE EMERGENCY IS RECTIFIED.?

1

34095 Ivor McChesney

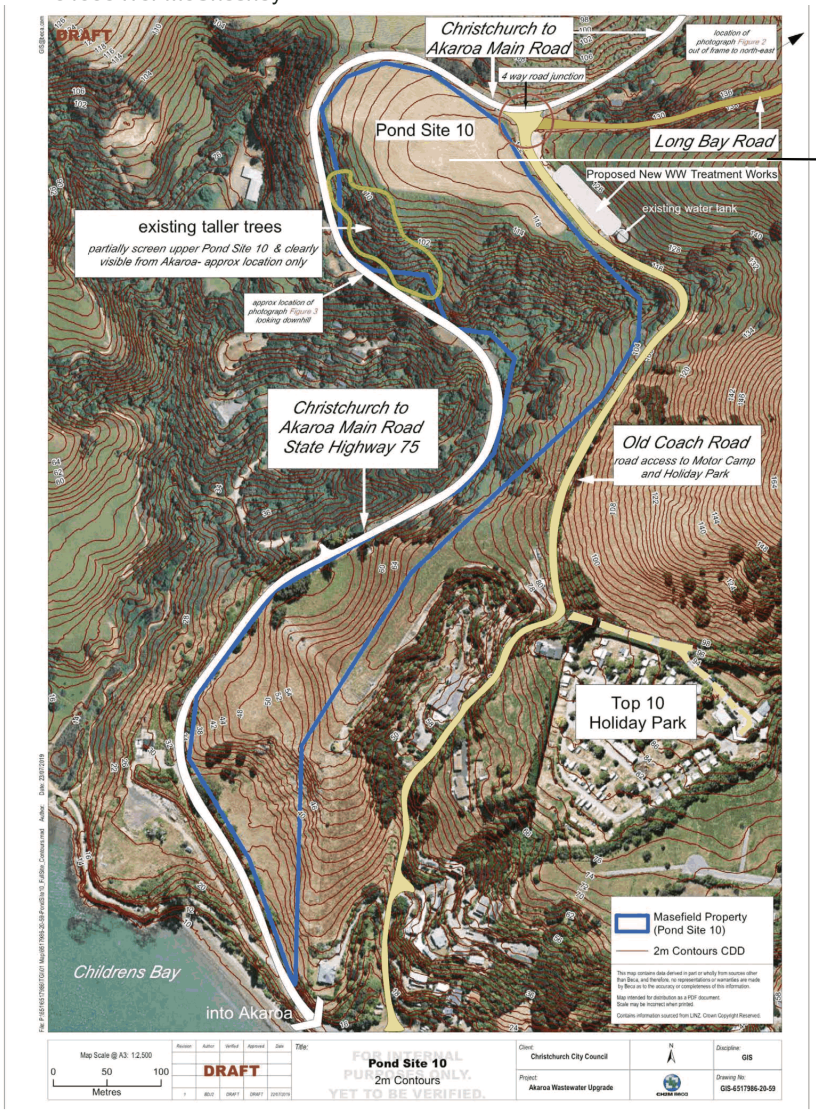


Figure 1 - Draft BECA 2m interval contour plan showing boundary of Pond Site 10 ownership in Blue with annotations identifying additional features including the proposed Wastewater Treatment in relation to the upper part of the Pond 10 site

Figure 2 -View looking towards the upper part of Pond Site 10 from an elevated corner location on Long Bay Road, a designated tourist route to the Summit Road. Site colour arises from the field crop. Christchurch Akaroa Road & Old Coach Road junction is clearly visible.

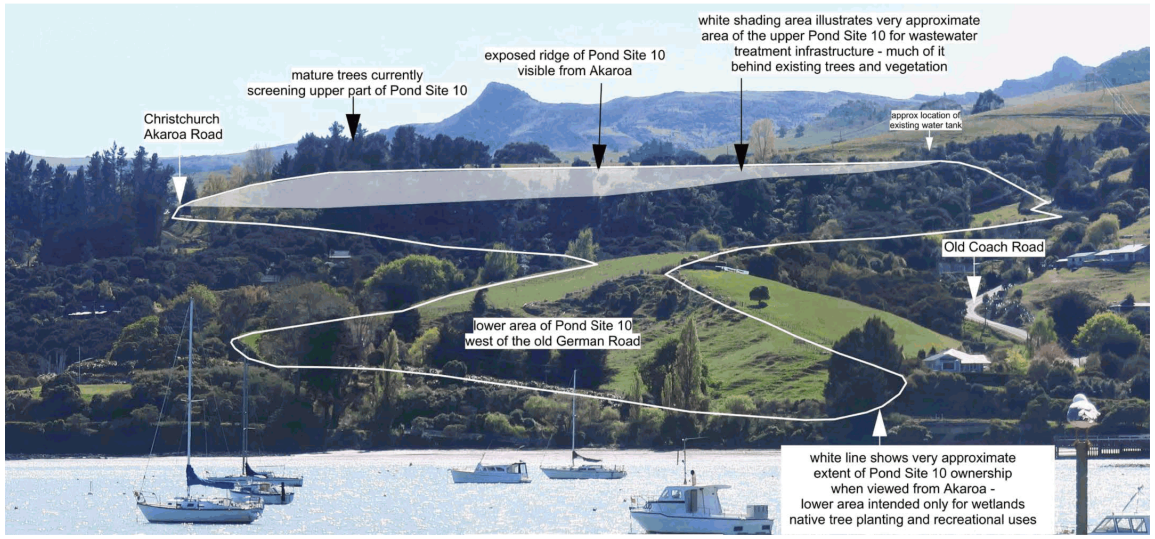
Figure 3 - Looking along the Christchurch Akaroa Road as it heads downhill into Akaroa - all the land to the left and much of that in the front view lies within the lower part of Pond Site 10 and continues all the way down to the entrance into Akaroa opposite the Boat Park.

34095 Ivor McChesney

Figure 4 - Photo-composite image of the undulating surface of upper part of the Pond 10 site looking south to Akaroa and east toward the 4-way road junction with the main Christchurch Akaroa Road on the right. This image is taken from a location within the road reserve immediately opposite the currently proposed Wastewater Treatment Works site on Old Coach Road. It illustrates the extent and visually exposed nature of this ridge-top location between the Akaroa and Takamatua catchments. This site will need to be significantly re-engineered to accommodate the proposed wastewater infrastructure, including the currently proposed three large ponds to contain both treated and untreated (raw) sewage.

Figure 5 - View from the Akaroa waterfront looking north across the water of the harbour towards the ridge and Pond Site 10.

Figure 6 - to the right is a zoom of the same image to illustrate more clearly the visibility and extent of Pond Site 10.



The Pond Site 10 ridge is overlooked by surrounding higher land and potentially visible from a substantial area of Akaroa township. It is partially screened from the township by a group of older mature evergreen trees on falling ground just below the site, as seen in the centre of *Figure 4* and in the photos above. **Development of the upper part of Pond Site 10 site for wastewater infrastructure is a requirement of all currently proposed options. It is a location sensitive to inappropriate change its development may prove very difficult to mitigate.**

Christchurch City Council

Akaroa Treated Wastewater Options Consultation (2020)

Presentation by

FRIENDS of Banks Peninsula

to

Akaroa Wastewater hearing panel

13 October 2020

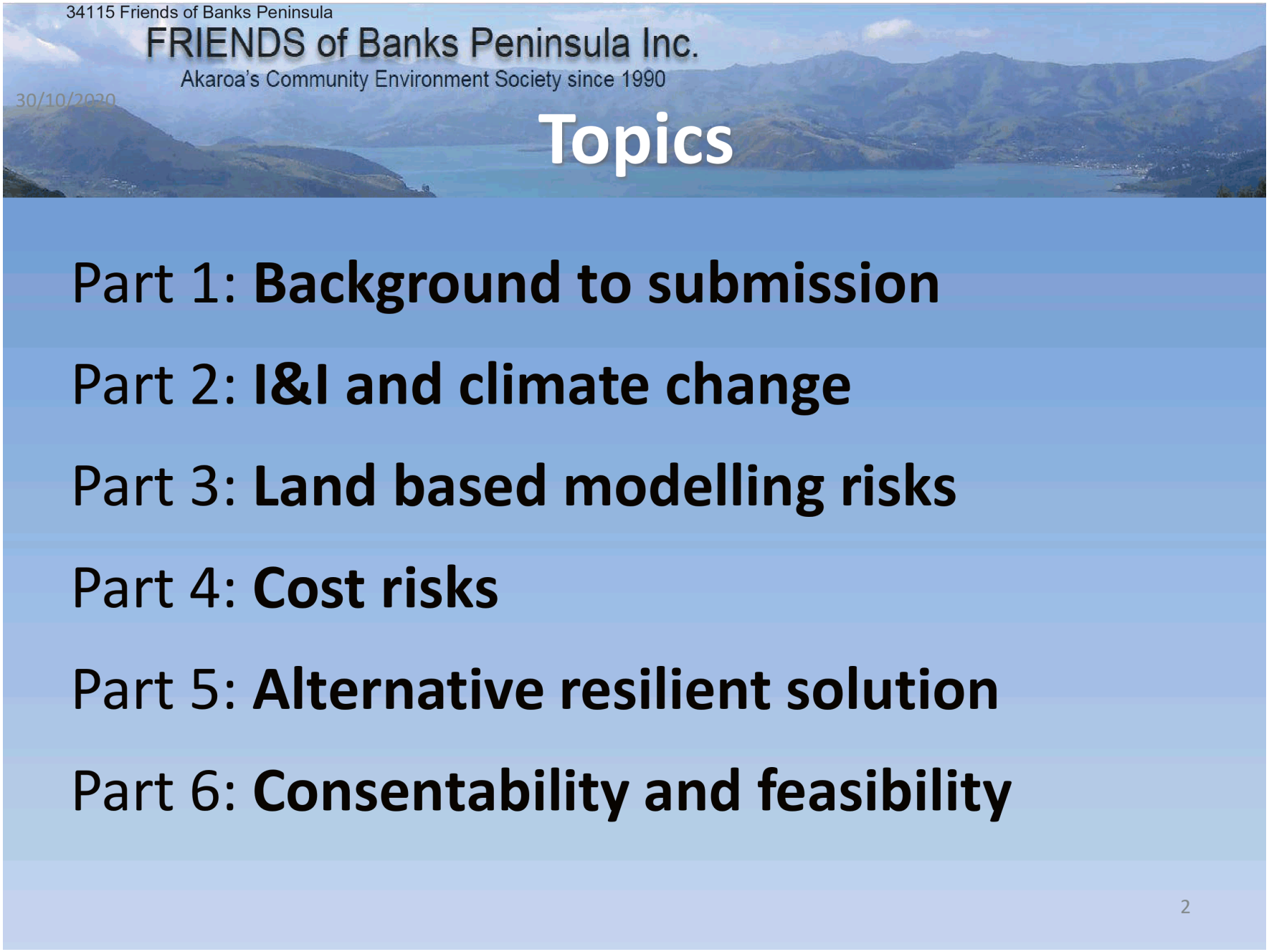
Suky Thompson PGDip(Parks Recreation Tourism)

Brent Martin PhD(Computer Science)

Pru Steven QC

Jack Turner BE(Civil) MRP(Hons) CPEng Tektus Consulting

Emily Afoa BA/BE(Hons) PhD(Civil) CPEng Tektus Consulting


34115 Friends of Banks Peninsula
FRIENDS of Banks Peninsula Inc.
Akaroa's Community Environment Society since 1990
30/10/2020
Topics
Part 1: Background to submission
Part 2: I&I and climate change
Part 3: Land based modelling risks
Part 4: Cost risks
Part 5: Alternative resilient solution
Part 6: Consentability and feasibility
2

Part 1:

Background to submission

Presenter: Suky Thompson

www.friendsofbp.org.nz

3

34115 Friends of Banks Peninsula

FRIENDS of Banks Peninsula Inc.

Akaroa's Community Environment Society since 1990

30/10/2020

Friends of Banks Peninsula

- Address local community environmental issues
- Involved with Akaroa Wastewater since 2008
- Recognise this is a tough problem to solve
  - cultural need to end harbour discharge
  - geology largely unsuitable for land disposal
  - local communities caught in the middle
- **Do not support consultation options**
- Community alternative solution
  - resolves these issues
  - provide future climate resilience

"the working party is disappointed with the final options, especially as an increasing impact of climate change will be scarcity of water". WP Joint statement 25 June 2020

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Informing our Submissions

- In depth understanding of proposals
  - 4 year Working Party process
  - Reviewed all technical reports
  - Taken expert advice
    - legal, engineering,
    - quantity survey, ecologist
- Clear community message
  - **Treat to potable standard**
  - **Reuse in Akaroa to solve chronic water shortages**

- Resultant **submission endorsed by 340 people**

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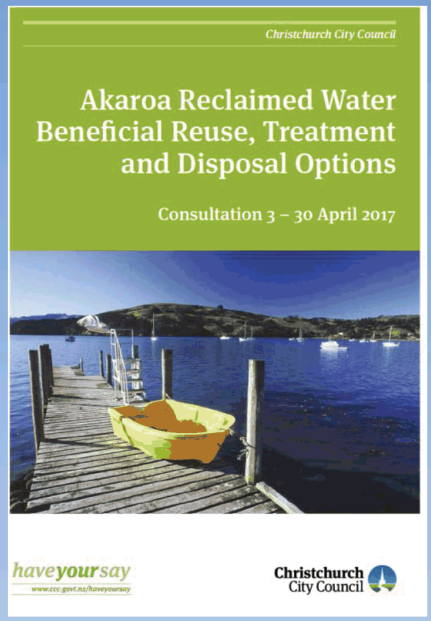
2017 Submission

- Advocated purple pipe re-use in Akaroa terminating with harbour outfall
  - New concept in 2017
  - Adopted as Option 4 in 2020
- Our calculations showed 100% re-use possible over time
  - Based on Council's data
- Council review of FOBP calculations
  - Led to discovery of faulty flow meter
  - Actual wastewater volume is double with 60% I&I



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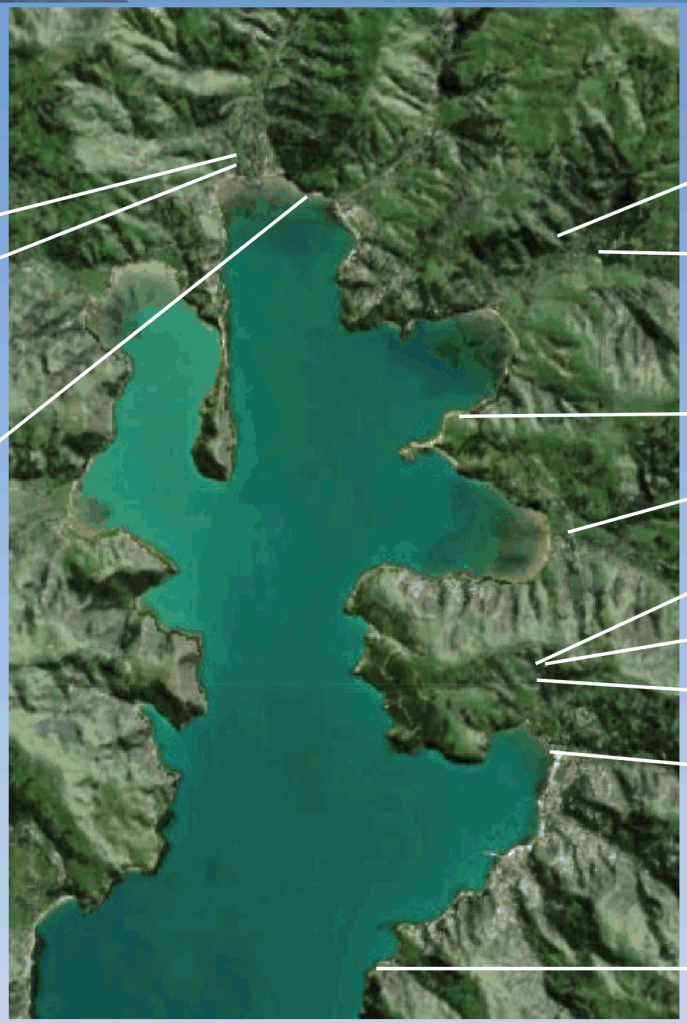
Large footprint = community distress

Duvauchelle system

Irrigation Field 11ha using Golf course

Storage dam + wetlands 1.5ha replace Showground

Existing plant



Akaroa system

2 ha Storage dam

Main Irrigation Field 34ha

Irrigation Field 3.1ha

Irrigation Field 2.9ha

Treatment plant

Raw sewage pond

Wetland and overflow

Terminal Pump Station

Existing plant Takapuneke

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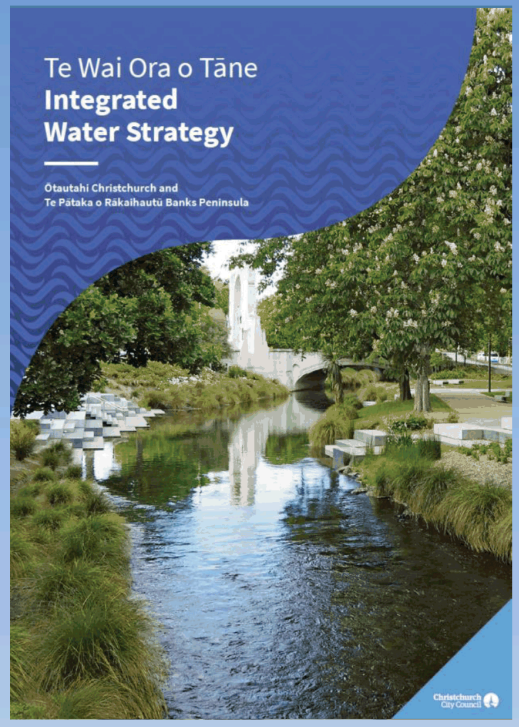
2020 Submission aims

- Critique of consultation options
  - Identify risks
- Help Council find a better solution
  - Meet cultural needs
  - Reduce impact on communities
  - Reduce environmental risk
  - Provide future climate resilience
- Integrated approach:
  - REDUCE stormwater infiltration
  - REUSE wastewater beneficially
  - RECYCLE to alleviate town supply shortage



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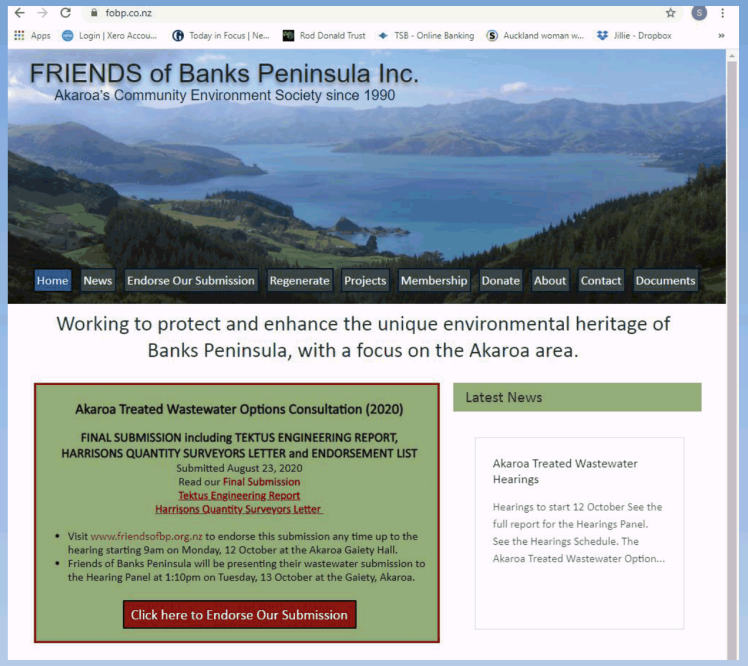
Public development

- Developed transparently in public domain
- Community fundraised for expert advice
  - Local residents personal donations
  - Takamatua Ratepayers Association
- Endorsed by
  - 340 individuals
  - Akaroa Civic Trust , Akaroa Ratepayers
  - Robinsons Bay Ratepayers
  - Other submitters
- Includes social and heritage impacts
  - Support other submitters concerns
  - Akaroa Civic Trust, Pavitt Cottage Trust
- Focus of presentation today
  - Environmental and cost risks
  - Future solution



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Part 2:

I&I

and

Climate Change

Presenter: Suky Thompson

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Volume a critical factor

- Harbour disposal is not volume limited
- Land based disposal **is** volume limited
  - More wastewater means bigger storage ponds
  - More wastewater needs more land for disposal
  - Correct sizing is critical
- Storage ponds are greatest community concern
- I&I – broken pipe network
  - Affects storage requirement drastically

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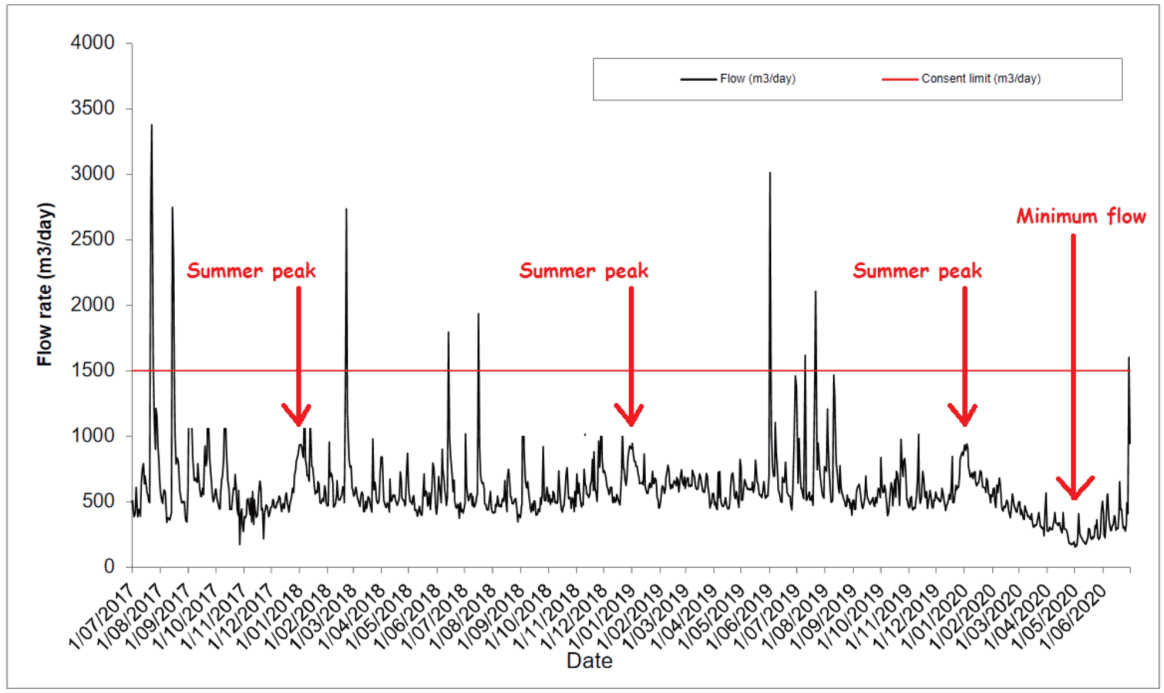
Significant I&I reduction critical

- I&I peaks during wettest conditions when irrigation is least feasible



- Winter I&I drives the need for oversized storage ponds
- I&I also results in raw network overflows

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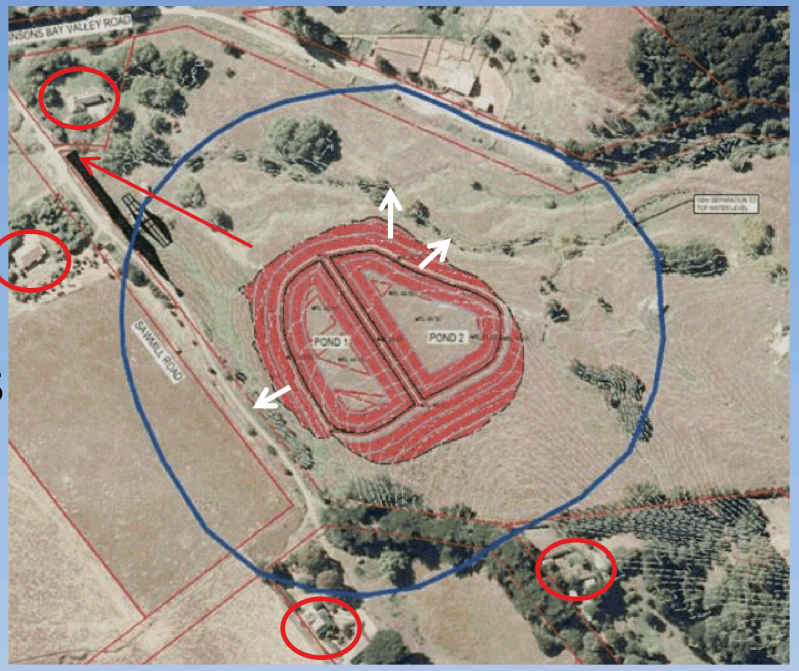
I&I means huge storage requirement

- Main storage dam to hold 19,000m^3
  - 2.7ha excavated 4m deep
  - 4m high dam face
- Sawmill Road only Inner Bays site with capacity
- Setbacks at minimum limits
  - Close to homes
  - Access over heritage site
  - Earthworks encroach on stream and gully
  - Downstream valley infrastructure at risk



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Pond Site 10 – I&I workarounds

- Raw sewage pond
  - Buffers inflow during heavy rain
- Constructed wetland enables Inner Bays option
  - Releases water to harbour if Robinsons Bay full
  - Reduces size of Robinsons Bay storage pond so it can fit
  - Similar wetlands needed for Duvauchelle scheme to fit

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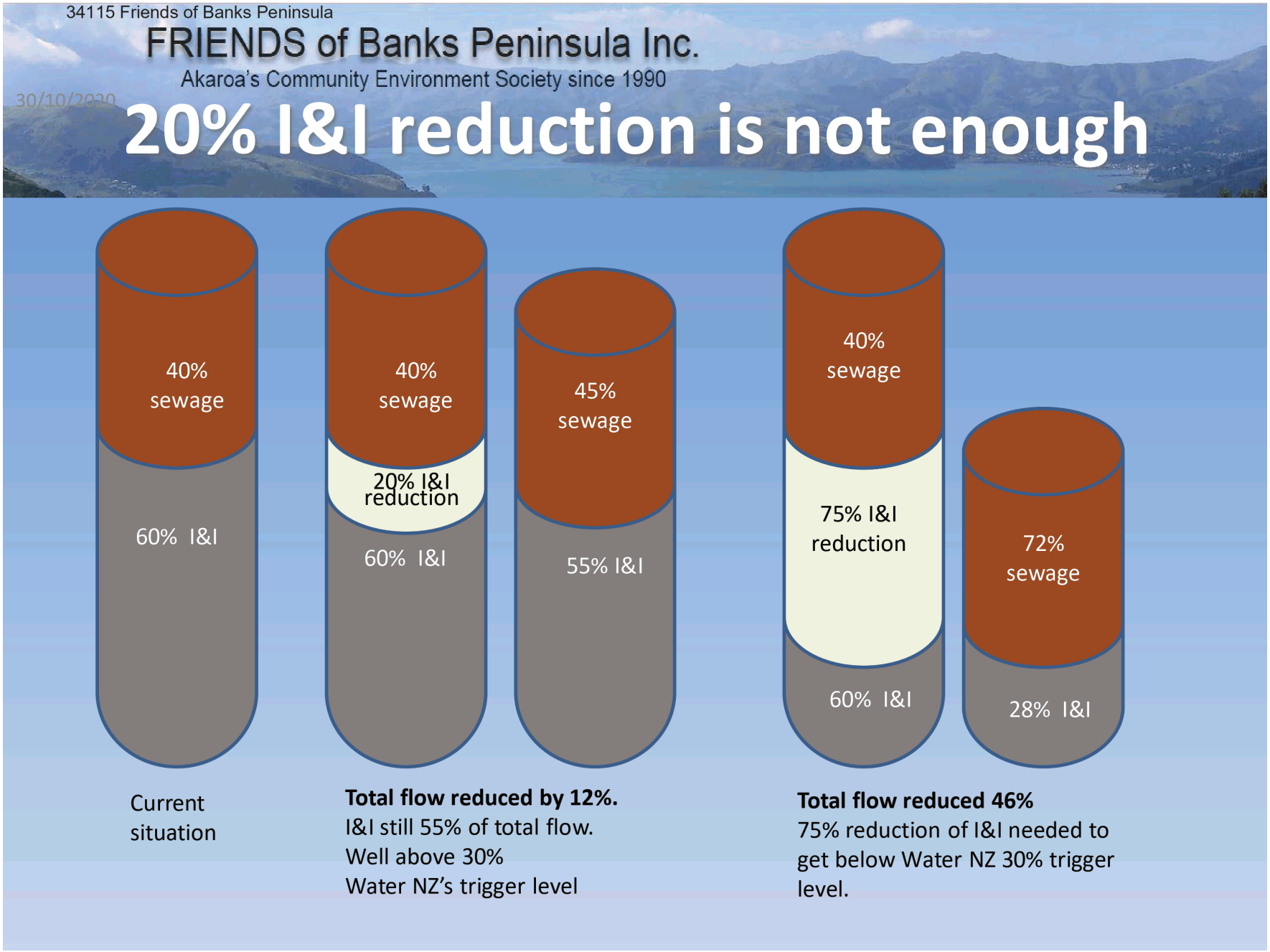
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20% I&I reduction is not enough
40% sewage
60% I&I
40% sewage
20% I&I reduction
60% I&I
45% sewage
55% I&I
40% sewage
75% I&I reduction
60% I&I
72% sewage
28% I&I
Current situation
Total flow reduced by 12%.
I&I still 55% of total flow.
Well above 30%
Water NZ's trigger level
Total flow reduced 46%
75% reduction of I&I needed to get below Water NZ 30% trigger level.

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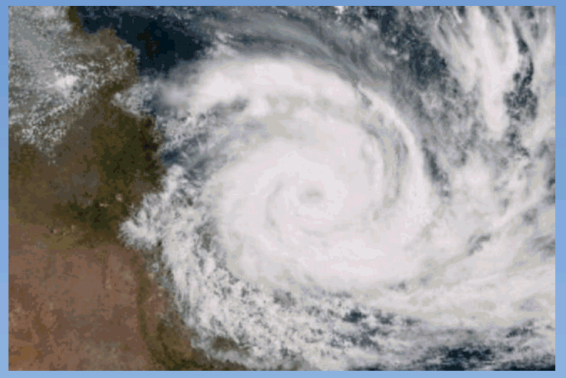
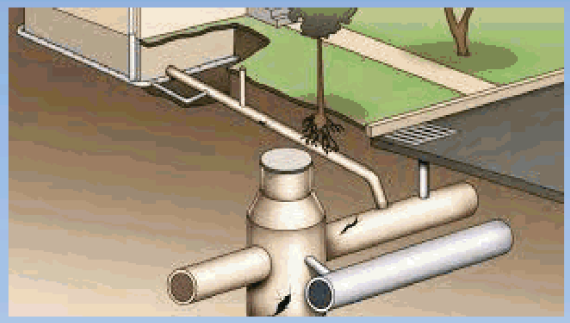
Climate Change exacerbates I&I risk

- Climate change exacerbates
  - peak storms
  - coastal groundwater level
- Partial fix to I&I proposed
  - Leaves network vulnerable to further incursion
  - Risks undersized system in future
  - Increases risk of raw overflows
- Fully fixing I&I provides future resilience
  - Requires a sealed system in lower part of Akaroa





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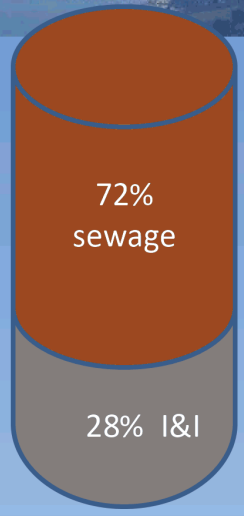
Reducing I&I top priority

- Reducing I&I significantly would
  - greatly reduce size of system
  - provide a much more resilient system
  - reduce raw sewage network overflows



- Strong public support in submissions
- **Add Government funding to Council funds**
  - **replace broken pipes with modern sealed system in lower town**
  - **$3.1m + $3.1m = $6.2m for I&I new pipes**

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Part 3:

Native tree irrigation model sensitivity to assumptions exposure to risk

Presenter: Dr. Brent Martin

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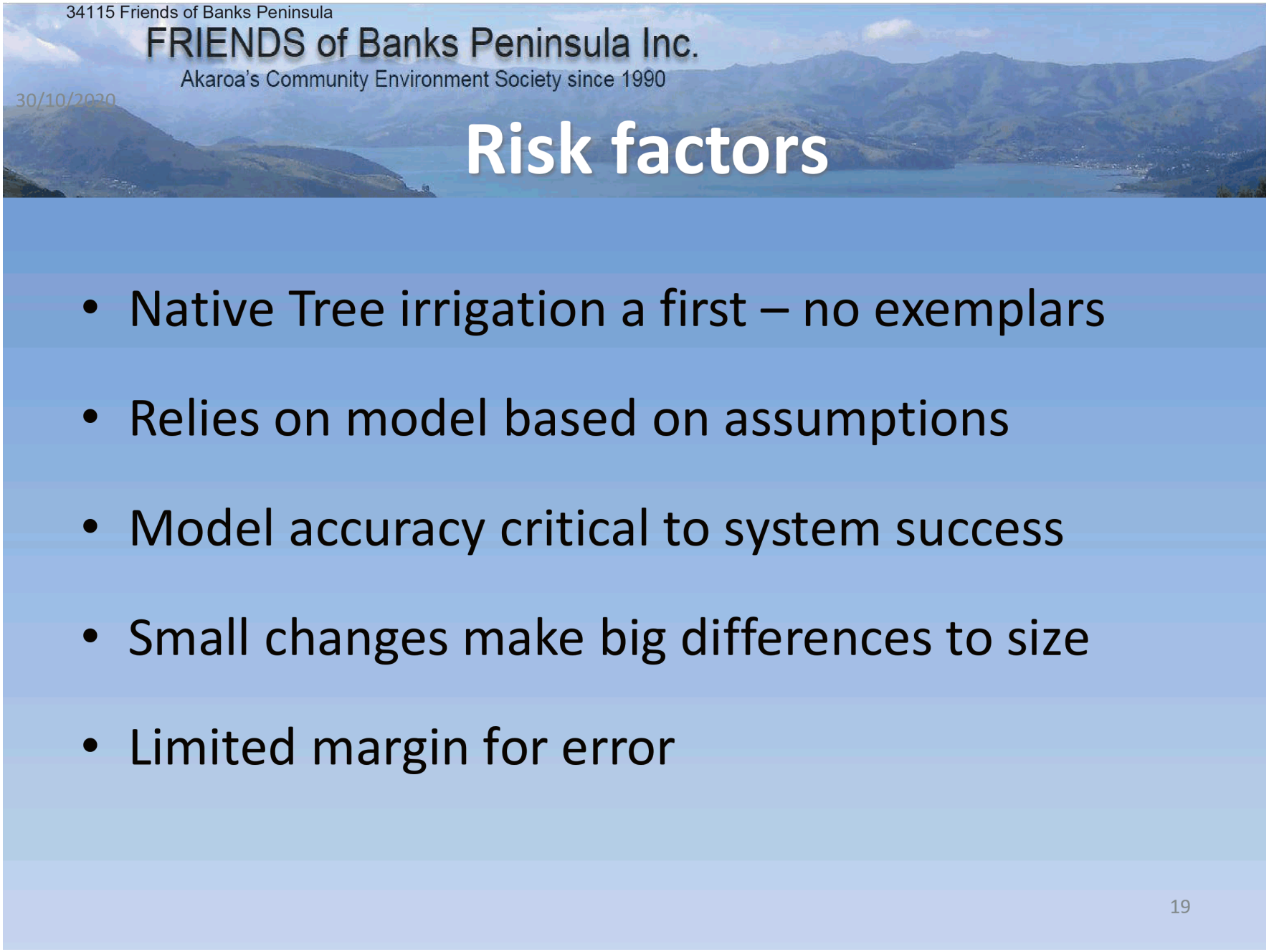
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Risk factors
• Native Tree irrigation a first – no exemplars
• Relies on model based on assumptions
• Model accuracy critical to system success
• Small changes make big differences to size
• Limited margin for error
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Native Tree irrigation a first

- Council exemplars of limited relevance
- Levin ("The Pot")
  - 50ha pines on sand plain
  - 10ha kanuka/manuka
  - recently planted
  - *"world first", "experiment"*
- Waikouaiti, Warrington
  - small systems discharging to sand near the coast
- None limited by soil uptake

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Critical assumptions

For the design irrigation area and storage:

- Sufficient rainfall is intercepted by the tree canopy to allow watering in winter
- Native trees will thrive on the water volume and nutrient load
- Year-round irrigation under trees will not cause instability on proposed soil types and slopes

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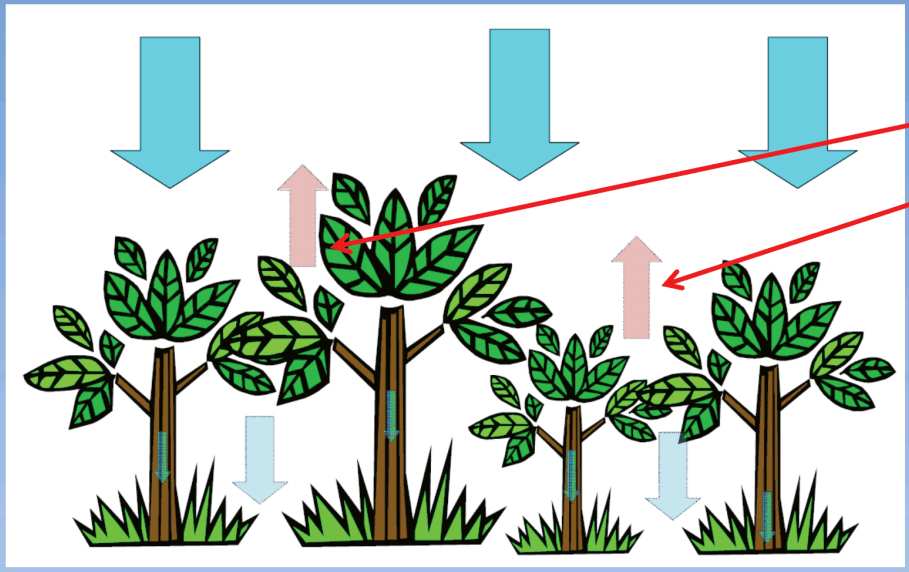
Reliance on canopy intercept

- Canopy intercept underpins concept of winter irrigation



Intercepted rainfall doesn't wet ground

(Davie 2007)

- Key component of solution
  - Assumes intercepted rainfall can be "replaced" with wastewater
  - Essential because proposed irrigation fields have poor draining soils

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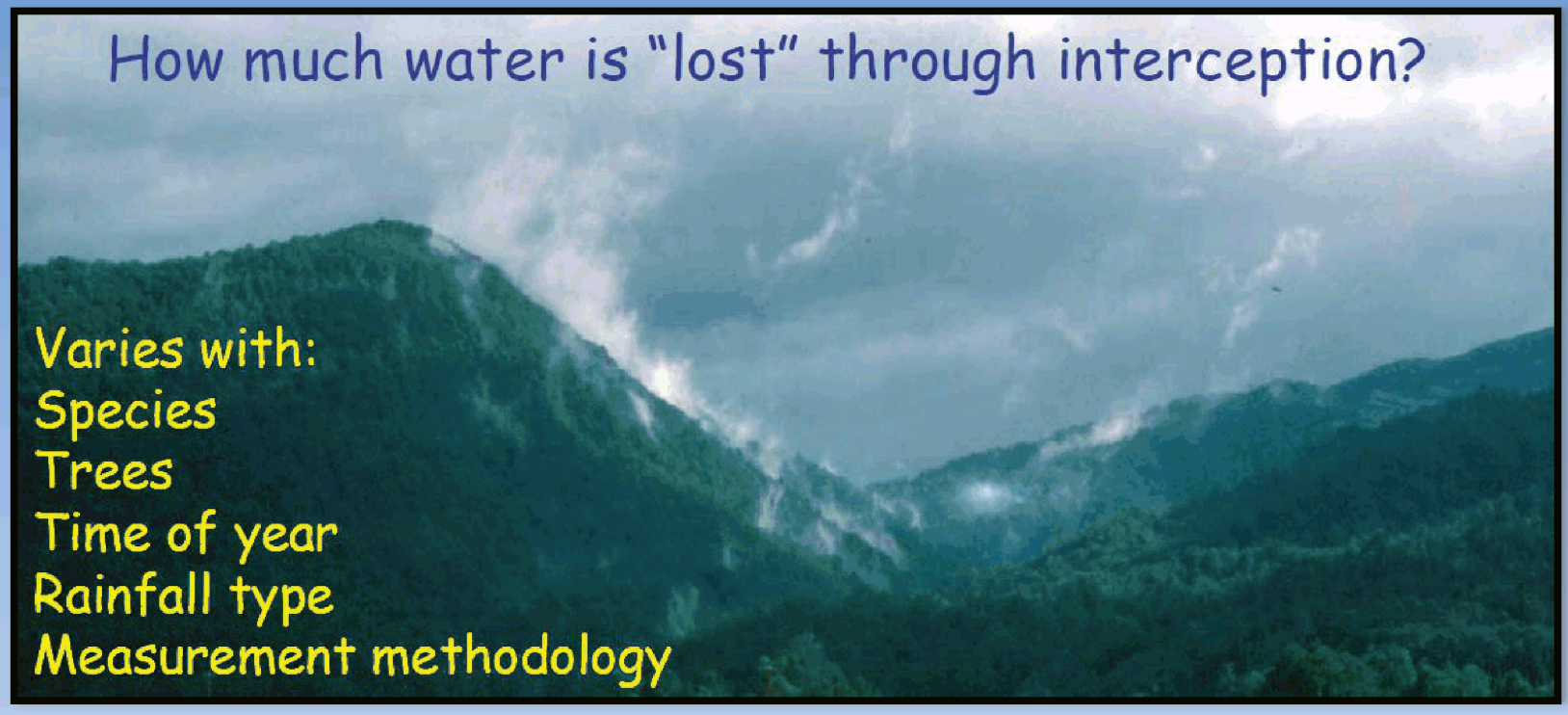
Intercept rates highly variable



Slide from Landcare Research workshop presentation by Tim Davie

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Canopy intercept rate assumption

Summary NZ figures - annual

Canopy cover	*Interception loss*
Pinus radiata	22%
Douglas Fir	29%
Native forest	33%
Scrub (manuka/kanuka)	37%
Tussock grassland	21%

Caution with annual percentages
Climate an important factor

Average used in model

(Tim Davie, Landcare research)

No guarantee 37% canopy intercept will be achieved

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Duvauchelle wastewater tree trial

- Trees planted in 2015, half irrigated with Duvauchelle wastewater
- Intended to verify that irrigation will perform as modelled
- Results released in Officers report 2 October 2020
  - Based on soil samples taken in 2018
  - After 3 years irrigation only and during initial rapid growth stage
- Results raise questions around
  - Nitrogen removal
  - Tree ability to thrive

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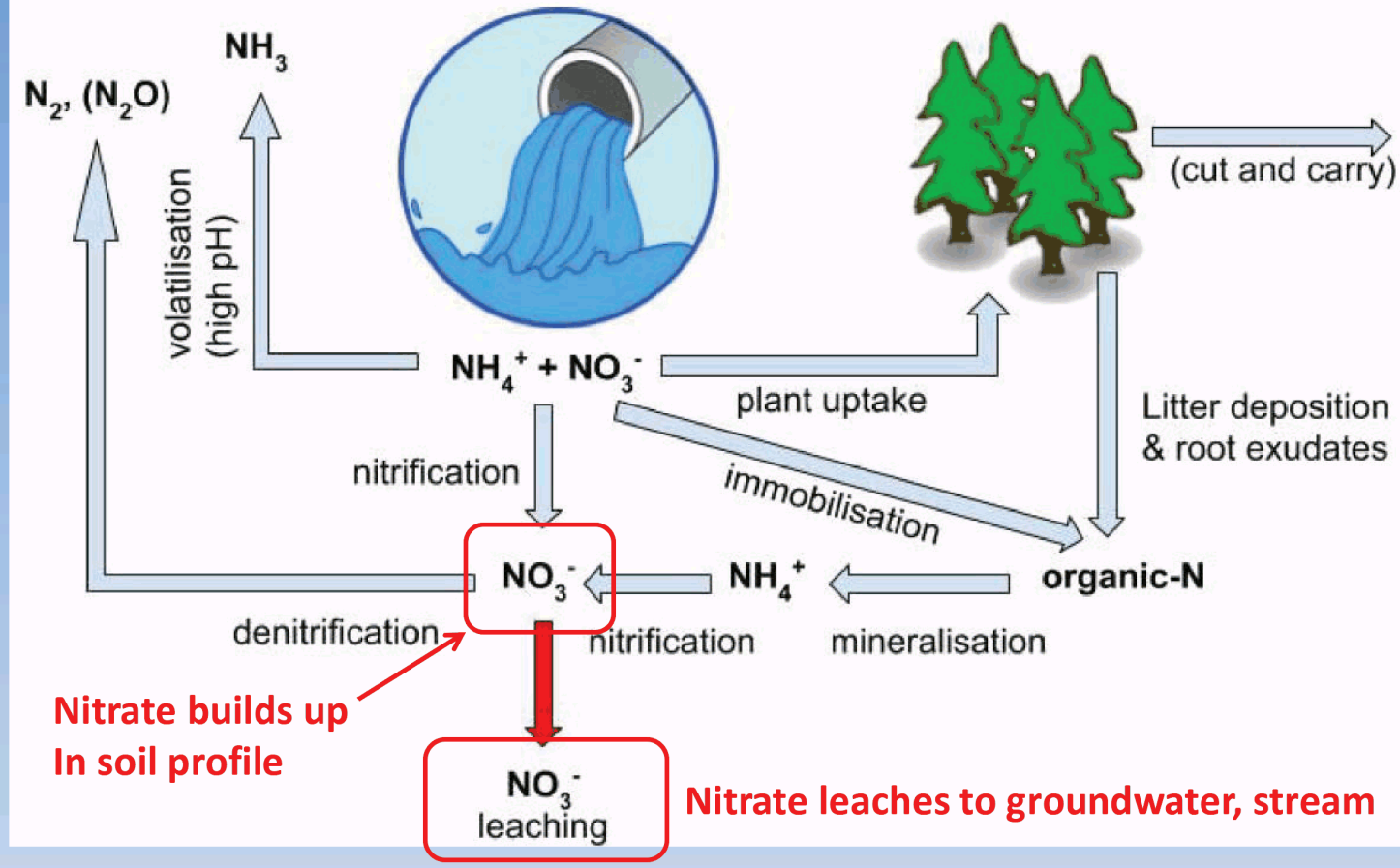
What is Nitrate leaching



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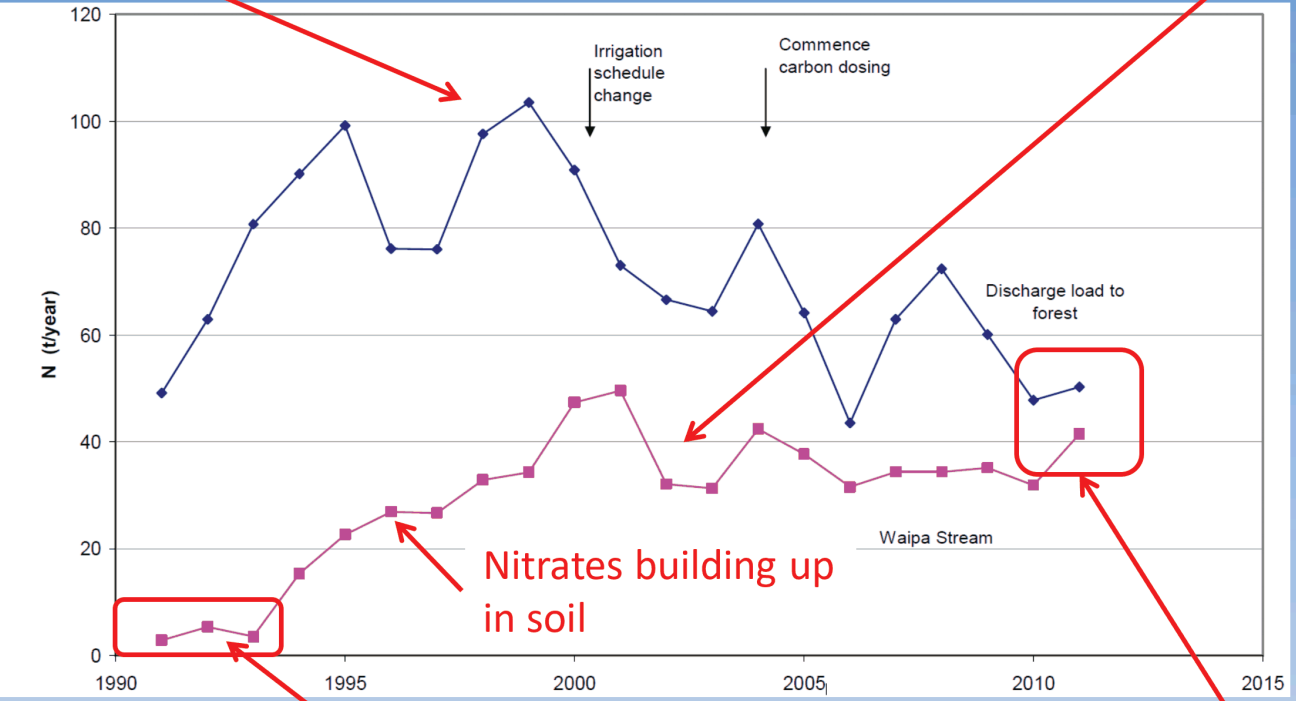
Long-term experience Whakarewarewa

Amount of nitrogen irrigated to forest

Nitrogen leached into stream



Nitrates building up in soil

First three years OK (length of Duvauchelle tree trial)

Long term: almost All nitrogen is leaching

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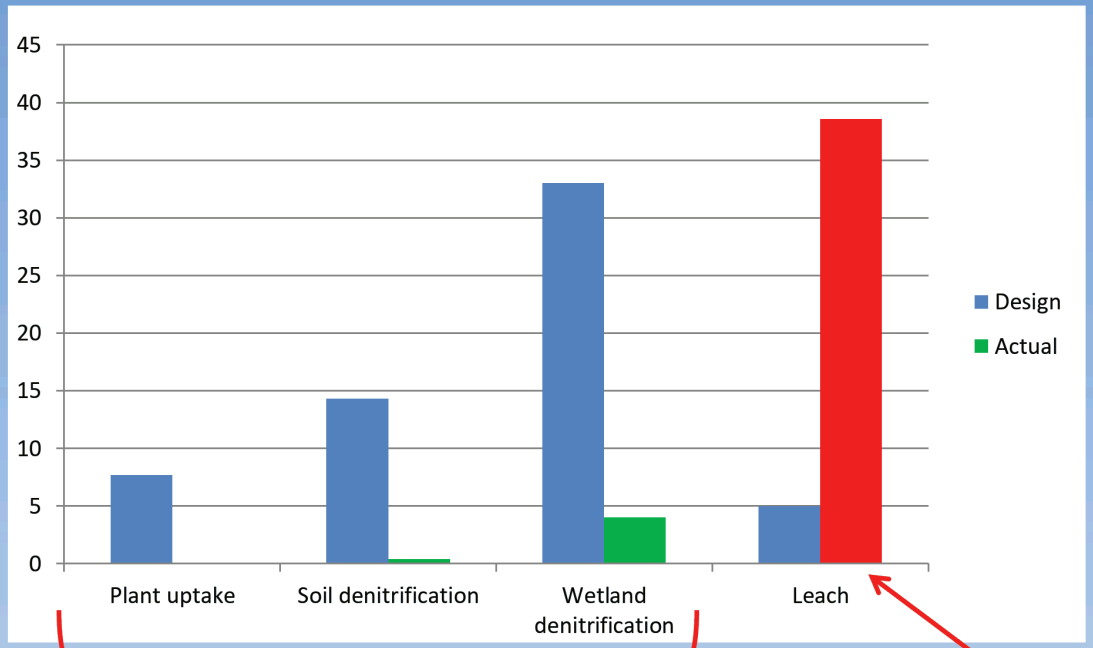
Design versus actuals - Whakarewarewa

Nitrate performance expectations versus 20 year actual results*



* *Rotorua Te Arawa Lakes Strategy Group 2013: Progress on the Change in Consent Condition Application for the Rotorua Wastewater Treatment Plant and Land Treatment System, June 2013*

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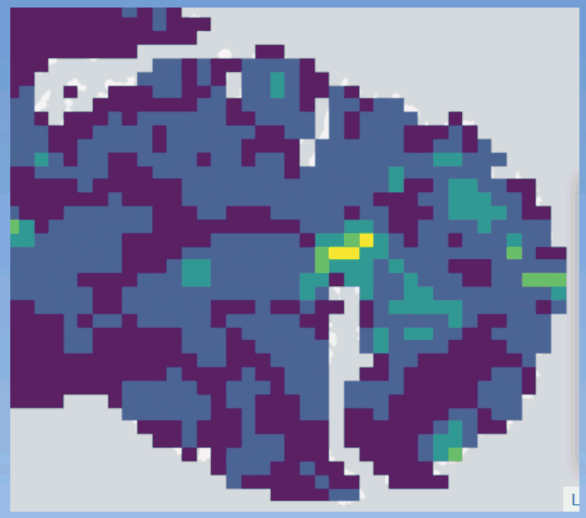
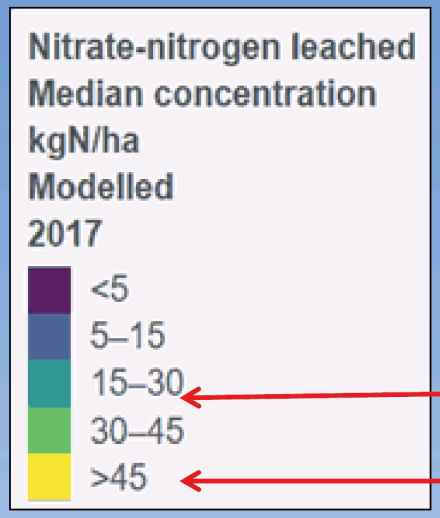
Leaching results Duvauchelle tree trial





Results after three years

Trial - average

Trial - worst

- Leaching significantly increased *after first three years*:
  - Equal to worst 1% of Banks Peninsula
  - Flax, cabbage trees worst: same as highest on BP (dairy farm)
- Likely to continue to increase – accumulating in topsoil
  - Nitrate concentrations doubled in first three years

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Map source: https://www.stats.govt.nz/indicators/nitrate-leaching-from-livestock

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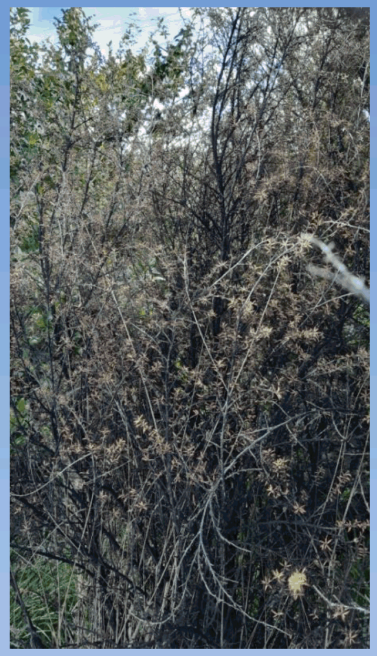
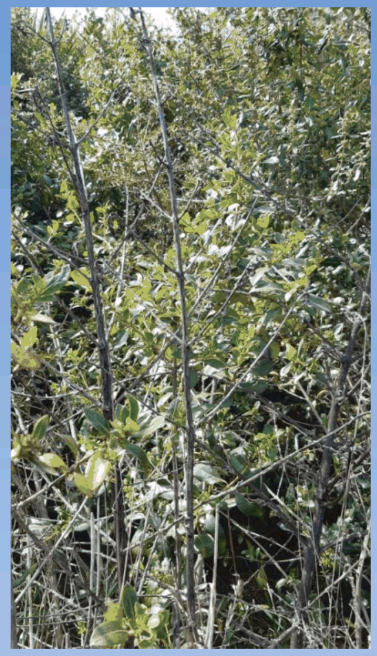
Tree mortality





- 36.5% mortality reported after three years
  - Manuka and kanuka heavy losses

- Coprosmas deformed growth
- Flaxes, cabbage trees doing best but
  - Poorest nitrogen performance
  - Non canopy-forming species

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Tree trial – independent assessment

- *"At least half of the plants looked ill and unthrifty*
- *Wastewater may have conferred initial benefits but a mere three more years of* ***wastewater delivery has seriously damaged the plants*** *throughout the site*
- ***My judgment of the trial is that it is a failure"***

- Geoff Walls, Ecologist, Taramoa Consultants, 8th October 2020

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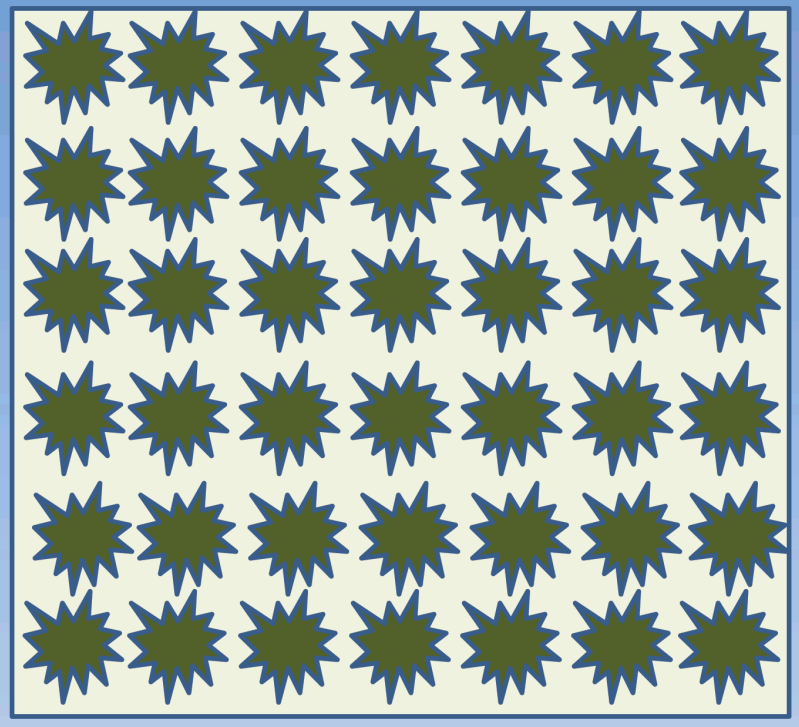
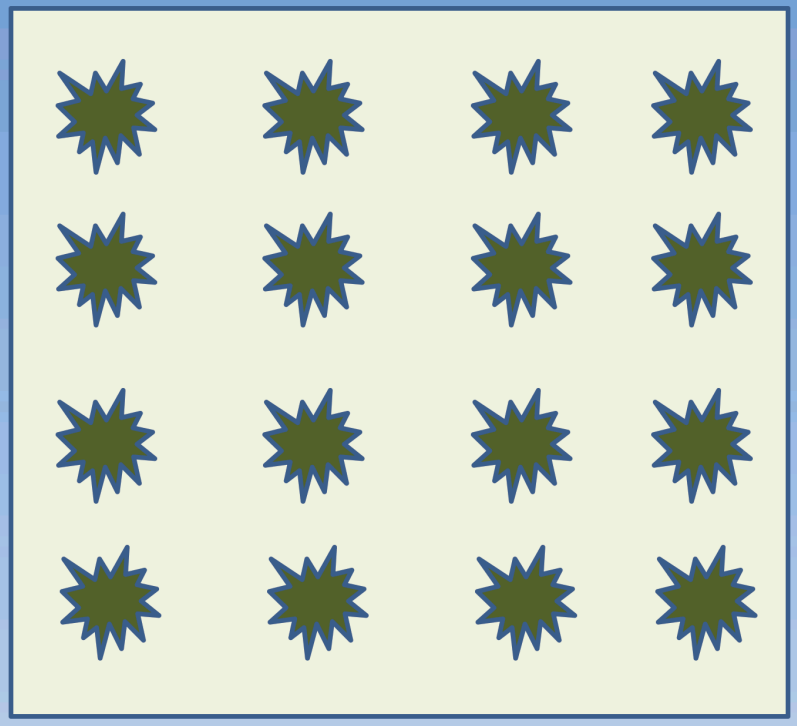
Applicability of trial to proposal

Duvauchelle Trial planting density



Proposed irrigation fields density



- Lower density of planting costed into proposals
- Fewer plants to take up nutrients per ha

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Summary of risks identified

- **Canopy intercept 37% may not be achieved**
- **Nitrogen uptake likely lower than expected**
  - Duvauchelle tree trial results concerning
  - Long term experience elsewhere
- **Natives fail to tolerate wastewater**
  - Duvauchelle tree trial high mortality, failure to thrive
  - Canopy forming species performing worst
- **Native tree irrigation at high risk of failure**
  - **No "Plan B"**

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Sensitivity to model assumptions

Modelled storage requirement

Reduction in I&I	30 ha	40 ha	60 ha
0%	**463,000m³**	36,000m³	21,000m³
20%	40,000m³	24,000m³	16,000m³
40%	21,000m³	14,000m³	12,000m³
60%	10,000m³	9,000m³	9,000m³

- Inner Bays irrigation field size and storage based on
  - 20% I&I reduction achieved and maintained
  - Canopy interception of 37%
  - Tree and soil ability to take the water & nutrients
- Larger system required if assumptions not achieved

- Figures most recent available detailing model. *Akaroa Wastewater Summary of Disposal and Reuse options, CH2M Beca Ltd 8 May 2020. Table 4-4.* Storage requirement now provided by both Robinsons Bay Pond and wetland.

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Inner Bays Highest Risk Exposure

- No room for expansion
- Proximity to streams
  - Higher risk of nitrogen pollution
- Streams drain to vulnerable shallow mudflats
- High impacts on people if system does not perform
  - Odour from mudflats

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Part 4:

Cost risks

Presenter: Suky Thompson

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Extremely expensive and growing

- Latest Inner Bays budget estimate **$68.8** million
  - **$6 million** increase on consultation top end cost
  - $30 million more than current budget of $38.8 million
- **830 connections = $82,800 per connection**
- **Costings in consultation document include WWTP**

The four options at a glance

	Comparisons			
	Inner Bays Irrigation Scheme	Goughs Bay Irrigation Scheme	Pompeys Pillar Irrigation Scheme	Harbour Outfall Scheme
Capital cost range ($ millions)	$54m to $63m	$61m to $71m	$66m to $76m	$45m to $52m
Operating cost (per year)	$510,000	$580,000	$580,000	$470,000
Carbon impact (over 35 years)	8,900 tonnes stored	4,500 tonnes stored	8,300 tonnes stored	1,300 tonnes emitted
Distance from treatment plant (approximate kilometres)	5.6km	11km	13km	4km

All figures include approx $35m for WWTP component

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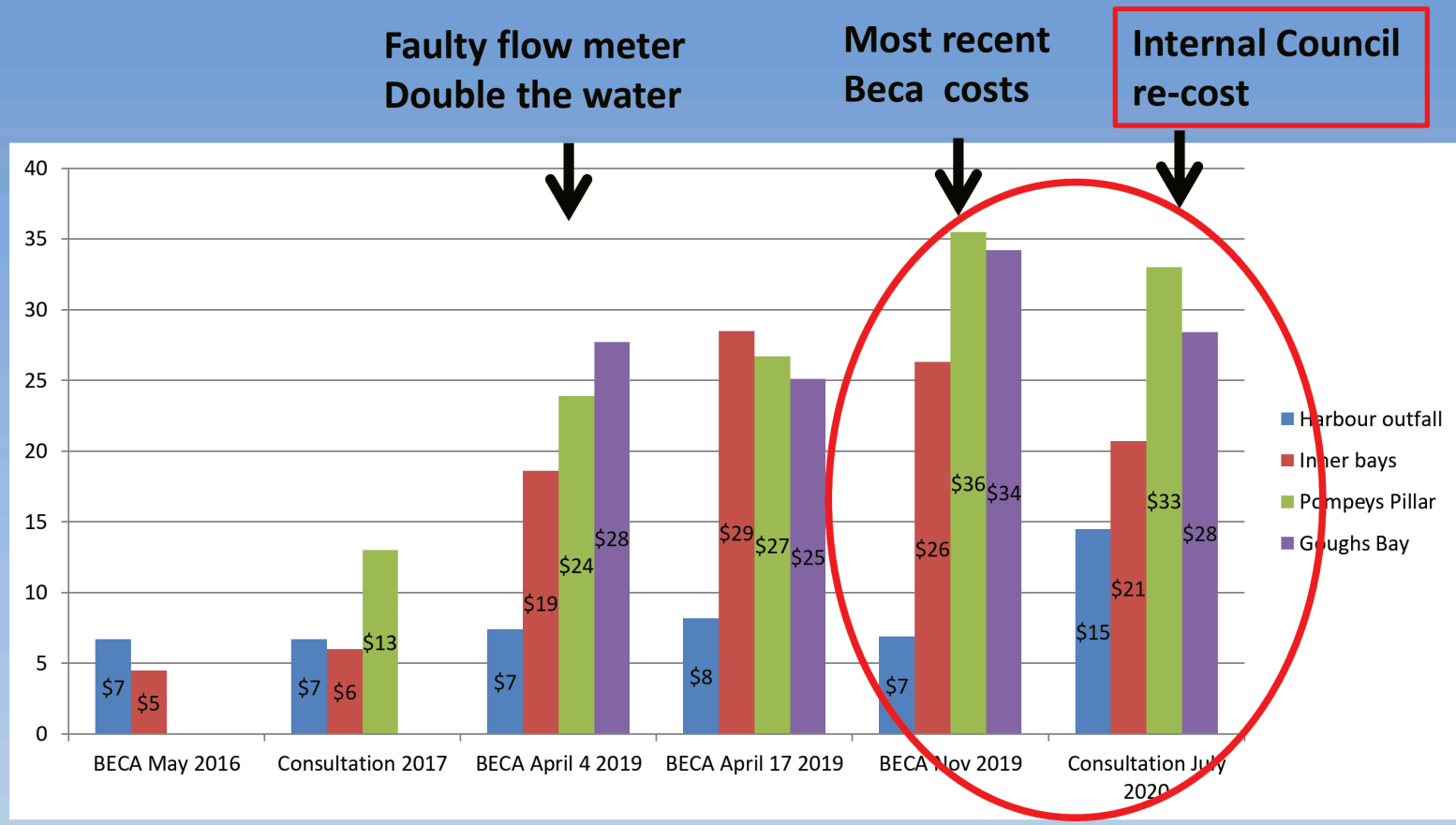
Cost history excluding WWTP



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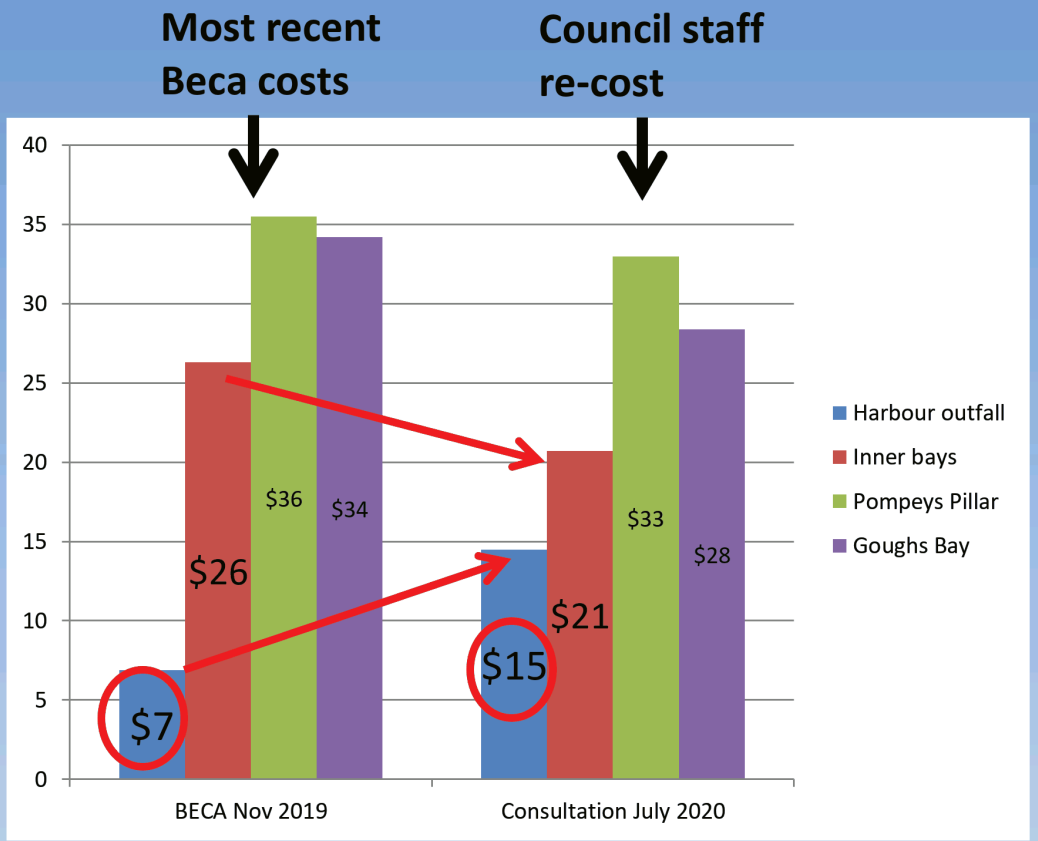
Examining internal re-costing

- Harbour outfall more than doubles
  - Highest contingency applied to lowest risk option



- Inner Bays cost reduced despite complexity

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Cost blowout risk

- Alarm bell raised by our Quantity Surveyor
  - Cost volatility = budget risk
- **We therefore request:**
  - **Independent review of costs**
  - **By impartial external agency**

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Part 5:

Future-focussed resilient option

REDUCE - REUSE - RECYCLE

Presenter: Dr. Brent Martin

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Design principles

- Deal with Climate change threats
  - Prepare for extreme storms and sea level rise
    - Replace broken pipe network with sealed network
  - Prepare for longer more frequent droughts
    - Direct water to Akaroa where it is most needed
    - Maximises beneficial re-use
- Address cultural needs
- Reduce social impacts
- Financially prudent
  - **No wasted sunk costs**
  - Stage to lower risk and spread costs
  - Flexibility at each stage

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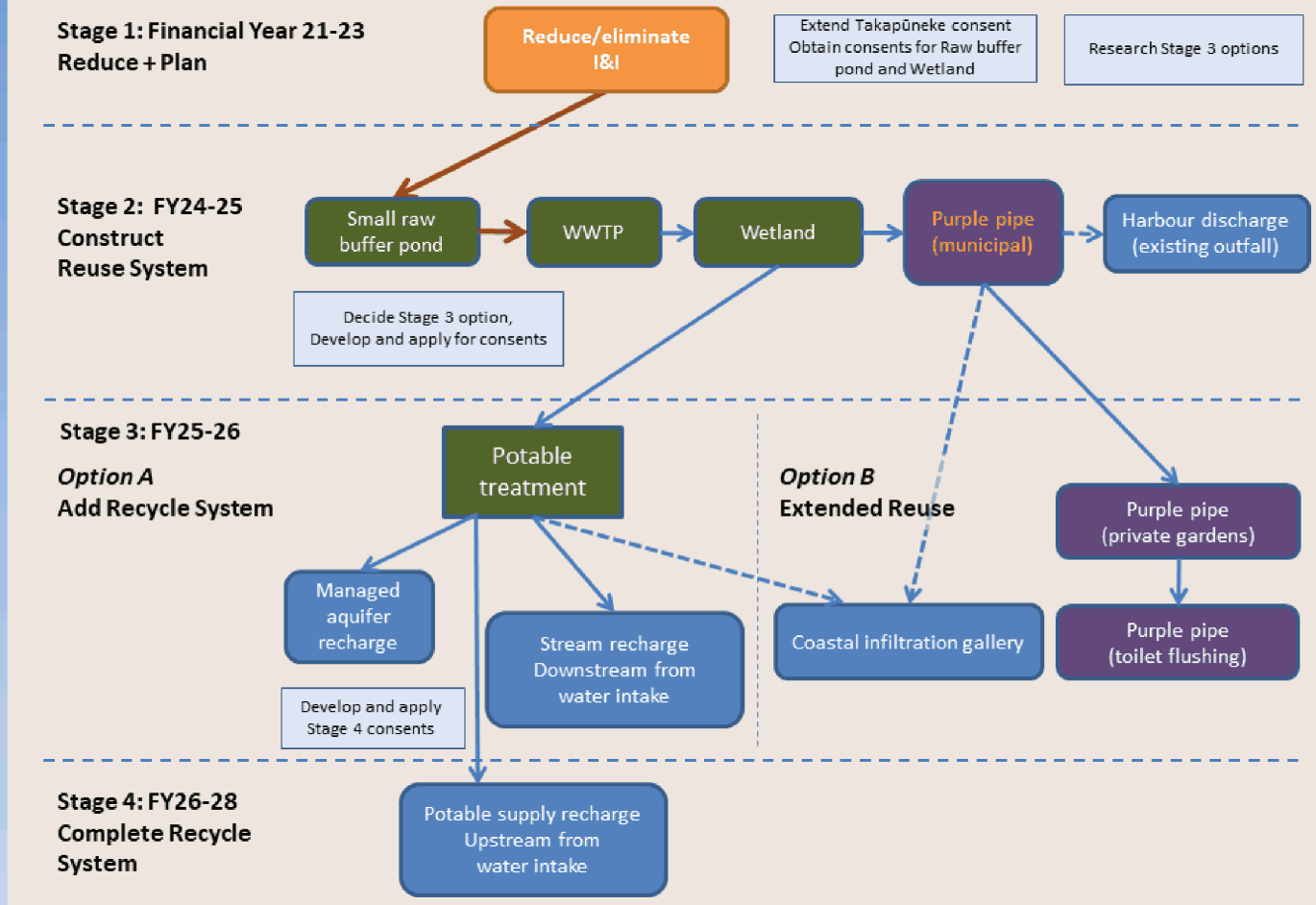
Staging in Reduce Reuse Recycle



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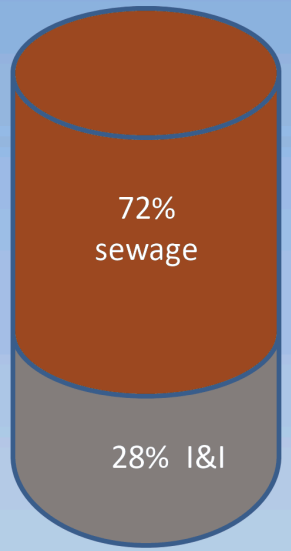
Stage 1 - Reduce I&I to below 30%

- High priority in Mahaanui Iwi Management Plan
  - All parties agree I&I reduction makes sense
- Current approach not guaranteed to deliver results
  - 20% insufficient to make a real difference
  - Network left vulnerable to climate change
- Tektus engineers advise
  - Partial low-pressure system in lower town to eliminate most inflow
  - CIPP if and where needed
- Saves money down the track
  - Smaller WWTP
  - Smaller everything
- Reduces raw sewage overflows



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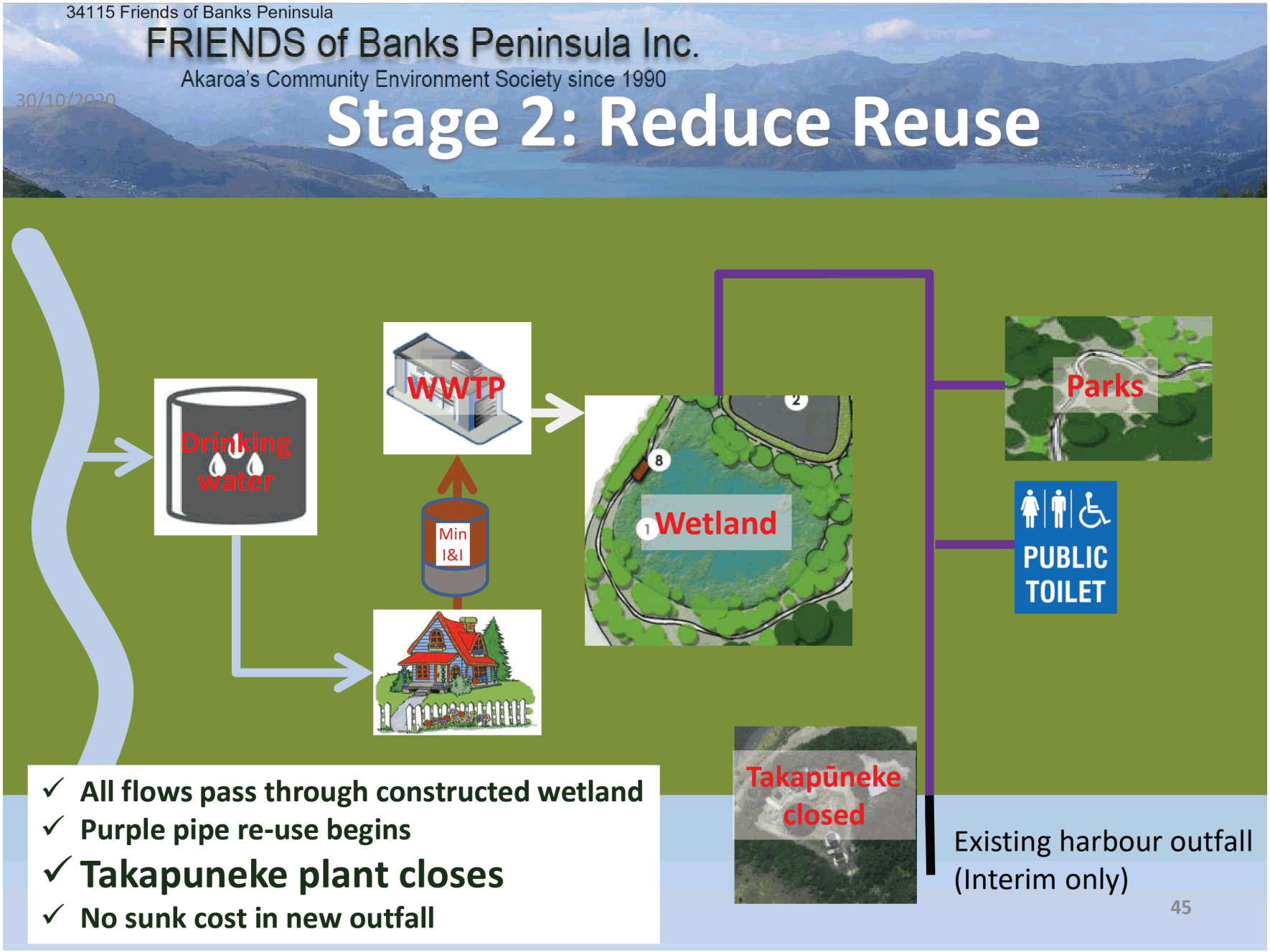
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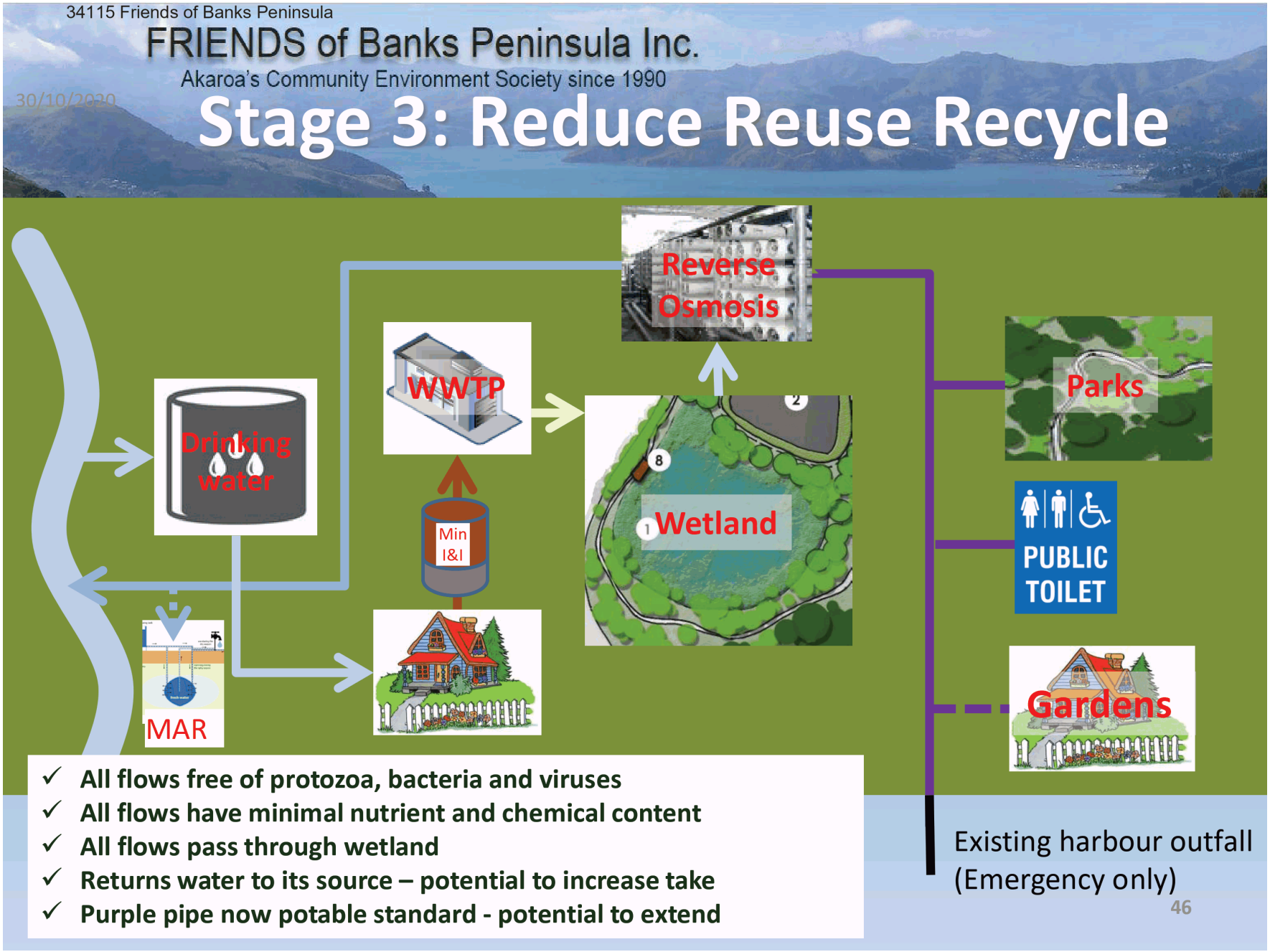
Stage 2: Reduce Reuse
Drinking water
WWTP
Min I&I
Wetland
Parks
PUBLIC TOILET
Takapūneke closed
Existing harbour outfall (Interim only)
✓ All flows pass through constructed wetland
✓ Purple pipe re-use begins
✓ Takapuneke plant closes
✓ No sunk cost in new outfall
45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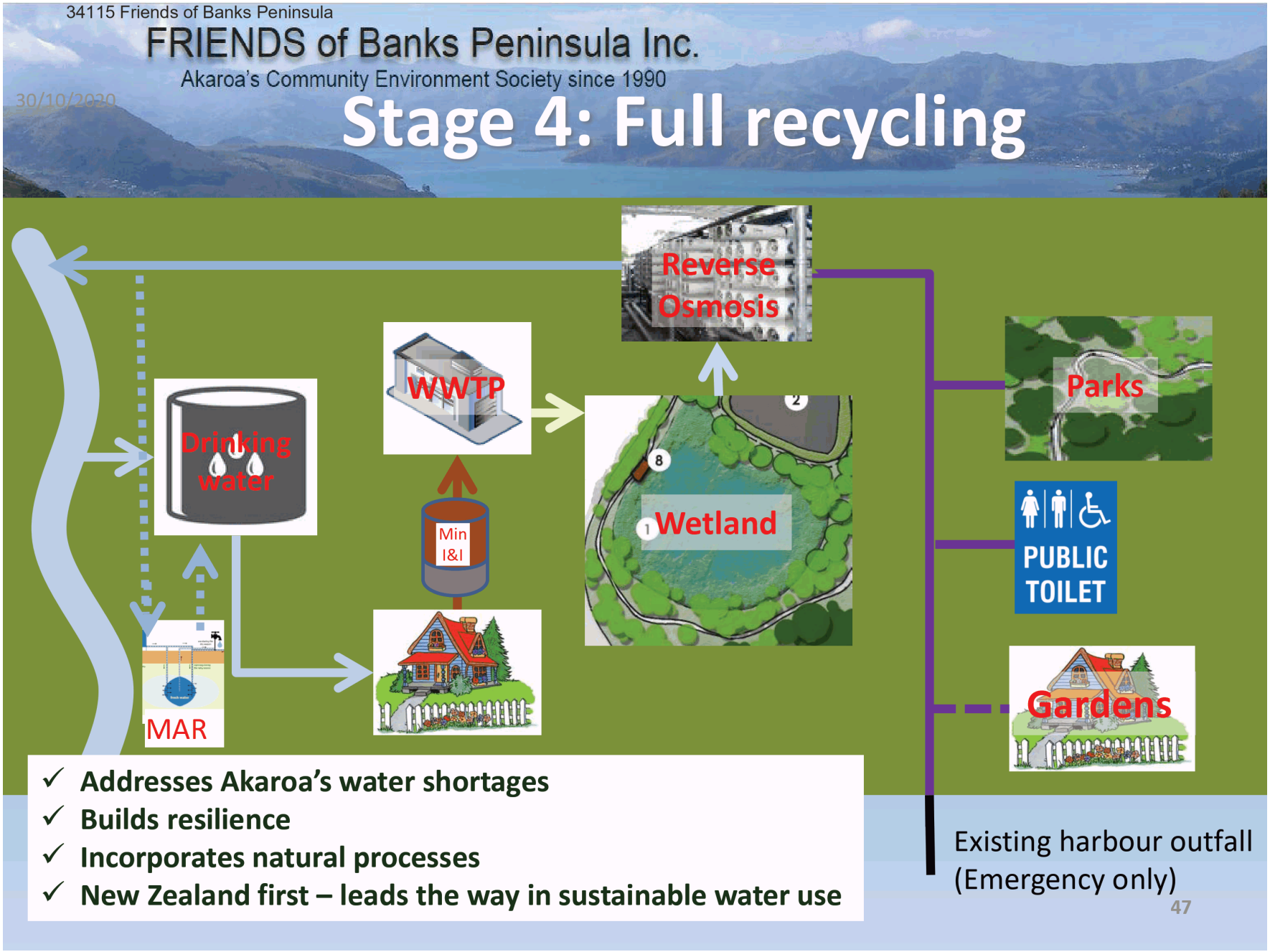
Stage 3: Reduce Reuse Recycle
Reverse Osmosis
WWTP
Drinking water
Min I&I
Wetland
Parks
PUBLIC TOILET
Gardens
MAR
✓ All flows free of protozoa, bacteria and viruses
✓ All flows have minimal nutrient and chemical content
✓ All flows pass through wetland
✓ Returns water to its source – potential to increase take
✓ Purple pipe now potable standard - potential to extend
Existing harbour outfall (Emergency only)
46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Stage 4: Full recycling
Reverse Osmosis
WWTP
Drinking water
Min I&I
Wetland
Parks
PUBLIC TOILET
Gardens
MAR
✓ Addresses Akaroa's water shortages
✓ Builds resilience
✓ Incorporates natural processes
✓ New Zealand first – leads the way in sustainable water use
Existing harbour outfall (Emergency only)
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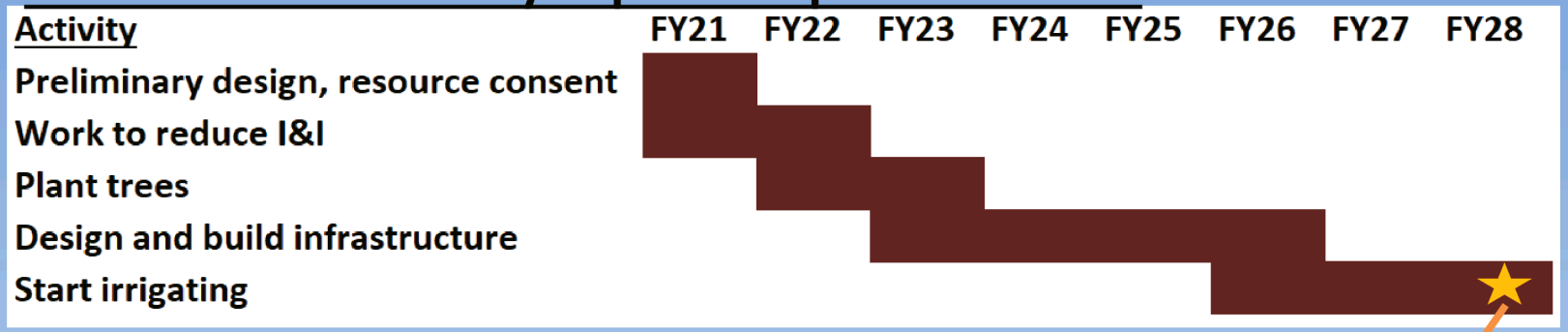
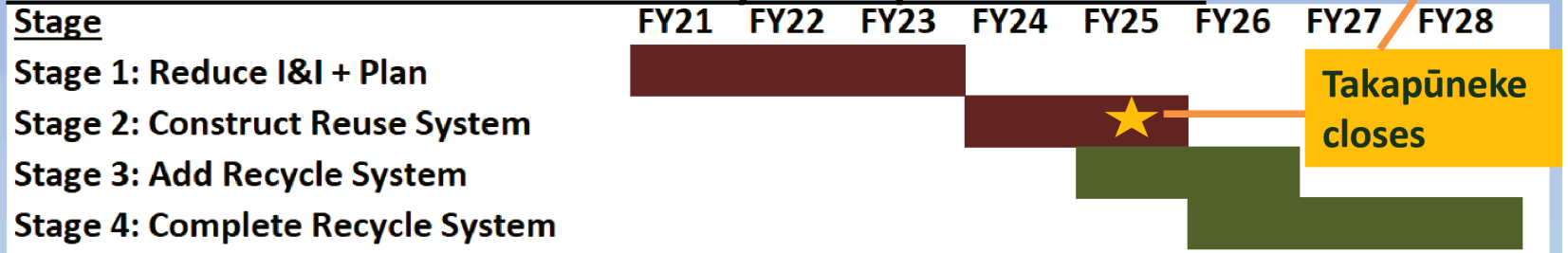
Timeline compared to Inner Bays

- Council extending Takapūneke consent to 2028

Timeline for Inner Bays option implementation[1]



Timeline for Reduce Re-use Recycle implementation



[1]*Source: Working Party meeting 8 March 2019. Start date adjusted to match current progress*

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Constructed Wetland

- All wastewater passes through constructed wetland
- Constructed wetlands supported in IMP
- Based on criteria Council have been using
- Duvauchelle proposed scheme includes this method:
  - *"A minimum of 2-3 days residence time in the wetland is provided to effect meaningful treatment and "passage through land" to address cultural concerns of Ngāi Tahu"**

*Combined Akaroa Duvauchelle Wastewater Scheme - Review of Costs and Benefits Revision 2

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Land requirement for wetlands

- Approx 1.4 ha if I&I reduced to 30%
- Based on Beca 2016 calculations of area needed
- Potential wetland sites identified in 2016 consultation

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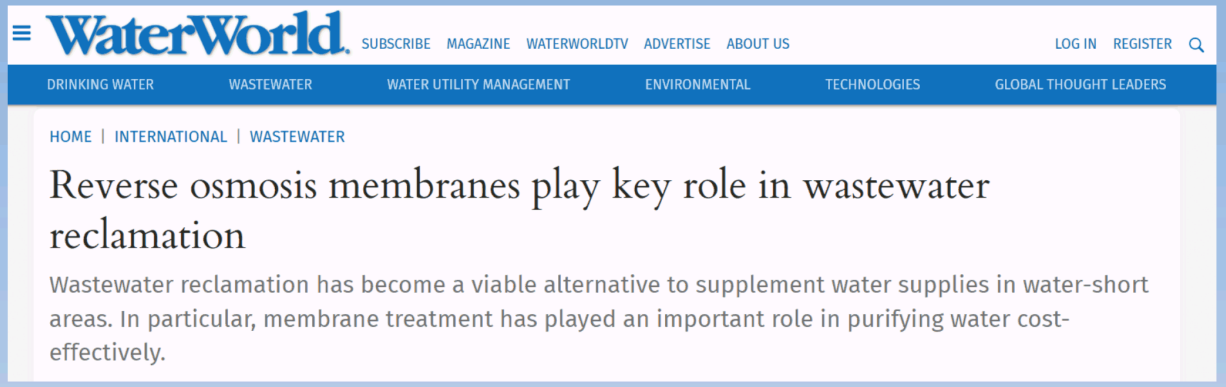
Reverse osmosis delivers

- Improved wastewater quality and safety

Contaminant	Ultra Filtration	Reverse Osmosis
Viruses	Moderately effective	Highly effective removal
Nitrates	Low	83-92% removed
Salts, Dissolved chemicals	No removal	Removes many

- Output to supplement water supplies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Reverse osmosis membranes play key role in wastewater reclamation

Wastewater reclamation has become a viable alternative to supplement water supplies in water-short areas. In particular, membrane treatment has played an important role in purifying water cost-effectively.

- Cost-effective water purification

Reverse osmosis (RO) membranes provide a cost-effective water purification solution for wastewater reclamation facilities. The Public Utilities Board (PUB) in Singapore,

Singapore operating cost similar to proposed plant

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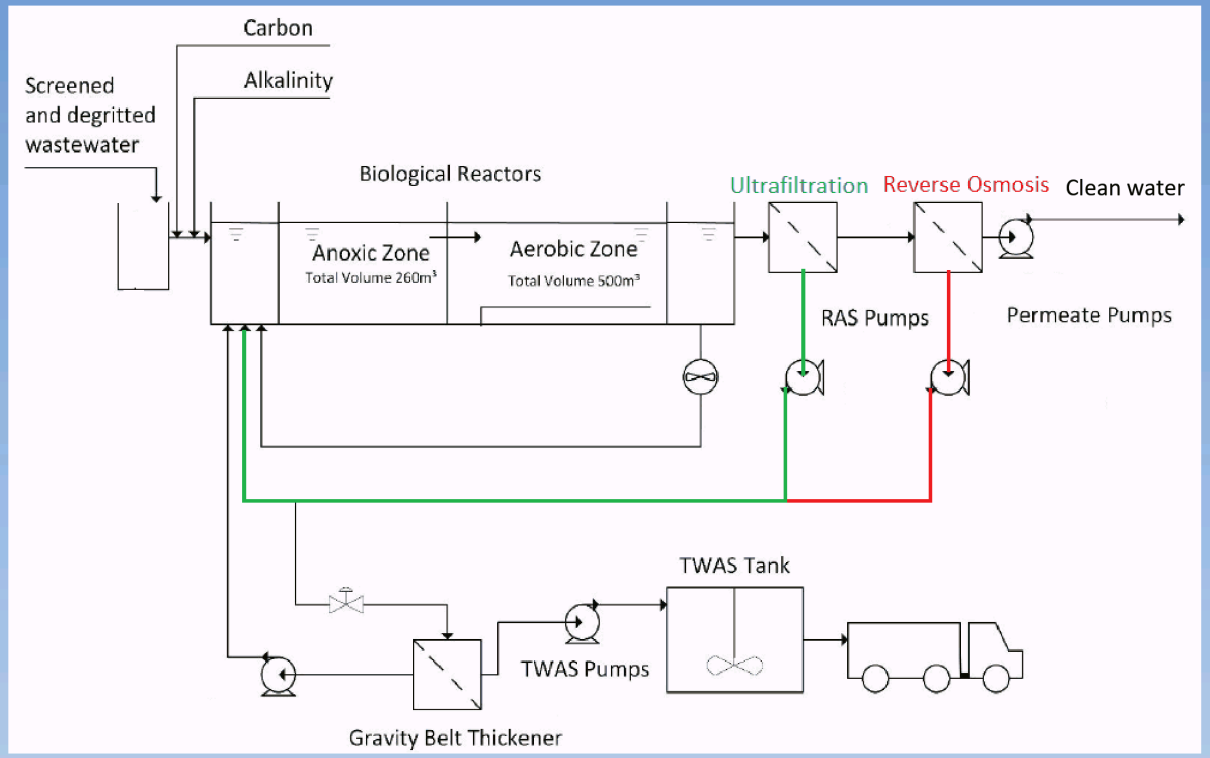
Recycle retentate through WWTP

- Highly treated wastewater input minimises retentate
- Recycle retentate through the plant
- Same as ultrafiltration in current proposal



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Result

- **Three Waters climate resilient system**
  - Akaroa broken sewer network fixed
  - Water returned to town to alleviate water shortage
- **Modern plant installed**
- **Takapūneke turned off sooner than planned**
  - All water passes over land through wetland
- **Costs spread over 3 LTP cycles**
- **Akaroa system a real exemplar for rest of NZ**

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Summary of decision sought

1. **Stop and rethink path forward**
   - set aside the current options
2. **Reduce I&I to below 30%**
3. **Set up a new multi-disciplinary team**
   - focus on Integrated Three Waters solution with government
4. **Adopt a new integrated solution**
   - focused on climate resilience
   - reusing water in Akaroa where it is most needed
5. **Work with government to change legislative framework to enable full recycling**

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Part 6:

Consentability

Feasibility

Presenters:
Pru Steven QC
Jack Turner, Tektus Consulting
Dr. Emily Afoa: Tektus Consulting

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34115 Friends of Banks Peninsula

Akaroa Wastewater Proposal Friends of Banks Peninsula Response to Officers Report

Presented to Akaroa Wastewater Hearing Panel 13 October 2020

1 Analysis of Submissions

The Officers report notes that the Friends of Banks Peninsula submission was endorsed by 324 people but does not place any additional weight on this support in determining weightings. This is almost the same number of people as the total number of submissions.

In the analysis of support for Land based options, the ranking made by those who supported Harbour Outfall as their first choice are added to those who supported Land based options as their first choice. The report then states, for example that that 92 people ranked Inner Bays as the #1 preference. This is incorrect. The people who chose Harbour Outfall in answer to the first question have not chosen Inner Bays as the #1 preference (or any other land option). The total number of people who supported Land based irrigation and the Inner Bays option as #1 is 72. This is 21% of submissions.

39% of these submitters did not provide further information to explain their choice. It is not known whether they have supported land based irrigation because they fundamentally do not want wastewater in the harbour, but without an understanding of the effects of what is proposed on the resident communities or the environmental risks involved because these are not listed in the consultation document.

As well as supporting reuse in Akaroa by irrigation to parks and purple pipe, many submissions requested a system that builds resilience to climate change, by using the treated wastewater to improve Akaroa's water supply and by removing stormwater and groundwater infiltration into the sewer system. The Officers Report is inconsistent in its recognition of this overwhelming theme.

2 Misunderstanding of the FOBP proposed solution

We provide a response to specific points in the Officers Report regarding the FOBP proposed solution, where these points do not accurately reflect the solution being proposed.

Please note the following fundamental aspects of the FOBP solution proposed:

1. Comprehensive repair/replacement of the Akaroa wastewater network to substantially reduce the volume and unpredictability of wastewater flows. Any suggestion of downsizing aspects of the Councils' proposed solution (e.g. the raw wastewater pond) are as a consequence of this anticipated reduction in wastewater volume

2. Land contact treatment (via a wetland or similar) of *all* treated wastewater flows, based on the same design parameters as the Council's engineers used when designing both the Akaroa and Duvauchelle proposals
3. Treatment of all wastewater flows to *potable standard*, such that all recycling options are safe for both public health and the environment
4. Eventual elimination of all wastewater disposal, whether to the harbour or to land

Many of the points raised below are a consequence of these aspects not being fully understood.

2.1 Retirement of the Takapuneke wastewater treatment plant

1. [8.4.3] indicates Council has already applied for consent to continue using the Takapuneke ***wastewater plant for eight years***, as required while the land-based disposal is developed (assuming all goes to plan)
2. The FOBP solution requires only the use of the existing ***outfall*** for this time; the plant would be redundant as soon as the new plant is commissioned, with a corresponding significant ***reduction in the time*** before the current low-quality discharge ceases

2.2 Buffer pond size

1. [8.4.4] suggests that FOBP is advocating a reduction in the amount of buffering, but this is not the case
2. FOBP suggests the buffer pond could be reduced in size on the basis of a more substantial reduction in I&I:
    a. wet weather "spikes" in volume would substantially reduce, and
    b. The overall wastewater volume being received would be lower
3. FOBP have made this suggestion because it could free up space for further wetlands. Alternatively, the raw pond could be retained at its current size, meaning lower flows (from reduced I&I) may further reduce the frequency of raw sewage network overflows.

2.3 Wetland retention times

1. [8.4.8] states that a retention time of 2-3 days is not supported by Ngai Tahu, yet the current proposal for Duvauchelle includes substantial wetlands, discharging to the Pawsons stream, with a 2-3 day retention time.
    a. The Duvauchelle scheme report states:
    "*Following engagement with Council, Ngāi Tahu and Beca/PDP the RBT proposal has been refined as follows (Akaroa Golf Club Master Plan Rev B 15th June 2020)*", and;
    "*A minimum of 2-3 days residence time in the wetland is provided to effect meaningful treatment and "passage through land" to address cultural concerns of Ngāi Tahu*"
2. [8.4.9] states that the wetland proposed in Option 1 for Inner Bays would normally have a retention time of around two weeks
    a. The PDP report on wetland performance indicates the 2l/s flow proposed is based on 2-3 days retention time
    b. A retention time of greater than 2-3 days only occurs when the wetland is flooded and becomes a storage pond

2.4 Cost of proposed solution Stage 2

1. [8.4.11] claims the cost of extending the purple pipe will be $6.4-$8.4 million
    a. We estimated costings based on the proposed harbour outfall (option 4) with the outfall itself removed and the overland pipe extended an additional 500m to the current outfall location. Total estimated cost is approx. $5m less than option 4 and $12-$15m less than option 1.

2.5 Stage 3a

2.5.1 Reverse Osmosis (RO)

1. [8.4.12] Refers to sections 6.5.1 to 6.5.5 regarding the practicality of reverse osmosis (RO)
2. [6.5.1] correctly asserts that the treatment currently proposed is of an extremely high standard ***except for nutrient (nitrogen and phosphorus) removal***. RO removes nutrients.
3. [6.5.2] highlights that RO is only used in areas that are very short of water, with contaminants discharged to the ocean
    a. The CCC water strategy reports that additional water supplies may be required for Akaroa and Takamatua due to climate change, so this is a real consideration.
    b. The problem of totally eliminating discharges to the ocean is a uniquely New Zealand issue; hence in other schemes (California, Singapore) they do not address this problem. However, FOBP agree that avoiding discharge of contaminants to the ocean is highly desirable.
4. [6.5.3] compares RO versus ultrafiltration. Because RO is an ionic (rather than purely physical) barrier, it removes substances that ultrafiltration does not, including:
    a. RO has much higher virus removal performance, including small viruses
    b. RO has high removal of dissolved nutrients (nitrates, phosphorus); ultrafiltration does not remove these
    c. RO has high removal of other chemicals including hormones, emerging contaminants and "forever chemicals"; ultrafiltration does not remove these
5. [6.5.4] makes statements regarding key issues with RO that are not an accurate reflection of the technology:
    a. The Officers report claims the additional energy required would be $80,000 - $120,000 (similar to pumping the wastewater to the Eastern Bays). This equates to approx. 1.7-2.5kWh per m3, which is significantly more than the Singapore scheme's ***total*** energy consumption (including for microfiltration, RO and post-treatment) of 0.8kWh per m3 (approx. $NZD38,000 per year). We disagree with the Officers calculation.
    b. The Officers report claims 20%-40% of the water treated by RO must be discharged as waste stream and will carry all of the contaminants removed ("retentate"). Other schemes (including Singapore) report retentate rates of only 10-15%
    c. Recent research into "zero drain" water pollution treatment suggests that retentate can potentially be avoided altogether:
        - The RO retentate can be recycled back through the treatment plant, *as is proposed by Beca for the ultrafiltration retentate*. This is beneficial to the plant's operation because it provides nutrients needed for the first stage of treatment (nitrification)

- The amount of contaminant present in the RO retentate will be *extremely small* compared to that produced by the ultrafiltration stage, with the exception of dissolved nitrates; these will be cycled back through the plant for further biological removal by digestion. Recent research suggests this has no impact on the plant's nitrogen removal performance
- Excess nitrates and other chemical contaminants present in the retentate can be reduced to solids (and removed with the sludge) using a number of well-known techniques including precipitation (via chemical dosing) and electro-biochemical removal. Removal of nutrients (phosphorus and dissolved nitrates) via chemical dosing has been previously proposed by Beca as an option if required.

a. In summary, the retentate issue is likely to be much smaller than the Officers Report suggests, if it exists at all
b. The Offers Report states that the clean water from the RO process would be "*no more culturally acceptable to discharge directly to water*".
    a. FOBP proposes that all of this treated water pass through a land contact treatment such as a constructed wetland to meet cultural concerns; there is no expectation that RO will make the water more culturally acceptable, only that it will make it more physically suitable for reintroducing into the receiving environment

6. [6.5.5] states that there is "no obvious benefit" in using reverse osmosis.
    a. The purpose of applying reverse osmosis is so that the treated wastewater can be re-used in Akaroa to alleviate water shortages, rather than disposed of via the harbour or onto land.
    b. FOBP assert that recycling Akaroa's water in this manner to alleviate shortages and reduce stress on stream aquatic life is a major benefit.
    c. The purpose of applying RO is to raise the quality of the reclaimed wastewater to a standard such that water recycling becomes feasible.
    d. FOBP would **not** advocate applying RO to wastewater that was being disposed of in the harbour or on land. FOBP's proposed solution aims to eliminate all such disposal.
7. [8.4.13] states RO may still not make the water potable and that further steps may be required to remove some contaminants such as pesticides.
    a. RO provides the highest level of contaminant removal practicable, including much greater removal of nutrient and chemical contaminants compared to ultrafiltration; Akaroa currently uses ultrafiltration to remove such contaminants from Akaroa's ***potable supply,*** so the RO-filtered water may produce an *improvement* in potable water quality. Other countries (USA, Singapore) use RO to treat wastewater prior to standard potable water treatment such as UV and chlorination.
    b. While pesticide and other farm chemical residues might occur in wastewater, they may also occur in Akaroa's current raw drinking water supply since the Akaroa catchment has been farmed for most of the town's history, and exposed to farm chemicals.
    c. FOBP do not propose to directly return the treated wastewater to the drinking supply; it would be blended with raw water and undergo the same treatment as Akaroa's current water supply

2.5.2 MAR

1. [8.4.14] states that MAR is not a viable option. We have retained MAR as a *potential* part of the solution because:
    a. The MAR feasibility study was terminated because of risk to drinking water supplies, but FOBP are proposing to treat the wastewater to potable standard first, so there would be no contamination risk, and
    b. The MAR feasibility investigation suggested it was feasible, but was terminated before physical testing was carried out
    c. MAR is not a critical component of the solution

2.5.3 Coastal infiltration gallery

1. [8.4.16] indicates that a coastal infiltration gallery lacks support
    a. We have included this idea as an alternative to using the existing outfall in the event that it is more acceptable to all parties overall; it is not a critical component of the solution
    b. We note that when this idea was consulted on in 2016, it was in conjunction with a lower treatment standard (including bypass flows).
    c. We also note also that CCC propose two coastal or near-coastal outflows (via streams): from the wetland at the Duvuachelle golf course, which will discharge 200-300m upstream from the shore after similar wetland treatment, and the wetland at pond site 10, which will discharge into the Childrens Bay stream approx. 500m upstream from the shore. Both of these discharges are into shallow bays.

2.5.4 Feasibility of Stage 3A

1. [8.4.17] states that Stage 3a is not considered a feasible option
    a. For the reasons given above, FOBP regard Stage 3A as a technically feasible option
    b. Stage 3A eliminates all direct disposal of treated wastewater
    c. Stage 3A provides substantial benefits to Akaroa from water recycling, and warrants further investigation.

2.6 Stage 3B Extended purple pipe (alternative solution)

1. [8.4.18] cites the current lack of regulation as a barrier to recycling treated wastewater. However, it would be several years before this option needed to be put into place.
    a. We note that since other regions (such as Auckland) are increasingly signaling the need to recycle water, it is not unreasonable to suggest that the legislation will be developed in the near future
    b. FOBP have proposed this option as a fallback in the event that Stage 3A does not proceed, since it provides a lower level of water re-use than stage 3A, but is not reliant on treatment to a potable standard. It is not part of the core solution

2.7 Stage 4 potable supply recharge

1. This stage is included as the final, logical step to complete a closed-loop water cycle.

8.4.14 and 8.4.21

2. [8.4.20 and 8.4.21] refer to issues regarding protection of water sources.
    a. The water being returned to the supply (via the stream) will be of *potable standard, prior to being treated by the Akaroa supply water treatment plant*.

   b. This is the same as is done in Singapore with a portion of their recycled NEWater. In Singapore they note that the quality of the recycled water exceeds that of the raw feed.
   c. As noted for 8.4.19, this option would be some years away, and there is a growing awareness in New Zealand of the need to recycle water to address future shortages, so it is likely that legislation will move in this direction
3. [8.4.22] suggests there will be cultural concerns:
   a. All of the water being returned to the stream/supply will have passed through a land contact treatment such as a wetland
4. [8.4.23] suggests it is contrary to Council's Te Wai Ora o Tane Integrated Water Strategy re protecting groundwater from contamination
   a. The water being returned to the supply (via the stream) will be of *potable standard*
   b. In contrast, the Council's preferred option of irrigation to land is expected to significantly increase leaching into groundwater, and the Duvauchelle tree trial report confirms that, even after the first three years, nutrient build-up in the soil increases nitrate leaching into groundwater.
   c. ***Thus, the Council's preferred option is expected to increase groundwater contamination***, whereas the return of potable water to the stream is not.
5. For the reasons given above, we believe that Stage 4 (indirect potable reuse) is feasible, and should be investigated further.

3 Other disputed statements

3.1 Inflow and infiltration

1. [6.3.4] suggests that new testing approaches mean they are hopeful of achieving a much higher I&I reduction that the "traditional approach of lining the pipes". This is at odds with the Beca report, which states that the issue is that repairing/replacing targeted faults (*rather than relining or replacing the pipes)* has limited success because groundwater rises and other faults will appear, i.e. the problem is the scope of repair, not the ability to locate the faults. They conclude for this reason that 20% is a valid target for this approach
   - FOBP advocate lining pipes in the lower part of Akaroa or replacing the lower section with a sealed, pressurized system, to eliminate I&I as far as possible at an achievable cost.
   - FOBP recognizes that this will cost more than piecemeal repair, and advocates *adding* the Government grant to the already budgeted funds. This provides a total of $6.2 m enabling a comprehensive approach such as lining or partial replacement with a sealed system, and for this work out to be carried out *prior to* sizing the rest of the system. In this way the I&I reduction cost will be offset by a reduction in later costs.

3.2 Protecting the harbour

1. [7.3.2] asserts that discharging treated wastewater to land protects the harbour
   a. The Duvauchelle tree trial demonstrates that for the land-based options an ***increase in nutrients leaching into groundwater*** is expected to occur.

b. Unlike a harbour outfall, where these nutrients are rapidly diluted and dispersed out to sea, with the Inner Bays scheme the nutrients will be discharged into a fresh water body and then travel to the harbour where they will meet the shallow Robinsons and Takamatua Bays and be absorbed into the clay bottom, adding to the nutrient load of these poorly flushing bays.
c. FOBP contend that this will be more detrimental to the harbour's health than a mid-harbour outfall.
d. FOBP's solution aims to remove as much nutrient and other contaminants to the harbour as possible, providing maximum protection to the health of the harbour

3.3 Climate change

1. [7.6.2] asserts that the land based options present a significant opportunity in achieving carbon offsets

a. The anticipated net carbon sequestration anticipated for Option 1 is similar to the total carbon emissions of around 10 houses, at a marginal cost (compared to a harbour outfall) of $7-10million. In contrast the same funds could purchase sufficient unproductive farm land to sequester the emissions of over 1,000 homes.
b. FOBP agree that carbon sequestration is a worthy goal, but the gains proposed are minimal in relation to the cost.

3.4 Risk of landslides and flooding

1. [9.6.2] asserts the land is suitable and will not create instability issues
2. Appendix L, Beca report (Thacker Site Robinsons Bay – Geotechnical Report) notes:
    a. A report by Tonkin and Taylor (2008) identifies areas of land instability in Robinsons Bay; this report does not cover the Thacker land [p4]
    b. Identifies instability risk and erosion in the alluvial soils at the river banks [p4]
    c. Increasing the moisture content near water courses or other slopes may cause the silt to slump following heavy rainfall or seismic activity [p11]
    d. Dispersive nature of the loess is likely to result in some localized erosion and potential instability in the higher areas [p11]

3.5 Property devaluation

1. [9.7.1] States that valuation information would need to be provided by a submitter regarding a reduction in property value.,
    a. Council has never informed or advised residents of this previously.
    b. Valuation advice was taken several years ago and indicated that devaluation would be expected by properties, with the degree based largely on proximity to the storage pond and irrigation fields.

2. [9.7.3] states that some community members have stated that large plantings of native trees may have benefits and increase property values.

3. Only three of the submitters supporting the Inner Bays option can be identified as property owners in those communities. Two of these #33810, #33729 own land required for the scheme and #34038 supports but with clear caveats for substantial I&I reduction and water reuse.

a. Our concern is for the neighbours and residents who gain no benefit, but take a loss to amenity and property values.
b. No compensation has been offered to owners for the loss in property values resulting from the decrease in amenity these properties suffer.

3.6 Risk of contamination

1. [9.8.1] asserts that irrigation rates have been selected based on infiltration testing
    a. Appendix L, Beca report (Thacker Site Robinsons Bay – Geotechnical Report) recommends that the effects on the local water courses be assessed if the scheme is developed
2. [9.8.2] asserts that the nitrate-nitrogen leaching rates of 2-47kg/ha is similar to grazed pasture:
    a. The average leaching rate has increased from 19.2 kg/ha to 27.8kg per ha after three years of wastewater irrigation, an increase of 45%
    b. In the worst case (flax), leaching has increased 250% (from 13.2kg/ha to 46.8 kg/ha) after three years
    c. A leaching rate of 46.8kg/ha is equivalent to a dairy farm, and experienced by <0.5% of Banks Peninsula by area (one dairy farm)
    d. Experience of other long-running schemes (Whakarewarewa, Levin) indicates that stream pollution from leaching can, and does, occur, and that it can take many years before the extent of the problem becomes apparent
3. [9.8.3] asserts that adverse effects on springs and streams is not expected; the above points indicate clear potential for pollution of groundwater, springs and streams

3.7 Insect/midge issues

1. [9.9.1-9.9.4] suggest insects/midges will not be a problem, or can be dealt with at the resource consent stage
    a. The Beca report specifically discusses potential mitigation options, and cites distance from the ponds as mitigation for insect problems in the outer bay options, suggesting midge issues may arise
    b. Tackling such issues at the resource consent stage is not a realistic option for many residents

3.8 Storage ponds leaking or bursting

1. [9.10.4] details various scenarios of dam burst during storms up to 1 in 100 years and concludes they would not reach building floors
    a. Ignores the anticipated increase in storm intensity and frequency from climate change
    b. Ignores known elevation modeling errors, where the ground elevation is over-estimated in the proximity of buildings; such errors are evident in the flood maps for the lower valley
    c. Assumes a dam collapse time of ten minutes. Beca indicated a five-minute sensitivity test was also carried out (which would be expected to show higher flood levels, and gives an indication of the sensitivity of the model to the speed of the dam collapse);

despite numerous requests (including a LGOIMA request) CCC have refused to release these results to FOBP, so it is impossible to assess the real risk

d. Takes no account of the risk of the water exit path (including culverts and under bridges) being blocked, despite this being a major cause of historical flooding on Banks Peninsula
e. Does not consider the risks for the river bank opposite, directly under the Pavitt cottage
f. The Beca report stresses that the dam break assessment is conceptual/indicative only because it is based on a number of high-level assumptions

2. [9.10.5] concludes that the consequence of dam burst is minor and the overall risk rating is low
    a. Does not take the above factors into account
    b. Does not take damage to farm land into account
    c. Does not take community wellbeing impacts from the threat into account

3.9 Visual effects

1. [9.12.2] asserts that pond site 10 is not visible from SH75, and limited visibility from other vantage points
    a. Pond site 10 is directly in front of drivers/passengers approaching from Christchurch as they ascend the Takamatua hill. The view will change from a natural hill to an artificially flat engineered landscape, including fences and other structures
    b. Pond site 10 is visible from Akaroa township including the main tourist area at the south end of the town
    c. Pond site 10 is highly visible from Childrens Bay Farm which has Akaroa's most popular walking track – the Rhino Track.

3.10 Storage ponds too large

1. [9.13.3] asserts the effects on Pavitt Cottage will be minimal because it is over 100m away
    a. The storage dam face will be *above* the Pavitt cottage, posing an ever-present risk of inundation

3.11 Option is not re-use

1. [9.14.1-9.14.6] compare the proposed irrigation rate to the short-term maximum irrigation rates recommended by Beca/PDP and conclude that because the proposed irrigation rates are around half these maxima, the proposal is beneficial re-use (because it is not watering to the maximum rate possible)
    a. The irrigation rate is limited by the long term acceptance rate (LTAR), ***not*** the short-term rates
    b. The rates selected for all land-based proposals are the ***maximum*** allowed by the LTAR
    c. The irrigation schedule includes watering *up to and beyond field capacity, including when it is raining.* As well as being bad practice (because it increases nutrient leaching and erosion risk), it is of no benefit to the plants or soil, and may in fact be harmful. It also reduces the ability of the soil to break down contaminants in the applied wastewater.

d. If the land-based proposals could irrigate up to the short-term application rates as suggested, the land area/storage and subsequent cost of these options would be significantly reduced. Instead, PDP illustrate that the current proposals would not be viable if the available land area reduced by any significant amount
e. For these reasons **the land-based proposals are clearly disposal as defined by the US EPA**

3.12 Negative effects on historic sites

1. [9.13.2] Says proposed ponds do not encroach in former sawmill site.
    a. It is the site entrance and the dam burst bunds that encroaches on the former sawmill site and is extremely close to Pavitt Cottage.
    b. The current site access from Sawmill Road is the only apparent feasible entrance to the site for the construction of the storage ponds – an exercise requiring extensive earthworks and heavy equipment.
    c. This is part of the offence created by the storage pond.
2. [9.13.3] [9.13.6] states proposed ponds are located more than 100 meters from Pavitt Cottage and its setting and given this buffer distance ii is anticipated there would be minimal effects on the cottage and that the Project team does not expect the ponds to have a negative effect on nearby properties.
    a. The impacts on the cottage and its environs during construction will be extreme. Its peaceful setting turned into a heavy industrial site similar to an open cast mine, with all vehicles passing on the narrow road immediately in front of the cottage and then onto the site entrance along side
    b. The ongoing effects will be an ugly structure visible from the approach to the cottage, and which has the potential to develop odour and breed midges, and collapse.
    c. The bunds around the dam wall cannot be planted.
    d. Maintaining a viable use for heritage buildings is critical for their ongoing maintenance and preservation. Pavitt Cottage relies on income from guest accommodation. The proximity of the storage dams will reduce the attractiveness of the cottage to guests.
    e. For these reasons the negative effects on nearby properties, and the heritage values are extreme.
3. [9.15] states there were concerns from submitters about the effects on nearby historical sites, and the project team state they do not expect the proposal would have adverse visual effects or adverse effects on heritage features.
    a. The site entrance will be directly over the principal archaeological site. This site entrance will be traversed by heavy machinery and trucks for a lengthy period of time while the storage pond structure is excavated. This will involve earthmoving machinery excavating a 2.7ha hole in the paddock above the Pavitt Cottage and constructing a 4m high dam wall
    b. The archaeological sites behind the Pavitt Cottage will be planted in forest
    c. The forest will come to within 5 metres of the rear of Pavitt Cottage. This will obliterate the current heritage setting. The current view from the Pavitt Cottage

connects it with its heritage setting, looking through a vista of the original fruit and nut trees planted by the settlers to the Williams cottage further up the valley.

d. The view shaft up the valley will be removed as this forest develops.
e. The proximity of forest to the building creates a fire risk unless only low flammability species are planted.
f. The view shafts from Robinsons Valley Road, Sawmill Road, up the stock route and from many private properties will be of the storage pond.
g. This structure will:
    i. Be part empty or empty most of the time revealing an inner black plastic liner
    ii. Bunds cannot be planted to screen it because this would obscure leaks
    iii. There will be a fence around the outside of the structure and a road around the top
    iv. Introduces an industrial and threatening element to the character of the landscape, with the heritage features either subsumed by the wastewater scheme or in its grim shadow.

4. [9.15.2] Report states there will be opportunities to adjust the designs to accommodate any historical features that may be impacted.
    a. Does not state how this will be achieved and we do not consider it feasible.
    b. The areas behind the Pavitt Cottage up to the Williams Cottage would need to be excluded from the irrigation field. If this was done the Council would need to find additional land elsewhere.
    c. There is no other feasible site entrance because there is a deep gully between the pond and Sawmill Road. The site entrance must be beside the Pavitt Cottage over the mill site.
    d. The visual and amenity impacts could be made less if the storage pond was elsewhere or much smaller. The present system does not enable this and is the configuration the Council has settled on after 4 years of investigations.
    e. We do not believe it is feasible to adjust the design. The problem requires a different solution.
5. Omitted – the report does not consider the significance of the Pavitt Cottage and associated Sawmill site.
    a. This is the site of the first power sawmill in Canterbury, a significant development that changed and accelerated the deforestation of the area.
    b. Its significance has been recognized through the erection of a heritage site marker, the publication of a book about the enterprise. It features on the back cover of Gordon Ogilvie's "Banks Peninsula Cradle of Canterbury", the definitive reference book on Banks Peninsula.
    c. The cottage is the mill owners home, and has had a number of owners over the years.
    d. Descendants of the original owners have fully restored it and now hold it in trust for all descendants to enjoy
    e. It is the turangawaewae for all these families, many mill workers and the focal point of the community of Robinsons Bay to this day

6. [15.10.5] States that project team agree that the heritage site should be protected and conserved, but do not state how this will be done. See earlier statements that we do not think this is feasible. The heritage site will be obliterated.

4 Other issues raised by FOBP not in the Officers Report

The officers report has not addressed many of the big issues such as the risk that the system is undersized, the lack of room for expansion, vulnerability to climate change or taking an integrated three waters approach to deal with Akaroa's other pressing water issues.

The report does not address significant matters in the FOBP submission including:

1. That the system is at significant risk of being undersized due to
    a. the sensitivity of the assumptions used to model the system capacity
    b. Pushing all design parameters to their maximum limits
    c. a Native Tree irrigation system is a first in NZ. Native trees may not have the ability to absorb nutrients and water volume as predicted, particularly in wet weather
    d. Population growth modelling proving incorrect
2. That there is no expansion capability in the Inner Bays scheme without further private land acquisition
3. That I&I needs to be more fully addressed to provide climate resilience
4. That the shallow mud flat bays, being susceptible to nutrient build up, are at risk if wastewater drains to the streams due to any of the above reasons.

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NO PLAN 'B' – TREE IRRIGATION – RISKS

- **Native tree irrigation model sensitive to assumptions – high risk.**
  - Should any of these assumptions prove incorrect then the storage and land irrigation areas will be too small – anticipated level of nutrient leaching for the Inner Bays options could be as high as that of a dairy farm.
  - Council left with a costly system not performing to design, and is potentially exposed to enforcement action/reputational harm.
- **Water quality consenting risks under the LWRP**
  - Bundled activities require consent for **non-complying** activity (under regional plans);
  - **No discretion** to grant consent if any potential effects are more than minor and proposal is contrary to relevant plan objectives and policies.
  - S3 RMA definition of 'effect' includes any potential effect of low probability (loosely, as in plausibility)[1] which has a **high potential impact**.
  - Modelling risks identified by FOBP will have to be robustly assessed and accounted for in an effects assessment.
  - Sch 4, Cl 6 RMA – an assessment of the activity's effects on the environment **must** include:

    (d) if it is likely that the activity will result in any **significant adverse effect** on the environment, a description of any **possible alternative locations or methods for** undertaking the activity;

    (e) a description of the mitigation measures (**including safeguards and contingency plans** where relevant) to be undertaken to help prevent or reduce the actual or potential effect.
- **The Council has no safeguard or contingency plan if modelling risks (any one of them) are realised.**
- **Only high level planning/effects assessment undertaken thus far.**
  - Further due diligence of land based options (and all environmental effects) is required.

[1] *Shirley Primary School v Christchurch CC* [1999] NZRMA 66 (EnvC)

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- **Effects to be considered through the LWRP 'policy' lens**
  - LWRP policies 4.13 and 4.14 – focus is on:
    - "reuse, recovers or recycles"; "minimise the volume or amount"; (Policy 4.13)
    - "not exceed the natural capacity of the soil to treat or remove the contaminant"; "not exceed available water storage capacity of the soil". (Policy 4.14)
  - Land based options involve disposal and not reuse; a need is being created (at significant cost) where that doesn't presently exist – pre-existing needs of the Akaroa community (for water) not met.

HARBOUR OUTFALL SHOULD NOT BE RULED OUT

- **Land based disposal previously rejected by the Council as feasible alternatives to harbour outfall**
  - The 2010 Harrison Grierson report recommended irrigation (of dry weather flows only) to the South of Akaroa, with a harbour outfall during winter.[2]
  - Irrigation then not considered feasible during wet weather events because:

    > Since the soil in the area is slow draining and the hydraulic capacity will be greatly reduced during wet weather events, the required irrigation area or storage volume would be very large and uneconomic.[3]

- **Council's consideration of alternatives rejected by Commissioner in 2015:**

  > … we can observe that within a radius of the WWTP the same as the length of the proposed outfall pipe (3.7 kilometres) there are over two thousand hectares of land. Until a wider investigation is undertaken it cannot be said that land disposal has been investigated and is not feasible or economic. Options might include buying a farm, installing a low density effluent disposal system over a large area, and re-selling the farm with appropriate easements and caveats.

- **Despite Commissioners' optimism, wider (extensive) investigations have resulted in the identification of few additional sites and none of the options are feasible, economic or produce sustainable outcome for the communities of interest.**
- **NZCPS Policy 23(2)**
  - States:

    > In managing the discharge of human sewage, do not allow:
    >
    > a) discharge of human sewage directly to water in the coastal environment **without treatment**; and

[2] This was subsequently ruled out after objection by Onuku/Ngai Tahu.
[3] para 234 Commissioners' Decision 2015, citing passage from the "Wastewater Options and Risk Analysis Report" February 2010, page 26

b) the discharge of treated human sewage to water in the coastal environment, unless:

i) there has been **adequate consideration of alternative methods, sites and route for undertaking the discharge**; and

ii) informed by an understanding of **tangata whenua values and the effects on them**.

(emphasis added)

- As to this policy:

> This is a clear direction that discharge of human waste into the CMA is appropriate only where there has been adequate consideration of alternatives, and by implication there are reasons for those alternatives being rejected. As discussed above under the heading of Consideration of Alternatives, we are not satisfied that the alternative of land disposal has been adequately assessed, so we consider the proposal is contrary to this policy.[4]

- That wider investigation has now been carried out; FOBP contends that the land disposal options considered are still not feasible or economic and ought to be rejected

- If FOBP recycle and reuse solution not possible due to (present) lack of a regulatory framework, a Harbour outfall option ought to be considered; either on a short term basis or as a longer term solution.

- A Harbour outfall is consentable as sustainable management under the RMA provided cultural concerns are addressed and the land-based options have been adequately investigated and reasonably discounted.

- In order to address cultural concerns, the treated effluent from the proposed WWTP must first pass through land in order to achieve consistency with relevant RMA instruments, including the NZCPS:

> If it then filters through to some sort of wetland draining into a watercourse and then to the harbour, the cultural concern would still be met.[5]

[4] para 257 Commissioners Decision 2015
[5] para 237 Commissioners' Decision 2015

Akaroa Wastewater hearings October 2020
Friends of Banks Peninsula response to panel questions

While your submissions states that it doesn't support any of the four proposed options, I see that for the Harbour Outfall, Goughs Bay and Pompeys Pillar you have described possible mitigations should we chose those options. What mitigations could be used to lessen the impacts on the community should the Inner Bays option be chosen? I note that several submitters, including Heritage New Zealand have put forward potential mitigations for this option.	#34115 FOBP response: • FOBP is opposed to directing wastewater away from Akaroa and incurring sunk cost in infrastructure that does not contribute to the eventual goal of reusing the water in Akaroa where the need is greatest. • Should the Council continue to pursue the Inner Bays option, then as per our observations regarding Goughs Bay and Pompeys Pillar, FOBP recommends that the Council work with the affected communities to identify a solution that would cause them to embrace rather than reject the water. • Our work with the community would suggest key mitigations are : ○ Reduce the volume of water so that the harmful impacts can be avoided including excessive storage ponds, over-watering and unacceptable proximity to streams, neighbours and impacting on heritage areas. ○ Treat the water to a potable standard so that it becomes a valuable commodity
A wetland area to treat all of the wastewater from Akaroa may be much larger than you had indicated in your proposal. (We have asked for information about size, but it may be 5, 10 or even 20ha.) If the wetland area was this large, what would the implications be for your proposal? ~~If so, what was their feedback?~~	#34115 FOBP response: The wetland size is dependent on a combination of the required retention time and the depth of the wetland. The wetland size we proposed is based on the 2-3 day retention time and with the construction depth and sites as per the Beca 2016 report (Akaroa Wastewater - Concept Design Report for Alternatives to Harbour Outfall, CH2M Beca, 12th May 2016). The retention time is a matter for Council to decide in consultation with Ngāi Tahu. Clearly if the area goes up substantially it will make it more difficult and less cost-effective to adopt this approach. The Council would need to negotiate an acceptable compromise.
Have you talked to the local Rūnanga about your proposal, whether the wetland approach would be appropriate and their views on potable/non-potable reuse of water? [If so, what was their feedback?]	#34115 FOBP response: 1. Re wetland approach, we have not had any formal discussions about this, but in an informal conversation, Debbie Tikao suggested that greater use of wetlands could be part of a solution. Note that we were essentially prevented from discussing similar

	options at the Working Party by the staff taking an extremely narrow view of the terms of reference. 2. Regarding potable/non-potable use, this depends on how the water is to be used: a. Water used to flush toilets should not be an issue as people do not come into contact with it, and it is fully contained within the system b. Water used to water gardens makes land contact c. At public meeting at Ōnuku marae, a spokesperson for Ngāi Tahu indicated drinking recycled potable water was a personal choice. d. We further note that Ngāi Tahu voiced support for re-use in their submission 3. We appreciate that the cultural issues around water create potential conflicts with water recycling, but submit that this is a much bigger issue than just Akaroa. With predicted decreases in rainfall from climate change, New Zealand is highly likely to need to start recycling water (e.g. in Auckland), so these issues need to be addressed at a national level.
What has been the feedback from Akaroa residents on a fully recycled system where the highly treated wastewater is reused in the water supply as would be needed to stop using the harbour outfall completely?	#34115 FOBP response: 1. This issue has been in the public domain over the entire consultation period: our position has been made publically known via the Akaroa Mail (letters and advertising), and our submission was in the public domain for the entire submission period while it was being developed. The submission has received over 340 endorsements, including from many people in Akaroa and, as you heard in the hearings, many submitters endorsed this approach. No-one has contacted FOBP to raise objections to this or raised objections at the hearings. Other members of the Working Party, including those representing Akaroa, have also put forward similar suggestions including MAR and have endorsed our submission. 2. We have not stated that potable-reuse would be required to stop using the harbour outfall completely. Both stream replenishment and potable re-use assume the water is returned to one or more Akaroa streams; the only difference is whether the water is returned above or below the potable supply intake. There is no requirement for potable re-use to be achieved; rather it is desirable if it further reduces water shortages in Akaroa. 3. We note that the practice of taking water for potable use from sources where treated wastewater is discharged upstream already occurs in New Zealand. "*Water taken for Auckland from the Waikato already includes treated water from outfalls from storm*

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	water and treated wastewater upstream of its take." https://www.nzherald.co.nz/nz/agreement-reached-tamaki-makaurau-to-take-more-water-from-the-waikato-river/OJTDOB375ZYCP45B26OPRLYPBI/
What is the total cost (and breakdown of cost) of the proposal that you have put forward?	#34115 FOBP response: We do not consider it reasonable or practical for a community organisation to provide these detailed costings, however we have performed a preliminary estimate (see attached after this table for further details): 1. Stage 1 (reduce I&I): $6.2m 2. Stage 1-2: new plant including wetlands: $49m 3. Stages 1-3 (includes reverse osmosis and stream replenishment): $57m 4. Stages 1-4 (complete recycling: assumes minimal cost as infrastructure already in place): $57m
Can you request an update from Tectus on the MOH progress on regulation changes re non use potable water?	#34115 FOBP response: See Tektus memo 15 October 2020 in FOBP submission compendium.
You claim that over the years the costings for the Harbour outfall option has increased while the costings for the Inner Bays has increased. Please explain?	#34115 FOBP response: As members of the Working Party we have received numerous drafts of the estimated costs of the various proposals. As noted in both our submission and hearing presentation, the land-based-disposal options all increased substantially in cost (excluding the cost of the WWTP and network upgrades) after the flow meter fault was discovered, because their size increased so dramatically, but the harbour outfall option remained much the same because it wasn't affected in the same way. However, after the costs were reviewed internally by a Council staff member, the cost of the harbour outfall (excluding treatment plant) more than doubled, while all of the land-based options reduced in cost by up to $6 million, with the Inner Bays option decreasing by $5 million despite no changes to the design. The reasons main for the cost changes are: 1. The methodology for calculating overheads was changed, and the harbour outfall attracted a substantially larger design and contingency overhead, despite having already been designed to the consenting stage in 2015, and substantial design and risk factors already being incorporated into the raw build cost 2. The cost of laying pipelines increased dramatically, particularly for laying pipes in Akaroa; some of these are now more expensive per km than the (purportedly more challenging) pipeline over to the outer bays 3. The cost of planting the irrigation areas fell substantially; it is unclear how this is being

	achieved since the latest costings no longer include the number of stems to be planted per hectare. The combination of the increase in the cost of the harbour outfall and decrease in cost of the other options has substantially narrowed the difference and is surprising given how stable the harbour outfall cost had been until the review. We also note that the previous costings (by Beca) were carried out by their team of professional quantity surveyors.
If the size and scale of the Inner Bays storage ponds were reduced, what would be the point where this would become acceptable?	This is a question to be answered by the affected communities, not by FOBP. We would suggest that the size and scale of acceptability will depend on factors such as the downstream risk, proximity to houses, visibility and impact on heritage.

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Appendix: estimated costings

Stage 1+2	Estimated cost	Notes
I&I reduction	$6,100,000	From Tektus
WWTP + network changes	$29,650,549	From Council costing
Wetland for all flows	$3,561,464	Inner bays wetland * 2 (assumes 2-3 days retention time)
Pipeline to Glen bay	$8,237,993	Option 4 cost of overland pipe + contingency
Extend pipeline to existing outfall	$905,112	Pro-rated from above
Municipal purple pipe	$229,319	From Option 4
Total stages 1-2	**$48,684,438**	
Achieved: new plant; land contact for all flows; purple pipe initiates reuse		

Stage 3: add recycling (mandatory components)		Notes
Reverse Osmosis system	$5,000,000	Assume double cost of membrane tanks + 80% contingency
Pipeline to Grehan Stream	$3,620,449	Pro-rated from Glen Bay pipeline (2000m) including contingency
Total stage 3	$8,620,449	
Total stages 1-3	**$57,304,887**	
Achieved: 100% of flows recycled into stream		

Stage 4: full recycling		Notes
Extend pipeline to above intake	$0	Minimal: pipeline already extends to intake
Total stages 1-4	**$57,304,887**	

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MEMO

TEKTUS CONSULTANTS

TO	FRIENDS OF BANKS PENINSULA INCORPORATED
FROM	TEKTUS CONSULTANTS LIMITED, JACK TURNER & EMILY AFOA
SUBJECT	AKAROA WASTEWATER • HEARING RESPONSE
DATE	15 October 2020

1 Introduction and Scope

1.1 This memo affirms our support of the Friends of Bank Peninsula (FOBP) submission, provides high-level comments regarding the government direction for water management, and responds directly to the query raised by the Hearing Panel.

2 Affirmation

2.1 Inflow and Infiltration (I&I)

a. We support the criticality of I&I improvements for any disposal solution.
b. The 60% current rate of I&I is high and a problem that arguably needs fixing now, independent of new treatment/disposal methods.
c. The baseline 20% target resulting from a partial fix is insufficient relative to WaterNZ guideline values[1].
d. Setting such a low benchmark for the I&I improvements and designing the treatment/disposal solution on that basis is a central shortcoming of the current proposal.
e. Climate change will further exacerbate the I&I problem.
f. Instead, we consider it more appropriate to target a best practice level of I&I and commit to implementing remedial network solutions to achieve that.

2.2 **We consider the 20% target I&I reduction (and resulting 55% I&I rate to the wastewater treatment plant) is an unreasonable baseline from which to approach the treatment discharge/disposal design on – as is currently the case.** Questions remain on the resilience of the existing network to future conditions, and combined with the evidential poor condition relative to significant I&I rates (particularly groundwater), alternative network solutions should be carefully considered at this point, rather than overdesigning the treatment/disposal system.

2.3 Staged Approach

a. **We support a staged approach to the disposal solution as proposed by FOBP, in that it provides further time to validate solutions used internationally and to allow legislation to enable it.**
b. FOBP proposed Stage 2 represents a significant improvement on the existing conditions and wastewater scenario in terms of water quality, connectivity with the land and Papatūānuku, and a volume loss from the purple pipe system. As above, Stage 2 provides a functional solution to allow opportunity to progress options for Stage 3, and for technology and legislation to catch up with many of the community's ultimate aspirations to use recycled wastewater.
c. Stage 3 represents a further improvement on the outcomes associated with Stage 2, with multiple reuse options via purple pipe, stream recharge (downstream of water takes), and/or Managed Aquifer Recharge (MAR). We are of the understanding that this solution can be completed under current legislation,

[1] WaterNZ guideline Infiltration & Inflow Control Manual, 2015 - https://www.waternz.org.nz/Folder?Action=View%20File&Folder_id=394&File=II%20Manual%20Volume%201.pdf

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MEMO

TEKTUS CONSULTANTS

therefore Stage 3 provides the flexibility to be a long term and effective solution irrespective of legislative changes regarding recycled wastewater.

d. There remains opportunity with potentially substantial and broad-ranging benefits from MAR – subject to water quality control and collaboration to meet cultural objectives. Both Deep Bore Injection (DBI) and MAR have been discounted as discharge/disposal mechanisms in the Akaroa context. However, in our view, legitimate potential remains for further consideration of these options to resolve a future-resilient water management regime. There is real potential for DBI and/or MAR to provide cost-effective options to manage residual disposal needs while building up toward maximum re-use without direct discharge to surface-level water bodies.
e. We support the option of Reverse Osmosis (RO) as a feasible solution to minimise risk of cross-contamination of water supplies with either stream recharge or MAR options, potentially supported by disinfection (such as UV).
f. As of 2020, there remains a greater barrier to the implementation of Stage 4, particularly with a short residence time between the stream recharge and water take / recovery. Again, MAR would improve this with a greater residence time, in-line with overseas examples.
g. Stage 4 represents an aspirational and appropriate target given the risk to water supply in the face of climate change; and one which would be short-sighted to negate at this time.

3 State of the Industry

3.1 Water resources in Akaroa are limited, and peak summer demand is typically coincident with large numbers of seasonal visitors. As a result, water restrictions are relatively common – with Feb-Mar 2020[2] a more severe, and recent, example. *Climate change projections for the Canterbury Region* (NIWA, 2020)[3] identify a range of changing climate parameters, the combined effect of which, particularly for summer, is reduced surface and ground water quantity available for supply and an increase in seasonal demand. Furthermore, low lying infrastructure is at risk of inundation by rising sea level and groundwater levels – including storm surge, coastal inundation coastal and erosion (MfE, 2017)[4]. New Zealand's first national climate change risk assessment – the newly-released *National Climate Change Risk Assessment for New Zealand – Arotakenga Tūraru mō te Huringa Āhuarangi o Aotearoa* (MfE, 2020)[5] identifies: "Risk to potable water supplies (availability and quality) due to changes in rainfall, temperature, drought, extreme weather events and ongoing sea-level rise" as an extreme risk, and in New Zealand's top ten most significant climate change risks based on consequence and urgency.

3.2 The *Water Services Regulator Bill – Taumata Arowai*, enacted Aug-20, implements the Government's decision to create a new regulatory body to administer and enforce the new drinking water regulatory system, while contributing to improved environmental outcomes from wastewater and stormwater networks. A complementary Bill, the *Water Services Bill*, introduced Jul-20, is intended to give effect to Cabinet's decisions on reforming the drinking water regulatory framework, and Taumata Arowai's new wastewater and stormwater monitoring functions. The *Water Services Bill* comprises a significant part of the Government's response to the Havelock North Drinking Water Inquiry which found the contamination was a result of systemic failure across service provision, regulation, and source protection (noting all aspects of the system were implicated). With significant change in the Water Industry, this poses opportunity for considerable reform from continuing the

[2] https://newsline.ccc.govt.nz/news/story/level-4-water-restrictions-for-parts-of-banks-peninsula
[3] https://www.ecan.govt.nz/your-region/your-environment/climate-change/climate-change-in-canterbury/climate-change-projections-for-canterbury/
[4] https://www.mfe.govt.nz/sites/default/files/media/Climate Change/adapting-to-climate-change-stocktake-tag-report.pdf
[5] https://www.mfe.govt.nz/climate-change/assessing-climate-change-risk

status quo and is likely to bring comprehensive oversight and greater consistency, particularly in our collective transition to climate risk adaptation.

3.3 There is currently no regulatory framework for the reuse/recycling of treated wastewater in New Zealand. Careful consideration of all regulatory aspects including, for example, the Building Act, Health Act (drinking water supplies), and Resource Management Act, is required to ensure appropriate risk prevention mechanisms, monitoring and compliance programs, and/or verification systems are implemented to effectively manage public health risk. Given availability and quality of potable water supplies are identified as a national risk due to climate change, this is likely to be a task tackled by Taumata Arowai.

3.4 Australian Guidelines for Water Recycling[6] provide relevant guidance in response to increasing climate variability and population levels leading to serious water shortages across many areas of Australia. There, alternative sources of water are becoming more important as water restrictions become more widespread. Two areas are addressed – augmentation of drinking water supplies and managed aquifer recharge. Both methods are a form of indirect augmentation – similarly utilised in Singapore, the United Kingdom, and the United States of America – whereby highly treated recycled water is discharged into a receiving body such as a river, stream, reservoir or aquifer (through indirect injection or soil aquifer percolation), before re-treatment and subsequent supply as drinking water. This allows for additional time, additional treatment, and dilution. Detention time, the time between augmenting the water supply and extracting (blended/diluted) recycled water for reuse, is a key parameter enabling operators and regulators to assess recycled water treatment and recycled water quality and, where necessary, to intervene before water is supplied to consumers.

3.5 We understand from industry peers that Auckland's Watercare Services Limited is increasingly aware of the potential benefits of wastewater reuse:

a. Opportunities for wastewater reuse have always been considered. Strategically, the desire is to move towards reuse. The lack of legislation has definitely been a roadblock, but regardless, Watercare have investigated reuse and set strategic direction such that any actions taken today are compatible with enabling reuse.
b. Further, the current Central Interceptor (CI) project in Auckland is an example of the movement toward enabling reuse. Notes from a recent Watercare public board meeting (28 April 2020)[7] highlighted that:
    i. The **Māngere Recycled Water Plant (RWP)** was proposed to produce drinking water quality recycled water from the Māngere Wastewater Treatment Plant (WWTP) to replace the use of potable water supply, and has the additional benefit of being able to demonstrate the benefits of wastewater reuse and its potential applicability to Watercare integrating this into its water supply system.
    ii. **Effluent from Māngere WWTP will be treated via ultrafiltration, Reverse Osmosis, Hydrogen peroxide /Ultraviolet light disinfection and Chlorination**. The RWP has a capacity of 1MLD and will be used as construction water for the CI project whilst tunnelling operations are in place at Māngere.
    iii. The process flow for Māngere RWP has been selected by considering the experience of various operational recycled water schemes in Australia, U.S. EPA guidelines and WHO guidelines.

3.6 Overall, this is an ever evolving and exciting area with wide-reaching implications across our existing social fabric. **Opportunities for forward-thinking and future-proofed solutions are often inter- if not multi-generational, responding to the understanding and perspective of that time, and Akaroa's overall water management regime is now at that juncture.**

[6] https://www.waterquality.gov.au/guidelines/recycled-water
[7] https://wslpwstoreprd.blob.core.windows.net/kentico-media-libraries-prod/watercarepublicweb/media/watercare-media-library/board-meetings/board_meeting_board_papers_28_april_2020.pdf

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MEMO

TEKTUS CONSULTANTS

4 Specific Query

4.1 The following query has been raised in response to the FOBP presentation of their submission to the Hearing Panel (note we have refined the wording as follows based on our understanding of the request):

Can you request an update from Tektus on the Ministry of Health (MOH) progress on regulation changes regarding reuse of treated wastewater?

4.2 In response, we note the following:

a. We understand the MOH has not yet evolved their position in respect of treated wastewater reuse beyond traditional '*collection and safe disposal of sewage effluent*'. However, its position in this area, including the relationship to drinking-water supplies, is specifically linked to the Three Waters review of 2019, which led to the Taumata Arowai – Water Services Regulator Act passed in July 2020.

b. Taumata Arowai will not become fully operational until enactment of the Water Services Bill, projected to occur in the second half of 2021. Until then, MOH will remain the regulator for drinking water safety. It is unlikely that the MOH will change course in the interim in respect of reuse, ahead of Taumata Arowai.

c. Based on the Taumata Arowai – Water Services Regulator Act (2020) itself, we note that the stated functions of the new national-level entity include:

> *Section 11 Functions of Taumata Arowai*
> *(a) provide national-level oversight, leadership, communication, and co-ordination in relation to—*
> *(i) drinking water safety and regulation, including the management of risks to sources of drinking water; and*
> *(ii) the environmental performance, management, and regulation of wastewater and stormwater networks; and*
> *(b) identify and monitor matters that affect the safety of drinking water, and the environmental performance of wastewater and stormwater networks, including current and emerging contaminants;*

d. It is likely that treated wastewater reuse will be a focus for Taumata Arowai once operational, particularly in the context of an increasingly uncertain and changing climate. Overseas experience suggests this form of water supply augmentation will become a reality here as well in time.

Yours sincerely,

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Date: 9 October 2020

To: Friends of Banks Peninsula

Duvauchelle Wastewater tree trial

Comments by freelance ecologist Geoff Walls, Taramoa Ltd, Christchurch
9 October 2020

I was asked to give an independent assessment of the wastewater tree trial for Friends of Banks Peninsula, as a matter of urgency. I visited the site on 8 October 2020 and my assessment follows. I am not expert in soil science or hydrology, but I have much experience in wetland ecology, wetland restoration, native plants, restoration planting and field assessment of the significance, condition and trend of native vegetation.

Experimental design
I was amazed by the design, which does not give any of the planted squares independence or sufficient size. Almost all squares are subject to edge effects (of four different aspects), crowding, shading and root competition from the adjacent squares. The very high planting density does not allow individual plants to exhibit their natural growth characteristics. The slope of the site probably means that all squares except the uppermost row are subject to the wastewater. So there are no true controls. The trial is therefore scientifically invalid and only able to be interpreted very crudely.

Choice of plants
The plants are a mix of wetland plants (harakeke/lowland flax and cabbage tree), terrestrial plants (totara, kanuka, akiraho, five-finger, tarata/lemonwood, whaririki/coastal flax and kapuka/broadleaf) and those that can tolerate a broad spectrum of soil moisture (karamu, karamu-mingimingi hybrids, cabbage tree and manuka). That's more or less appropriate for the trial, which has an emphasis on trees, but their intense intermingling masks their observable response to the wastewater and their very different forms, habitat preferences and natural growth rates greatly compounds the dysfunction and confusion of the trial. Wastewater treatments on land in New Zealand and other countries are

usually in the form of constructed or natural wetlands with dense beds of reed-like plants (rushes, sedges, reeds, raupo, harakeke, toetoe and the like).

Condition of plants

At least half of the plants looked ill and unthrifty, regardless of plot setup. Manuka had mostly died, as had quite a lot of kanuka. Many of the kanuka, akiraho, tarata/lemonwood, kapuka/broadleaf and karamu looked poisoned, as though they had been sprayed with herbicide. The wastewater probably contains numerous chemicals toxic to native plants that are used in the home and by industries and get flushed into the sewerage system. So the apparent poisoning is not unexpected.

Much of the totara was suppressed by high densities of taller faster-growing plants, clearly struggling for light, space and normal soil nutrients. Where the competition was less and the soil not soggy with wastewater, totara looked healthy and vigorous.

Harakeke and cabbage trees were mostly thriving. That suggests that the trial site has become more wetland than terrestrial, and that the specialist wetland plants are better able to make use of the nutrients and moisture from the wastewater and less affected by the toxins.

The growth rates may have appeared spectacular then. Now they look at best normal for a damp fertile coastal site on Banks Peninsula, and at worst either grossly inflated or barely progressing.

Success or failure?

The trial was set up and planted in June 2015, so is just over five years in duration. The researchers' final report (June 2017) was only for the first two years, and the trial was deemed a success. Three years on, my assessment is that the trial demonstrates that the wastewater may have conferred initial benefits but that a mere three more years of wastewater delivery has seriously damaged the plants throughout the site.

The resulting vegetation from the outside and at the higher end looks pretty good. But inside it is far from well. Overall, the vegetation resulting from the trial neither normal restored terrestrial native forest nor normal native wetland vegetation. It is an ecological mess and ecologically sick. It smells bad, of death and decay, from too much toxic wastewater for too long. My judgement of the trial is that it is a failure. Not a complete failure, because important things have been made clear. But there are no grounds for promotion of the trial as a model of successful restoration of native vegetation using wastewater; quite the contrary.

Suggestions

If the local authority is determined to continue disposing of wastewater on Banks Peninsula land, it should consult the experts. There are numerous functional systems in New Zealand, both on private land and land manged by local authorities. There are professional companies who specialise in this field and there are clear guidelines available from the Ministry for the Environment.

If more trials are contemplated, it is recommended that they are properly designed constructed wetlands using wetland plants. Native plants that could be used include harakeke, cabbage tree, toetoe, mingimingi (*Coprosma propinqua*), kahikatea, swamp maire, pukatea, raupo and numerous sedges and rushes. The margins could be planted with kowhai, manuka, manatu/lowland ribbonwood and houhere (lacebarks). Otherwise, willows could be used. They are quick-growing and could be high-turnover. They would have to be well contained because of their rampant weed potential.

It might be worthwhile experimenting with plantations of our best native timber trees, such as totara, matai, silver pine, rimu, beeches, kowhai, rewarewa, puriri, tanekaha, Chatham Island akeake and manatu/lowland ribbonwood. They might respond positively to small infrequent applications of wastewater.

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Duvauchelle Wastewater Tree Trial: Photos by Geoff Walls, 8 October 2020

From the outside the plants look quite good and the trial therefore a success.

However, all is not well within: karamu is grossly misshapen, pathologically too dense and slumping through weakness.

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Broadleaf is deformed and dying, due to toxins, unhealthy soil and a regime of nutrients and soil moisture that it cannot handle.

Most of the original planted manuka has either died or is ailing, with such heavy loads of sooty mould that photosynthesis is almost impossible for them. None of the kanuka look very well, although more have survived so far. That harakeke and cabbage tree are in better condition indicates that the site has become a wetland due to the wastewater input.

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Many of the trial kanuka have contorted branchlets and dysfunctional growing tips. This sort of thing happens with sublethal herbicide exposure, but in this situation the toxins are probably water-borne not air-borne.

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Kelly, Samantha

From: Brent Martin
Sent: Tuesday, 20 October 2020 5:43 pm
To: Kelly, Samantha
Cc: Suky Thompson; Sue Church
Subject: FOBP wastewater submission - clarification of legislative requirements

Dear Samantha,

We were concerned at some of the Hearing Panel questions on Friday that seemed to indicate members thought legislative change was required before the FOBP solution could be implemented. This is not the case for the first three stages, and questionable for the fourth optional stage.

We therefore summarise the steps here and would be grateful if you would forward this to the panel.

Stage 1 (reduce I&I): no leglislative changes required

- No reuse introduced
- Current plant and outfall still in use

Stage 2 (build reuse system): no legislative changes required

- New treatment plant built
- All treated wastewater makes land contact via wetland
- Purple pipe for municipal use only - no legislative changes required
- Partial harbour discharge for the remainder via existing outfall

Stage 3 (build recycle system): no legislative changes required

- All wastewater treated to potable standard *and* undergoing land contact
- Purple pipe for municipal use only
- Remainder returned to stream *below* the water intake - water supply unaffected
- Harbour discharge avoided except in emergency
- *OPTIONAL further purple pipe reuse for private properties - MAY require legislative changes (depending on how affected by potable water standard) but not an essential part of the solution*

Stage 4 (full recycling) - legislative changes *MAY be required*

- Indirect reuse - unused treated wastewater (potable) returned to stream *above* the intake - MAY trigger legislative changes depending on how affected by potable water standard *NOTE: this step is aspirational and is not required to avoid harbour discharge, which has already been achieved at Stage 3*

Regards,

Brent Martin

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Weathering the storm

As Auckland's dry spell drags on, Watercare chair Margaret Devlin is staying cool in the face of criticism, writes **Andrea Fox**

Watercare was criticised for its comment 'well, we need it to rain' but the reality is, we need it to rain.
Margaret Devlin

Watercare chair Margaret Devlin is pretty zen for someone who is at the business end of the blame game for Auckland's water shortage.

As they'd say in her homeland Ireland, "there's not a bother on her".

That could be partly due to being a veteran professional company director, adept at putting on a poker face. Or it could simply be the fact that she doesn't control the weather.

She's a warm person so it's not cool indifference. Devlin has devoted her career to managing public infrastructure – here and in the UK – so it's not as though she's oblivious to the fallout when it fails.

The simple reality, Devlin says, is that "we need it to rain".

She offers another reality: "Auckland hasn't had water restrictions since 1993".

And one more: "Watercare has a statutory obligation to be a cost-efficient, minimum-cost provider, so we need to make sure we can demonstrate to Aucklanders, and to Auckland Council and shareholders, that Watercare is indeed being cost-efficient and a minimum-cost provider. Minimum-cost, of course, is not low-cost – it's minimum-cost".

Is that code for Watercare's purse strings being kept too tight for too long?

Watercare is owned by Auckland Council but it's not funded by the council.

Its revenue comes from water and wastewater charges, infrastructure growth charges and borrowing. And its capital expenditure demands are increasing – by $100 million in 2019.

Since Auckland Council was established 10 years ago, Watercare has invested $2.5 billion in new infrastructure, yet it has extended debt by just $463m. That debt is consolidated into the council's debt, which reduces Watercare's headroom for borrowing.

But Devlin is not here to make excuses.

Questions about why Watercare wasn't better prepared for the drought – which Auckland mayor Phil Goff called a one-in-200-year event – and why it hadn't invested more in storage are "all valid", she says.

They've been angry questions – on social media and at a political level.

To bring on additional water sources, Watercare had to spend more than $200m that wasn't in its budget.

That resulted in Auckland councillors, already facing Covid's impact on council revenue, being handed a $44m expense they weren't expecting to treat water from the Waikato River.

Councillors' sensitivities were also bruised in July by some harsh findings in an independent report on the oversight of council-owned organisations.

The report noted that stakeholders considered Watercare unprepared for the drought, and that its report to the council's audit and risk committee in the New Year fell short of compliance with the council's "no-surprises" policy. But it also found the council offered almost no practical strategic direction to these organisations. For water, there was no strategy at all.

As the political fur continued to fly in August, Watercare chief executive Raveen Jaduram resigned his $775,000-a-year job. He exits next week. A search is on for his replacement.

There was also talk that Devlin, chair since 2016, should step down. She was reported to have been carpeted by a furious mayor Goff, water being a highly political issue.

About this, Devlin will only say: "As you would expect within any family, there were some healthy discussions … but actually the family all came together to say we have an issue, we need to fix it".

While she says the questions are valid, she doesn't agree that the drought was predictable.

"I know Niwa and the MetService have yet to give their final opinion on the current weather conditions, but the drought we are in is almost the worst since records began, and certainly the lack of rainfall from last November to May this year has been the driest period since records began.

"People say, surely you should have looked at this going forward, but at that stage there was no indication that the weather pattern was going to continue.

"One of the debates going around is, do you have a drought-proof system or a drought-resilient system? Either comes with dollars by the way. There is no cheap water available anymore."

While others have been quick to point the finger, Devlin is not playing that game today.

She says Auckland is the most efficient water user in the country. And yes, that's in part because it meters water.

She doesn't feel let down by weather forecasters, nor by Watercare staff who have worked "exceptionally" hard on the drought response and come in for abuse. Devlin has been personally jolted by some comments "that are not professional", but says her concern is for staff.

A criticism fired at her is that she has too many governance jobs – at least a dozen of them. Ironically, her speciality is audit and risk.

Watercare is her biggest job, she says, followed by chairing Lyttelton Port. Some are advisory boards, or don't meet frequently.

"I'm the first to admit I don't have my work/life balance right. But I never have. Ask my husband. But I love what I do and I thrive on it."

A handy scapegoat could have been the Resource Management Act. The city had been waiting seven years in a queue – of more than 100 applicants – for consent to take 200 million litres a day from the Waikato River.

Devlin's not going there either. "It's no different to any consenting around the world which looks at levels in a river and the health and wellbeing of a river. There's been a lot of discussion around, if the consent had been given earlier would building [of Auckland water storage] started earlier? That may have been the case but if the river was at a level we couldn't take the water … I think the drought has got mixed up with consenting."

Margaret Devlin.

Watercare has had a consent to take 150 million litres a day from the Waikato River since 1998. It has only done that since last year because it didn't have the treatment infrastructure to receive it all, fuelling accusations that it left things much too late.

In June, the Government stepped in. Technically, Watercare now has consent to take the 200 million litres, but it's complicated. Devlin says 'really it only has consent for 175 million litres, and that relies on river levels.

"At certain times we can only take 150 million litres. We also have two other consents granted – one is using a Hamilton City Council consent they are not using, and we've got consent to take another 100 million litres during winter.

"They'll fall away when we get to 200 million litres. Ultimately, we'll only ever be taking about 300 million litres out of the river in totality."

Devlin says Watercare will learn from the crisis, and two tough lessons could be just around the corner.

The organisation is digesting results of a benchmarking report it commissioned from the Scottish water regulator, yet to be made public, and late next month it is expecting another independent report it commissioned, this time on the quality – or not – of its preparedness.

COMING BY CHRISTMAS

Watercare says it will be able to produce an extra **40 million litres** a day by Christmas

That's enough to meet the needs of **130,000** people

Most of it (25 million litres) will come from the **Waikato River**

That compares with Watercare's October consumption target of **415 million litres** a day or less

Photo/123rf, Herald graphic

Will Devlin step down if the results are critical?

"I'd rather not get distracted about what the outcome is," she says. "We want it done and we want to learn from it. Like the old saying, if you don't want the answer, don't ask the question. Let's find out how we can do things better."

Meanwhile, she says Watercare slipped up in its messaging to Auckland. "Maybe we needed to be much clearer about the fact that putting restrictions on in any infrastructure network globally forms part of planning.

"While people might look at those restrictions as being a failure, actually our system is built on an assumption of a level of restrictions.

"Whereas the rest of the country is quite used to having water restrictions at some stage, there've been no restrictions [in Auckland] since 1993. I think that's where we didn't get the message across."

Devlin says restrictions hadn't been necessary because resilience has been built into the network since the 1993-94 drought. And yes, population growth and climate change have also been factored into planning.

"Watercare was criticised for its comment 'well, we need it to rain' but the reality is, we need it to rain. That doesn't mean we were totally reliant on it raining, but our biggest dams, our biggest single sources of supply, are fed on rainwater."

The day Devlin spoke to the *Herald*, Watercare's reservoirs were at 67.7 per cent. They dropped from 89.5 per cent on November 1 last year to 42.5 per cent on May 25, as Auckland received 60 per cent of its normal rainfall. Restrictions were imposed on May 16.

"Auckland people have been fantastic in their response," says Devlin. "In the peak summer period we were supplying 560 million litres of water a day. At peak demand during winter with restrictions on, demand dropped to 368 million litres a day.

"People have responded so well, I think it reflects recognition it was an unusual situation."

What's the outlook for restrictions?

The restrictions for commercial users were eased this month. They make up about 30 per cent of water customers and some have been vocal about their business loss.

Auckland householders should hear the verdict for them at the end of next month.

The forecast is for a wet and warm summer but, as Devlin says, it's only a forecast and Watercare's job is to safeguard water supplies for summer and into autumn.

"At this stage we are not out of the woods; the weather is still very unsettled."

By Christmas an additional 40 million litres a day will be coming in from a mix of sources including the Waikato River – enough water to meet the commercial and residential needs of 130,000 people.

Watercare is working on bringing in an extra 50 million litres a day from the river by May.

A management plan for the next 20 years is being finalised.

"We're looking at the permutations of what needs to be done and what the impact is on pricing. That discussion still has to happen."

Aucklanders' part in that price discussion should start from the end of November, she says. But over-arching this planning will be the Government's much bigger programme for national water reform.

In August the Government started national roadshows on a proposed huge shakeup in water and wastewater management, which includes a new national regulator and funding carrots for councils. Watercare's future could be up in the air.

Whatever is ahead, "there are a lot of zeros attached", says Devlin.

But there seems little prospect of any privatisation of water.

"The Government has been very clear, local government has been very clear and the legislation has been very clear. Water will not be privatised in any way, shape or form.

"I think sometimes people go down a rabbit hole about do we fix the [funding] problem. They say we'll just go to the private sector to get some money. The issue is, we need to understand what the problem is and what do we do to fix it. I think that's where the water reform programme is starting to get some real traction."

The recently passed Infrastructure Financing Act showed New Zealand has begun to look at different ways of funding water infrastructure, she says.

"But ultimately, of course, it all has to be paid for. And there isn't a mythical 'somebody'. Only one person has to pay, and that's the customer.

"We need to have a new relationship with water. We need to start treating it as precious.

"We do seriously need to look at other options such as purified recycled water and desalination because those things will become a reality at some stage. The question is when.

"Water is a finite resource."

Ultimately, of course, it all has to be paid for. And there isn't a mythical 'somebody'. Only one person has to pay, and that's the customer.
Margaret Devlin

The Lower Huia Reservoir, pictured in May.
Photo / Brett Phibbs

34045 Sue Church

Suzanne Church – Wastewater Hearing Panel – 12 October 2020

Our family live half a kilometre downstream from the proposed Robinsons Bay storage dam, near the creek, on a property identified as being 'threatened' if the dam breaks. The stress of living downstream from this structure is a huge concern.

- Constructed on the edge of the Valleys main stream, ephemeral streams will run down two other sides of it.
- Plastic lined, and close to empty during the warmer months, it will be susceptible to odour, waterfowl and midges.
- It is extremely close to homes, with extensive ex-cavation work taking up to a year.
- The dam face will be above the historic Pavitt Cottage on the edge of the stream. It poses a huge flooding risk if it breeches, threatening houses and property, with only one downstream home being provided flood protection.
- Assurances of its safety bring no comfort after the earthquake damage that has occurred here in the past.

Beca's dam break analysis shows a risk to downstream infrastructure if the dam bursts during a storm. Council state that 'the consequence of a dam burst is minor and the overall risk rating is low'. The analysis, however, relies on a large number of assumptions, and disregards many considerations:

- It fails to take into account any upstream slips, or blockages in the waterway due to debris obstructing the flow – this does occur.
- Nor does it acknowledge bank slumping that can cause blockages and alter the streams flow.
- The stream must pass under a small bridge immediately below the dam site and if it backs up at this constricted point it will pool just below the dam face.
- If the dam does breech, there will be a huge quantity of dirt from the bunds structure that will likely end up sliding downwards towards, and possible into, the creek.
- The analysis disregards the likelihood of intensified storms due to climate change.
- It assumes a 10 minute dam collapse time. Beca indicated a 5 minute sensitivity test was carried out, which would, of course, show higher flooding levels, but requests for this have been denied leaving us very apprehensive of its contents.
- A fundamental issue with Lidar mapping analysis means inaccurate results occur, as variation of ground elevation is picked up in places that are actually due to the height of trees and houses – not the ground level itself. This is apparent on the mapping results of the lower valley, where the water level seems to suddenly stop where there are large trees. This means the instances where results claim that 'floodwaters won't reach the floorboards of houses' may be based on faulty elevation data.
- Any 'out of channel' stream flooding would be unpredictable, and consideration must be taken into account of the bridge at the bottom of the Valley – part of the State Highway.

34045 Sue Church

Impacts are significant:

- with the obvious visual affront
- the injustice of placing a substance that is considered offensive in the middle of our community
- increased industrialisation
- huge heritage impacts
- and a stigma attached that has already left residents' unable to sell property.

My photo demonstrates how saturated our Valley can become. Adding to this catchment by watering for the next 40 years introduces more risk. If this scheme proves to be undersized, more land will be needed for irrigation, possibly through compulsory purchase.

This proposal has grown over time. The down slope criteria was relaxed from 15 to 19 degrees and the Canterbury Air Regional Plan setback measurements were overlooked – both to allow for greater land use. The Thacker site was too small so land in Takamatua was introduced, followed by the Reid block and eventually Hammond Point as well. Despite these 4 land parcels, a wetland was still needed on a 5th site. It seems nothing more than a desperate attempt to design the scheme based around Robinsons Bay where there are willing sellers.

A letter to Council from 227 residents from Robinsons Bay and Takamatua outlined many concerns. All were omitted from the consultation document, which was clearly biased, misleading and disregarding the four wellbeing's this consultation is supposed to be based on.

The proposal is untried, risky and grossly oversized due to the I&I.

Please reassess - and look for a sustainable and resilient solution.

33652 Garth Tiffen

Garth Tiffen
#33652.

AKAROA WASTEWATER – PROPOSALS FOR DISCUSSION

Good afternoon my name is Garth Tiffen and I have been living in Takamatua since 2012. For over 30 years prior to that I had enjoyed holiday times in Takamatua with family and friends. Like many of my neighbours, I am very fearful that our lovely Inner Bays area is to be targeted by the council as a dumping ground for Akaroa's waste water problem.

In my submission, I chose not to tick any of the options. Clearly, I don't wish to have the Inner Bays option taken up, nor do I wish to have the waste water imposed on other unwilling landowners. Similarly, I would rather not have the waste water piped out to the harbour if another sensible option were being offered. But that's not the case!

I have no technical data to offer, but I have listened to the experts who have spoken at the presentations provided by Friends of Banks Peninsula recently - for which I'm grateful.

In relation to Inner Bays option, preferred by the Council, I offer the following comments:

1. The scheme provides for compulsory acquisition of land from unwilling owners. While consideration must be made towards the cultural effects that harbour discharge may have on Ngai Tahu and possibly others, due consideration needs to be provided also for other community members who live in the Inner Bays region. The unwanted wastewater holding pond in Robinson Bay will mean changes to their landscape forever and will be an ugly reminder of the potential risk that it provides to residents. As I recall from technical data presented by experts, there are unrealistic assumptions regarding the pond's maximum capacity to cope with climate change weather extremes.
2. The ponds at the top of Old Coach Rd and in Robinsons Bay will very likely provide an unwanted odour, despite Council assurances to the contrary. Local residents downwind will have to wear it. No doubt the ponds will also lead to an infestation of mosquitos, never a welcome addition to any community!
3. Currently, water from the Takamatua Stream is pumped to Akaroa, treated and then used by Akaroa to supplement the water shortages constantly experienced by the town. What the Council is proposing is that Takamatua not only provides a supplement to Akaroa's water supply but it should then also accept Akaroa's wastewater in return – and then help pay for the whole project through rates. A fair deal? The answer's obvious!
4. Ponds installation and waste dispersal will alter the landscape and lead to a devaluation of properties in the area. Residents living in the vicinity don't deserve to have this negative impact on their farming and residential properties. The ponds on our local landscape will also do nothing for tourism, an important part of Akaroa's economic wellbeing
5. Statistics recorded by the council from submissions show the Inner Bays as the preferred land-based option. But I question where many of those submitters live. It's easy to wish your problem on to someone else's backyard.
6. Inner Bays residents all have their own waste treatment systems on site, at their own cost. Now we're being targeted to accept Akaroa's waste into our community. And apparently through our rates we'll also be contributing to the cost – both the initial capital and ongoing servicing and maintenance costs.

The council needs to come up with a better solution for the use of this water, a scarce commodity in Akaroa, particularly in the summer months. I believe a purple pipe option should be taken out of Council's too hard basket and given greater attention. Alongside this, the council

33652 Garth Tiffen

should continue its efforts to reduce the amount of stormwater leakage into the sewage system. It has a significant impact on the volumes to be treated.

Similarly, I understand that managed aquifer recharge is another possibility that could be further explored, for the benefit of Akaroa's inadequate summer water supply.

Until there has been a solution offered which will provide for a productive use of the wastewater, I believe it should be filtered to a very high level (near potable at least) and discharged well out into the harbour. This could be a temporary arrangement until such time as a productive use could be established and agreed with all parties, making better use of what could become a most valuable resource, without imposing an unwanted dumping of the problem on to other communities.

33521 Robin Tiffen

33521# Robin Tiffen

Akaroa Wastewater Proposals

I have been coming to Takamatua for 45 years to the holiday house built by my father and we have lived here permanently since 2012. We moved here as a lifestyle choice to enjoy the beautiful unspoiled environment here on Banks Peninsula. We contributed financially to the water supply scheme that served Takamatua adequately for many years and bought, installed and maintain our own wastewater treatment system.

The inner bays communities have been facing uncertainty and mounting costs in preparing multiple submissions over the last 4 years and face further anxiety as the process continues.

- Although engineer in past life make no ~~more~~ other claims to expertise, than common sense.

I see three main issues that must be addressed.

1. The first priority must be to **eliminate** the inflow and infiltration into the wastewater system as a result of broken or incorrectly connected pipes. Akaroa residents must take responsibility for grey water and storm water pipework on their own properties and ensure they are working without leaks. This would reduce the requirements of the treatment scheme to 30% (-40%) of that currently being proposed.
2. The second priority should be to address the increasingly common water shortages faced by Akaroa by re-using as much of the wastewater as possible installing, at best, a treatment plant capable of producing potable water, or at the very least, a purple pipe system reticulated to Akaroa residents for garden watering and vehicle and boat cleaning. The demand for these uses is highest in the summer when the population of Akaroa increases significantly and when the water supply is at its lowest. Akaroa Harbour is an extremely important environment and enjoyed by residents and visitors alike as a scenic icon, food basket, playground and tourist attraction. The treatment level proposed appears to meet most of the standards necessary for a harbour outfall for any excess wastewater. Levels of nitrogen and phosphorus could be further reduced with suitable treatment that is acceptable to all residents.
3. None of the options provided in the current consultation document require Akaroa residents who produce the waste to take any responsibility for its disposal. Takamatua and Robinson's Bay residents take full responsibility for their waste disposal by providing and maintaining underground systems on their own properties at their own expense. The vast majority of submissions favouring disposal to land, do not live or own property in the vicinity of the proposals.

   Suitable individual or grouped wastewater systems could be provided for most of Akaroa but this does not appear to have been considered.

The Local Government Act requires, and I quote, a "sustainable development approach and taking into account the social, economic, environmental and cultural wellbeing of communities now and in the future." They "must consider the views and preferences of people likely to be affected by, or with an interest in, the decision to be made." Council staff members have stated that this has intentionally not been done at the design stage but is the responsibility of the Hearings Panel and Council. I sincerely hope this will happen and a decision will be made that enables future generations to enjoy this area as much as my family have.

What is the most important thing in the world? It is the people, the people, the people. He tangata, he tangata, he tangata.

33744 Ross Blanks

AKAROA WASTE WATER SCHEME
Submission apposing Inner Bays proposal

Thank you for a 5 minute opportunity to present to my elected reprentatives.

Ross Blanks Veterinarian .

Many of the issues I raised in my written submission will have been traversed)and I endorse

We all want a clean harbor . I was originally for a land based option . Along with the majority of those surveyed I am most definitely not in favour of the working groups preferred inner harbor scheme

As a matter of fact I walk and kayak the Robinsons Bay waters and coastline regularly . The mudflat shellfish are hanging in there and there are still areas of healthy mudflat . Small schools of small fish are prevalent . Flounder still habit and the odd stingwray pokes its nose in . The Bay is degraded already and more recently there has been bull kelp loss around the points due to a couple of very warm years The recovery after deforestation has been a long one It is an incredibly shallow Bay that does not flush tidally as efficiently as mid harbor . The Inner Bays introduces an unneccesary risk to that most vulnerable part of the harbor

I am here because after attending a public meeting I was appalled to be advised that " at the end of the day the decision would be a political one" .. We are not in Trump America that I know of and we, and that means you , have an absolute obligation to make a decision based on Science and best practice. I hope very much that Iwi who have KaitiakiTanga pertaining to the afore mentioned Mahinga Kai Are of the same view

My understanding of the Kaitiakitanga imperative is that . that no human waste should go in to the harbor before being processed through natures wetland .

33744 Ross Blanks

If the Political consideration is trying to meet the cultural conditions required under the Kaitiakitanga I submit the following for consideration .

If we spend our limited rate payer resources on the best practice engineering available for our treatment station we will have a **Engineered** Wetland . we can have the same or better cleansing capability as a **natural** Wetland . We all adopt more advanced technologies in all walks of life over time .

- **Risk (Inner Bays)**

I have interviewed a n engineering consultant in the USA who specializes in designing computer systems for waste water processing for large midsize and small urban areas where the water is cleaned and reused a number of times as it moves down river .

- **His observations are salient**
- fix network infiltrate/exfiltrate
- Clean up the effluent then discharge to harbor at point where there is good tidal flow (he said) paradoxically this a more secure option for the harbor than the inner bays option .
- " the more choke points and the more complex the system the higher the likelihood of it being overwhelmed in a storm event or earthquake . The proposed inner bays scheme has a number of choke points which would easily be overwhelmed in a storm event . That risk is acknowledged by your working group with a poorly thought out spill overflow option of effluent in to Childrens Bay
- Moving the fluid effluent field to the least flushed shallowest most sensitive part of the inner harbor increases risk .
-
- Modelling remains wildly inaccurate whilst there is up to 70 % of the volume coming from infiltration of the collection network from Storm water (by accident design or decrepitude.
- Nitrification of the harbor is likely to be more of a problem from landbased disposal in to shallow non flushing bays.
- As an aside nitrate removal is doable. It adds 8 to 10 % on to the ongoing costs .(refer modeling costs need to be based on a fixed network
-

33744 Ross Blanks

ASIDE MY Comment . The working group is paying lip service to this fix while suggesting at best they can only achieve a 20 % improvement with a central govt grant .
I suggest This council grow a pair and start auditing every residents sewage system to clean up the storm water infiltrate . We all ...Every rate payer needs to own this problem . Planning a system as a tray to collect under a leaky bucket would be better planned if the holes were plugged in the bucket first. A leaky system is the first risk to harbor we should be sorting .

Conclusion .
The decision must be made on the basis of best practice and science. Politics should play a part only in that it acknowledges the concerns of us all particularly those with Kaitiaki over mahinga Kai that the engineered solution of a **engineered wetland** ie treatment plant can do the job of what was historically acceptable ie a **natural wetland ,** Before controlled discharge through a well placed ocean outfall well out in tidal flow

- The working group. have gone down an incredibly expensive rabbit hole with the best of intentions , and continues to rack wage costs defending a poor choice .
- The survey posted online of preferred land based options gives no clear indication that the majority of survey responders favour a land based solution
- A majority of responders did not indicate a land based preference because there is no option better for providing the cleanest possible discharge to the harbor with the least risk than
- an engineered wetland (treatment station) and that was not offered as a choice

- The inner bays scheme shifts and magnifies the risk to the most sensitive least tidal flushing part of the harbour using a plan with too many choke points at risk of being overwhelmed or compromised in storm or seismic events
- The most cost effective way of putting the cleanest water in to the harbor is by spending most of the money on the most up to date plant we can and sending the resultant cleaned effluent through a longer outfall to the more tidal part of the harbor .

33744 Ross Blanks

Leaves future adoption of reuse available as the pipework is local reduce the amount going in to the harbor by piggy backing reuse purple pipe water for irrigation in and around Akaroa ..
I don't accept that the DHB has put in the time to back their veto of these systems It is an appalling excuse that the lack of central Government regulation should stop this discussion progressing .
There are all sorts of cluster solutions available

33989 Robinsons Ratepayers and Residents Association

Robinsons Bay Residents and Ratepayers Association

Submission to Akaroa Wastewater Hearings – 16 October 2020

Presented by Lee Robinson, Chairperson

33989 Robinsons Ratepayers and Residents Association

1. This submission is made on behalf of the Robinsons Bay Ratepayers and Residents Association (the Association).
2. Robinsons Bay is a community of permanent residents and holiday homes (at least 80 households).
3. The people have worked together over the years to improve the amenity of the Bay, restoring its wharf and developing its reserve. The significant heritage of the bay is highly valued by its residents and visitors. (photos)
4. The bay itself is favoured by boaties for recreation including water skiing, swimming, and sailing. (photos)
5. Gathering food from the bay and stream is an important part of our culture. The stream is one of the best for whitebaiting. The shallow flat bay is known for its flounder fishing. Fishing off the wharf is popular again since the restoration.
6. Using Robinsons Bay as a disposal site for Akaroa's wastewater is abhorrent to the ratepayers and residents of this community. A culturally offensive substance containing hormones, antibiotics, emerging contaminants and some viruses is to be dumped in our valley for decades to come. The wastewater will not be tested prior to leaving the plant. There is no guarantee that it will meet the consent conditions over time.
7. The offence to our community is compounded by the size and insensitive location of the infrastructure and the environmental risks posed.

7.1. A storage dam the size of four football fields and a 30ha irrigation field is to be located in our upper valley with a further irrigation field on Hammond Point.

7.2. The dam is sited immediately above the Pavitt cottage and the heritage Sawmill site, a place of immense significance to the development of Canterbury and one to which many New Zealand families trace their roots. (photo)

7.3. The Pavitt cottage has been a focal point of the community since it was purchased by the family and fully restored. It has been used for many community gatherings. It will be open to the public as part of the Christchurch Heritage Festival at the end of October. We urge panel members to visit. (photo)

8. Surrounding the proposed wastewater sites are small holdings and homes that enjoy the amenity of the area - tranquillity, birds, freshwater, clean air and beautiful views. Wastewater irrigation is to take place to within 5m of their properties. The storage dam structure is much closer than 100m to several neighbours - the setback being applied is from the wastewater itself, not the earthworks. This is the only way it could be made to fit.
9. This dam will sit near empty when the weather is dry, exposing the black polythene liner and creating a habitat for breeding mosquitoes, midges and odour and risk to neighbours and those downwind.
10. During periods of wet weather this dam is expected to be full. It is positioned above the stream draining the main catchment of Robinsons valley, elevating the flood risk to residents below it. Risks of dam burst and bank slumping of streams are identified in the Beca report. No compensation has been offered to those properties below that will suffer an elevated flood risk. (photo)
11. The lower valley already experiences flooding during heavy rain, exacerbated by storm surges as the culverts draining its streams are below the hide tide level. Along with more extreme weather expected with climate change, the addition of even more water to the catchment during times of heavy rain or prolonged wet weather creates an even greater risk of flooding and land movement.
12. The dam is to have a four metre high bund wall, that cannot be visually screened by planting and will introduce an ugly and dominant industrial element into the pastoral landscape. The dam wall will be visible from many places along the Valley Road and the entire dam will be visible from properties with vistas over the site. The visual amenity of our beautiful upper valley will be irrevocably damaged.
13. People who have their life savings invested in the affected properties will have their investments destroyed. There is a stigma attached to being a place for wastewater disposal - hardly surprising given the negative effects experienced by other neighbourhoods near wastewater facilities. The market for properties will naturally diminish as this place becomes less desirable.
14. The Robinsons Bay community are united against this proposal, with the sole exception of the three property owners who will benefit from the sale of their land to the Council.

33989 Robinsons Ratepayers and Residents Association

15. The environmental risks to the bay itself are significant. The use of native trees for a wastewater disposal field is completely untried and an experiment. Irrigation is proposed throughout winter even during time of heavy rain, and the water carries a high nutrient loading.

15.1. The bay is characterised by the head of the harbour mudflats which are exposed for long periods each day due to the tidal flows. This is a potential breeding ground for odour.

15.2. The mud flats at Robinsons Bay do not currently smell, unlike some other bays in the Inner Harbour. Irrigation of the slopes and valley with wastewater is likely to result in run-off and the Bay is at risk of becoming odourous should additional nutrients accumulate in the mudflats.

15.3. Hammond Point is a narrow spit of steep loess cliffs riddled with tunnel gullies. If irrigation of this Point results in further tunnel gully erosion or slips, these will increase sedimentation in the Bay.

16. It is now settled law that residents' appreciation of the amenities of the area, is highly relevant and any assessment of a proposal must involve consultation with the community. Experts need to consider the perception on the residents of the proposal on any change to rural character and amenities of the area as considered by the residents who are affected.

17. Of further significance we note that:

17.1. Over 60% of the wastewater is infiltration into the Akaroa network. That the Council should even consider building a vastly expensive new wastewater treatment system without first fixing the broken network beggars belief.

17.2. Akaroa has a water shortage problem, yet this proposal does nothing to address this, or climate change

17.3. It is not well known by the community but a component of the Sewage Treatment Plant, the Terminal Pump Station - has been consented at the entrance to Akaroa, near the coast, and close to sea level in a prime amenity area. This large, 7.5 metre high unsightly Terminal Pump Station will store untreated raw sewage sludge and be opened and emptied regularly. In our view this consent was obtained with minimal community consultation and it was renewed to 2028 with no consultation. We believe there will be an outcry once this becomes well known in Akaroa. (photo)

17.4. Up until the late 1970s visitors to Akaroa were welcomed by a rubbish dump (stench, seagulls, smoke and unsightly mess), which is now the capped landfill where this Terminal Pump Station is planned. The Association is concerned at the impact of this entire wastewater scheme on our neighbouring communities and Akaroa itself.

18. Our Association vigorously opposes the Inner Bays option. It would be an ecological and environmental disaster. It is very expensive, now close to $70 million, and the Council would still need to spend many more millions more to improve Akaroa's water supply, fix the sewer network and provide re-use of the wastewater in Akaora as requested by an overwhelming majority of submitters. Very little support has been shown for the proposals during this hearing process, and the many risks have been highlighted. The proposal fails to prepare Akaroa and surrounding communities for our climate changed future and is an imprudent use of ratepayer funds at a time of great economic uncertainty and increasing Council debt.

19. We support the Friends of Banks Peninsula proposal. We need our Council to be innovative, creative and responsible and take a long term view of Akaroa's water issues. Fix the network of broken pipes first and focus on finding the path forward to reuse and recycle the water into Akaroa where it is most needed. Soon, and well within the lifetime of this wastewater system – that water is going to be desperately needed in Akaroa. As ratepayers we are asking for our hard earned dollars to be wisely spent, not wasted on these current proposals.

20. We are seeking the Council to prioritise the issues of climate change and water shortages and support a sustainable option for wastewater for the Akaroa Community for years to come.

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Robinsons Bay wharf, restored by the community in 2019 as a joint venture with the Council at a cost of $30,000 to the local residents involving 23 working bees and over 35 local participants

(Paras 3 and 4)

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Native Reserve developed by the community on Robinsons Bay School site

(Para 3)

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Looking across the stream to the site of the proposed storage dam

(Para 7.2)

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Pavitts Cottage on the old historic Sawmill site and immediately adjoining the proposed storage dam

(Para 7.3)

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The Robinsons Bay Stream situated immediately below the proposed dam and would serve the main catchment of the Robinsons Bay Valley

(Para 10)

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Looking from the boat park area on the Akaroa waterfront towards the site of the proposed Sewerage Terminal Pump Station

(Para 17.3)


Association

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#33989

Submission to Akaroa Wastewater Hearings
Robinsons Bay Residents and Ratepayers Association
16 October 2020
Presented by Lee Robinson, Chairperson

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33989 Robinsons Ratepayers and Residents Association

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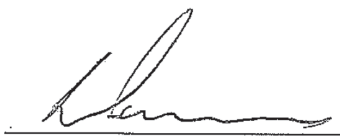

LMC Robinson, MNZM

Chairperson, Robinsons Bay Residents and Ratepayers Association

16 October 2020

Submission #33989

33989 Robinsons Ratepayers and Residents Association

Robinsons Bay and Takamatua concerns with disposal of Akaroa wastewater in our communities

The communities of Robinsons Bay and Takamatua have been extremely concerned for the past 4 years about the ongoing proposals to dispose of Akaroa's wastewater in our communities and near our homes and oppose the Inner Harbour Irrigation Scheme.

The Akaroa Wastewater Working Party was set up by the Community Board in response to our community concerns in 2017, but these concerns are not addressed by the Inner Bays option that continues to be included and is favoured by the Council staff.

The proposed Inner Bays scheme includes:

- Construction of a storage pond, 2ha in size (equivalent to four football fields) with capacity to hold 19 million litres of treated wastewater on a sloping site with a 4m high dam face adjacent to the main Robinsons Valley stream. It is in the centre of the Robinsons Bay valley community surrounded by houses on three sides, and immediately above the fragile and significant historic Pavitt Cottage.
- Three irrigation fields planted with native trees within 5m of neighbouring properties in upper Robinsons Bay, at Hammond Point and on the Takamatua flats.
- Construction of an artificial wetland on the land between State Highway 75 and Old Coach Road to enable discharge of wastewater to Childrens Bay when the storage pond at Robinsons Bay is full.

We oppose this scheme because it is a complex, high cost and untried system, placed in the centre of our communities with little margin for error, and does not provide resilience against future climate extremes.

This scheme places our environment, lives and properties at direct risk of adverse effects now and in the long term future for the following reasons:

1. High cost unproven system placed in the centre of communities with little margin for error
2. The design of the Inner Bays option is so tightly constrained by availability of suitable land that the minimum setback distances from houses, property boundaries and streams have been used increasing impacts of negative effects on communities
3. Risk of flooding from dam burst and stream bank slip for downstream houses
4. Risk of nutrients and other contaminants leaching to streams and draining to shallow mudflats impacting aquatic life due to irrigating close to streams, year round, and in wet weather
5. Negative impact on significant archaeological site, related heritage cottage and surrounding heritage landscape from storage pond and irrigation field in Robinsons Bay
6. Wastewater will be released into Childrens Bay at Akaroa
7. Sewage reticulation is not being provided to the receiving communities
8. High value land in the Inner Harbour required and any future expansion likely to require acquisition of even more high value private land.

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We now explain these reasons in more detail:

1. **High cost unproven system placed in the centre of communities with little margin for error**
   - Irrigation of wastewater to planted native trees has never been tried before in New Zealand. This is an unproven and experimental system.
   - The setback distances used by the Council to select suitable sites for wastewater infrastructure are based on engineering concerns and do not take into account the social impacts on the neighbouring residents
2. **The design of the Inner Bays option is so tightly constrained by availability of suitable land that the minimum setback distances from houses, property boundaries and streams have been used**
   - Common adverse effects of storage ponds are odour, midges, mosquitoes, noise and visual effects
   - The risk of these effects impacting people is greatly increased by the placement of this infrastructure so close to houses
   - These risks are ongoing and likely to have a negative impact on the values of property in the immediate vicinity of the storage pond over the lifetime of the system, and the potential to devalue and hinder property sales for residents close to the irrigation fields in both Robinsons Bay and Takamatua.
   - Trees within 5m of property boundaries will shade neighbouring properties and affect views.
   - Residents of Robinsons Bay will be subjected to extreme disruption during the excavation of the storage pond and laying of pipes.
3. **Risk of flooding from dam burst and stream bank slip for downstream houses**
   - There are several houses downstream from the storage pond and irrigation field in Robinsons Bay
   - The storage pond will be constructed with the main Robinsons Valley stream below the northern dam face and is bounded by an ephemeral stream on the western side. The main stream appears to be closer than the minimum site selection parameter, which was intended to keep the dam out of the stream flood area.
   - Dam burst analysis presented in the Beca Report shows an increased risk of flooding if a dam burst occurs during a major storm with properties being inundated around houses, and in some cases under the floor boards, including the Pavitt cottage and the lower part of Robinsons Bay, also endangering stock.
   - The dam burst analysis does not take into account risks of debris blocking the stream where it passes under Sawmill road in a constricted space. The Beca report also identifies an elevated risk of stream bank slumps and slips which could lead to further flooding. Peninsula experience shows that flooding risks are heightened when debris constricts stream flow during storms leading to a build-up of water followed by a flash flood.
   - The irrigation field at Robinsons Bay includes some areas that have downslopes steeper than the 15° site selection criteria advised by engineers, exacerbating the risks of slips. The irrigation field at Hammond Point is also sited above downslopes steeper than 15°.
   - The irrigation field at Takamatua is on land that is close to sea level and already boggy in winter. The downstream settlement is flood-prone.
   - The wetland is sited above State Highway 75 and the Akaroa Cottages residential area. It involves substantial earthworks and a constructed face up to 10m high on the western side facing the State Highway. A comprehensive dam burst analysis has yet to be done, but Beca have identified risks.

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4. **Risk of nutrients and other contaminants leaching to streams and draining to shallow mudflats impacting aquatic life due to irrigating close to streams, year round, and in wet weather**
    - Irrigation is to take place within 25m of the centre of continuous streams, and 10m from ephemeral streams (that run during times of rain only), again the minimum setback requirement.
    - The treated wastewater will contain high levels of nutrients, including nitrogen and phosphorous. It is not yet known what contaminants (eg, micro-plastics) will not be removed by the treatment process.
    - Irrigation of wastewater to planted native trees has never been tried before in New Zealand. A small tree trial has been running at Duvauchelle for several years, but the trees are not yet at maturity and no results have been released regarding their ability to absorb nitrogen. Nitrogen build-up in the soil has been problematic for other land based irrigation schemes such as Rotorua that discharge to mature pine forests.
    - The size of the native tree irrigation fields and irrigation rates are based on modelling assumptions. These assume that the eventual tree canopy will intercept sufficient rain water to enable irrigation throughout winter, only ceasing after 50mm of rain. Both Robinsons Bay and Takamatua valleys experience severe ponding and stream burst during this level of rain.
    - Irrigation during wet weather will increase run-off to the streams.
    - The streams at Robinsons Bay and Takamatua drain to shallow coastal mudflats. If nitrogen builds up due to run-off, or if the trees do not absorb the amount of nitrogen envisaged, there is a risk of pollution and odours.
    - The disposal of wastewater in an area that already receives adequate, and at times excessive rainfall, cannot be regarded as beneficial reuse.

5. **Negative impact on significant archaeological site, related heritage cottage and surrounding heritage landscape from storage pond and irrigation field in Robinsons Bay**
    - The storage pond and irrigation field in Robinsons Bay would be located on a registered archaeological site, significant to Banks Peninsula and to Canterbury as the place of the first sawmill in Canterbury with a large waterwheel harnessing the power of the Robinsons Valley stream. The site includes the mill site and associated ponds, tramways and ancillary buildings, and a now abandoned 19th century cottage. These matters are confirmed in a recently commission archaeological assessment that has yet to be acknowledge by the Council.
    - Adjacent to the Sawmill site is the Mill cottage, the oldest standing structure in the area. The cottage was subdivided from the main Sawmill site about 20 years ago when it was purchased by a member of the original Pavitt family who built the first mill, fully restored, and left in trust for the descendants of the early families to use and enjoy. It is now also rented as a holiday let to the public to assist with paying for its upkeep and maintenance.
    - The Mill cottage is focal point for the archaeological landscape that stretches up to the abandoned cottage and is hugely valued by the residents of Robinsons Bay as the starting point for the European history of the bay. The existing property boundaries in Robinsons Bay still reflect their original ownership by mill workers, and there are many extant heritage features in the Bay, including the Schoolmasters house, farm buildings and trees planted by early settlers.
    - The storage pond will now dominate that landscape as it is sited immediately above the Mill cottage and will be visible from Sawmill Road, Okains Bay Road and houses in the area.
    - Access to the site during construction and on an ongoing basis will be from Sawmill Road over the location of the Sawmill site. This is likely to be irreversibly damaged during the construction.

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- Trees will be planted over the other archaeological features, completely obscuring the abandoned cottage and to the boundary of the Mill cottage, separating it from its heritage context.
- The owners, the Pavitt Cottage Trust, is extremely concerned that about loss of income during the construction period and ongoing loss due to the destruction of the archaeological landscape and the potential for odour, noise and other nuisance from the close proximity of the ponds.

6. Wastewater will be released into Childrens Bay at Akaroa

- The Inner Harbour option includes a constructed wetland at the top of Old Coach Rd for further purification of the treated wastewater, including restoring the mauri of the water to make it culturally acceptable to Ngāi Tahu prior to entering the harbour
- During normal conditions treated wastewater will trickle into it at the rate at which it evaporates. When the storage ponds in Robinsons Bay become full (anticipated during times of prolonged wet weather) water will flow through the wetland to the Childrens Bay creek and out into Childrens Bay. The wetland is intended to remove significant amounts of nutrients, particularly nitrogen, from the treated wastewater. In very large wet weather events (estimated at once every ten years), the wetland will overflow and the treated wastewater will flow directly to Childrens Bay without passing through the wetland.
- There is considerable uncertainty around whether the wetland will perform as intended; the study used to inform its design of a significantly different system (with continuous flow), and there are numerous examples around New Zealand of the failure or poor performance of constructed wetlands at wastewater disposal sites , including those at Whakarewarewa and Ashburton.
- If the wetland fails to perform as intended, there is a risk of pollution of the Childrens Bay mudflats.
- The wetland requires significant construction and visual alterations to a prominent site at the gateway to Akaroa

7. **Sewage reticulation is not being provided to the receiving communities**

- It is unfair to impose the risks and impacts of disposing of Akaroa's wastewater on another community when that community does not benefit from the scheme.
- There are many residences in Takamatua and Robinsons Bay that dispose of their own sewage via septic tanks, at their own expense. They are now being asked to also dispose of Akaroa's wastewater.

8. High value land in the Inner Harbour required and any future expansion likely to require acquisition of even more high value private land.

- The proposed disposal sites include rolling country on a north-facing farm in Upper Robinsons Bay, a coastal headland at Hammond Point, and the flat field alongside SH75 in Takamatua.
- Using these sites for wastewater precludes their use for other purposes, including farming, horticulture, housing and recreation.
- The use of high value land for irrigation fields is being promoted by Council as beneficial reuse of the treated wastewater because they will be planted with native trees. Resources would be better directed towards larger areas of lower cost marginal land enabling greater biodiversity and carbon benefits at less cost, and harnessing natural regeneration of indigenous vegetation. This occurs readily on Banks Peninsula and is preferable to planted forest, both ecologically and in terms of cost.

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- These three sites are needed to provide the minimum land required to reduce the storage ponds to a feasible size. If the volume of wastewater becomes greater than planned for (due to settlement growth or extended reticulation), or if irrigation rates have to be adjusted, then more high-value land will be needed, further encroaching upon these communities.
- The site at Takamatua is also flagged by the Duvauchelle wastewater irrigation scheme for relocation of the Duvauchelle Show highlighting the scarcity of inner harbour land.

Signed by the following residents and landowners of Robinsons Bay and Takamatua:

Name	Community
Peter G Steel	Robinsons Bay
Karen Watson	Robinsons Bay
Susan Bruce	Takamatua
Ray Bruce	Takamatua
Elizabeth Foley	Robinsons Bay landowner
Garry and Tanya Moore	Robinsons Bay
Bryan and Nancy Tichborne	Trustees, Pavitt Family Trust
William and Joan Adair	Robinsons Bay
Mark and Anna Pitts	Robinsons Bay
G.D.Shanks & N.A Shanks	Takamatua
Doig and Andrea Smith	Robinsons Bay
John Thom	Ngaio Point, Robinsons Bay
Julie Wagner	Ngaio Point, Robinsons Bay
Paul and Pip McFarlane	Robinsons Bay
John Thacker	Takamatua/Robinsons Bay
Tim and Nadine Adair	Robinsons Bay
Brent Schulz and Christine Shearer	Takamatua
Kathleen Liberty	Robinsons Bay
Doug Neil	Robinsons Bay
Cynthia, Tony and Hannah Muir	Takamatua
Brendan and Marion Glover	Robinsons Bay
Eric Ryder and Judy Jeffrey	Robinsons Bay
David and Sue Thurston	Takamatua
Harry Thurston	Takamatua
Mary & Michael Browne	Trustees, Pavitt Family Trust
Helen Leach	Trustee, Pavitt Family Trust
James and Michelle Adair	Robinsons Bay
Mark & Denise Wren	Takamatua
Fiona Turner	Robinsons Bay
Craig & Leanne Hastie	Ngaio Point, Robinsons Bay
Kevin and Averil Parthonnaud	Robinsons Bay
Liz and Hayden Cleaver	Robinsons Bay
Graham & Lorraine Raxworthy	Robinsons Bay
Jacqui & Brent George	Trustees ,Pavitt Family Trust
Andreas Lageder & Anabel Barino	Robinsons Bay
Chris and Annette Moore	Robinsons Bay
Ross and Julianne Blanks	Robinsons Bay
Craig and Suzanne Church	Robinsons Bay
David & Christine Kelly	Robinsons Bay
Bill and Jaynie Abbott	Robinsons Bay
Richard and Pam Florance	Takamatua
Ross and Brigitte Shepherd	Robinsons Bay
Lyndsey Rhodes	Robinsons Bay

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Lee and Marian Robinson	Robinsons Bay
Todd and Louisa Raxworthy	Robinsons Bay
Chris and Tracey Pottinger	Robinsons Bay
John and Rosalyn Curry	Robinsons Bay
Michael and Barbara Harrington	Takamatua
Brian and Anne Eves	Robinsons Bay
Craig and Sarah Raxworthy	Robinsons Bay
Dick and Shirley Fernyhough	Trustees ,Pavitt Family Trust
Sara Parks	Takamatua
Graeme Curry	Landowner, Robinsons Bay
Toby and Annabell Smith	Robinsons Bay
Suky Thompson	Robinsons Bay
Brent Martin	Robinsons Bay
Joyce and Murray Walker	Takamatua
Johannah & Michael Curwood	Trustees , Pavitt Family Trust
Dianne Carson	Robinsons Bay
Julian and Katrina Calcutt	Robinsons Bay
Elizabeth Lawson	Takamatua
Alistair and Nerolie Davidson	Robinsons Bay
Trevor and Gill Bedford	Takamatua
Peter and Stephanie Ganly	Takamatua
Stuart Jeffrey	Takamatua
Amanda & Callum Wilson	Trustees , Pavitt Family Trust
Andrew & Mandy Bax	Trustees , Pavitt Family Trust
Viola Kasikova	Robinsons Bay
Craig & Julie Swan	Takamatua
Richard and Sue Lovett	Robinsons Bay
Hugh Martin	Robinsons Bay
Pamela and Tony Fisher	Landowner, Robinsons Bay
Ken and Yvonne Marshall	Robinsons Bay
Garth and Robin Tiffen	Takamatua
Jamie Palmer	Robinsons Bay
Norman Bayne	Robinsons Bay
Neil and Rebecca Barnett	Takamatua
Tom and Lynne Brennan	Robinsons Bay and Takamatua
Gary & Ruth Fail	Takamatua
Monique Connell	Takamatua
Stephanie Connell	Takamatua
Prunella Downes	Takamatua
Maria Browne	Trustee, Pavitt Family Trust
Wayne Best	Robinsons Bay
Fran Anderson & Grant Robertson	Robinsons Bay
David & Claire Williams	Trustees , Pavitt Family Trust
Peter Zwart	Robinsons Bay
Anne Zwart	Robinsons Bay
Steve and Annette Lelievre	Takamatua
Steve Parker	Trustee, Pavitt Family Trust
Peter Roberts	Takamatua
Glenys Roberts	Takamatua
Pat Lyons and Wayne Sceats	Robinsons Bay
Robyn Walker	Lessee, Takamatua
Geoff Harris	Robinsons Bay
Laurice Bradford	Takamatua
Hannah and Paul LeLievre	Takamatua

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Christine Aylesworth and Richard Evans	Takamatua
Benoit Navarron and Flore Mas	Ngaio Point
Janey & Roger Thomas	Trustees , Pavitt Family Trust
Ben Tichborne	Trustee, Pavitt Family Trust
Kevin and Heather Sibley	Takamatua
David and Wendy Flemming	Robinsons Bay
Janice and Rodney Innes	Tamakatua
Kim and Barbara Avery	Robinsons Bay
Anne and John Bowden	Takamatua
Noel & Sue Strez	Takamatua
Nancy Kennedy	Robinsons Bay
Tony & Pip Mason	Robinsons Bay
Tim and Jacquie Johnson	Takamatua
Geoff Beaver	Takamatua
Gavin and Sonia Shepherd	Robinsons Bay
Hugo Tichborne	Trustee, Pavitt Family Trust
Guy Tichborne	Trustee, Pavitt Family Trust
Niall Holland & Jan Whyte	Takamatua
Elizabeth and Brian Bain	Robinsons Bay
Mark Milligan	Takamatua
Murray and Linda Smith	Robinsons Bay
Graeme and Karen Bryant	Takamatua
Ken and Carol Reese	Takamatua
Carolyn Browne	Trustee, Pavitt Family Trust
Chris & Sharyn Reid	Takamatua
Simon Hadfield	Robinsons Bay
Darryl and Martine Swann	Takamatua
Amy and Amber Swann	Takamatua
Jill Lockett	Robinsons Bay
Richard and Lorraine Troughton	Takamatua
Mike and Rose Ryan	Robinsons Bay
Brett Lea	Takamatua
Kathrine and Hugh Fraser	Takamatua
Gordon Boxall	Ngaio Point
Evelyn and John Oliver	Robinsons Bay-Duvauchelle
Derek & Sue Marr	Takamatua
Jenny and Tony Hay	Takamatua
John Thomson and Joanna Hase	Robinsons Bay
Shaun Huddleston	Robinsons Bay
Frank and Maryline Shaw	Takamatua
Lizi Reese	Takamatua

Extra names after date closed

Fi Smith and Tony Bird	Takamatua
Michael and Anne Schlumpf	Takamatua
Fiona Buchan-Ng	Takamatua

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Pavitt Family Trust

Brent George and Nancy Tichborne

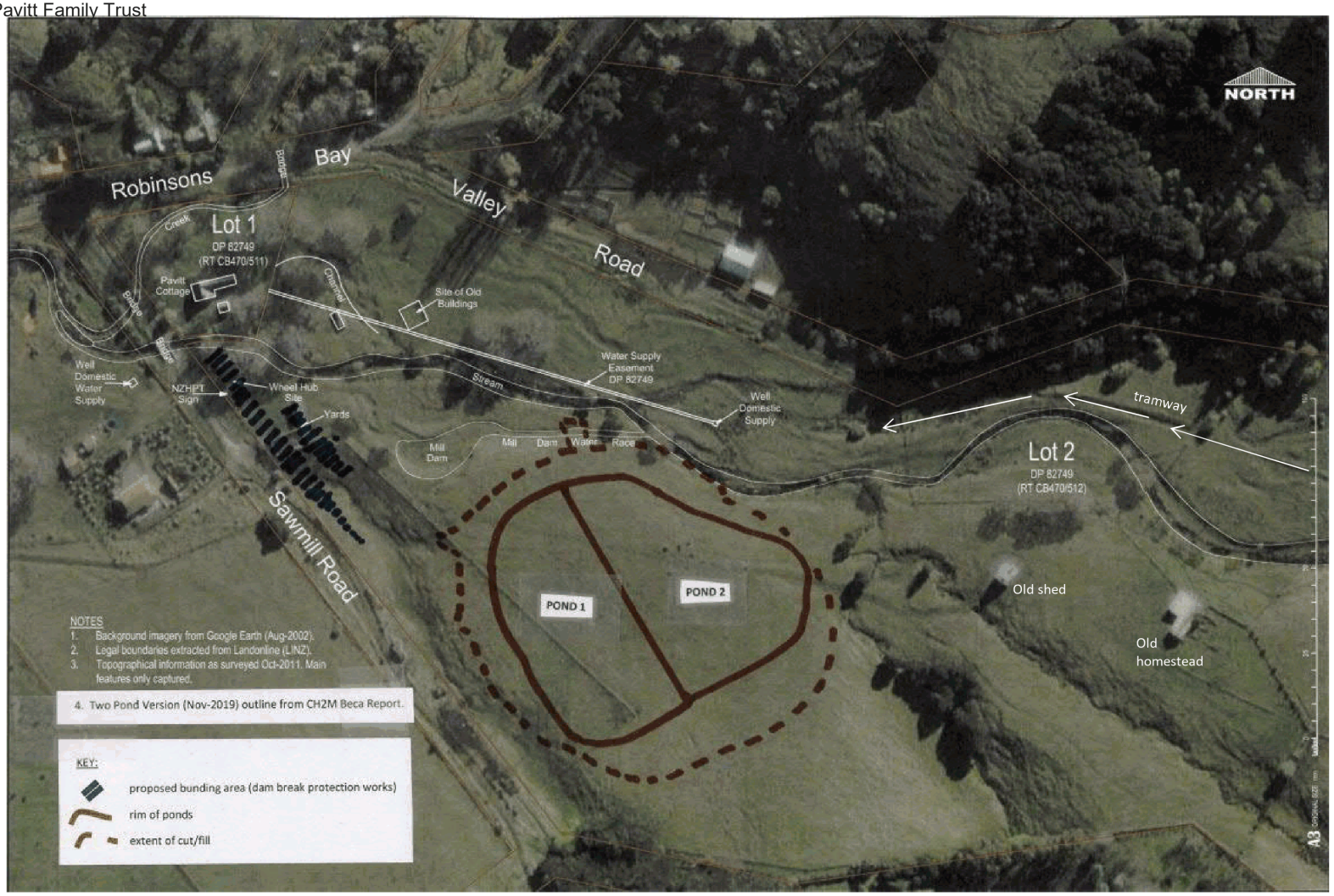
Akaroa Wastewater Options

Hearing Presentation 16-Oct-2020

33902 Pavitt Family Trust

The Robinsons Bay Sawmill and Pavitt House c. 1870. Wynn Williams

33902 Pavitt Family Trust



Topographical Plan of Historic Sawmill Area – Sawmill Road, Robinsons Bay (2011-20)

33902 Pavitt Family Trust

Pavitt Cottage – 5 Sawmill Road, Robinsons Bay

33902 Pavitt Family Trust

Pavitt Family Trust – Presentation Outline – Akaroa Wastewater Issue 2:55pm Friday 16-Oct-2020

(Version CCC)

[Queue the first image Wynn Williams Painting]

Introduction (Brent)	Thank You for the opportunity to speak to the Hearing Panel. Firstly – we would like to acknowledge the Pavitt Descendants that are present here today in support of us and this Pavitt Family Trust presentation. [Ask them to stand – Present: Bryan Tichborne; Jacqui George; Carolyn Browne; Oscar Green]. I would like to introduce Nancy Tichborne. - Nancy is the Chairperson of the Pavitt Family Trust who are the owners of the property at 5 Sawmill Road known as the "Pavitt Cottage" - The Trust represents approximately 300 Pavitt Descendants whom are members of the "Friends of Pavitt Cottage" group - Nancy is a descendant of John and Elizabeth Pavitt – among the first European settlers to Banks Peninsula My name is Brent George. - I also represent the Pavitt Family Trust, and Mary Browne (a submitter and descendent of John & Elizabeth Pavitt) - I am married to a Trustee who is a Pavitt Descendent - I have co-authored several research papers into the historical aspects of the Robinsons Bay Pavitts and the Cottage in Robinsons Bay, in conjunction with Helen Leach ONZM and Emeritus Professor of Anthropology Our presentation will be in two parts. Firstly, I will summarise and emphasise the main points of the joint submissions we have made in relation to the Pavitt Cottage property. Nancy will follow, closing with a statement summarising the Pavitt's historical connection to Banks Peninsula as a demonstration of our long-standing cultural and emotional connection to Robinsons Bay.

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	We understand that you have read our submissions, and have been provided with copies of the Archaeological Assessment for the Pavitt Cottage and Thacker properties; and also a copy of Jessie Mould's 1991 book entitled "The Old Water Wheel. The Story of the First Sawmill in Canterbury".
The Pavitt Family Trust and the Pavitt Cottage	The catalyst to our recent ownership of Pavitt Cottage was due to the late John Fernyhough – a Pavitt descendant and philanthropist – following the 1990 Pavitt Family Reunion held in Christchurch and Akaroa. - His acquisition, and subsequent major restoration of the cottage saved this historic home - It was his intention to transfer the property into a charitable trust in perpetuity, acknowledging its historical significance, and preserving it for the benefit of Pavitt descendants and also the wider community. The Pavitt Family Trust was borne out of John's vision More recently, the Cottage is being utilised as a focal point for the Robinsons Bay community in order to share and acknowledge its historical importance.
Financial Viability of the Pavitt Family Trust	The financial viability of the Pavitt Cottage is dependent on receipts from members and friends of the Pavitt family, donations, and more recently, income from external visitors via Bachcare - The Trust has no cash reserves and its ongoing financial viability would be critically affected should the Inner Bays Option proceed - There would be zero income from the rental of the cottage during the proposed construction period as no visitors would want to enjoy the Cottage or location whilst site works were underway - We also predict future use of the Cottage as a holiday destination would diminish significantly with the wastewater ponds being immediately above the Cottage - Without an income that covers the operating and maintenance costs for the cottage, the Trust's ownership will lapse, and the future preservation of the family's direct historical connection with the past will be compromised, putting the future preservation of the Cottage in peril

[Queue the second image Topo Plan]

33902 Pavitt Family Trust

Archaeological Assessment	The Pavitt Family Trust commissioned an Archaeological Assessment of the Pavitt Cottage site and adjacent Thacker property earlier this year. The wider area was included as it presents physical evidence of a site where there was known historical sawmill activity. - A copy of the report was provided to Council as soon as it was released in May. Yet the July and August "Have Your Say" and Community Briefing publications from Council outlining the wastewater treatment options did not refer to, nor acknowledge the archaeological significance of the main site critical to its "Inner Bays" option. We can only conclude that this assessment was inconvenient to Council, and so for Council to choose to overlook it at that time was disingenuous. - It is also noted that the Beca technical reports give the heritage features of Robinsons Bay scant acknowledgement – although the Maxwell and Huebert Archaeological Assessment is added as an Appendix. (Refer sections 5.6 p55 and 5.7.2.1 p59) - We also note that the report was not available in time for the Working Party to consider – but are aware that some Working Party members had requested Council to undertake an assessment. - The consultation "Questions and Answers" notes distributed at the Christchurch community briefing did record the Pavitt Cottage as an historic site, but arbitrarily dismissed the impacts of the proposed works, and concluded that there would be *"no risk"* to the cottage or its setting. No supporting evidence was included. - A similar dismissive comment was stated for the old Sawmill Site adjacent to the cottage. This is within the Thacker property. Archaeological approval of works prior to disturbance of an archaeological site would not protect any historical features from destruction. - There can be no excuse for allowing damage or destruction to archaeological features by ignoring or denying their existence. Any large construction activity and artificial planting of significant tracts of the Robinsons Bay valley will destroy these heritage features forever - Coincidentally, on 25-October the Pavitt Cottage will be open to the public and featured as part of "Christchurch Heritage Week" as promoted on the Eventfinda website The comprehensive archaeological report found that: - The Cottage is – and I quote - *"an excellent example of an early settler's dwelling, and its archaeological value is assessed as high*". The cottage is already registered as an archaeological site (N36/155) - The surrounding Thacker property landscape that includes the sawmill site is assessed as *"medium to high archaeological value".* This area has now been recorded as an archaeological site (N36/260)

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	- This assessment of the sawmill complex revealed archaeological evidence that has been overlooked by Council but was well known to the late Murray Thacker and local members of the Historic Places Trust in the 1990s when they recorded the site as an Historic Place. Murray Thacker was an historian, collector, conservationist, compassionate community man, and Founder/Director of the Okains Bay Museum. - We wonder what Murray Thacker would make of this Council proposal to destroy the Valleys archaeological value. We also wonder what Council would do if the current Thacker owner was not conveniently a willing seller. An archaeological assessment for this area should have been commissioned by Council – as was done for the Pompeys Pillar option (2017)

[Queue the third image Pavitt Cottage]

Risks to the Pavitt Cottage	The Inner Bays option would pose significant risks for the Cottage site.
	- With two large wastewater storage ponds immediately adjacent to and above the Cottage, there would be a significant risk of loss of life to occupants should the dams fail
	- The Dam Break Analysis was summarised within the Community Briefing documents
	  o The dam break scenario can be distilled to be the equivalent of the water from 1 standard size para-pool being released every second over a 10 minute period. Imagine that!
	  o The Cottage building is depicted to be extremely close to the water flow. It is not clear if the model adequately deals with water surge; vegetation deflection; or accounts for the existing streams variable water level, or the restrictions imposed by the bridge.
	- The setback of the vegetation planting is reported to be as close as 5metres to the Cottage boundary. This will have significant shading, security, and fire danger impacts on the property
	- There are many other likely negative impacts on the cottage including:
	  o Truck movements during construction and maintenance
	  o Dust and construction noise
	  o Midges and odour effects have not been discounted
	  o Noise from the pond pumps

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	○ The irrigation field would affect the Cottage's water supply source ○ And the obvious detrimental visual impacts of the earthworks and unnatural landscaping for the pond, and the large roadside flood protection bunding immediately adjacent to the Cottage
Other	This extremely limited hearing time restricts our presentation arguments significantly. Our individual submissions identified many other important aspects including: - That the consultation process was flawed. ○ The "Have Your Say" document was biased by eliminating the discharge to harbour option as a choice and forcing submitters to rank their preferred options - The artist's impressions of the sites after development were misleading and incorrect. ○ By presenting images from 1.5km away the Robinsons Bay pond size appears small and insignificant. I am aware of the Akaroa Civic Trust submission included their composite image of the Sawmill Road ponds from a much closer perspective, which presented a significant negative visual impact from the adjoining Robinsons Bay properties - The Council's decision will be made under the guidance of the Local Government Act 2002 which requires Council to respect the well-being of communities, which includes the descendants of the early settlers ○ The social, economic, environmental, and cultural well-being of the community are all impacted, as evidenced by the strong majority of local responses opposing the Inner Bays option proposed ○ And in our view, Council must also consider he mental well-being of the community in its considerations - The significant amount of previous public consultation feedback, and Working Party effort that opposed the Inner Bays option must not be wasted or ignored
Brent's Conclusion	My conclusion: • The Pavitt Family Trust supports the Friends of Banks Peninsula submission and endorses their "Reduce, Reuse and Recycle" approach to wastewater treatment. • The Pavitt Family Trust also supports the Akaroa Civic Trust submission. If <u>your</u> recommendation to Council is to endorse the Inner Bays option, then <u>you</u> will be responsible for:

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	• Desecrating the archaeological history relating to the Robinsons Bay Sawmill site by the irreversible destruction of the landscape • You will be contributing to ending the Pavitt family's direct association with Robinsons Bay by triggering the termination of its ownership and careful management of the historic Pavitt Cottage • And you will be ignoring the significant majority of submitters who oppose the Inner Bays and other land-based options that have been presented. The Voices of the Community have been loud and clear. You and Council must listen to the Community.

Nancy's Statement	My ancestors the Pavitts were lucky to make it to Akaroa Harbour… A broken rudder meant that they were blown, first across the Tasman and south of Stewart Island - more or less out of control. Then up the east coast of the South Island - ending up heading for rocks at the entrance to Akaroa Harbour. Whalers spotted their predicament and Captain Bruce towed them into safety. They were starving and exhausted and when the rudder was finally fixed only one passenger got back on. The remainder decided that Akaroa would be their final destination - not Remuera as had been the original intention. They had nothing, but ended up settling in Robinsons Bay - where they built the first water driven sawmill in Canterbury. Not bad for people who had been dairy farmers in Essex. Deaths, accidents, fire and illness took its toll on this brave family and all the many workers who took part in the mill operation. After the timber had gone, farmers took over and with their hard work made it the beautiful valley it is now. With native bush naturally filling up the gullies and the grand old deciduous trees adding to the exquisite tapestry that it is today - it is a peaceful, historic and very very beautiful part of Banks Peninsula. Papatuanuku (Mother Earth) did a great job filtering the wastewater for New Zealand's first immigrants. But it is a different story today because of the greater number of people requiring her fragile services. With climate change

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	rapidly looming in the future we must be very careful what we do. Flash floods, forest fires, droughts etc can destroy poorly thought out projects such as this one. Akaroa is already desperately short of water in the summer months - ratepayers' money should be spent making use of this highly treated wastewater. In the meantime, send it out on the outgoing tide into the vastness of the ocean. My plea to you is to save Robinsons Bay and its cultural heritage for all New Zealanders and their descendants. It is a taonga for us all. Our sincere thanks to all the many people who have supported this cause to oppose the Inner Bays option for the disposal of Akaroa's wastewater.

Images:

		
Picture 1	**Picture 2:**	**Picture 3:**
The Robinsons Bay Sawmill and Pavitt House c. 1870. Wynn Williams	**Topographical Plan of Historic Sawmill Area – Sawmill Road, Robinsons Bay (2011-20)**	**The Pavitt Cottage - 5 Sawmill Road**

33919 Keefe Robinson-Gore

Ka haea te ata, haro ana te kāhu ki te tihi o Ōteauheke, rere tau rā i runga i ngā roimata o awa iti, ka poupou te rā i runga Tuhiraki topa tau atu taku manu ki te ara pounamu o Akaroa, ko tēnei a Tārewa, ko tēnei a Irakehu, ko tēnei ahau.

Tuatahi tēnei te mihi ki ngā manawhenua o tēnei rohe.

Kia koutou e hui kotahi nei, ki ngā uri o ngā kaipatu tohora, ngā kaipatu kekeno, ngā taihara o Ahitereiria, rātou ko ngā tauiwi katoa, nāia te mihi.

Tēnei te tono ki a koutou te kaunihera o Ōtautahi, kia maumahara tonu koutou ki nga herenga ki a mātou ngā mamawhenu o Te Pakata o Rāikaihautū, o te whanga o Akaroa, o Ngāi Tārewa o Ngāti Irakehu whanui.

Tirohia, rongohia, maramahia tōku whakāro ki tēnei kaupapa, ā, kia tere te karohirohi i runga i te huarahi ki mua i a mātou. Te tahi ki te tahi, e hikoi ana māua taha ki te taha.

Kia whakaū, kia whakahono, kia whakatinana ngā herenga i raro i te maru o te Tiriti o Waitangi.

I would firstly like to acknowledge the mana whenua of this area.

To those of us gathered here as one, mana whenua and tangata whenua, to the descendants of the sealers and whalers, convicts of the penal colony of Australia, and of colonists' past and present my acknowledgements to you all.

I stand here as an individual, on behalf of my family, as a member of the Akaroa community and in my mana as Ngāi Tārewa & Ngāti Irakehu.

My challenge to you, the Christchurch City Council, is that you always remember your obligations to us, the mana whenua of Banks Peninsula, of Akaroa Harbour, and your responsibilities to uphold the mana of the families of Ngāi Tārewa and Ngāti Irakehu.

These obligations are conferred upon Christchurch City Council, as a manifestation of the Crown, with Crown delegated functions and authorities.

The exercising of your authority must comply with the Local Government Act and the Resource Management Act, notwithstanding compliance with Treaty Principles – including the duty of active protection. Decisions are to be made in the spirit of the Treaty partnership, and in accordance with Treaty principles.

Look, listen and understand my thoughts on this matter so that the sun may shine on a new path of progress and prosperity, a path we may walk together, side by side. Be steadfast in your resolve to honour and hold to your responsibilities under the principles of Te Tiriti o Waitangi, which was signed by our rangatira, Iwikau and Piaraki, on the shores of our harbour 180 years ago.

The hills and coastline of Akaroa harbour tell the stories and escapades of great chiefs, of occupation and of the deeds that shaped the very land in which we reside. Waitaha traditions tell that after Rākaihautū had dug the southern lakes with his kō— Tūwhakarōria—he and his son, Rokohouia, returned to Canterbury with their people. On their return, Rākaihautū buried his kō on a hill overlooking the harbour. That hill was named Tuhiraki. Rākaihautu remained in this region for the rest of his life.

33919 Keefe Robinson-Gore

These landscapes tie me to this place, and are my connection to my ancestors, the cosmos, and the dawn of creation. Akaroa harbor is intrinsically woven into my identity – it is part of my DNA. It is my sustenance just as it has provided sustenance to successive generations of my whānau for over more than 750 years.

I cannot fathom the community's response in favour of discharge to harbour as our harbour has underpinned the economic sustainability of our community for centuries. From traditional fishing practices to feed our whānau, to early whaling and sealing, later to commercial fishing, and now marine farming, tourism through wildlife and harbour cruising, and swimming with the smallest and rarest dolphins in the world. Continued waves of economic activity have degraded the water quality of our harbour and to continue to pump human effluent into it, treated or not, further erodes this environment.

The mauri of the coastal area represents the essence that binds the physical and spiritual elements of all things together, generating and upholding all life. All elements of the natural environment possess a life force, and all forms of life are related. Mauri is a critical element of the spiritual relationship of Ngāi Tahu Whānui with the coastal area. This spiritual connection is recognised by the Crown under section 313 of the Ngāi Tahu Claims Settlement Act 1998, however this acknowledgement has not translated into action on the part of the Crown.

Our whānau are treated as second class citizens within the township of Akaroa where the preservation of the colonial heritage of the French and English is paramount, sometimes to the detriment of the community. In comparison, places of significance to us sit desolate, unoccupied, and unrecognised. Even today we are segregated from our community and referred to as "the Ngāi Tahu parties." The continued degradation of the harbour is just one of these examples and I reject the proposal to discharge human waste, treated or not, into the harbour.

For this reason, I am in favor of the Inner Bays Irrigation Scheme as the preferred option. This option is the only one that looks to restore te mauri o te wai, that is, restoring to a certain extent the life-giving properties of the treated wastewater through interaction with Papatūānuku. The flow on effects of this option, through a wetland reuse scheme, could include the development of a community amenity, relationships with environmental education providers, and opportunities to nurture the development of an educational focused economy.

Finally I wish to remind the hearing panel of this;

On the 28th of November 1998, when I was just 10 years old, the then Prime Minister of New Zealand, Dame Jenny Shipley, stood on the mahau or porch of my whare, Karaweko, at Ōnuku Marae and apologised to Ngāi Tahu whānui for the injustices of the past. The Prime Minister said "…in fulfilment of its Treaty obligation, the Crown recognises Ngāi Tahu as the tāngata whenua of, and as holding rangatiratanga within, the Tākiwa of Ngāi Tahu Whānui."

The apology goes on to say that the Crown wishes "…to begin the healing process and enter in to a new age of cooperation with Ngāi Tahu."

This apology, along with various settlement mechanisms, was made for past treaty breaches which included the decimation and loss of tribal access to mahinga kai, or traditional foods and food gathering sites. The set of issues within the mahinga kai grievance constituted, what our tribal leaders referred to as, the 'ninth tall tree'. A decision to continue to discharge treated or untreated wastewater into the waitai, or coastal waters, of Akaroa could constitute a new breach.

33919 Keefe Robinson-Gore

Cooperation is more than just consultation. As mana whenua, holding rangatiratanga over these tribal areas, I fail to see where the Council, as an agent of the Crown, has enacted this or any part of the promised "new age of cooperation".

I leave you with the question: "How do we begin to heal as a people, or as a community, when the degradation of our harbour, a body of water that is inextricably linked to our identity and where we derive our rangatiratanga from, is allowed to continue?"

Our future is in your hands. You have the ability be on the right side of history, I hope that you seize the opportunity, rather than let it trickle through your fingers.

In closing I wish to leave you with an adaptation of our tribal whakataukī;

Mā mātou, a, mō ka uri a muri ake nei, done by us, for those that come after us.

34016 Jeremy Moore

Verbal Submission - Jeremy Moore - Family home on Sawmill Road Robinsons Bay -

- If I may – can I suggest that my short submission that was pre circulated is taken as read.
- I would like to summarise some of the matters you have heard this week.
- I'll focus mainly on the Inner Bays scheme as this is the option, I'm most familiar with.
- I submit that piping wastewater 8km from Akaroa, up and down hills and digging up a narrow, winding, state highway is absurd and a health and safety risk.
- Spending $68+ mill for 830 residential connections is also absurd (over $80,000 per connection). As a responsible public authority, Council must spend ratepayer money prudently. This level of expenditure for such a small number of households is simply not prudent.
- We all know the costs of civil infrastructure projects such as these notoriously blow out, so the actual cost is likely to be significantly higher.
- You've heard that an independent QS who reviewed the costs has identified material flaws in the assessments presented by Council officers. If Council relies on this information, your decision will also be similarly flawed.
- In addition, there is a perception from many in the community that the costs as presented have been manipulated to suit Council's agenda.
- I submit that under close inspection, these costs would not hold up to judicial review scrutiny (if this step was required – and I hope that it isn't).
- You've also heard from an independent Civil Engineer (Jack @ Tektus) who has explained that the wastewater design as proposed is untested with a very high chance of failure –there is no back up plan when this design fails. Thus in pursuing this option, the Council will have wasted a significant sum of public money on a scheme doomed to fail from the start
- Council's preference for the Inner Bays scheme seems to be predicated on the fact there is a willing seller of land. This is not a justifiable reason to ignore all the other significant adverse environmental effects.
- I submit that Council officers involved with this project for many years are under pressure to find a solution, and they are blinkered by this pressure as the Inner Bays option before the Panel is a poor outcome with extremely high risk and high cost.

34016 Jeremy Moore

- Ngai Tahu is an important voice. You've also heard from many other stakeholders in the community over the last few days and their equally strong views. These are people who also recreate, work and love living on the Peninsula.

- The view of people who live on the Peninsula is overwhelming in favour of either an Akaroa based re-use solution as presented by the Friends of Banks Peninsula or to improve upon the Harbour outfall option.

- In my professional career I have considerable experience in resource consenting, and I submit that continuing to pursue the Inner Bays option is a waste of Council's time and money.

- If a resource consent hearing was held to assess the environmental effects of the Inner Bays scheme, I believe there is virtually no chance that independent commissioners would grant consent. The adverse effects on the environment, people and their homes, heritage values and local businesses are far too great for an independent commissioner to grant consent.

- I submit that resource consent for the Inner Bays scheme is not achievable. I understand there is also recent local caselaw or precedent to support my view. (Oceania Dairy Case – with a similar pipeline into the sea).

- I respectfully suggest that the panel reject the Inner Bays scheme. There is no point wasting more time on this unconsentable option in my view.

- Council should focus on an Akaroa based re-use solution as presented by the Friends of Banks Peninsula or in my personal view progress with the Harbour Outfall and improve upon the overall outcomes for the harbour with other forms of mitigation such as major environmental offsets to reduce run-off and raw sewage entering the harbour. This type of solution would result in a net environmental gain.

- Thank you for this opportunity I'm happy to answer any questions.

33883 Department of Conservation

Department of Conservation
Te Papa Atawhai

POINTS FOR DISCUSSION FOR SUBMISSION AKAROA WASTEWATER HEARINGS PANEL
Friday 16 October 2020

- **The Department prefers land-based options for the discharge of treated wastewater over the option for a modified discharge to Akaroa Harbour**

- **We consider that continued discharge to the Akaroa Harbour to be odds with efforts to maintain and improve marine biodiversity in this area. Akaroa Harbour is an important habitat for Hectors Dolphins, and this combined with the Akaroa Marine Reserve are a valued feature to visitors to the area and the local community**
  - **There are 34 trips to view dolphin every day in summer**
  - **This generates $25m for the Akaroa economy (ref Black Cat economic impact study)**
  - **We manage these impacts carefully**
  - **Research conducted by Otago Universities, Will Carome shows that dolphins are being pushed out of the harbour and are no longer using the lower harbour in the manner they used to so we need to minimise all potential threats (see separate email for research)**

- **We support Ngai Tahu in their submission regarding a discharge to the harbour being incompatible with the cultural values of the harbour and coastal waters generally.**

- **We note there are positive outcomes from the discharge to land proposals with creation of native plantings which have some habitat potential for indigenous species.**

- **It is expected that enough capacity is built into any new discharge system to land option to allow for potential future growth.**

- **Any emergency overflows at the new pump station to Akaroa Harbour should only be in exceptional circumstances and water to be treated to a high standard prior to this point in the system.**

Akaroa Wastewater Options feedback – DOC-6395453

33883 Department of Conservation

- Background information
  Policy 23(2) (b) of the NZCPS 2010 sets a stringent test for allowing discharge of treated human sewage to coastal marine areas under the Resource Management Act. While the Council's current process to identify and assess options for the wastewater discharge will likely satisfy the requirement of Policy23, to consider alternatives to discharge direct to coastal waters, given the information provided regarding the effects on cultural values it seems unlikely that discharge is a realistic option

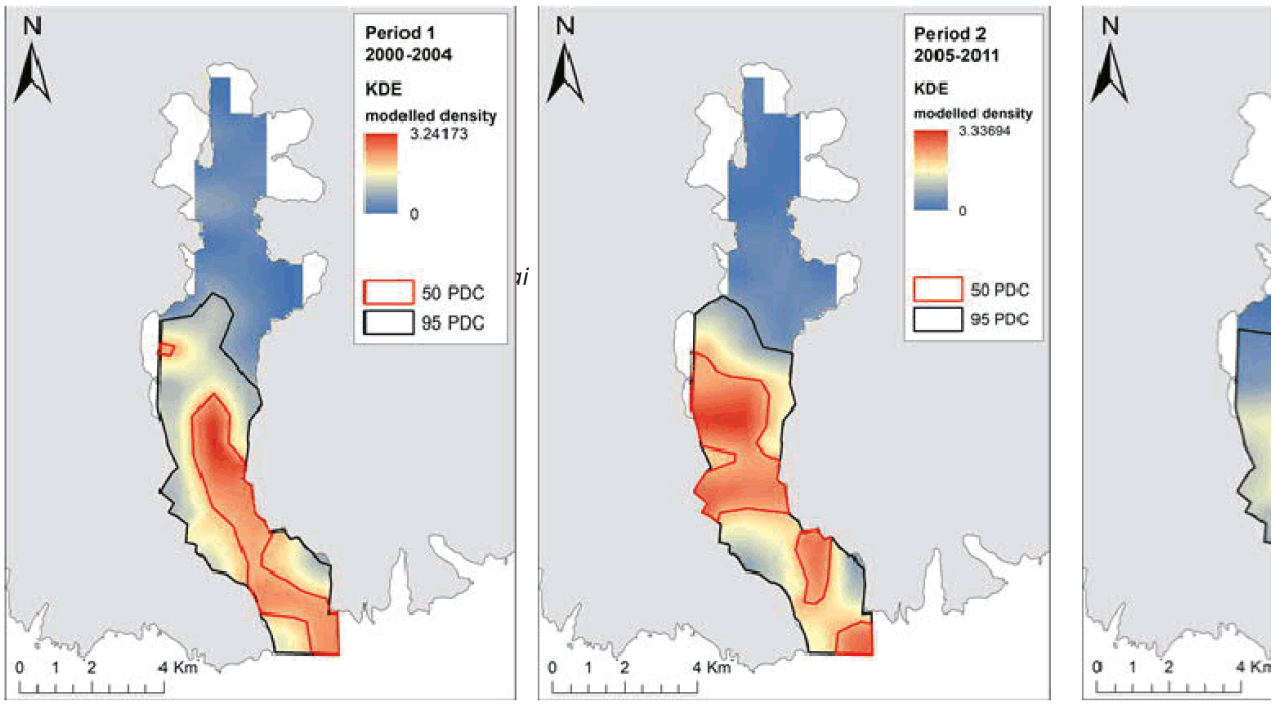
33883 Department of Conservation

Kelly, Samantha

From: Rachel Brown
Sent: Tuesday, 20 October 2020 11:43 am
To: Kelly, Samantha
Subject: Material re the shift in dolphin use of the harbour

HI Samantha
As per my previous email here is the research information linked to bullet point number 2 that Andy spoke to on Friday afternoon

This image comes from Otago's research – it shows how Hectors Dolphin use of the harbour has shifted since 2010. This is a remarkable finding and significant cause for concern – could it be harbour and water quality health or could it be tourism and cruise ships. Examining the next period will be really important since one of the upsides of COVID is we have no cruise ships at present – so we effectively have a control. Will the dolphins move back into the harbour again?



33883 Department of Conservation
notify us immediately and erase all copies of the message and attachments. We apologise for the inconvenience. Thank you.

34134 Te Rūnanga o Ngāi Tahu

Kelly, Samantha

From: Rik Tainui
Sent: Monday, 19 October 2020 6:16 pm
To: Manihera, Te-Kaharoa <Kaharoa.Manihera@ccc.govt.nz>
Cc: Te Aika, Shayne <Shayne.TeAika@ccc.govt.nz>
Subject: Closing Statement- Akaroa Waste Water- Rik Tainui

Opening comments; Over the three days of the hearings, I have listened to all of those that spoken to their submissions. Several have referred to their historical connections to Akaroa and the Penisula and some have presented on behalf of others. I noted that 347 people signed the Friends of Banks Peninsula submission.

I thought it would fitting to remind the panel that we are here today representing the 22,000 registered Ngaitahu that whakapapa to Akaroa and the surrounding bays. Our ancestors arrived in Akaroa 750 years ago- that is 25 generations of my whanau that have used and done their best to protect our harbour.

- As the written submission from the Ngāi Tahu parties notes, the kōrero we are having now has been going on since 1994. Over that time, Ngāi Tahu, the Akaroa community and the Council have all recognised that we need better treatment of Akaroa's wastewater, and better solutions for dealing with the treated results.

- The Ōnuku/Ngai Tahu position during that time has been consistent – discharging wastewater to the Harbour is unacceptable, no matter how well it is treated.

- I have personally been closely involved with this mahi for the last 7 years, and I have seen a real, positive change in our relationship with the Council over this issue, during that time.

- In 2015, Hearing Commissioners declined the Council resource consent to construct and use a bigger, better harbour outfall. That decision recognized and valued Ngāi Tahu cultural perspectives, and said the Council hadn't done enough to explore alternatives,(i.e. disposal or reuse on land)

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- When the Council first started re-looking at alternatives as part of its appeal against that decline of consent, some of our whānaunga were cynical about whether that was a genuine effort, or just a box-ticking exercise in the hope that would be enough for the Environment Court to overturn the decline.

- As the months of investigation turned into more than four years, that cynicism turned into hope and today I can say that I genuinely believe that the Council staff, contractors and elected members who have been involved have acted in good faith and done their absolute best to present us all with an option, or options, for land-based re-use of treated wastewater that we can have confidence in.

- On behalf of Ōnuku, Wairewa and Te Rūnanga o Ngāi Tahu I want to convey our appreciation and gratitude to everyone involved in that mahi. Ngā mihi ki a koutou katoa.

- Our position on the four questions posed in this process is clear:

    - Should treated wastewater be discharged to land or water? **The wastewater should absolutely be discharged to land, to be reused and cleansed**

    - Should the discharge be to the Inner Bays, Goughs Bay or Pompeys Pillar? **To us, sending wastewater to Goughs Bay or Pompeys has more than a touch of 'out of sight out of mind' about it. We strongly support the Inner Bays option, but also note that further enhancements to that option, can and should be made.**

    - Should we irrigate wastewater to public parks? **We support all forms of beneficial reuse that recognizes wastewater is a resource, not refuse.**

    - Should we explore further a purple pipe option? **Absolutely!**

- We know that some people still have concerns with Option One, and we will be encouraging the Council to keep looking for ways to refine the proposal to mitigate those.

- There is other work to be done – through this process we've learnt just how much of the wastewater in our system comes from infiltration of groundwater and storm-water. We strongly suggest that the council address this first. We also believe that charging Akaroa residents for excessive use would assist in the reduction of I & I.

- It will soon be up to this Panel to make its recommendations on how best to proceed. As we see it, what is important in your deliberations at this point aren't the technicalities of gradient levels or storage ponds – there will be a detailed design stage and a whole RMA consent process to iron out the details.

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- You will know your responsibilities under the Local Government Act better than I do, but as noted around para 32 of our written submission, key among those, is promoting the social, economic, environmental and cultural well-being of the community. In our book, only one of the options before you, can deliver on all of those crucial well-beings.

- Your decision is one that must be made very much with a focus on the future – this is, a once in a generation chance to be courageous and do the right thing.

- In closing, I can do no better than recommend to you our Ngāi Tahu whakataukī – "mō tātou, ā, mō kā uri ā muri ake nei" – for us and our descendants after us.

--
Rik Tainui

34134 Te Rūnanga o Ngāi Tahu

AKAROA WASTEWATER – Submission Presentation

Debbie Tikao September 2020

Tēnā koutou katoa, ko Debbie Tikao taku ingoa. I am here representing the Ngāi Tahu Parties and am the Taiao (environmental) portfolio manager for Ōnuku Rūnanga. I have held that position for 7 years. I am also a registered landscape architect with 22 years professional practice experience.

The direct discharge of human waste to natural water, almost regardless of how treated the wastewater might be is considered abhorrent by Māori. As such, today local bodies throughout the country are working closely with tangata whenua to find solutions that address cultural and spiritual matters relating to the protection of water and the disposal / re-use of treated wastewater and to fulfil the partnership envisioned within Te Tiriti o Waitangi.

POINTS:

1. For Ngāi Tahu, the primary management principle is the maintenance and enhancement of mauri. The Ngāi Tahu Freshwater Policy identifies a number of factors which reflect the status of mauri within waterways such as its life-supporting capacity and ecosystem robustness; fitness for cultural use; natural character and indigenous flora and fauna; and continuity of flow from the mountain source of a river to the sea.[1] This principal encapsulates the understanding that all parts of the ecosystem are intricately interwoven and bound by a life force, mauri. Mauri is the physical energy that permeates the universe and animates life. Through the lens of western science, we understand this interconnectedness as the hydrologic cycle, nitrogen and carbon cycle….also referred to as ecosystem services. Ecosystem services are the many and varied benefits to humans gifted by the natural environment (of which we are part of).

   Regardless of which lens you chose to look through, natural systems have been degraded all over the world, the process of degradation, is in part attributed to our lack of understanding of ecosystem services. As we stand here today, we watch the world change in front of our eyes. It is no longer acceptable that we don't understand the very natural processes that sustains life. Nor is it acceptable to disregard traditional ecological knowledge. For Ngāi Tahu, the natural resources of this landscape formed the basis of their way of life, their belief system and economy. Māori understood that these natural resources were taonga, and they had to be respected and harvested sustainably. Māori respected and carefully guarded their knowledge of the world around them - mātauranga taiao, which was handed

[1] *Te Rūnanga o Ngāi Tahu Freshwater Policy.*

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down through generations and built upon over 800 years of careful observation of natural processes.

2. We have heard from a number of submitters that the water quality of Akaroa Harbour has been degraded over the years by a number of contributing factors, not solely wastewater, so why should it be an issue to continue to discharge treated wastewater? On the matter of the cumulative adverse effects of land use on the harbour we fully agree.

   When the famed Waitaha ancestor, Rākaihautū planted his kō into Tuhiraki (Mt Bossu), and named the land on which he stood - Te Pātaka-a-Rākaihautū, he named it as he claimed it as, "the food storehouse of Rākaihautū". This was once a landscape that was rich in natural resources. The harbour, rocky shoreline, sandy beaches, forested hills, streams, and lakes constituted a basket brimming with food.

   Today, it's hard to imagine the landscape that was, the landscape that filled the eyes (and stomach) of Rākaihautū and inspired him to name it a food storehouse. It is not a food storehouse today. Health warnings against the harvesting of shellfish or swimming in the harbour are not uncommon. Increased sedimentation resulting from deforestation, run off from stormwater, wastewater discharge, over fishing, nutrient run off from farming…the list goes on….all play a part in the deterioration of mahinga kai value. Over the past 30 years we have seen an accelerated rate in environmental decline. In 2015 at the Council Hearing for Akaroa Wastewater, Ōnuku kaumatua, Wi Tainui gave evidence. His evidence painted a picture of his knowledge of Akaroa Harbour, and the decline in kaimoana. In his evidence, he states that he lived in Akaroa harbour all his life and had gathered kaimoana from various areas of the harbour since childhood.[2]
   In his evidence, Wi goes on to state:

   "Akaroa harbour was renowned from early times through to living memory for the quality and quantity of its kaimoana.

   When I was a child, kaimoana was abundant both within the harbour and out in the open ocean beyond the heads.

   I have witnessed first-hand the changes to the cultural health of Akaroa harbour that have affected our ability to gather kaimoana."[3]

   Because there are many other factors affecting the health of the harbour, does that make it ok to continue to discharge treated wastewater? Knowing that the proposed state of art filtration process will not remove all cleaning products, pharmaceuticals, hormones, it only removes low levels of nitrates and some bacteria and viruses still get through. And what of yet unknown emerging contaminants? No, it is not acceptable, not today, not knowing

[2] Tainui, W., 2015. Statement of Evidence of Wi Puhirere Tainui on behalf of Ōnuku Rūnanga, Wairewa Rūnanga, Te Rūnanga o Ngāi Tahu and Akaroa Taiāpure Management Committee – Applications CRC150046, CRC150047, CRC150048, CRC150049, CRC150020, CRC152814 & RMA92026256 to build a wastewater treatment plant and ocean outfall at Akaroa
[3] Ibid

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what we know to continue to contribute to the degradation of the harbour when we have a once in a lifetime opportunity no to! The days of an out of sight, out of mind mentality are no longer acceptable!

3. During the hearing process, there has been much talk of Climate change, as there should be considering this process is resulting in unprecedented loss of biodiversity and ecosystem collapse. Climate change threatens our way of life, our ability to feed ourselves, and it will most certainly threaten many of our heritage and cultural landscapes.

   The Ngāi Tahu parties believe we need to protect all of our cultural landscapes, but we must also ensure we protect our future, we must be working with and restoring our natural processes, we cannot continue to work against them.

4. As Ōnuku Rūnanga representatives both Rik Tainui and myself have been members of the Akaroa Wastewater reuse working party, I personally first started attending meetings with CCC in 2012, and I clearly remember attended Environment Court mediation in 2013 in which Council was seeking to extend the consent to continue to discharge from Takapūneke for an additional two years. At that mediation we asked if the Council would consider reuse as a feasible option given the anticipated increase in water restrictions resulting from climate change. The Councillors' then stated that reuse was unlikely as the community were not ready and would find that option culturally unacceptable. Look how far we have come in such a short time. We understood back than that no one silver bullet was going to solve this complex jigsaw puzzle. Irrigation to land, reuse and constructed wetlands were put forward from the outset as the most resilient, future proofed, ecologically beneficial and culturally appropriate way forward. And here, 8 years later, we stand by what we have long believed to be right.
   The Ngāi Tahu parties support the Inner Bays Option, however, like many other submitters to this kaupapa, we too agree, that we haven't yet got all the pieces of this complex jigsaw puzzle to quite fit within this challenging landscape. There have been many points and recommendations offered up by various submitters that we fully support. Like many other submitters, we too have spent some time examining the moving around the pieces of the jigsaw puzzle, in the hope that we can find a fit that works best for all.

- Firstly, we have also maintained and agree with other submitters that all the Akaroa Wastewater options are in fact ambulance at the bottom of the cliff solutions. Reduction of wastewater in the first instance must be a priority.
  - CCC have already stated that they can achieve a 20% reduction in I&I and have recently confirmed separate funding to do this, as we understand this is a conservative and easily achievable reduction. Other Councils have achieved much greater, we ask that CCC achieve a minimum of 40% reduction in I&I.
  - There are other mechanisms Council could consider to reduce wastewater within the existing housing stock. For example, paying for water use through installing water meters (this has been very successful in other cities). Council could also encourage water saving technologies too – some of these would be easy to retrofit into houses.
  - Planning rules for new development; new rules and policy which promotes more sustainable development (particularly with climate change) and water sensitive design such as separating grey from blackwater, greywater could be diverted for

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reuse such as flushing toilets. The objective would be to minimise future pressure on the existing wastewater system.

- This would reduce pressure on Council to increase wastewater infrastructure in the future.
- Sustainable technology such as composting toilets could also be incentivized as this results in less infrastructure spend for Council.

- Secondly, the Ngāi Tahu parties have maintained that reuse is the right and most sustainable solution. Council must lobby the Ministry of Health to fast track setting the standards for reuse to private households. Ngāi Tahu would support Council where needed to help to achieve this.
- Thirdly, we believe we can mitigate the adverse effects the currently proposed storage reservoirs could have on the community of Robinsons Bay and on Pavitt Cottage. Reduction in I&I and potential further reduction that could be achieved through implementation of some or all of the suggestions above, will collectively result in the reduction in storage requirement.
- Further storage volume reduction could be made by changing the frequency of use of the proposed subsurface wetland in Pond Site 10 and by adding one to two more subsurface wetlands into the Inner Bays option. This has the potential to result in a cost savings as storage could be housed in smaller completely enclosed tanks which could more easily be accommodated further up the valley or at Pond Site 10 and be much more visually sympathetic to the receiving environment, and significantly easier to visually mitigate. This concept also removes the risk of dam break. Also, of note, this concept has been discussed with CCC staff and they believe this is feasible.
- Fourthly, the point above could potentially reduce the amount of land required for irrigation to trees. This could result in further cost savings, as Takamatua and Hammond Point would unlikely be required.
- Fifthly: In terms of cost, it is possible, that with these proposed amendments, the cost of the Inner Bays option may well be in line with the cost of the harbour outfall option.
- Sixth: Some submitters have put forward the option of Ocean outfall (ie. Beyond the Heads), this was investigated by Council and removed as an option due to the additional cost. This option is also not supported by the Ngāi Tahu parties for the same reasons harbour discharge is not supported. Ocean currents could also push the treated wastewater into the takiwā of our whanaunga Wairewa and Koukourarata, their mussel farms and their customary fishing grounds.
- Seventh: Irrigation to native trees is and has always been wholly supported by the Ngāi Tahu parties. The role of our earth's forests are more critical now than ever, and we all have an immense responsibility to restore forest cover as fast as we can. We do not agree that irrigation to native forest is a form of disposal. Forests play a vital role in terms of ecosystem service. Forests suck water from the ground and release it as vapour into the atmosphere, forming clouds and rain, this process is not disposal!! This is an opportunity to restore approximately 40ha of native forest.

  With regards to the visual amenity of native forest vs the English landscape, and the claim that native forest will have an adverse visual effect on the traditional English and rural aesthetic of this area, is an interesting, and contested point. As a trained and experienced expert in landscape and visual assessment, I am certain that the addition of native forest to this valley could be designed sensitively and in a way that adds value to this area by enriching the narrative of place. This narrative could tell the story of change in values over

time and will be a meaningful expression of our collective histories and our aspirations for a better future.

"Ka titiro whakamuri, kia anga whakamua."
We look to our past, to face our future.

- Lastly, a brief overview of the function of subsurface wetlands. These are engineered systems that are designed to utilise the natural processes of rooted wetland plants, sunlight, gravity, soils, and their microbial populations to transform contaminated water into cleansed water that can be reused[4]. The effectiveness of constructed wetlands for the treatment of wastewater, stormwater and other industrial waste has been well researched and tested in many countries. In the Beca report, it is stated that wetlands can remove up to an additional 80% of nitrates. With regards to the effective removal of emerging contaminants, when we first started investigating subsurface wetlands, there wasn't a lot of data available, but this is now an area of research and findings are demonstrating the effectiveness of these systems. This also shows how fast we are moving to understand natural processes and how we can better work with these to live more sustainably.

  The constructed wetland is a treatment system which uses natural chemical and biological processes to stabilize, sequester, accumulate, degrade, metabolize, and/or mineralize contaminants.
  A few technical points about the system:
  - They are shallow, only 600mm in depth
  - water passes through them horizontally over a period of at least two weeks (not 2 days).
  - They are not open standing bodies of water, water sits about 50mm below the surface
  - They are fully planted with native grasses and reeds. So, will be visually more compatible with the existing landscape
  - They are also lined, so there is no risk of leaching of contaminants.
  - They will accommodate a maximum of 2L of water per second and be approximately 1ha in size each.
  - It is anticipated that two new wetlands will be needed, but they don't need to be located together, they can also be designed to blend with the environment in a series of wetlands (in other words, they don't need to be one large wetland).
  - As we understand it, they can be cascading, so although flat land is preferred, they can also function on a gentle gradient.
  - As stated in the consultation document, the wetlands have many other benefits, they can be designed with path systems, boardwalks, interpretation panels, artworks, and shelters. They can provide an important educational opportunity to demonstrate how the combined knowledge systems of western science and Mātauranga Maori have come together to build a better and more resilient future for us all.

[4] ITRC, 2003 - Interstate Technology Regulatory Council Wetlands Team, USA (www.itrcweb.org/guidancedocument.asp?TID=24), and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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- Wetlands perform all year round, and we wouldn't need to wait four years for them to be fully operational, they would be able to start receiving treated wastewater much sooner than irrigation to native trees. For Ōnuku Rūnanga, this has the massive advantage that the plant at Takapūneke could be decommissioned sooner.
- This proposal also offers a higher degree of resilience. In the event there is a damaged pipe to the irrigated trees or storage tanks, treated wastewater can be diverted to the wetlands.
- The cleansed water, once it has passed through the subsurface wetland, could then be harvested for reuse. It is possible that the water, once harvested could be passed through a UV process, and may be more likely to meet the support of the Ministry of Health for reuse to private households.
- Lastly, a point of clarification. The Ngāi Tahu parties previously considered and rejected the proposal of a 2 to 3-day passage of treated wastewater to the harbour via a surface wetland and coastal gallery. This was rejected on the basis that this process was tokenistic only, served no meaningful function and contributed very little to further removal of contaminants.

Wetland systems are one of the technologies that are being supported by other iwi around the country as they understand the cleansing function of these natural systems to further remove contaminants and to restore the mauri to water.

From a Māori perspective, the combined processes of subsurface wetlands, aeration, and daylighting the water over a rocky stream brings into play the natural processes of te taiao (the environment). Māori believe that the health of all things depends on water. It is a taonga, a resource to be protected and treated with respect. In traditional Māori knowledge, wai (water) was classified in accordance with its characteristics and ceremonial use. These categories determined how the water could or could not be used. The mixing of water from separate categories was, and still is considered unacceptable to Māori.[5] In this regard, the mixing of wastewater which would be classified as Wai-kino (Polluted water) should not be mixed with other categories of water. The Mahaanui Iwi Management Plan notes that the mixing of waters occurs naturally, however, natural mixing is almost always facilitated by the presence of a wetland, estuary or similar environment that provides a natural buffer or transition zone.[6]

This natural process was important, because in order for the mauri of the water to be fully restored it needed to go through the processes of "kia whitikia e te rā, kia purea e te hau, kia horoia e te ua, ā, kia hurihia e ngā kōwhatu, to be shone upon by the sun, to be purified by the wind, to be washed by the rain, and to be tumbled by the rocks.[7] The process of the subsurface wetland will interact with the forces of nature and Papatūānuku to cleans and revitalise mauri;

- Water passes through Papatūānuku (the earth) to transform and cleanse the polluted water which feeds the surrounding biota and in turn begins to re-invigorate its mauri.

[5] Goodall, A., Palmer, D., Tau, T., Tau, R., *Te Whakatau Kaupapa: Ngāi Tahu Resource Management Strategy for the Canterbury Region,* Aoraki Press, Wellington, 1990, pp.4-15.

[6] Jolly, D. and Nga Papatipu Rūnaka working group, *Mahaanui Iwi Management Plan.* Christchurch, 2013, p.93.
[7] Winiata, P. Lecture delivered at Te Wānanga o Raukawa, Ōtaki. 2002

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- Tane (The Atua of the forest and all that dwells within it), uses of plants, roots, micro-organisms, birds and insects form the natural biological processes that absorb and remove contaminants with the added benefit of significant carbon sequestration and a natural increase in biodiversity.
- Tāwhirimātea (the wind) to oxygenate and agitate the water
- and Tama- nui-te-Rā (the sun) to add UV light.

To close, I will leave you with a whakatauki written by my children's great great grandfather, Teone Taari Tikao.

"The sea was before the land and the sky,

cleansing, joining. And where the sea meets the lands, there are obligations there that are

binding as those of whakapapa."

Akaroa Treated Wastewater Options

Hearings Panel Site Visits

The site visits will cover the following areas:

- Map 1 – Shows an overview of the site locations.
- Map 2 – Inner Bays Scheme Sawmill Road site.
- Map 3 – Inner Bays Scheme Takamatua and Hammond Point sites
- Map 4 – Goughs Bay Scheme (Viewable from the road to the south)
- Map 5 - Pompeys Scheme
- Map 6 - Robinsons Bay Pond site and adjacent historical sites
- General (purple line on Map 1) – New Wastewater Treatment Plant site, Terminal Pumps station site, and Glen Bay

Christchurch City Council

GIS@beca.com

File: P:\6517986\GIS\01 Map\6517986-20-56d_ConsultationMaps_OverviewMap_NativeTrees - SIMPLIFIED.mxd Author: BDJ2 Date: 9/04/2020

Map Scale @ A3: 1:45,000

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Kilometres

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Revision	Author	Verified	Approved	Date
1	BDJ2	DRAFT	DRAFT	09/04/2020

Title:

Overview of Options
Irrigation to Native Trees

Client: Christchurch City Council

Project: Akaroa Wastewater Upgrade

CH2M Beca

Discipline: GIS

Drawing No: GIS-6517986-20-56d-01

Christchurch City Council

File: P:\65\16517986\TG\10\ Map\6517986-20-56e_ConsultationMaps_IrrigationSites_NativeTrees - SIMPLIFIED.mxd Author: BDJ2 Date: 9/04/2020

GIS@beca.com

Map Scale @ A3: 1:6,000

0 50 100 200

Metres

N

Revision	Author	Verified	Approved	Date
1	BDJ2	DRAFT	DRAFT	09/04/2020

DRAFT

Title:

Irrigation Site to Native Trees

Option 1 Inner Bays Irrigation Scheme

Client: Christchurch City Council

Project: Akaroa Wastewater Upgrade

CH2M Beca

Discipline: GIS

Drawing No: GIS-6517986-20-56e-02

Attachment A Item 9

GIS@beca.com

File: P:\651\65179861TGI\01 Map\6517986-20-56e_ConsultationMaps_IrrigationSites_NativeTrees - SIMPLIFIED.mxd Author: BDJ2 Date: 9/04/2020

Map Scale @ A3: 1:6,000

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Revision	Author	Verified	Approved	Date
	DRAFT			
1	BDJ2	DRAFT	DRAFT	09/04/2020

Title:

Irrigation Site to Native Trees

Option 1 Inner Bays Irrigation Scheme

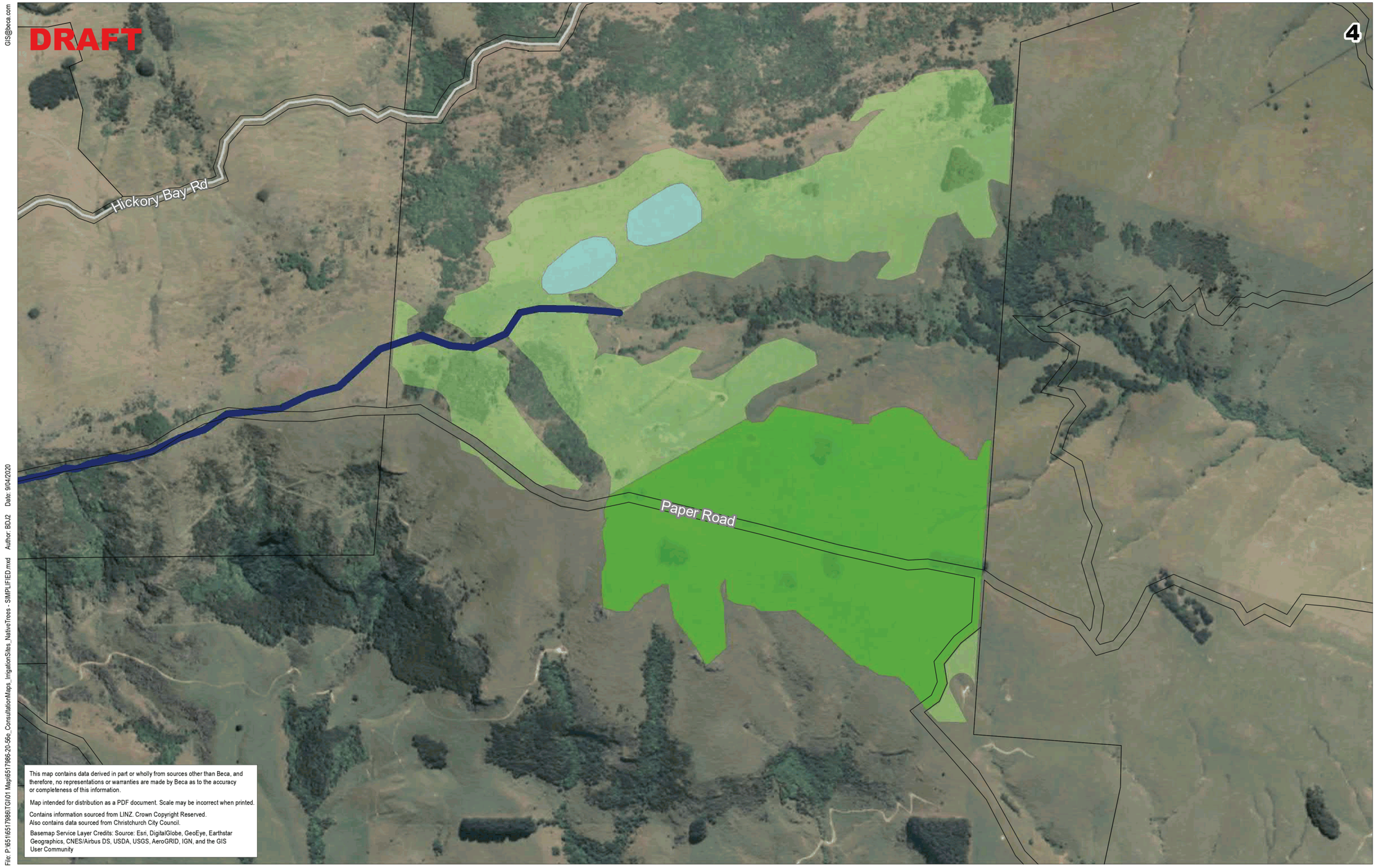
Client: **Christchurch City Council**

Project: **Akaroa Wastewater Upgrade**

CH2M Beca

Discipline: **GIS**

Drawing No: **GIS-6517986-20-56e-03**



Map Scale @ A3: 1:7,000

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Metres

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Revision	Author	Verified	Approved	Date
	DRAFT			
1	BDJ2	DRAFT	DRAFT	09/04/2020

Title:

Irrigation Site to Native Trees

Option 2 Goughs Upper Zone Irrigation Scheme

Client: **Christchurch City Council**

Project: **Akaroa Wastewater Upgrade**

CH2M Beca

Discipline: **GIS**

Drawing No: **GIS-6517986-20-56e-04**

Christchurch City Council

Map Scale @ A3: 1:7,000

0 50 100 200

Metres

N

Revision	Author	Verified	Approved	Date
		DRAFT		
1	BDJ2	DRAFT	DRAFT	09/04/2020

Title:

Irrigation Site to Native Trees

Option 3 Pompeys Pillar Irrigation Scheme

Client: **Christchurch City Council**

Project: **Akaroa Wastewater Upgrade**

CH2M Beca

Discipline: **GIS**

Drawing No: **GIS-6517986-20-56e-05**

Map Scale @ A3: 1:2,000

0 25 50 100

Metres

N

Revision	Author	Verified	Approved	Date
1	BDJ	Draft	Draft	19/06/2020

DRAFT

Title:

Thacker Study Area

Dripper irrigation to native trees & identified historic features

Client: Christchurch City Council

Project: Akaroa Wastewater Upgrade

CH2M Beca

Discipline: GIS

Drawing No: GIS-6517986-20-31f

AKAROA TREATED WASTEWATER OPTIONS HEARINGS PANELS – QUESTIONS & ANSWERS

Trim Reference: 20/1235908

#	Panel Member	Panel Question	Council Officer Response
1	Cr Templeton 5/10/20	Consentability. As the staff report mentions, this is usually dealt with at the consenting stage through the RMA process. However, we don't want to go through a costly and time consuming process for any option that may not be likely to be consented, only to then go back to looking at options again. While the finer detail of the process is best left to the consenting process, it would be useful to have additional advice from staff on this issue, given that submissions question the consentability of the Inner Bays option. There is also an assertion that having now explored the land based options that they are 'not viable' and therefore the Harbour Outfall should be able to get consent. In this context is there any definition of what constitutes 'viable' options that would be useful in our deliberations?	In the report Akaroa Wastewater Summary of Disposal and Reuse Options (CH2M Beca, 2020)[1] (Beca options report), the consentability of the long-listed options is summarised in Table 3-5 (Summary Assessment of Longlist Options). Year round irrigation to land was rated green (low risk) and discharge to mid-harbour via outfall was rated red (high risk). A planning evaluation for each of the three land based options is included in the report (section 5.7 for Inner Bays, section 6.5 for Goughs Bay, section 7.5 for Pompeys Pillar). Each of these sections includes a table of likely consenting risks (Table 5-1 for Inner Bays, Table 6-1 for Goughs Bay and Table 7-1 for Pompeys Pillar) all of which conclude that the consenting risks are low for all aspects other than cultural/historic values which is a medium risk. All of the land based options are technically viable and rigorous assessments have been undertaken to confirm this, as described in the Beca options report. Technical feasibility was one of the criteria used during the short listing process and those options that were not technically feasible were not short listed. The assertion that the land based options are 'not viable' is incorrect. If the Council decides to seek resource consent for the Harbour Outfall, then the Council's application would maintain that this options assessment process has satisfied the requirements of s105(1) of the RMA to have regard to alternative methods of discharge. It is possible that this assessment may pass that threshold; however, that is not the only test for the resource consent application. Effects – including effects on Tikanga Maori – and consistency with objectives and policies will also be relevant factors. The notion of viability is not a legal test but a practical consideration.
2	Cr Templeton 5/10/20	Some of the submissions mention other Plans that they believe are relevent to the hearings and consideration process such as the Mahaanui Iwi Management Plan or	The **Mahaanui Iwi Management Plan**[2] is described in the Council document, "Engaging with Ngāi Tahu" as a document that must be taken into account in relation to various matters under the Resource Management Act 1991. It "provides a values-based, plain language policy framework for the protection of Ngāi Tahu values and for achieving the outcomes that provide for the relationship of Ngāi Tahu with

[1] https://ccc.govt.nz/assets/Documents/Consultation/2020/07-July/Akaroa-Wastewater/Akaroa-Wastewater-Summary-of-Disposal-and-Reuse-Options-Rev-3.pdf
[2] https://mahaanuikurataiao.co.nz/wp-content/uploads/2019/08/Full-Plan.pdf

AKAROA TREATED WASTEWATER OPTIONS HEARINGS PANELS – QUESTIONS & ANSWERS

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#	Panel Member	Panel Question	Council Officer Response
	7/10/20	Harbour Management Plan etc. Are these or any other plans or policies relevant to our decision making, should we be taking them into consideration and if so in what way? Follow up: Reference could have been the Harbour Settlement Plan. The new Integrated Water Strategy Te Wai Ora o Tāne is another one to have a clear link/reference to as it's referenced in some submissions.	natural resources across their takiwā." and "There is a strong and expressed expectation by Ngāi Tahu that the Iwi Management Plan will be implemented in all relevant Council processes and programmes." This plan may contain information of relevance to the decision to be made by the Panel/Council, particularly in light of the fact this decision is one to which section 77(1)(c) of the Local Government Act 2002 applies. The options being considered involve a significant decision in relation to land or a body of water, so Council must '*take into account the relationship of Māori and their culture and traditions with their ancestral land, water, sites, waahi tapu, valued flora and fauna, and other taonga*'. In relation to the above, the Ngāi Tahu Claims Act 1998, Part 1, Sections 7 & 8 are as follows: *7* *The Crown apologises to Ngāi Tahu for its past failures to acknowledge Ngāi Tahu rangatiratanga and mana over the South Island lands within its boundaries, and, in fulfilment of its Treaty obligations, the Crown recognises Ngāi Tahu as the tāngata whenua of, and as holding rangatiratanga within, the Takiwā of Ngāi Tahu Whānui.* *8* *Accordingly, the Crown seeks on behalf of all New Zealanders to atone for these acknowledged injustices, so far as that is now possible, and, with the historical grievances finally settled as to matters set out in the Deed of Settlement signed on 21 November 1997, to begin the process of healing and to enter a new age of co-operation with Ngāi Tahu.* It is for the Panel to decide what weight to give any submissions referring to this plan. The **Akaroa Harbour Basin Settlements Study**[3] is something the Council can have regard to (as its own document), but as per the comments on section 80 below – the Council can decide to act inconsistently with anything in the study, including the implementation plan, if there is reason to do so. Given the reports that are part of the study, and the "Issues and Prospective projects report" and "An associated Implementation Plan", are all pre 2009 documents, there may well be matters the Council would want to/need to be inconsistent with.

[3] https://ccc.govt.nz/the-council/plans-strategies-policies-and-bylaws/plans/area-plans/akaroa-harbour-basin-settlements-study

AKAROA TREATED WASTEWATER OPTIONS HEARINGS PANELS – QUESTIONS & ANSWERS

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#	Panel Member	Panel Question	Council Officer Response
			The same applies to **Te Wai Ora o Tāne Integrated Water Strategy** – although being a more recent document (Sept 2019) it is perhaps less likely that Council would choose to/need to act inconsistently with that document. In relation to other plans or policies that may be referred to in submissions, if they are Council plans and policies then the Panel/Council should be aware of section 80 LGA02. This section does not prevent a decision from being made that is inconsistent with another plan or policy but provides that if the a decision to be made is significantly inconsistent with, or is anticipated to have consequences that will be significantly inconsistent with, any plan or policy then Council "must, when making the decision, clearly identify— (a) the inconsistency; and (b) the reasons for the inconsistency; and (c) any intention of the local authority to amend the policy or plan to accommodate the decision." Plans or policies of other organisations, particularly ones that have no statutory recognition, will simply be a part of a submission that can be weighed alongside other factors in that and other submissions, if the Panel believes the plan/submission contains information that is relevant to the decision to be made. For example, a policy of an environmental organisation setting out goals they'd like Parliament to meet for healthy rivers, which is referred to in a submission, is unlikely to be relevant to the Panel/Council decision-making.
3	Cr Templeton 5/10/20	What is required to 'fix' the CCC stormwater pipe network to reduce Infiltration and Inflow (I&I) to best practise? How much is already planned and budgeted?	Our current estimate is that stormwater inflow and groundwater infiltration (I&I) makes up approximately 60% of the total wastewater volume. Best practice would be 20% or less. We have already undertaken a distributed temperature sensing (DTS) survey of Akaroa's wastewater network which has identified potential sources of cold water (i.e. groundwater and stormwater), so we have a very good idea of where the faults on our network and which private laterals have problems. One of the projects on the list for government funding for 3 Waters Reform is to reduce I&I into Akaroa's wastewater network. The budget is $3.1 million, which is based on the cost estimate to fix the faults

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#	Panel Member	Panel Question	Council Officer Response
			identified in the DTS survey and other investigations. This will include repairing and replacing manholes and pipes. We are confident that this will reduce I&I by at least 20%, based on traditional approaches to reducing I&I. However, because we have much better information about what needs fixing, we're hopeful that we the reduction in I&I will be much greater. A traditional approach would be to line all wastewater pipes. This would cost around $350 per metre, so the cost to line all wastewater mains and laterals in Akaroa would be in the order of $11 million. Alternatively a pressure sewer system could be retrofitted which would be in the order of $30 million. However, experience with SCIRT found that it was problematic to retrofit pressure sewer systems in areas that already have a gravity wastewater system, particularly from a customer and legal perspective.
4	Cr Templeton 5/10/20	What options are available to us to encourage or expect more sustainable use of the reticulated drinking water supply by Akaroa residents?	Every year we conduct a water conservation campaign across the Christchurch district, encouraging people to save water. Water restrictions are imposed most summers in Akaroa, with signage at the entry to Akaroa, online notices and newspaper advertising. New buildings on Banks Peninsula are required to install a rainwater storage tank for non-potable uses under the Water Supply, Wastewater and Stormwater Bylaw 2014. However, growth is low and few new buildings are built. An effective way to reduce demand further would be to introduce volumetric charging for water. We plan to propose this in the draft Long Term Plan. Installing smart water meters would provide much better information to us and residents about water consumption. This could be used detect and notify property owners of leaks and high consumption. This could be undertaken as part of the smart water monitoring system project that is on the list to receive government funding for 3 Waters Reform.
5	Cr Templeton 5/10/20	Many submitters are keen for us to take more time to explore potable reuse for Akaroa, given the	To the best of our knowledge, no government agency is looking at potable or non-potable reuse. In response to our request, the Taumata Arowai Establishment Unit advised (Jim Graham, 20 October):

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#	Panel Member	Panel Question	Council Officer Response
		shortages in drier months and looming climate change. Some mention the Government's 3 Waters Reforms as giving hope in this and thought that there were indications this might be being looked at. Is there any indication from central government, the new regulator or other agency that potable reuse (or private non-potable reuse) is being looked at or if there were timeframes to do so? A proactive check with Taumata Arowai would be appreciated.	*The Taumata Arowai Establishment Unit is not preparing any regulations for potable and/or non-potable reuse of wastewater. Re-use of wastewater is not something that routinely occurs in New Zealand so there has not been a need for such regulations or standards. If the need changed it could be considered further. If people are interested in standards for potable reuse of wastewater, they could look to Australia, particularly Western Australia where some work on this has been undertaken.* The Taumata Arowai Establishment Unit has been set up, but Taumata Arowai itself has not yet been established. The Department of Internal Affairs website about the Taumata Arowai Establishment Unit[4] states: "When Taumata Arowai is fully functionally, in essence its role will be to: • Oversee and administer an expanded and strengthened drinking-water regulatory system, to ensure all New Zealand communities have access to safe drinking water. That includes holding suppliers to account, if need be. • Oversee from a national perspective the environmental performance of waste water and storm water networks. (Regional councils will remain the primary regulators of waste water and storm water). The Three Waters reforms are designed to: • "Provide clear leadership for drinking water regulation through a new, dedicated regulator; • Significantly strengthen compliance, monitoring, and enforcement relating to drinking water regulation, and equip the new regulator with the powers and resources needed to build capability, support suppliers of all kinds to meet their regulatory obligations, and take a tougher, more consistent approach to enforcement where needed; • Manage risks to drinking water safety and ensure source waters are protected; • Ensure more people can access water that is safe to drink, by requiring all suppliers (except individual domestic self-suppliers) to be part of the regulatory system, and to provide safe drinking water on a consistent basis;

[4] https://www.dia.govt.nz/Taumata-Arowai-Establishment-Unit

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#	Panel Member	Panel Question	Council Officer Response
			• Lift the environmental performance and transparency of wastewater and stormwater networks; and • Improve national-level leadership, oversight, and support relating to wastewater and stormwater." It is clear that the focus of Taumata Arowai and 3 Waters Reform is on improving the safety of drinking-water across the country, and improving environmental outcomes for wastewater and stormwater. No mention is made of potable or non-potable reuse. Angela Sheat in the submission from Community & Public Health, Canterbury District Health Board (#33709) states "The CDHB supports the concept of non-potable reuse of treated wastewater however due to the lack of regulatory framework around the public health risks we do not support the proposal at this stage, particularly in respect of private household use in Akaroa." Please also refer to the answer to Q20.
6	Cr Templeton 5/10/20	P13 pf the agenda mentions actively engaging with Akaroa residents and 'requiring' them to fix their leaking pipes to reduce I&I. How might we 'require' this and is an additional resolution or process needed?	Experience so far has been that property owners on Banks Peninsula have been very cooperative in this regard when they understand that the extra water getting into the pipes causes overflow of sewage to the harbour in rain events. However, should we need to take enforcement action, we can require residents to repair their private drainage lateral where water (other than sewage) is getting into the pipe under the Water Supply, Wastewater and Stormwater Bylaw 2014: *27. WASTEWATER DRAINS* *(1) Unless authorised by the Council no person may:* *(a) Cause or allow any water from a water pipe, artesian well, ram or other hydraulic appliance or any surface water, subsoil drainage, roof water or condensing water to enter a wastewater drain or a drain connected with a wastewater drain.* If a property owner refuses to make the necessary repairs we can take a prosecution under the Bylaw. Further under section 459(1) (f) of the LGA 1974:

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#	Panel Member	Panel Question	Council Officer Response
			(1) In respect of any land or building within the district, the council may, subject to sections 283 and 294(9) and to subsection (7), by notice in writing, require the owner thereof to do all or any of the following things: *…* f. *to execute, provide, and do generally any works, materials, and things which in the opinion of the council are necessary or expedient for the efficient drainage of the premises and every part thereof.* Section 459(6) also provides that if the owner fails to do the work required by the notice, the Council can do the work instead and recover its costs from the owner. Therefore, no additional resolution or process is needed to require residents to fix faulty wastewater drains.
7	Cr Templeton 5/10/20	On p47 of the agenda 2 submissions are referenced that mention separation of sewerage from grey water to lower treatment volumes. The response doesn't cover the submission by Michael de Hamel 33971, which goes into more detail about a way to do this (his second point). It'd be great to have similar advice on his proposal.	The second point in Mr de Hamel's submission suggests having two separate reticulated systems, one for bodily waste (black water) and one for grey water. The submission suggests that the grey water could be treated and discharged to the harbour without causing offence to Ngāi Tahu, and the bodily waste would be tankered to Christchurch if it couldn't be disposed of locally. Research by ESR[5] and BRANZ[6] has found that grey water is contaminated with faecal bacteria such as E. coli. Therefore, Mr de Hamel's assumption that this would be an acceptable solution to Ngāi Tahu may not be correct. As most properties in Akaroa are too small for soakage of grey water to ground onsite, it would require the construction of a separate reticulated system. This would cost in the order of $40 million. The grey water would need to be treated before it was released to the environment, which would cost in the order of $5 million. This doesn't include the cost of the disposal system, which would depend on whether the discharge was to a local stream or to the harbour.

[5] Siggins, A., Burton, V., Ross, C., Lowe H. and Horswell, J. Effects of long-term greywater disposal on soil: A case study. Science of the Total Environment, Volumes 557–558, 1 July 2016, Pages 627-635 https://www.sciencedirect.com/science/article/abs/pii/S0048969716305083?via%3Dihub

[6] https://www.buildmagazine.org.nz/index.php/articles/show/greywater-from-waste-to-resource

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#	Panel Member	Panel Question	Council Officer Response
			In addition, property owners would need to replumb their buildings to separate grey water from black water (bodily waste), which could cost several thousand dollars per property. Assuming $8,000 per property, this would add an extra $7 million to the cost of the scheme. Black water would need to be collected and treated in a separate system. Due to high potential for contaminants from kitchen and laundry water, BRANZ recommends that wastewater from these sources is treated as black water along with wastewater from the toilet. Their research has found that about half of the water used by a house is grey water (150 litres per day) and half is black water. Separating the grey water would reduce the annual wastewater volume by approximately 44,000 cubic metres per year, which would be a 21% reduction to the total annual flow. This would leave an average annual volume of 164,000 cubic metres per year, which is still far too high to make tankering to Christchurch a viable option. Therefore, a wastewater treatment plant and a reuse/disposal system for the black water would still be required whilst a second, parallel, network and treatment plant would be needed for the grey water. Reducing wastewater flow by 21% by separating grey water would make little difference to the cost of the harbour outfall scheme, as the raw wastewater buffer pond smooths out peak flows to the treatment plant. A few hundred thousand dollars could be saved by building a smaller buffer pond. The total cost of this proposal would be in the order of $100 million, which would be a much more expensive option than any of the proposed consultation options. It also may not meet the cultural needs and aspirations of the Ngāi Tahu parties due to faecal contamination in the grey water.
8	Cr Cotter 6/10/20	It would be helpful for the panel to receive a reasonably detailed summary of the process to date, starting from the original consent lodgement, what options were in there, and a summary of the	The history of the project since lodging the consent application in 2014 is summarised in the presentation that staff gave to the hearings panel on 12 October. Please also refer to section 3 (longlist options) and section 10 (stakeholder engagement) of the Beca options report. Please refer to Section 7 of the Assessment of Environmental Effects for the 2014 consent application[7] for the consideration of alternatives. This described the previous assessment of alternatives for wastewater

[7] https://ccc.govt.nz/assets/Documents/Services/Wastewater/Akaroa-Wastewater-Scheme-Upgrading-Resource-Consents-Application-and-Assessment-of-Effects-on-the-Environment-AEE-CH2M-Beca-June-2014.pdf

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#	Panel Member	Panel Question	Council Officer Response
		findings from the Environment court please. As short a document as possible obviously, but enough to contain the pertinent details.	treatment plant locations undertaken by MWH in 2008, and the investigations by Harrison Grierson, in conjunction with Golder Associates and ecoEng Ltd in 2010, of alternative methods for treated wastewater disposal. The options for disposal of wastewater were a harbour outfall (near shore or mid harbour) and irrigation to land, and a combination of the two. Please also refer to the conference paper Akaroa's treated wastewater – finding a land based solution (O'Brien, B., Land Treatment Collective conference, April 2019).
Questions received after Monday 12 October oral submissions			
9	CB Member Peden 12/10/20 Revised 19/10/20	I & I funding to bring the I & I down by 20% yet best practice is a max 20%, How can we deal with the last 20% of the 60% that is estimated effect on the Akaroa Wastewater treatment?	Please see the answer to Q3.
10	CB Member Peden 12/10/20 Revised 19/10/20	How long/How plausible is it to get the ministry of health to approve non potable reuse?	Please see the answer to Q4.
11	CB Member Peden 19/10/20	Water charges for high users in Akaroa, is this being looked at?	This was proposed in the revised draft 2020/21 Annual Plan and received 65% support from submitters on the Annual Plan. However, the Council decided not to proceed with this. We will be consulting on volumetric charging for water in the draft Long Term Plan 2021 – 2031.
12	CB Member Peden 12/10/20 Revised 19/10/20	Planting options - Can these be amended to suit? What was initially on the land before European settlers and/or Maori Settlers? Are these able to be planted on this site, how will they establish with the extra water added to site?	Yes the species for planting can be selected to suit. The land was covered in native bush before settlers arrived. There are still some remnants of native bush and the plan is to ecosource the seed from these areas. Hugh Wilson (botanist and manager of Hinewai Reserve) has provided a list of suggested species (see Appendix T of the Beca report). We would work with Hugh Wilson, Ōnuku Rūnanga and members of the local community on appropriate species if a land based option is chosen. The trees would be irrigated with a lesser amount of wastewater initially until the canopy was established we estimate it would take at least five years to establish a reasonable canopy cover.

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#	Panel Member	Panel Question	Council Officer Response
13	CB Member Peden 12/10/20 Revised 19/10/20	Peer review of the options, has this been done by an external group or is the Becca report enough	The Akaroa wastewater technical experts group (which included experts for the Council, the Ngāi Tahu parties and Friends of Banks Peninsula) responded to specific questions from the working party in 2016 and 2017 about the irrigation options. The technical experts produced three joint statements, much of which is still very relevant to the options proposed.[8] David Painter Consulting undertook a peer review of the Akaroa Wastewater - Concept Design Report for Alternatives to Harbour Outfall (CH2M Beca, 29 January 2016) for the Ngāi Tahu parties, and Beca responded to this in Appendix B in the final version of that report in May 2016.[9] The wastewater network model was reviewed by HAL Consulting. There have been no additional peer review of the current Beca options report.
14	CB Member Peden 12/10/20 Revised 19/10/20	If money wasn't the issue, what do the Water team (experts) think would be the best option that we haven't seen? For example is there new technology online (say in the last few years) that could help with this project?	We do not think that there is a better option. We think that the best option is the Inner Bays irrigation scheme as proposed, for the reasons outlined in the Proposed Council Officer Recommendations attached to the agenda for this hearing.
15	CB Member Peden 12/10/20	Can we do anything in the district plan re water use and conservation in Akaroa?	Lifemark and Homestar certification schemes for new buildings were included in the proposed Replacement Christchurch District Plan. The Crown's closing legal submissions confirmed the removal of the proposed sustainability standards under the Replacement Christchurch District Plan[10]:

[8] https://ccc.govt.nz/assets/Documents/Services/Wastewater/Akaroa-Wastewater-Irrigation-of-Treated-Wastewater-to-Land-Conference-of-Technical-Experts-Joint-Statement-30-November-2016.pdf
https://ccc.govt.nz/assets/Documents/Services/Wastewater/Akaroa-Wastewater-Irrigation-of-Treated-Wastewater-to-Land-Joint-Statement-of-Technical-Experts-No-2.pdf
https://ccc.govt.nz/assets/Documents/Services/Wastewater/Akaroa-Wastewater-Irrigation-of-Treated-Wastewater-to-Land-Joint-Statement-of-Technical-Experts-No-3.pdf
[9] https://ccc.govt.nz/assets/Documents/The-Council/HYS/2016/april/Akaroa-Wastewater-Appendix-B-Peer-Review-and-Response-to-Peer-Review.pdf
[10] http://chchplan.ihp.govt.nz/wp-content/uploads/2015/03/495-Crown-Closing-legal-submissions-for-Residential-hearing-with-appendix-22-4-15.pdf

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#	Panel Member	Panel Question	Council Officer Response
	Revised 19/10/20		***Sustainability standards*** *27. As Bruce Klein said in evidence, the costs associated with the Lifemark and Homestar certification schemes (and similar measures)increase construction costs, are above and beyond the minimum building code requirements, are incompatible (if used as a standard or matter of discretion in a district plan) with the Crown's objectives to reduce red tape and compliance costs, place added pressure on already stretched building consent processes and are difficult to manage and enforce.* *28. Moreover, they are likely to be ultra vires. The Crown supports the analysis on this point developed in paragraphs 36 to 52 of the opening submissions for Te Rūnanga o Ngāi Tahu, Ngā Rūnanga and Ngāi Tahu Property Limited on the Residential Proposal.* *29. For these reasons, they were removed from the 9 March 2015 revised version of the Proposal33 but they have found their way back into the Revised Proposal through the inclusion of sustainability principles as a matter of discretion in Rule 14.9.1B when considering a range of restricted discretionary activities – RDAs 7, 12, 13, 14 and 19 in Rule 14.2.2.3 for example.* *30. Provision is included now also in Rule 14.9.37 (8) which includes, as a matter of discretion in relation to the enhanced development mechanism and community housing, the incorporation of "environmental efficiency measures" in design.* *31. The difficulty with provisions such as these is that they provide scope for a consenting officer to require standards of this sort to be included within a development. There is no way, on the part of the resource consent applicant, of knowing which standards might be imposed.* It is therefore unlikely that the District Plan is the most appropriate mechanism or method to address water use and conservation measures. The Water Supply, Wastewater and Stormwater Bylaw requires new buildings on Banks Peninsula to install rainwater tanks for non-potable use. However, due to the low growth rate in Akaroa, this makes little difference to the overall demand for water.

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#	Panel Member	Panel Question	Council Officer Response
16	CB Member Peden 12/10/20 Revised 19/10/20	Impact to water supply to the Donna and David Kingan land, has this been looked into?	The well on the Kingan property is 42 metres from the arm of the Childrens Bay Creek that the wetland would occasionally discharge to (see figure below with the well circled in blue). The impact on this well of an occasional discharge from the wetland has not been assessed yet, but would be done as part of the Assessment of Environmental Effects for the resource consent application if this option is chosen. If necessary, treatment at the point of supply could be provided, or possibly a connection to the reticulated supply.

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#	Panel Member	Panel Question	Council Officer Response
			
17	CB Member Peden 12/10/20	Can tourism money help with infrastructure costs?	The Council does not collect money from tourists. From time to time the Government provides funding to provide infrastructure for areas with high tourist numbers, but we have not been successful in obtaining any of this funding for Akaroa (e.g. for public toilets). So unless the Council was prepared to introduce

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	Revised 19/10/20		something like a bed tax, where tourists are charged a fixed amount per night, it is unlikely that tourism money can help with the infrastructure costs.
18	CB Member Peden 12/10/20 Revised 19/10/20	Marine waste/black water off cruise ships, is this common practice in Akaroa Harbour?	Please see the answer to Q23.
19	CB Member Peden 12/10/20 Revised 19/10/20	Have conversation from Auckland City Council to Ministry of Health regarding non potable water reuse started?	Please see the answer to Q5 and Appendix G (Correspondence on Non-Potable Reuse from CDHB) of the Beca options report. The advice provided by the Drinking Water Assessor said that she had consulted with the Ministry of Health in preparing her response. Watercare (the agency responsible for water supply and wastewater in Auckland) is not pursuing potable or non-potable reuse and is not discussing it with the government (Chris Thurston, 22 October).
20	Cr Templeton 12/10/20	Would non-potable re-use work with the water safety plan for Akaroa?	We would need to consider the risks that non-potable reuse would pose to the drinking water supply in the water safety plan (e.g. the risk of accidental cross-connections to the potable supply). This would include whether the preventive measures we have in place are sufficient to reduce those risks to an acceptable level, or whether additional preventive measures would be required. Our view is that a non-potable reuse scheme could be implemented safely, providing sufficient preventive measures were put in place to prevent contamination of the drinking water supply. However, it may make obtaining approval from the regulator for our water safety plan more difficult.
21	Cr Templeton 12/10/20	Size of land area needed for wetland for whole supply to be filtered in this way and what land would be available locally to do it?	The maximum annual flow from our modelling (which uses a 47 year history of weather data) was 236,000 cubic metres per year, with a peak daily flow of 1210 cubic metres per day. Assuming we have approximately 5000 cubic metres of storage volume to smooth out the peak flows, we would need a wetland that could accommodate a flow of approximately 8 litres per second. The size of wetland depends on the acceptable residence time of water in the wetland. This is shown in the graph below for a flow of 8 litres per second through the wetland. It can be seen that a wetland area of 8 hectares would be required for two weeks' retention time.

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			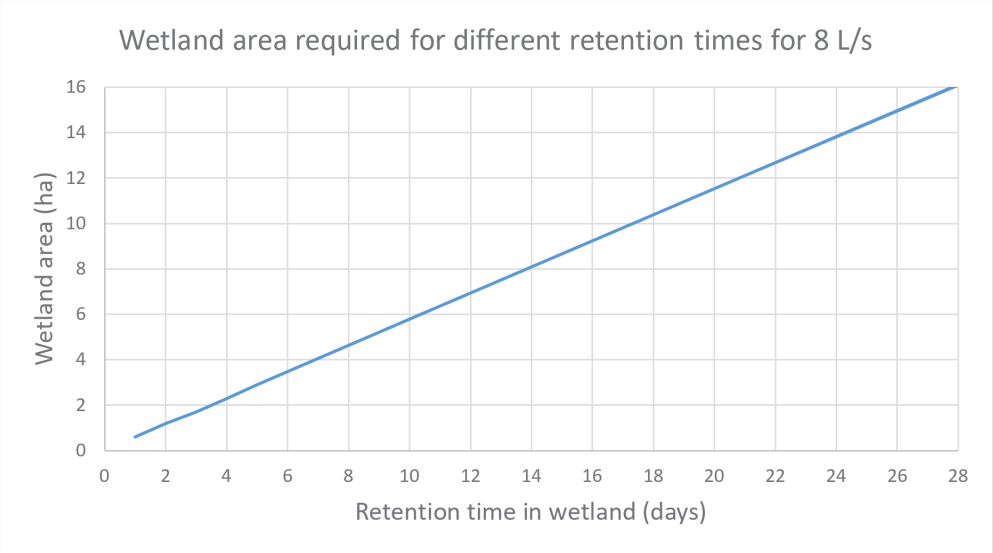 The following areas are relatively flat and could be considered for wetlands, with the indicative wetland area available shown for each site: - Old Coach Road wetland site: 0.2 ha (i.e. as per Inner Bays irrigation option) - 11 Sawmill Road: 1 ha (i.e. instead of the Robinsons Bay storage pond) - Takamātua Valley (east side of highway): 3 ha (i.e. instead of the Takamātua irrigation area) - Takamātua Valley (west side of highway): 3 ha - Lower Robinsons Bay Valley: 4 ha - Upper Robinsons Bay Valley west of Sawmill Road: 4 ha This is indicative only and further work would need to be done to confirm this.
22	Cr Templeton 12/10/20	Potential for other crops to be irrigated by CCC or other parties along the pipeline i.e. hemp?	Due to the high quality of the treated wastewater, it would be possible for the Council or other parties to irrigate horticultural crops such as hemp. A resource consent to discharge treated wastewater to land would be required.

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#	Panel Member	Panel Question	Council Officer Response
23	Cr Templeton 12/10/20	Do cruise ships in the harbour discharge waste and can we do anything about it if they do?	The Harbour Master advises that cruise ships that visit Akaroa do not discharge wastewater into the harbour. Cruise ships have advanced wastewater treatment systems with the treated wastewater retained onboard and normal practice is to discharge this into the open sea between ports. However, we do know that smaller boats discharge wastewater into the harbour at times. The Resource Management (Marine Pollution) Regulations 1998[11] provide that no persons may discharge untreated sewage from a ship or offshore installation within 500 metres of the shore or a marine farm, or in water depths of less than five metres. Discharges of Grade A treated sewage (which is of a similar quality to that from the existing Akaroa wastewater treatment plant) are permitted by the Regulations provided they are further than 100 metres from a marine farm and discharges of Grade B treated sewage are permitted by the Regulations provided they are further than 500 metres from a marine farm or a Mātaitai reserve. Such distances or depths may be increased in a regional coastal plan. Places where the restrictions in the regulations should be tightened should also be determined by the process of investigation and public consultation. However, Environment Canterbury's Regional Coastal Environment Plan simply refers to the regulations for the discharges from boats in most cases (Rules 7.1 – 7.6). The exception is that for specific bays in Banks Peninsula where discharge of untreated sewage is a prohibited activity (Rule 7.7), but Akaroa Harbour is not included in this list. Therefore, discharging treated wastewater from a boat would be permitted in most of Akaroa Harbour, and discharging untreated sewage from a boat would be permitted down the southern end of the middle of the harbour. Policy 7.3 of the Regional Coastal Environment Plan says: *A process of investigation and public consultation shall be undertaken that will identify and define additional parts of the Coastal Marine Area where:* *a. specific water quality standards should be set and maintained;* *b. the area should be protected from discharges of untreated sewage from vessels; and* *c. there are particular cultural values identified by Tāngata whenua that require protection*

[11] http://www.legislation.govt.nz/regulation/public/1998/0208/latest/DLM253779.html

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			We asked Environment Canterbury if it had undertaken this investigation and public consultation yet and received this response (Jane Doogue, 20 October): *We are only in the initiation stage of our project to review the regional coastal planning framework, identifying issues relating to various topics including coastal water quality. The discharge of wastewater from boats has been raised in our internal conversations to date.* *Next year we will be discussing issues, and options to address them, with stakeholders and the wider community. We will be engaging with territorial authorities including Christchurch City Council early next year, and the wider community later in the year. Discharges into the CMA from various sources, and via a range of activities, will be included in these discussions.* *Review the regional coastal planning framework is expected to take us approximately four years, with notification in 2023/2024.*
24	Cr Templeton 12/10/20	Several submitters have questioned the reality of growing natives on the high and exposed Goughs Bay area. Can we check with CCC ecologist Nick Head on viability of plantings on Goughs?	Paul Devlin (Head Ranger Port Hills & Banks Peninsula) advises that we would expect the plantings at higher altitudes to take longer to grow then those at lower altitudes. Please also see the answer to Q42.
25	Cr Cotter 12/10/20	If option 4 was chosen, could the outfall from the pipe be released on an outgoing tide?	This was considered as an option in the Akaroa Wastewater Options: Harbour Discharges – Risk Analysis (Golder, 2009)[12] (sections 7.5.3, 9 and 10). This found that a discharge on an outgoing tide was slightly better than a continuous discharge to Akaroa Harbour, but there would be additional costs for a storage facility to store the wastewater between ebb tides. The report concluded that the benefit of an outgoing tidal discharge was barely distinguishable from a conventional (continuous) discharge and the additional benefit associated with it is unlikely to warrant the additional costs.
Questions received after Tuesday 13 October oral submissions			

[12] https://ccc.govt.nz/assets/Documents/Services/Wastewater/Akaroa-Wastewater-Options-Harbour-Discharges-Risk-Analysis-Golder-Associates-October-2009.PDF

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#	Panel Member	Panel Question	Council Officer Response
26	Cr Templeton 13/10/20	It was mentioned that there had been no landscape assessment done for the Pond 10 site. Is this necessary at this stage or will it be done for the RMA process if the option is chosen? Is there preliminary work in this space?	A high level review of landscape and visual effects of a treated wastewater storage pond at Pond Site 10 was carried out by Align in 2017 (Appendix V (Landscape and Visual Assessment) of the Beca options report). The summary of findings for Pond Site 10 are included in Table 5.3 of that report and found that the effects would be low to moderate. The design has evolved since 2017 and now includes a covered raw wastewater storage pond, and possibly a wetland and treated wastewater storage pond. A further landscape assessment has not been completed but would be done to inform the Assessment of Environmental Effects for the resource consent application. We are of the view that landscape effects will be able to be appropriately mitigated.
27	Cr Templeton 13/10/20	Sue Church mentioned that there had been an additional 5 minute dam break assessment done. Is this correct, are the results available and if so what do they mean for the proposal?	For context the "X minute" dam burst assessments refer to the time between water initially escaping the dam to when peak flow is reached. After this period the flow rate from a dam burst lessens. In setting up the dam burst modelling and calculations the modellers ran a number of trials to check their initial set up and confirm the model was delivering reasonable outputs. This included a range of trial scenarios including five minutes to peak flow. We were advised by Beca's engineers not to consider scenarios of less than 10 minutes as these would be unlikely to be acceptable to a peer review by Dam Watch and that they considered that 10 minutes was a reasonable starting point. We did not ask the modellers to investigate options and produce reports on scenarios that were unlikely to pass a Dam Watch review, therefore a report on a 5 minute dam burst was not produced and not available for distribution.
28	Cr Templeton 13/10/20	Are there smaller areas closer to Akaroa that could be used for irrigation like those mentioned in the last process when less wastewater was expected?	Yes there are other smaller areas that could be suitable for irrigation in Takamātua Valley and Robinsons Bay. These are shown on the map in Section 5.3 of the Beca options report, with more detail provided in Appendix P. In total, 102 hectares of land in the Inner Bays may be suitable for irrigation, which is much greater than the 40 hectares required for the Inner Bays irrigation scheme.
29	Cr Templeton 13/10/20	Given the concern that we have no 'Plan B' if the native plantings fail, would it be possible to use an exotic species with a clear track	Yes it would be possible to plant exotic species that are proven to thrive when irrigated with treated wastewater. Planting native trees rather than exotic species was chosen because this was preferred by the Ngāi Tahu parties and had general support from many people in the community.

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#	Panel Member	Panel Question	Council Officer Response
		record in the wastewater space such as pine or fir? If so, does this alter any other parts of the proposal or consentability? What is the response from our staff and those running the trial in Duvauchelle to the assertions that the plantings are not thriving and the area would leach too much nitrate?	The policy theme in the Christchurch District Plan is to maintain and enhance areas of indigenous biodiversity: **Policy 9.1.2.2.10 Maintenance and enhancement of indigenous biodiversity** a. Enable activities that maintain and enhance indigenous biodiversity including: i. planting with appropriate indigenous species; and ii. the removal or management of pest plant and animal species and for biosecurity works Planting native trees is a permitted activity, whereas plantation forestry is a restricted discretionary activity in the Christchurch District Plan. Resource consent would also be required from Environment Canterbury for vegetation clearance for the harvesting of the exotic forest; this would be a discretionary activity for the Robinsons Bay site as it is classified as a soil erosion risk area in the Land and Water Regional Plan. Professor Brett Robinson who has been running the Duvauchelle tree trials advises that: **Nitrate leaching** Given the proposed average treated wastewater application rate of 595 mm/year and a total nitrogen concentration in the treated wastewater of 15 milligrams per litre (mg/L), the total amount of nitrogen added will be 89 kilograms of nitrogen per hectare per year (kg N/ha/year). This is well below the application rate of nitrogen at Whakarewarewa of 130 - 260 kg N/ha/year.[13] The calculated rate of nitrate-N (nitrate-nitrogen) leaching from the Duvauchelle tree trial (receiving 250 kg N/ha/year) was 2 - 47 kg N/ha/year, depending on the vegetation type[14]. Therefore, it is likely that the nitrate-N leaching from the proposed site will be less than half of this value, given the above levels of

[13] https://www.ccc.govt.nz/assets/Documents/Services/Wastewater/Akaroa-Wastewater-Irrigation-of-Treated-Wastewater-to-Land-Joint-Statement-of-Technical-Experts-No-3.pdf

[14] http://www.kiwiscience.com/downloads/Copy%20of%20CCC_report_updated_Final23Sep20.pdf

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#	Panel Member	Panel Question	Council Officer Response
			treatment and application. This is within the range of nitrate leached from grazed pasture (Stats, N.Z. 2019. Nitrate leaching from livestock.[15] The irrigation rate at Whakarewarewa forest was 3,285 mm per year, more than five times higher than the rate that would be applied for the Inner Bays irrigation (595 mm/year). This, combined with the higher rainfall in Rotorua (about 1500 mm/year compared with rainfall at Akaroa of around 1000 mm/year) resulted in a level of nitrate leaching at Rotorua that is many times greater than would occur from the Inner Bays irrigation scheme. **Response of NZ-native vegetation to treated wastewater, comment on the trial in Pipers Valley Road** The native plants at the Duvauchelle field trial are divided into 27 blocks. Twelve of these blocks are receiving treated wastewater. The remainder are controls, not receiving treated wastewater. Most of the plants showed increased survival, growth and vigor in the blocks receiving treated wastewater. None of the species showed reduced growth or disease caused by effluent irrigation. There are some species that are not thriving at Duvauchelle, namely *Leptospermum scoparium* (manuka), *Pseudopanax arboreus* (five-finger), and *Olearia paniculata*. These species are ecologically unsuitable for the area: their growth is poor on both the control (non-effluent irrigated) and treatment blocks. Their poor growth is not caused by the treated wastewater. Most of the plant-death at the field trial occurred in the six months following planting, before effluent irrigation started. Following the irrigation of effluent, the survival rate in the treatment plots was significantly higher than the control plots. The plants in the trial were planted at a high density (0.5 m x 1 m) in order to minimise the time needed to get the results. As the plants mature, there is some "self thinning", a normal ecological process where weaker individuals succumb to overshadowing by more vigorous plants. In a full scale planting, the plants spacing would be greater (e.g. 1.5 x 1.5 m) to reduce costs and facilitate weeding.

[15] https://www.stats.govt.nz/indicators/nitrate-leaching-from-livestock
(accessed 11 August 2019)

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#	Panel Member	Panel Question	Council Officer Response
			Minimising the risk of planting NZ native species The trial has demonstrated that application of treated wastewater is either beneficial or has no effect on the growth of NZ native species. Failures are caused by species that are not adapted to the local conditions (even if they are native to the peninsula). This risk can be mitigated by selecting a range of species, rather than planting a monoculture). The Duvauchelle and other trials have also demonstrated that the greatest threat to the establishment of NZ natives on the site is weed competition. A weed management programme is a critical success factor. It should be noted that establishment of pines or firs is not without risk due to fire and windthrow (potentially damaging the irrigation system). This risk is significantly reduced for lower-growing and non-flammable NZ-native species such as flax, *Coprosma* spp. and *Griselinia* spp.
30	Cr Templeton 13/10/20	Do we have a 'best case' estimate of how much reduction we could get in wastewater if we did best practise I&I fixing for both CCC and private laterals, along with strong water conservation measures in Akaroa? What would this mean for the size of the pond and irrigation area?	Please see the answer to Q70.
31	Cr Templeton 13/10/20	Whose responsibility is it to keep stream and creek beds in Robinsons Bay free of debris so as not to block at pinch points during floods?	The Council is responsible for maintaining stream culverts under its roads and NZTA is responsible for maintaining culverts under the state highway. The Council is not responsible for making sure that creek beds are free from debris, this would be up to the landowner. However downstream culvert checks and maintenance could also be a resource consent condition for the storage pond, in which case we would work with other stakeholders such as NZTA to ensure this is carried out.

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<table>
<tr><th>#</th><th>Panel Member</th><th>Panel Question</th><th>Council Officer Response</th></tr>
<tr><td>32</td><td>Cr Templeton 13/10/20</td><td>Several submitters have compared the proposed pond/dam in Robinsons Bay to the Bromley ponds (i.e. with odour, midges and 'settling'). In what ways are they similar and in what ways do they differ?</td><td>The wastewater which enters the ponds at Bromley is treated to a lower standard than would be the case in Akaroa. The Christchurch wastewater treatment plant provides primary and secondary treatment (screening, sedimentation, organic load reduction and clarification) before the wastewater enters the ponds for tertiary treatment (disinfection by sunlight). By comparison, the treated wastewater entering the storage ponds in Akaroa would receive primary, secondary and tertiary treatment including utrafiltration. This provides a much greater reduction in suspended solids, organic load, nutrients and pathogens than is the case for Christchurch. The table below compares the average treated wastewater quality entering the ponds at Bromley with that proposed for Akaroa.

Average wastewater quality entering ponds at Bromley and Akaroa (milligrams per litre)
<table>
<tr><th></th><th>BOD</th><th>Total suspended solids</th><th>Ammonia</th><th>Total Nitrogen</th></tr>
<tr><td>Bromley</td><td>13</td><td>28</td><td>27</td><td>36</td></tr>
<tr><td>Akaroa (proposed)</td><td>5</td><td>1 (5)</td><td>2</td><td>15 (30)</td></tr>
</table>

Due to the very low organic load, the risk of odour from the treated wastewater storage ponds is low. This is discussed in more detail in Section 5.8 (Storage Pond Odour Considerations) of the Akaroa Wastewater Investigation of Alternative Sites for Land Irrigation (CH2M Beca, March 2017)[16].

As the suspended solids concentration is very low, there would also be very little in the way of settling of solids in the ponds. However, they could be emptied and cleaned out if required.

Midges – please refer to section 9.9 of the staff report for comments on insects/midges. Midges lay their eggs onto ponds and the larvae grow on the sandy/muddy bottom of shallow ponds. This growth period varies from three weeks in warmer temperatures to several months in colder temperatures. When midges transform from the pupae stage they float to the pond surface, dry out and then fly for up to 72 hours before dying. The Bromley ponds (and Lake Forsyth-Wairewa) have a fine grained bottom but the storage ponds will be lined with a polyethylene liner so the larvae will not be able to stick to the liner. The larvae</td></tr>
</table>

[16] https://ccc.govt.nz/assets/Documents/Services/Wastewater/Akaroa-Wastewater-Investigation-of-Alternative-Sites-for-Land-Irrigation-CH2M-Beca-March-2017.pdf

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			grow more rapidly in the warmer periods (November to March). Midges proliferate in the warmer temperatures (their life cycle is much quicker). In the summer months the ponds will be at their lowest and often empty and therefore any midges present will die. If midges were present in the ponds cycling the storage ponds to empty in the summer months so that each was empty for a period on a monthly basis would ensure easy predation of the midge larvae. It is also a simple matter to use an insecticide to kill the midges if necessary.
33	Cr Templeton 13/10/20	Is it possible, or desirable, to add small islands in the dam (similar to Bromley) for wildlife or would the empty pond in summer mean that wasn't useful?	The proposed ponds at Robinsons Bay would have a surface area of 1 hectare, whereas the area of the ponds at Bromley are 200 hectares. There wouldn't be enough room in the Robinsons Bay ponds to include an island while still providing the required wastewater storage volume.
34	Cr Cotter 14/10/20	Pru Stevens claimed that none of the land based options are consentable. Can staff give us their opinion on this comment?	Her submission was about activity status under the Resource Management Act rather than consentability. All land based options are consentable. This was assessed in the Beca report. Activity status (discretionary, non-complying etc.) does not determine consentability. The discharge to harbour option has the consentability issues highlighted in the 2015 commissioners' decision and in the staff opening comments in this hearing.
35	Cr Cotter 14/10/20	Pru Stevens also claims that Inner Bays is not consentable due to outlet to Childrens Bay. Response?	Please see the answer to Q34.
36	Cr Cotter 14/10/20	Can we have a staff response to the FOBP and other submitters that the Duvauchelle trial is a failure?	Professor Brett Robinson who has been running the Duvauchelle tree trials advises that: **Nitrate leaching** Given the proposed effluent application rate of 595 mm/year and a total nitrogen concentration in the effluent of 15 mg/l, the total amount of nitrogen added will be 89 kilograms of nitrogen per hectare per year (kg N/ha/year), which is well below the application rate at Whakarewarewa of 130 to 263 kg N/ha/year.[17]

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[19] Stats, N.Z. 2019. Nitrate leaching from livestock. https://www.stats.govt.nz/indicators/nitrate-leaching-from-livestock (accessed 11 August 2019)

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37	Cr Cotter 14/10/20	Can we have a staff response to the concerns of increased mosquitos due to the ponds?	Please see the response to Q32.
38	Cr Cotter 14/10/20	I & I work programme - It would be good to give the submitters a concrete timeline and assurance that we are addressing this with the Government reform money.	We have assigned $3.1 million of government funding for 3 Waters Reform for I&I reduction work in Akaroa. This must be spent by 31 March 2022 and we plan to commence physical works by March 2021. This will target the areas of Akaroa with the highest ingress of groundwater and stormwater into the wastewater network. Whilst this is happening, we will be working with property owners where our survey has found high I&I and advising them of any repairs or changes they need to make to their properties to be compliant.
39	Cr Cotter 14/10/20	How much extra cost would a reverse osmosis system be in	Adding a reverse osmosis plant was considered in sections 5.11 and 8.6 of the report Akaroa Wastewater Investigation of Alternative Sites for Land Irrigation (CH2M Bece, March 2017)[20] (2017 Beca options report). The estimated additional capital cost was $4.26 million and the net present value (whole of life cost over a

[20] https://ccc.govt.nz/assets/Documents/Services/Wastewater/Akaroa-Wastewater-Investigation-of-Alternative-Sites-for-Land-Irrigation-CH2M-Beca-March-2017.pdf

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		addition to the upgraded filtration plant of CCC options?	25 year period) was $9 million due to the very high running costs. This cost estimate does not include the costs associated with disposing of the retentate (the concentrated waste stream from the plant). If the reverse osmosis treatment stage was located after the wetlands, as proposed by Friends of Banks Peninsula, additional treatment (e.g. filtration) would be required between the wetland and reverse osmosis. This would further increase the cost. The additional space required for reverse osmosis and filtration may not fit within the consented wastewater treatment plant building envelope, so additional consents may be required.
40	Cr Cotter 14/10/20	Can we have confirmed in writing that all the land owners in the inner bays option are now willing negotiators?	The landowners in Robinsons Bay and at Hammond Point are willing to negotiate with us. The landowner in Takamātua has asked us to undertake a valuation of their property.
41	Cr Cotter 14/10/20	Can staff please outline the process should any archeologically significant findings be uncovered during construction at Pavitt Cottage?	If the Inner Bays option were selected by the Councillors we would begin by undertaking a site archaeological assessment. This would determine the extent of the historical features and identify areas impacted by the project. We would then refine the earthworks and irrigation designs to avoid these areas as far as possible. When applying for resource consents we would also apply for an Archaeological Authority from Heritage NZ. Heritage NZ would then advise of any conditions on the works to best preserve existing features, minimise impacts and address accidental discoveries. If an accidental discovery were encountered (this is where something unexpected is found) protocols agreed with Heritage NZ would be triggered. This may include an assessment of the discovery by an archaeologist and removal by the archaeologist if appropriate. Our archaeologist would then work with Heritage NZ and Iwi regarding the long-term custody of the discovery.
42	Cr Cotter 14/10/20	Is it fair to say that there will be challenges in getting plantings to grow at Goughs and Pompeys due	Goughs Bay and Pompeys Pillar are more exposed and are at a higher elevation than the Inner Bays, so it would be fair to say that it would be more difficult to establish trees at these sites. The previous landowner of the Goughs site advised us that there would be no problem in growing trees on that site.

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#	Panel Member	Panel Question	Council Officer Response
		to harsh conditions, compared with Inner Bays?	It is worth noting that all of Banks Peninsula was covered by native forest before settlers arrived.
43	Cr Cotter 14/10/20	How confident are staff in their population growth prediction of 15% over 10 years compared with Mr Stronach's claim that is will double to 1200 in 10 years?	The population growth projection is based on census data and projections by Statistics NZ. Our experience is that the median projections have been accurate historically in Akaroa and therefore we're reasonably confident that these predictions are accurate. In addition, the Section 32 report for the Banks Peninsula Small Settlement Area Assessments for the Replacement District Plan stated that "There are currently 127 existing vacant lots in Akaroa with a total area of 45 hectares. It has been estimated that this land has the potential to provide an additional 138 residential units." Therefore, there is limited scope for growth within Akaroa. There would be no issue if the proportion of permanent residents increased, as the wastewater treatment plant is designed to cope with the peak summer population which is much higher. Staff do not hold the material that Mr Stronach has based his claim upon, though we would welcome any additional information he may have.
44	Cr Cotter 14/10/20	Can we have a response to the suggestion by several submitters that all the land based options are too small and not future proofed?	All options are subject to population growth predictions. Should the population grow significantly beyond predictions then there are several options to accommodate the additional flows: - In the case of the Pompeys there is up to 91 ha of land on the property proposed that could be irrigated as trees, however we currently propose to only irrigate 48ha. There is significant scope on this site to accommodate growth. - In the case of Goughs there is approximately 100 ha of land on the property proposed that could be irrigated as trees, however we currently propose to irrigate 33ha. There is significant scope on this site to accommodate growth. - In the case of the Inner Bays scheme there is other land that could be purchased to supplement the scheme and used to accommodate unexpected future growth. Approximately 100 ha of suitable land is identified on Page 6, Appendix P, of the Beca report, although this is distributed across multiple landowners. We currently propose to irrigate 40 ha of this area.

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			- In the case of the Inner Bays scheme there may be an opportunity to more frequently direct flows to the wetland, however this would be subject to further discussions with Ngai Tahu. - In the case of all schemes staff have proposed a 20% I&I reduction but have highlighted there is an opportunity for additional reductions. These could be pursued in preference to increasing irrigation capacity.
45	Cr Cotter 14/10/20	How can we be assured that the streams and springs will not become contaminated (raised by submitter John Thomson)	
46	Cr Cotter 14/10/20	What would happen if the power went off?	If the power goes off at any of the proposed irrigation sites then irrigation would cease. If the power goes off at the wastewater treatment plant or any of the pumps stations, back-up generators will automatically start and the relevant pumps and systems would continue operating. We also intend to include a back-up power supply for monitoring systems at the storage pond site.
47	Cr Cotter 14/10/20	What is staff response to Ivor McCheseny's concerns over the Industrial look of pond site 10, with the fencing, electricity substation, security lighting and all additional infrastructure?	The site is on the Akaroa skyline and resource consents will be needed to store and treat wastewater on this site. An Assessment of Environmental Effects will need to be prepared, which will include an assessment of landscape and visual effects. We will need to fit the plant into the local landscape as sympathetically as possible. In concept designs, we noted that the covered raw wastewater storage pond would need to be fenced to avoid people walking on and damaging the cover. We envisaged surrounding the pond fence with screening plantings which would hide the fence from view. We do not anticipate flood lighting or continuous illumination, but there will be outside lights for staff having to work outside daylight hours. We typically tie these to our building alarms to turn off five minutes after the alarm is set. We therefore suggest the lights will not be on frequently and rarely late at light. The nearest sub-station is operated by Orion and is located approximately 400 metres from the site on Old Coach Road. We do not plan to build another one.

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48	Cr Cotter 14/10/20	How can we justify the cost per capita and this being the most expensive in NZ?	Unfortunately Akaroa is located in a place where disposing of treated wastewater in an appropriate way is very expensive. Staff and consultants have worked hard over the past five years to present viable options for the Council to choose from. The scope of the Akaroa wastewater scheme is large, as it includes major upgrades to the wastewater network, a new terminal pump station, a new treatment plant at a new site and a new reuse/disposal scheme.
49	Cr Cotter 14/10/20	Kevin and Averil Parthonnaud claimed the irrigation would be 5 metres from their boundary where they have food growing. Is this correct?	Kevin Parthonnaud may have said 25 metres rather than 5 metres; however to confirm the Parthonnauds live on the opposite side of Robinsons Bay Valley Road to the Thacker Farm. Their boundary is approximately 26 metres from the proposed irrigation area, and approximately 160 metres from the proposed storage pond.
50	Cr Cotter 14/10/20	Fiona Turner claimed that CCC staff have informed her that one of her water sources will be contaminated because the scheme will be above her intake. Is this correct can staff provide a response?	Fiona Turner has two water supplies. Her main supply is from the neighbouring Moore's overflow, which has its source at the bottom of the Reid property. This would not be affected by the proposed irrigation scheme. She has a secondary supply from an ephemeral trickle on the Reid's property which could be affected by the proposed irrigation scheme. Neither supply is protected by an easement. An up-gradient septic tank would provide a minimal risk of contamination to springs and the given that the irrigated water quality will be many orders of magnitude better bacteriological quality that septic tank effluent the risk to down-gradient springs negligible. If the Inner Bays irrigation option was chosen, we would work with her to provide a secure water source. This could be from a spring upstream of the irrigation area, or treatment at the point of supply.
51	Cr Templeton 16/10/20	Could staff provide a response to the issues raised in the Friends of Banks Peninsula oral submission/written document which provides a response to the Officers report.	Please see separate attachment.
52	Cr Templeton 19/10/20	What is the latest climate information for the area as per Bronwyn Hayward's heard submission and the implications of	The most useful reports, which contain a number of change maps of the South Island and Canterbury, are: NIWA Report 2019339WN, (Feb 2020). Climate Change Projections for the Canterbury Region, Macara, G, Wolley, J-M, Pearse, P,Wadhwa, S, Zammit, C, Sood, A, Stevens, S. and Climate Change and Variability-

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		this for not only Akaroa but Takamatua and Robinson's Bay water supplies as well?	Ngāi Tahu. NIWA Client Report 2016160AK. Pearce, P.R, Tait, A., Bell, R.G., Mullan, A.B., Paul, V., Law, c., Collins, D., Zammit, C, Sood,A. The maps from these reports can also be explored here: https://ofcnz.niwa.co.nz/#/home If we look at the IPCC RCP 8.5 scenario (which is most commonly used for climate change risk assessment at national and regional level), the average annual **rainfall** is projected to be about 0-5% lower than the baseline (1986-2005 average) for Banks Peninsula in both the 2040 and 2090 timeframes. For comparison, Christchurch city and surrounds are projected to be 0-5% wetter in terms of annual average rainfall. (See page 70 of the Canterbury report, lower 2 maps) The bigger differences are in the seasonal shift in rainfall (pages 73 and 75 of Canterbury report). In 2040 Banks Peninsula is projected to have: - 0-10% less mean rainfall in summer and autumn - 0-5% less inland and 0-5% more in some coastal areas in winter - 0-5% more rainfall in spring. In 2090 Banks Peninsula is projected to have: - 10-15% less mean rainfall in summer - 0-5% less rainfall in autumn - 5% more inland and 5-10% more in some areas in winter - 0-5% less rainfall in most of Banks but possibly 0-5% more in some southern parts in spring. (Note that these numbers are more reliable than the statistically downscaled numbers in the table on page 77, which suggest the opposite pattern.) If we look at **dry days** (defined as the number of days per year with rainfall less than 1 mm) the annual average is 1-5 more dry days by 2040 and 5-10 more dry days by 2090 (page 81). Projected changes in number of dry days per season for Banks Peninsula in 2040 are (page 84): - 1-2 more dry days in summer - 0-1 more in autumn

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			- 0-2 fewer in winter - 1 fewer to 1 more in spring By 2090 Banks Peninsula is projected to have: - 2-4 more dry days in summer - 1 fewer to 1 more in autumn - 0-2 more winter - 1-4 more in spring In terms of drought, though, the most useful measure is **soil moisture deficit**, which looks at evapotranspitation/temperature/wind as well as rainfall. Annual mean soil moisture deficit days (where more water leaves than arrives) are set to range between 1 and 10 more days by 2040 and 10 to 20+ more days by 2090, which means that Banks Peninsula is shifting towards drought as one of the worst sufferers in Canterbury (page 95). Seasonal soil moisture deficit in 2040 for Banks Peninsula is predicted to be (page 98): - Up to 15 more moisture deficit days in in summer Up to 10 more days in autumn 1 fewer to 3 more days in winter - 1-10 more days in autumn. Seasonal soil moisture deficit in 2090 for Banks Peninsula is predicted to be (page100): - Up to 10 more moisture deficit days in in summer Up to 15 more days in autumn 1-10 more days in winter - 1-10 more days in autumn. The area round Akaroa tends to be upper end of the range for summer, autumn and spring. So, in terms of climatic changes, there is a big uncertainty for rainfall, but projections suggest that generally, rainfall will be similar in mean annual terms, but Banks Peninsula will tend to have wetter

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			winters and drier summers and autumns, with spring variable. There will be more days when there is no rain at all. And soil moisture deficit (an indicator of drought) having significantly more days by 2090. On top of that, highest demand in hot weather and the holiday season is likely to coincide with times of lowest water availability.
53	Cr Templeton 19/10/20	Feedback and advice on the new option presented by Ngai Tahu. Also – advice on how we could incorporate it into the Inner Bays option should we choose to and whether would be different enough as to trigger a new consultation?	Feedback/advice on the option: The ideas presented by the Ngāi Tahu parties were: - Increasing the area of wetlands (which could be located on more than one site) and increasing the frequency of discharge from the wetland. This would reduce the storage pond volume required. - The retention time in the wetland would need to be at least two weeks. At a practical level, one way of incorporating this into the Inner Bays irrigation scheme would be: • Adding 1.8 hectares of additional wetlands on the Sawmill Road site to allow a 2 litres per second discharge to harbour with a minimum residence time of two weeks. • Removal of the Takamātua and Hammond Point land to reduce the irrigated land to 34 hectares. • Removal of 19,000 cubic metre storage pond and replacing this with storage tanks with a capacity of 15,000 cubic metres This could reduce the scheme costs by $500,000 to $2 million, however this is subject to further modelling and investigation. Regarding whether further consultation would be required, no, we would not expect to consult on an amended version of the Inner Bays option. We have already presented a worst case scenario for comment. If the tweaked option reduces the storage required, then we are just responding to the feedback we have received and have amended the design slightly. That is the value in asking for feedback; there may be changes made to the proposal(s) consulted on. If we are able to amend the Inner Bays irrigation option that is a positive outcome for those with concerns about the dam risk with the storage ponds. Please note that Ngāi Tahu are not the only submitter to request a larger wetland in order to reduce the size of the storage ponds; other submitters have also suggested this. The main question to ask (in deciding whether something might need further consultation) is whether there is anyone who would have submitted on the proposal that did not, if the amended option had been part of the original consultation. Due to the large number of submitters and submissions received from the Friends of Banks Peninsula, Takamātua and

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			Robinsons Bay Ratepayers and Residents Association, it would be unlikely that any new submitters would have decided to make a submission purely based on this amended option.
54	Cr Templeton 19/10/20	If we didn't irrigate in Takamatua would it make a difference to the size of pond needed in Robinson's Bay?	Assuming 34 hectares of irrigation in Robinsons Bay the storage volume would need to be: • Approximately 38,000 cubic metres without a wetland system and no discharge path to harbour. • Approximately 28,000 - 32,000 cubic metres with an infrequent discharge to harbour (via a wetland) at a frequency of 1 in 10 years. • Approximately 15,000 cubic metres with a wetland continuous discharge at 2 L/s. These figures must be considered provisional are intended to provide an indicative answer. Modelling would need to be undertaken to confirm these.
55	Cr Templeton 19/10/20	Is there potential for a small bund to be built to divert any perceived potential floods away from Pavitt Cottage? Would it be warranted? The Trust were concerned about a lack of income for the Cottage during construction time – is there a way to help with this by, for example, hiring it out?	This is unlikely to be warranted and our initial assessments suggest the Pavitt Cottage would not benefit from a bund. However if the option were selected we would undertake a more in depth assessment to confirm this but initial investigations suggest additional levees or bunds are not necessary to protect the Pavitt Cottage from a dam burst event. Perhaps Pavitt Cottage could be rented out by the construction contractor and/or maintenance contractor to provide worker accommodation. For any of the options selected we would pass on the contact details of our contractors to any businesses or persons who would like to approach them for the provision of services or products. We note that all options will have effects on neighbours, road users and other stakeholders. The Resource Management Act requires us to address effects on the environment including the local community. This could include considerations such as hours of work, noise, dust, and other construction effects.
56	Cr Templeton 19/10/20	The potential fire hazard of having additional irrigated native plantings in Robinson's Bay has been mentioned as a risk. It would be good to get advice on this.	The rural fire fuel load would change from grasses to natives for all of the land based options. We would have an opportunity with these options to work with Fire & Emergency NZ for our planting plans to plant appropriate species and create "green fire breaks" where the plantings border neighbouring buildings. This means there is an opportunity to improve the fire risks of the area being planted.

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57	Cr Templeton 19/10/20	Can we reuse the new UV treatment plant from Takapūneke at the new site to improve the treated wastewater and enable non-potable reuse when standards are introduced?	It is possible that we could relocate the new UV system at the Akaroa wastewater treatment plant to the new treatment plant. However, this would depend on what exactly the re-use standards are. We would also need to make sure that the treated wastewater quality at the existing treatment plant was not compromised during the relocation.
58	Cr Cotter 19/10/20	Is the waste water storage pond the size of 4 football fields? One football field is .714 Hectare	A typical football is 100 metres by 50 metres, which is 0.5 hectares. A regulation FIFA football pitch can be between 0.4 and 1.1 hectares. In our preliminary design of the Robinsons Bay Storage ponds the first pond compartment has a surface area of 0.54 hectares and the second pond compartment an area of 0.58 hectares. Combined this is 1.12 hectares, which is about two typical football pitches. If the full extent of the bund around the ponds and water surface is included the area affected is 2.1 hectares, which is about four typical football pitches.
59	Cr Cotter 19/10/20	Will the raw sewage pond be full all of the time, or is it only used when required?	As described in section 9.2.2 of the Beca options report, all flow to the treatment plant will be received into an inlet structure. When flows are in excess of the hydraulic capacity of the treatment plant membranes a high-level outlet in the structure will allow excess flows to be directed to a covered 6,000 m^3 raw wastewater storage pond. The wastewater treatment plant is sized to treat normal flows of up to 14 litres per second. This is enough to treat most flows most of the time. In summer during the morning when the flow is highest, some wastewater will be diverted to the raw wastewater storage pond. Higher flows during storm events will also be diverted to the raw wastewater storage pond.
60	Cr Cotter 19/10/20	How high will the cover be?	The cover will float on top of the storage pond. See Figure 9-8 in the Beca options report for a photo showing an example of a covered pond.
61	Cr Cotter 19/10/20	How will we manage the effect on the business at Pavitt cottage during construction? The	Please refer to the answer for Q55.

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		submitters claim it will kill their business.	
62	Cr Cotter 19/10/20	How do we respond to the accusation that the plantings as Pavitt cottage will ruin the landscape and not be pleasing?	The High-Level Landscape and Visual Review (Align, 2017) in Appendix V (Landscape and Visual Assessment Review) of the Beca options report noted about Robinsons Bay that: *Environmentally the landscape is relatively varied; made up of pockets of native forest, pine forest, exotic trees, olive groves, streams and riparian edges. A large historic oak plantation lies mid-way within the valley area. Areas of broadleaved indigenous hardwoods, Manuka and kanuka and other mixed indigenous forest exist in sporadic areas across the wider area.* *Robinsons Bay is extensively modified and is a highly mixed-use landscape. The patchwork nature of the area creates a varied pattern of environments rather than a simple or cohesive overall singular-type of landscape. This means that new or introduced environments are likely to have the capacity to be relatively easily absorbed into the general area.* Section 5.7.2.3 (Preliminary Assessment of Effects) in the Beca options report states: *The landscape review (see Appendix V) determined that all of the possible irrigation sites identified within the wider Robinsons Bay landscapes have the potential to accommodate the proposed irrigation area (pasture or planted) with low to moderate impacts on the existing character or general amenity of the area. This is because both landscapes already consist of a patchwork of various land cover and land uses and the introduction of a new land use would be easily absorbed within this context. Any planting should be carried out as sensitively as possible with mitigation measures including planting along contours, avoidance of straight edges and ridgelines and use of native vegetation where possible. Accordingly, the above can apply to 11 and 88 Sawmill Road sites.* It is worth noting that planting trees is a permitted activity in the Christchurch District Plan.
63	Cr Cotter 19/10/20	Do staff have a response to Ngāi Tahu's suggestion that we could have smaller ponds and more of them, this would be more pleasing	Please see the answer to Q53.

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		on the eye, and their sanctioning of sub surface wetlands?	
64	Cr Cotter 19/10/20	Am I correct that Ngāi Tahu require waste water to pass through a wetland for minimum of 2 weeks?	Yes the Ngāi Tahu parties stated at the hearing that residence time in the wetlands of two weeks would be required. Ngāi Tahu whānau practice (holistic) says that the longer water is cleansed over land the safer it is to be reused. This is in many incantations, songs and stories (legends). Debbie Tikao used the phrase *'Purea nei e te hau* (cleansed by wind - agitation), *horoia e te ua* (washed by rain - dilution), *whitia e te rā* (shone on by the sun – UV treatment), *Mahea ake ngā pōraruraru* (to remove the pollution). These lyearics are philosophic in their meaning, and apt in practice.
65	Cr Cotter 19/10/20	Could we create a special pervious surface area for boat washing in Akaroa using the purple pipe water?	Yes this would be possible. If the water was to be collected and returned to the wastewater treatment plant, it should be covered so that it doesn't collect rainwater (otherwise it becomes a source of I&I).
66	Cr Davidson 19/10/20	FOBP's independent assessment of the Duvauchelle tree trial concluded that it was a 'failure'. The site visit to the trial site did not give the appearance that it was a 'failure'. Could staff give a response to FOBP's position on the trial and do we have an independent view on the trial?	Unfortunately the independent ecologist for Friends of Banks Peninsula did not obtain the relevant project methods and details prior to undertaking his assessment, and appears to have misunderstand the purpose of the project. We therefore do not consider his assessment is robust. He seems to have misunderstood the purpose of the experiments and has misinterpreted this as a demonstration plot. He also suggests planting species that don't occur in our ecological district or even in the South Island (Antony Shadbolt, Team Leader Biodiversity). We have not obtained an independent view of the tree trial as we trust that Professor Brett Robinson and the students that he supervises are competent in his work. Please also see the answer to Q29.
67	Cr Davidson 19/10/20	There has been concern about the risk of fire from the increased load. What is the risk?	Please see the answer to Q56.
68	Cr Davidson 19/10/20	FOBP have identified a number of risks with the native tree planting and irrigation, including canopy intercept of 37% not being	Please see the separate attachment. At a conceptual level there are essentially two ways to manage nutrients within a wastewater application to land system; either control the rate of nutrient application to match the vegetation uptake over the

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		achieved, Nitrogen uptake lower than expected, native trees fail to tolerate and no plan "B". Could staff respond to these concerns?	system life cycle (i.e. long term), or periodically "cut and carry" the vegetation grown using the applied water or nutrients. As the proposed vegetation is native plantings and an assumed benefit is long term eco-restoration and increased biodiversity, then it is also assumed that the native plantings will not be cut down and removed. The corollary to this policy is that nutrient application rates to land need to be managed to match the planting uptake. This will be achieved by application of nutrients at a rate well below that permitted for agricultural land (200 kg N/ha/yr), use of a biological nutrient removal (BNR) treatment process to control nutrient loading rates on an ongoing basis, by monitoring the performance of the system over time, and by provision for adjusting the treatment process to further denitrify the wastwwater if required in future. The "Plan B" in the case of the Akaroa land-based scheme is adaptive measures and controls that can be put in place over time as part of the "Plan A" scheme to manage performance . "Plan B" measures include the following: • Design taking into account the Duvauchelle wastewater irrigation to native tree trials but at much lower nutrient and hydraulic loading rates • Very low rate application of water and nutrients onto suitable soils in a way that meets recognised design guidelines • Ability to adjust wastewater quality over time to respond to performance of system based on monitoring • Ability to adjust hydraulic application rate to different parts of the land to suit localised infiltration characteristics • Selection of a range of native plantings to manage the risk of individual species intolerance.
69	Cr Davidson 19/10/20	There have been a number of submissions that have raised concerns about midges, pests and odour. With the irrigation of trees and storage ponds for the treated water with the land based options, is there likely to be an increase in pests, midges and odour?	Please see the answer to Q32. There will be a pest management plan as part of the maintenance contract to ensure that there is not an increase in pests.

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70	Cr Davidson 19/10/20	If we maximise the reduction of I&I as much as possible, reduce water use and plan for use of the purple line for non-potable water use, what would that do to the inner bays scheme design?	The third letter in Appendix B (PDP Irrigation Modelling) of the Beca options report explores the Inglewood scenario, where I&I reductions were very successful after undertaking a distributed temperature sensing survey like the one we have undertaken in Akaroa. This found that if we achieved similar reductions in I&I (40% reduction in average flow, 70% reduction in average dry weather flow and 30% reduction in peak wet weather flow), then this would reduce the irrigation area to 34.5 ha (the irrigable area on the Thacker farm) and would reduce the storage volume to 16,000 cubic metres. (40 hectares of irrigation and 19,000 cubic metres of treated wastewater storage is proposed for the Inner Bays irrigation scheme). Initial calculations for the best case scenario are: - Current design annual wastewater volume is 208,000 cubic metres per year (including 20% I&I reduction) - Reducing I&I by 65% (which would reduce I&I to best practice levels) would reduce this volume to 155,000 cubic metres per year - Potential for non-potable reuse in toilet flushing and Council grounds: 30,000 cubic metres per year (assumes 800 toilets connected and 5,000 cubic metres to irrigate grounds, we can't assume winter irrigation of gardens). This gives a best case annual average volume of 125,000 cubic metres per year. - Reducing the irrigation area in proportion to the reduction in flow would mean that 24 hectares of irrigation area and a 5,000 cubic metre storage pond would be required. Please note that these are preliminary calculations only and modelling using the 47 year rainfall record would need to be undertaken to confirm these values.
71	Cr Davidson 19/10/20	Is this a NZ first, and if so, are there examples elsewhere in the world using similar topography and soil structure?	The proposed Akaroa scheme is not a NZ first. We operate a similar although smaller scale schemes at Wainui and Tikao Bay on the opposite side of Akaroa Harbour. Both schemes involves application of treated wastewater onto sloping loess soils using surface drippers in a pine plantation. There have been no reports of adverse effects from the operation of these schemes. Silver Fern Farms Pareora operates a large-scale land irrigation system applying up to 3,600 cubic metres per day of meat processing wastewater onto 141 hectares of land, including an area of sloping loess soils. This land-based cut-and-carry scheme has been progressively developed by Silver Fern Farms since 2005 as an alternative to disposing wastewater to sea via a short outfall. The Pareora scheme works well for

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			most of the operating season but there are wet periods when limited volumes can be applied to land due to loess soil saturation. The Omaha Wastewater Treatment Plant treats wastewater from Omaha, Point Wells and Matakana. The existing wastewater treatment plant is comprised of an aerated lagoon, oxidation pond, sand filters and UV disinfection. The treated wastewater is discharged onto a pine and eucalypt plantation, the Omaha Beach Golf Course, and 5.5 hectares of mixed native plantings. The area has sandy soils with peat layers so is not a loess soil system. Levin's treated wastewater is discharged to land at what is locally known as The Pot – a 110 hectare pine and native forest plantation 7 kilometres from Levin within the Waiwiri Catchment. The discharge consent conditions include a requirement for ongoing improvements for the Waiwiri Stream. A trial is being undertaken on 10 hectare of the site to determine if irrigating wastewater onto manuka/kanuka dominated ecosystems will improve water quality in the Waiwiri Catchment. This trial is supported with funding from the Ministry for the Environment Freshwater Improvement Fund. The soils in the area are typically sandy, with gently sloping sand dune formation.
72	Cr Davidson 19/10/20	Can we lay a purple pipe to Robinsons Bay at the same time to future proof this area?	Yes. An example of a Robinsons Bay Purple Pipe network is shown below. This example would service approximately 250 rating units and entail 4.4km of mains pipes and 4km of sub-mains. It would cost approximately $5.5M to $8M to construct. (Note we have not investigated the makeup of the 250 rating units) Staff would like to take the opportunity highlight that it would be cheaper and more effective to link the Akaroa water supply network to the Duvauchelle network and construct additional storage tanks. This may more cost effectively provide resilience to both networks, especially if combined with excessive water use charges in high demand periods.

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			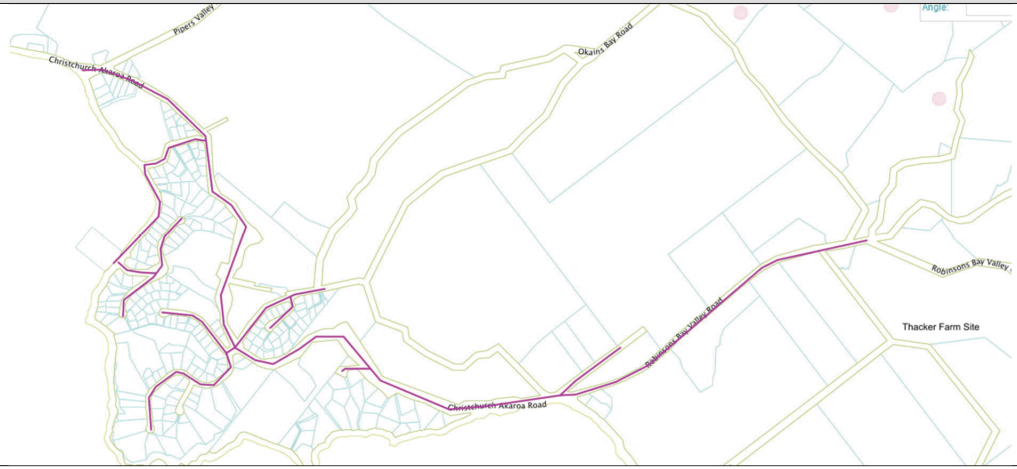
73	Cr Davidson 19/10/20	If we reduce I&I to industry best standard and introduce conservation methods before designing the chosen scheme, will this delay the project, including decommissioning the existing treatment plant?	We do not expect the I&I reduction work to influence the decommissioning date of the existing wastewater treatment plant at Takapūneke. This is because we anticipate a two year period in which to obtain the consents, and land if necessary, for each of the four options. We anticipate that the I&I reduction work would be completed in this time.
74	Cr Davidson 19/10/20	What can be done to expedite the decommissioning of the existing treatment plant?	The first task to expedite the decommissioning of the existing treatment plant is to select a preferred option to allow us to begin refinement of the option and detailed design. This may include further consultation with the community board and local residents or further consideration of certain aspects of the scheme; however further reviews of all options and further consultations would not support an expedient decommissioning. A second area to expedite the works is to allocate additional funding to accelerate delivery. Additional planning work would be needed to understand the potential cost versus time trade off but allocating additional funding for the purposes of accelerating the works would allow us to decommission the Takapuneke WWTP sooner.

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#	Panel Member	Panel Question	Council Officer Response
75	CB Member Peden 19/10/20	Referring to day 2 - Is treating the WW to a potable standard even possible?	It is technically possible to treat to a potable standard. However, this is only done overseas and there is nowhere in New Zealand which does this. The cultural and legislative requirements are different in New Zealand and it is extremely unlikely that drinking treated wastewater would ever be culturally acceptable to tangata whenua. One of the six fundamental principles for drinking water supply from the Stage 2 report of the Havelock North Drinking Water Inquiry is "Protection of source water is of paramount importance." The six principles from the inquiry have been included in the Ministry of Health Guidelines for Drinking-water Quality Management for New Zealand and into our water safety plans, including the Akaroa/ Takamātua water safety plan. Wastewater presents the greatest risk to drinking-water and every effort is made to make sure that it does not contaminate the water supply. Using it as a source for drinking water would therefore be anathema to safe drinking water. It is therefore extremely unlikely that the regulator for drinking water supplies (currently the district health boards, soon to be Taumata Arowai) would ever give permission for direct reuse of treated wastewater as a drinking water source.
76	CB Member Peden 19/10/20	Referring to day 2 – Is there anyway of getting Nitrates out of the water?	The proposed Biological Nutrient Removal (BNR) treatment plant will remove much of the nitrate in the incoming wastewater, down to an average level of around 15 milligrams per litre in summer (refer Section 2.3.1 of the Beca options report). This represents an application rate of 70 kg/N/ha.yr, which is about one third of the permitted fertiliser application rate for agricultural land. The nutrient loading rate has been set to match the uptake by the native plantings. Furthermore this can be adjusted in future if needed based on monitoring. It would be possible to reduce the total nitrogen (which is mostly in the form of nitrate) in the treated wastewater to 5 mg/L, as described in section 5.9 of the report Akaroa Wastewater Investigation of Alternative Sites for Land Irrigation (CH2M Beca, March 2017)[21]. *Achieving this level of denitrification will involve increasing the reactor sizing, increasing the sludge recycle rate, and also adding ethanol dosing to provide additional carbon. These design features will impose additional costs and the intention is to optimise the design, and associated costs, once the assimilative capacity of the irrigation scheme has been confirmed.*

[21] https://ccc.govt.nz/assets/Documents/Services/Wastewater/Akaroa-Wastewater-Investigation-of-Alternative-Sites-for-Land-Irrigation-CH2M-Beca-March-2017.pdf

AKAROA TREATED WASTEWATER OPTIONS HEARINGS PANELS – QUESTIONS & ANSWERS

Trim Reference: 20/1235908

#	Panel Member	Panel Question	Council Officer Response
77	CB Member Peden 19/10/20	Referring to day 2 – What can purple pipe water be used for on a domestic level? Pools if treated by chlorine? Or just water of gardens/grass and flushing toilets?	MoH and CDHB are generally opposed to any domestic reuse use as discussed in Section 5.7.5 of the Beca options report and the attached email in Appendix G from Angela Sheat. The Australian guidelines for water re-use advise non-potable reuse can be used for gardens, toilet flushing and washing machines. No other uses are allowed.
78	CB Member Peden 19/10/20	Referring to day 2 – Is the reverse osmosis process beneficial after the micro filtration system? Will that get rid of Nitrates?	As stated in section 5.11 of the 2017 Beca options report: *The reverse osmosis (RO) plant would be an add-on to the existing treatment plant process. The permeate from the reverse osmosis plant would presumably be irrigated to land .The retentate would also need to be disposed of in some manner. As the retentate will represent a significant percentage of the incoming wastewater flow, and will also contain almost all of the contaminants present in the influent wastewater, this stream will not be easy to dispose of. It is unlikely to be economically viable to tanker the retentate back to Christchurch Wastewater Treatment Plant.* *Other options for disposal of the retentate could include local disposal to land or to sea. Retentate disposal to Akaroa Harbour is unlikely to be acceptable to range of stakeholders. Retentate disposal to land may be viable, but negates the benefit of the RO system as the contaminants separated by the RO system end up back on the land along with the permeate. Under this scenario the RO system provides no obvious benefit.* Reverse osmosis would remove nitrate from the treated wastewater. However, it would be possible to remove most nitrate using the currently proposed treatment process as described in the answer to Q76. Wastewater treatment plants are designed to achieve a treated wastewater quality which can be assimilated into the receiving environment without causing adverse effects. The proposed treatment process is appropriate for irrigation to land, disposal to harbour or non-potable reuse. Adding reverse osmosis would provide very little additional benefit in terms of reducing adverse effects and would come at significant additional cost.

AKAROA TREATED WASTEWATER OPTIONS HEARINGS PANELS – QUESTIONS & ANSWERS

Trim Reference: 20/1235908

#	Panel Member	Panel Question	Council Officer Response
			It should be also be noted that application of reverse osmosis does not eliminate the need for a land irrigation system as the nutrients and salts in the retentate (concentrated waste) stream must still be disposed to land or elsewhere and cannot be recycled infinitely within the treatment process.
79	CB Member Peden 19/10/20	Referring to day 2 – Does anyone have approximate cost to adding a reverse osmosis system to the current plan? Do we have the land size for it?	Please see the answer to Q39. The size of the reverse osmosis plant would not be large as the flow is small, but space is needed for high pressure pumps and high pressure modules. A high level estimate of 50 square metres might be needed for the installation of a reverse osmosis plant.
80	CB Member Peden 19/10/20	Referring to day 3 – How likely are we to have raw sewerage dumping into Children's Bay?	Currently the raw wastewater from the wastewater network overflows onto Akaroa's beaches approximately once every six months. With the changes to the network that form part of the Akaroa wastewater scheme, this will reduce significantly to once every ten years. Any overflows from the proposed Terminal Pump Station to Childrens Bay Creek would have received primary treatment (screening and grit removal) before discharge.
81	CB Member Peden 19/10/20	Referring to day 3 – How soon can we get onto private owners regarding localised I & I?	We can start this work immediately.
82	CB Member Peden 19/10/20	Referring to day 3 – What is the reason for not screening the dam?	There will be landscape planting around the storage ponds at Robinsons Bay. Please refer to Figure 5-11 in the Beca options report for a landscape concept for the site. The dam bund will be grassed rather than planted, to protect the integrity of the bund.
83	CB Member Peden 19/10/20	Referring to day 3 – Is the treatment plant site going to have screening?	There is already landscape planting along Old Coach Road opposite the treatment plant site. This was planted as a consent condition of the water supply reservoir next to the wastewater treatment plant site. There will also be landscape planting around the storage ponds and wetlands.
84	CB Member Peden 19/10/20	Referring to day 3 – Is there any testing/monitoring of the water after treatment?	Yes the treated wastewater will be tested for various parameters. The parameters that must be tested and the frequency of testing will be included as resource consent conditions for whichever option is chosen.
85	CB Member Peden 19/10/20	Referring to day 3 – Do we have an estimate on cost to get I & I down by 40%?	It is not possible to provide cost estimates for different levels of I&I reduction. While we are confident that we can achieve a 20% reduction in I&I, it is possible that we could do much better than this. As described in section 2.2.1 of the Beca options report, Inglewood significantly reduced I&I after undertaking a distributed temperature sensing survey like the one we have undertaken in Akaroa.

AKAROA TREATED WASTEWATER OPTIONS HEARINGS PANELS – QUESTIONS & ANSWERS

Trim Reference: 20/1235908

#	Panel Member	Panel Question	Council Officer Response
86	CB Member Peden 19/10/20	Referring to day 3 – Wetlands - How does subsurface hold onto water for two weeks?	Retention time in the wetland is calculated by dividing the volume of the wetland by the flow through the wetland. The treated wastewater slowly makes its way through the wetland media and plant roots until it reaches the outlet.
87	CB Member Peden 19/10/20	Referring to day 3 – How much wetland would be needed?	As described in section 5.2 of the Beca options report, the wetland proposed for the Inner Bays irrigation scheme would have a surface area of 3,800 square metres and a gravel media depth of 600 mm.
88	CB Member Peden 19/10/20	Referring to day 3 – Storage - Is this possible in tank form rather than pond, spread over the Thacker property/Takamātua?	Yes it would be possible to store the treated wastewater in tanks rather than in storage ponds.
89	Cr Templeton 12/10/20	Referring to the additional email from Friends of Banks Peninsula regarding clarification on legislative requirements - Could we please have a response from staff? Is it legislation that would be required or are standards set through a different mechanism for the non-potable and potable residential reuse? Is it likely there be enough non-potable reuse of the treated wastewater in Akaroa at stage three to avoid harbour outfall use, without going to potable reuse?	Our understanding of the MoH and Community Health/CDHB comments is that they are concerned about adverse public health effects arising from the "purple pipe" use for either potable or non-potable use. They consider that there needs to be new regulation (or possibly standards?) developed at a central government level before they would be comfortable about those risks. It may not need new legislation. Their feedback says that they don't have the same degree of concern with Council non-potable reuse on public land. Therefore regarding the FoBP email of 20 October summarising the "legislative requirements": 1. No changes needed for stage 1 I&I improvements: agreed. 2. No changes needed for stage 2 wetland and municipal purple pipe use: agreed, if Community & Public Health and MoH are comfortable with the proposal. 3. As for 2. Regulatory changes needed for stage 4 purple pipe supply to private property – agreed that regulatory changes will be needed, if it remains the position of Community & Public Health/the new Regulator that community health risks cannot be adequately managed under the current framework. There would not be enough non-potable reuse to use all of the treated wastewater, as it would just be used for flushing toilets and watering gardens. More wastewater would be generated than could be used.

27 October 2020

Question 51

Staff response to FOBP letter "Akaroa Wastewater Proposal Friends of Banks Peninsula Response to Officers Report, Presented to Akaroa Wastewater Hearing Panel 13 October 2020"

Extracts from the FOBP letter are shown in **bold** with staff comment below in normal text.

1. Analysis of Submissions

It is not for staff to place any weighting on submissions, our role is to present the community views and it is up to the hearings panel to agree on any weighting that they feel should be applied. As we have explained at the community meetings, this process is not a vote. Our decision makers need to consider the four well-beings – social, economic, environmental and cultural. We consulted in order to get a better understanding of the social and cultural well-beings of the community. The hearings panel and the Mayor and Councillors will also need to consider the economic and environmental well-being of communities now and in the future.

2.0 Misunderstanding of the FOBP proposed solution

1. **Comprehensive repair/replacement of the Akaroa wastewater network to substantially reduce the volume and unpredictability of wastewater flows. Any suggestion of downsizing aspects of the Councils' proposed solution (e.g. the raw wastewater pond) are as a consequence of this anticipated reduction in wastewater volume**

   We understand and agree with this comment.

2. **Land contact treatment (via a wetland or similar) of all treated wastewater flows, based on the same design parameters as the Council's engineers used when designing both the Akaroa and Duvauchelle proposals**

   We understand that FOBP are in favour of passing all treated wastewater through a wetland. We agree that it would be appropriate to use the same residence time for Akaroa and Duvauchelle.

3. **Treatment of all wastewater flows to potable standard, such that all recycling options are safe for both public health and the environment**

   We understand that FOBP are in favour of treating all water to a potable standard. However, using the treated wastewater for potable purposes is extremely unlikely to be acceptable to mana whenua and the drinking water regulator.

4. **Eventual elimination of all wastewater disposal, whether to the harbour or to land**

   We understand that FOBP are in favour of the eventual elimination of all wastewater disposal, whether to the harbour or to land. We do not think this is possible.

2.1 Retirement of the Takapuneke wastewater treatment plant

We note the comments made by FOBP.

2.2 Buffer pond size

1. [8.4.4] suggests that FOBP is advocating a reduction in the amount of buffering, but this is not the case

2. FOBP suggests the buffer pond could be reduced in size on the basis of a more substantial reduction in I&I:

a. wet weather "spikes" in volume would substantially reduce, and

b. The overall wastewater volume being received would be lower

3. FOBP have made this suggestion because it could free up space for further wetlands. Alternatively, the raw pond could be retained at its current size, meaning lower flows (from reduced I&I) may further reduce the frequency of raw sewage network overflows.

The clarification that the buffering can be reduced following a reduction in I&I is a reasonable suggestion.

2.3 Wetland retention time

1. [8.4.8] states that a retention time of 2-3 days is not supported by Ngai Tahu, yet the current proposal for Duvauchelle includes substantial wetlands, discharging to the Pawsons stream, with a 2-3 day retention time.

a. The Duvauchelle scheme report states:

"Following engagement with Council, Ngāi Tahu and Beca/PDP the RBT proposal has been refined as follows (Akaroa Golf Club Master Plan Rev B 15th June 2020)", and; "A minimum of 2-3 days residence time in the wetland is provided to effect meaningful treatment and "passage through land" to address cultural concerns of Ngāi Tahu"

2. [8.4.9] states that the wetland proposed in Option 1 for Inner Bays would normally have a retention time of around two weeks

a. The PDP report on wetland performance indicates the 2l/s flow proposed is based on 2-3 days retention time

b. A retention time of greater than 2-3 days only occurs when the wetland is flooded and becomes a storage pond

FOBP are incorrect when they state that the Duvauchelle wastewater treatment wetland is being designed with a retention time of two days. Unfortunately it seems that FOBP were relying on a now out of date draft of the Duvauchelle Wastewater Summary of Disposal and Reuse Options report which they obtained under a LGOIMA request. The latest draft dated 10 September 2020 states that the median design retention time would be 16 days.

FOBP are incorrect when they state that the design residence time for the proposed wetland for the Inner Bays irrigation scheme is two days. It is designed to have a two week residence time for all but the most extreme wet weather events (note this is based on the total wetland volume including the freeboard above the media as well as within it). The two day retention time is the minimum retention time during a large storm (approximately once every ten years).

The Ngāi Tahu parties were quite clear in their submission that they sought a wetland retention time of at two weeks (Debbie Tikao, Hearing Day 3).

2.4 Cost of proposed solution Stage 2

1. [8.4.11] claims the cost of extending the purple pipe will be $6.4-$8.4 million

a. We estimated costings based on the proposed harbour outfall (option 4) with the outfall itself removed and the overland pipe extended an additional 500m to the current outfall location. Total estimated cost is approx. $5m less than option 4 and $12-$15m less than option 1.

The FOBP estimating approach is incorrect and does not adequately allow for a full roll out of a purple pipe network including side street mains and their associated submains.

2.5.1 Reverse Osmosis (RO)

Items 1-4b: Staff do not dispute the quality of water a reverse osmosis system could produce.

Item 4c. RO has high removal of other chemicals including hormones, emerging contaminants and "forever chemicals"; ultrafiltration does not remove these.

This statement is incorrect. The proposed treatment plant will remove some emerging contaminants. Please refer to the answer to Question 7 in the third joint statement of the Akaroa Wastewater Technical Experts1, which was prepared by experts for the Council, Ngāi Tahu and FOBP. This states that emerging organic contaminants (which is the term used for all these contaminants) may be partly or completely removed by a combination of wastewater treatment processes (using membrane bioreactor process as is proposed for Akaroa) and land treatment.

5. [6.5.4] makes statements regarding key issues with RO that are not an accurate reflection of the technology:

a. The Officers report claims the additional energy required would be $80,000 - $120,000 (similar to pumping the wastewater to the Eastern Bays). This equates to approx. 1.7-2.5kWh per m3, which is significantly more than the Singapore scheme's total energy consumption (including for microfiltration, RO and post-treatment) of 0.8kWh per m3 (approx. $NZD38,000 per year). We disagree with the Officers calculation.

Unfortunately the Tektus report included in the FOBP submission does not contain a list of references and the links within the pdf do not work, so we have been unable to verify these claims.

On the topic of operations and maintenance costs, section 11.2.2 of the 2017 Potable Reuse Compendium (United States Environmental Protection Agency, which summarises current practice in wastewater reuse, states:

For potable reuse facilities, the RO feed pumps typically account for roughly half of the overall power use, with membrane filter pumps and UV systems each accounting for 5 to 10 percent of the total power.

[1] https://ccc.govt.nz/assets/Documents/Services/Wastewater/Akaroa-Wastewater-Irrigation-of-Treated-Wastewater-to-Land-Joint-Statement-of-Technical-Experts-No-3.pdf

Therefore, the power consumption of the wastewater treatment plant would significantly increase with the addition of reverse osmosis. This is consistent with the Officers Report.

b. The Officers report claims 20%-40% of the water treated by RO must be discharged as waste stream and will carry all of the contaminants removed ("retentate"). Other schemes (including Singapore) report retentate rates of only 10-15%

Retentate flows of under 10% - 15% could be achieved however this comes at a higher energy cost and turnover of replacement RO modules. It also requires more cleaning with chemicals such as caustic solutions and strong acids.

20% - 40% retentate would present a better operational outcome.

c. Recent research into "zero drain" water pollution treatment suggests that retentate can potentially be avoided altogether:

- **The RO retentate can be recycled back through the treatment plant, as is proposed by Beca for the ultrafiltration retentate. This is beneficial to the plant's operation because it provides nutrients needed for the first stage of treatment (nitrification) .**

FOBP provide no evidence to support this statement. It is also contrary to their above statement that other schemes report retentate rates of only 10-15%.

It is not possible to return all of the retentate to the start of the treatment process and dispose of none of it. This would result in an ever increasing concentration of contaminants in the wastewater treatment plant (the law of conservation of mass).

The design as proposed includes recycling some of the sludge removed by the membranes back through the plant to provide sufficient microorganisms to treat the wastewater (see section 9.2.2 of the Beca options report)2. The rest of the sludge removed by the membranes will be removed from the process, dewatered and tankered back to Christchurch for conversion to biosolids.

- **The amount of contaminant present in the RO retentate will be extremely small compared to that produced by the ultrafiltration stage, with the exception of dissolved nitrates; these will be cycled back through the plant for further biological removal by digestion. Recent research suggests this has no impact on the plant's nitrogen removal performance**

This is a contrary statement to that made in 2.5.1.4, which states that reverse osmosis removes a greater amount of viruses, dissolved nutrients (nitrogen, phosphorus) and emerging contaminants. FOBP provide no evidence to support this statement.

The total amount of sludge to be removed is the pertinent matter, not how much sludge (retentate) is removed by individual processes. The higher the treatment standard, the greater the volume of retentate (sludge) to be removed. As stated above, it is physically impossible to return all retentate to the start of the treatment process.

- **Excess nitrates and other chemical contaminants present in the retentate can be reduced to solids (and removed with the sludge) using a number of well-known techniques including precipitation (via chemical dosing) and electro-**

[2] https://ccc.govt.nz/assets/Documents/Consultation/2020/07-July/Akaroa-Wastewater/Akaroa-Wastewater-Summary-of-Disposal-and-Reuse-Options-Rev-3.pdf

biochemical removal. Removal of nutrients (phosphorus and dissolved nitrates) via chemical dosing has been previously proposed by Beca as an option if required.

FOBP provide no evidence to support this statement. We are unclear how phosphorus and emerging contaminants would be removed from the wastewater if they are returned to the start of the process. While some emerging contaminants can be removed by the proposed membrane bioreactor process, some won't be. Returning them to the start of the process will result in an ever-increasing concentration of these contaminants in the wastewater treatment plant.

a. **In summary, the retentate issue is likely to be much smaller than the Officers Report suggests, if it exists at all**

   We disagree with this statement for the reasons stated above. FOBP have provided no evidence to support their claims.

b. **The Offers Report states that the clean water from the RO process would be "no more culturally acceptable to discharge directly to water".**

   a. FOBP proposes that all of this treated water pass through a land contact treatment such as a constructed wetland to meet cultural concerns; there is no expectation that RO will make the water more culturally acceptable, only that it will make it more physically suitable for reintroducing into the receiving environment

As described in the response to item 2.3, FOBP have incorrectly assumed that a wetland with a 2-3 day retention time would be culturally acceptable to the Ngāi Tahu parties. As the Ngāi Tahu parties stated in their verbal submission, a wetland with a retention time of at least two weeks would be required. If the flow through the wetland was 8 litres per second, a wetland area of 8 hectares would be required. It would be difficult to find enough land within the Inner Bays to accommodate wetlands of this size.

This is a matter for Ngai Tahu to comment on.

Staff would however like to query the final statement "FOBP proposes that all of this treated water pass through a land contact treatment such as a constructed wetland to meet cultural concerns; and there is no expectation that RO will make the water more culturally acceptable, only that it will make it more physically suitable for reintroducing into the receiving environment"

It is also helpful that FOBP have clarified that they are advocating a full treatment by Reverse Osmosis then a wetland treatemtn vbefore discharging to harbour. Staff therefore query the following:

1. Staff suggest that a suitable water quality can be achieved without RO for a discharge to harbour via a wetland. The RO process would add cost and complexity for no material gain.
2. No indication has been given for a suitable wetland site of a minimum of 8-15 hectares as would be needed for 8 L/s and two weeks residence.
3. No indication has been given for a suitable storage for excess flows if an 8 ha scheme is preferred.
4. No indication has been given as to where to direct the nutrient rich retentate from the reverse osmosis process.

6. **[6.5.5] states that there is "no obvious benefit" in using reverse osmosis.**
   a. The purpose of applying reverse osmosis is so that the treated wastewater can be re-used in Akaroa to alleviate water shortages, rather than disposed of via harbour or to land. FOBP assert that recycling Akaroa's water in this manner to alleviate shortages and reduce stress on stream aquatic life is a major benefit.
   b. The purpose of applying RO is to raise the quality of the reclaimed wastewater to a sufficient treatment standard that such water recycling becomes feasible.
   c. FOBP would not advocate for applying RO to wastewater that was being disposed of to the harbour or on land. FOBP's proposed solution aims to eliminate all such disposal.

As described in the answer Q75 from the hearings panel, it is extremely unlikely that potable reuse would ever be acceptable to mana whenua or the drinking water regulator. The treatment standard proposed is appropriate for non-potable reuse. Adding reverse osmosis is not warranted and comes at significant extra capital and operational cost. It would not be possible to reuse all of Akaroa's wastewater for non-potable uses, so some form of discharge to land or water would be required.

It is possible that the treated wastewater could be discharged to a stream after passing through a wetland with a retention time of two weeks, but as stated above it would be difficult to find enough land for these wetlands.

2.5.1.7 - Staff have no additional comments.

2.5.2 MAR

2.5.2 – We recognise that FOBP have retained Managed Aquifer Recharge as an option in their proposal however our position remains that it is not viable.

2.5.3 Coastal infiltration gallery

We acknowledge the FOBP comments.

2.5.4 Feasibility of Stage 3A

1. [8.4.17] states that Stage 3a is not considered a feasible option

a. For the reasons given above, FOBP regard Stage 3A as a technically feasible option

b. Stage 3A eliminates all direct disposal of treated wastewater

c. Stage 3A provides substantial benefits to Akaroa from water recycling, and warrants further investigation.

2.6 Stage 3B Extended purple pipe (alternative solution)

1. [8.4.18] cites the current lack of regulation as a barrier to recycling treated wastewater. However, it would be several years before this option needed to be put into place.

a. We note that since other regions (such as Auckland) are increasingly signaling the need to recycle water, it is not unreasonable to suggest that the legislation will be developed in the near future

b. FOBP have proposed this option as a fallback in the event that Stage 3A does not proceed, since it provides a lower level of water re-use than stage 3A, but is not reliant on treatment to a potable standard. It is not part of the core solution

FOBP proposal for Stage 3A is for *the treatment process is upgraded to produce potable water. This opens opportunities for safe managed aquifer recharge (MAR) stream recharge (below the water take) or disposal of potable water to the harbour via coastal infiltration.*

FOBP proposal for Stage 3B is *if potable recycling is not selected, then the purple pipe network is extended throughout more of Akaroa, and harbour discharge is replaced by coastal infiltration.*

It would not be necessary to treat the wastewater to a potable standard before disposing of it below the stream water take or to a coastal infiltration gallery. However, passing through a wetland with a retention time of two weeks would be required before discharging to a stream or coastal infiltration gallery and it would be difficult to find enough land for such a large wetland in the Inner Bays.

As described in the answer to Q19 from the hearings panel, Watercare has confirmed that it is not pursuing potable or non-potable reuse and is not discussing it with the government.

2.7 Stage 4 potable supply recharge

1. This stage is included as the final, logical step to complete a closed-loop water cycle. 8.4.14 and 8.4.21

2. [8.4.20 and 8.4.21] refer to issues regarding protection of water sources.

a. The water being returned to the supply (via the stream) will be of potable standard, prior to being treated by the Akaroa supply water treatment plant.

b. This is the same as is done in Singapore with a portion of their recycled NEWater. In Singapore they note that the quality of the recycled water exceeds that of the raw feed.

c. As noted for 8.4.19, this option would be some years away, and there is a growing awareness in New Zealand of the need to recycle water to address future shortages, so it is likely that legislation will move in this direction

3. [8.4.22] suggests there will be cultural concerns:

a. All of the water being returned to the stream/supply will have passed through a land contact treatment such as a wetland

4. [8.4.23] suggests it is contrary to Council's Te Wai Ora o Tane Integrated Water Strategy re protecting groundwater from contamination

a. The water being returned to the supply (via the stream) will be of potable standard

b. In contrast, the Council's preferred option of irrigation to land is expected to significantly increase leaching into groundwater, and the Duvauchelle tree trial

report confirms that, even after the first three years, nutrient build-up in the soil increases nitrate leaching into groundwater.

c. Thus, the Council's preferred option is expected to increase groundwater contamination, whereas the return of potable water to the stream is not.

5. For the reasons given above, we believe that Stage 4 (indirect potable reuse) is feasible, and should be investigated further.

Rule 5.85 of the Land and Water Regional Plan states that the discharge of treated wastewater into or onto land where a contaminant may enter water within a Community Drinking-water Protection Zone is a prohibited activity, so we would be unable to obtain consent for indirect potable reuse.

In addition, using the treated wastewater for potable purposes is extremely unlikely to be acceptable to mana whenua and the drinking water regulator. Relying on future changes in acceptability, regulations and/or technologies is a high risk approach. We therefore cannot plan around a potable reuse option as an immediate solution and need to focus on options that are practicable and achievable.

3 Other disputed statements

3.1 Inflow and infiltration

1. [6.3.4] suggests that new testing approaches mean they are hopeful of achieving a much higher I&I reduction that the "traditional approach of lining the pipes". This is at odds with the Beca report, which states that the issue is that repairing/replacing targeted faults rather than relining or replacing the pipes) has limited success because groundwater rises and other faults will appear, i.e. the problem is the scope of repair, not the ability to locate the faults. They conclude for this reason that 20% is a valid target for this approach

- **FOBP advocate lining pipes in the lower part of Akaroa or replacing the lower section with a sealed, pressurized system, to eliminate I&I as far as possible at an achievable cost.**

- **FOBP recognizes that this will cost more than piecemeal repair, and advocates adding the Government grant to the already budgeted funds. This provides a total of $6.2 m enabling a comprehensive approach such as lining or partial replacement with a sealed system, and for this work out to be carried out prior to sizing the rest of the system. In this way the I&I reduction cost will be offset by a reduction in later costs.**

We do not support the use of cured in place (CIP) lining technologies as proposed by Tektus Engineering and FOBP.

Lining technologies were substantially used for repairs of earthquake-damaged wastewater pipelines in Christchurch and it was found that significant groundwater control is required to ensure the inflation and high temperature curing processes involved in pipe lining are successful. We therefore avoid using this technology in areas of high groundwater, which unfortunately coincides with areas of high groundwater I&I in Akaroa.

We are also cautious around using liners in small diameter pipes where the loss of flow capacity due to the liner is problematic. As much of the Akaroa network has pipes of 150 mm diameter or less, we

would prefer to avoid this technology as it is likely to introduce new restrictions and increase overflows.

We think that the proposal for a sealed low pressure system for the lower parts of the Akaroa network ignores the significant issues of the hillside streets feeding into the network. A significant number of pump stations would need to be added to capture these hillside flows and pump them into the sealed network. Alternatively a designated gravity collector to receive these flows and convey them through the low lying areas. A final alternative would be to install a low pressure reticulation for the whole town. We consider all of these options to be overly complex and unnecessarily expensive.

In short, our view is that FOBP and Tektus proposal does not consider the practicalities of the Akaroa network. We think that a targeted repair process to reduce I&I considering a wide range of techniques is the best approach for Akaroa rather than a "one size fits all" solution.

3.2 Protecting the harbour

1. [7.3.2] asserts that discharging treated wastewater to land protects the harbour.

a. The Duvuachelle tree trial demonstrates for the land-based options an increase in nutrients leaching into groundwater is expected to occur.

This statement is incorrect. Please see the answer to Q29 from the hearings panel. The amount of nitrate leached is expected to be similar to the current land use (i.e. grazed pasture).

b. Unlike a harbour outfall, where these nutrients are rapidly diluted and dispersed out to sea, with Option 1 the nutrients will be discharged to a fresh water body, and then travel to the harbour where they will meet the shallow Robinsons and Takamatua Bays and be absorbed into the clay bottom, adding to the nutrient load of these poorly flushing bays.

The nutrient load that eventually makes its way to the stream will be small compared with other inputs such as runoff from the surrounding catchment and septic tanks. This will be explored in more detail during the Assessment of Environmental Effects for the resource consent application if the Inner Bays irrigation option is chosen.

3.6 Risk of contamination

1. [9.8.1] asserts that irrigation rates have been selected based on infiltration testing

a. Appendix L, Beca report (Thacker Site Robinsons Bay – Geotechnical Report) recommends that the effects on the local water courses be assessed if the scheme is developed

2. [9.8.2] asserts that the nitrate-nitrogen leaching rates of 2-47kg/ha is similar to grazed pasture:

a. The average leaching rate has increased from 19.2 kg/ha to 27.8kg per ha after three years of wastewater irrigation, an increase of 45%

b. In the worst case (flax), leaching has increased 250% (from 13.2kg/ha to 46.8 kg/ha) after three years

We note we have not proposed to plant 40 hectares of flax in Robinsons Bay.

c. A leaching rate of 46.8kg/ha is equivalent to a dairy farm, and experienced by <0.5% of Banks Peninsula by area (one dairy farm)

This is a misleading statement. 46.8 kg/ha would be the application rate in a typical year if the treated wastewater had a nitrogen content of approximately 10 mg/L and it was spread over 40 hectares. The leaching rate would be significantly less as we would expect soil microbes and vegetation to take up or process most of the applied nitrogen.

d. Experience of other long-running schemes (Whakarewarewa, Levin) indicates that stream pollution from leaching can, and does, occur, and that it can take many years before the extent of the problem becomes apparent

3. [9.8.3] asserts that adverse effects on springs and streams is not expected; the above points indicate clear potential for pollution of groundwater, springs and streams

It is not possible to make direct comparisons with Whakarewarewa, as the irrigation was to pine forest on free draining pumice soils. Effects on the receiving environment will be carefully considered during the resource consent application process.

3.7 Insect/midge issues

1. [9.9.1-9.9.4] suggest insects/midges will not be a problem, or can be dealt with at the resource consent stage

a. The Beca report specifically discusses potential mitigation options, and cites distance from the ponds as mitigation for insect problems in the outer bay options, suggesting midge issues may arise

b. Tackling such issues at the resource consent stage is not a realistic option for many residents

Please see the answer to Q32 from the hearings panel. To clarify, the effects of midges would need to be addressed prior to application of resource consent as the controls would be relevant to the application.

3.8 Storage ponds leaking or bursting

a. Ignores the anticipated increase in storm intensity and frequency from climate change

Staff have not been provided with the reference material FOBP have used to determine this. We have however used NIWA guidance on the impacts of Climate Change as referred to in the Beca report.

b. Ignores known elevation modeling errors, where the ground elevation is over-estimated in the proximity of buildings; such errors are evident in the flood maps for the lower valley

FOBP have not requested the LiDAR survey data used in the mapping so we are unclear on the basis of this statement.

c. Assumes a dam collapse time of ten minutes. Beca indicated a five-minute sensitivity test was also carried out (which would be expected to show higher flood levels, and gives an indication of the sensitivity of the model to the speed of the dam collapse); despite numerous requests including a LGOIMA request) CCC have refused to release these results to FOBP, so it is impossible to assess the real risk

Please refer to the answer to Q27 from the hearings panel. We do not hold this document and one was not published. We cannot release a document we do not have.

d. Takes no account of the risk of the water exit path (including culverts and under bridges) being blocked, despite this being a major cause of historical flooding on Banks Peninsula

Blockages were considered and we reiterate that further assessments have been recommended by our consultants should the Inner Bays irrigation option be selected.

e. Does not consider the risks for the river bank opposite, directly under the Pavitt cottage

The shape and height of the river bank on the Pavitt Cottage side of the stream has been modelled using LiDAR scans and included in the dam burst analysis.

f. The Beca report stresses that the dam break assessment is conceptual/indicative only because it is based on a number of high-level assumptions.

This is correct. We agree that further assessments and investigations must be undertaken to further develop this work if the Inner Bays irrigation option is selected.

2. [9.10.5] concludes that the consequence of dam burst is minor and the overall risk rating is low

a. Does not take the above factors into account

b. Does not take damage to farm land into account

c. Does not take community wellbeing impacts from the threat into account

We acknowledge these comments but believe that the modelling undertaken to date is sufficient for the options assessment. Further work would be done if the Inner Bays irrigation option is selected.

3.9 Visual effects

1. [9.12.2] asserts that pond site 10 is not visible from SH75, and limited visibility from other vantage points

a. Pond site 10 is directly in front of drivers/passengers approaching from Christchurch as they ascend the Takamatua hill. The view will change from a natural hill to an artificially flat engineered landscape, including fences and other structures

b. Pond site 10 is visible from Akaroa township including the main tourist area at the south end of the town

c. Pond site 10 is highly visible from Childrens Bay Farm which has Akaroa's most popular walking track – the Rhino Track.

We will seek to minimise visual impacts of the Pond Site 10 works and would seek to build ground level structures as far as possible and include appropriate landscape planting. We recognise the wetland and other parts of Pond Site 10 may be visible from higher altitudes. Visual and landscape effects will be considered as part of the Assessment of Environmental Effects for the resource consent applications.

3.10 Storage ponds too large

1. [9.13.3] asserts the effects on Pavitt Cottage will be minimal because it is over 100m away

a. The storage dam face will be above the Pavitt cottage, posing an ever-present risk of inundation

As the dam would not have water in it for more than half of the time and not be full for more than 10% of the time, we are unclear how this would be an ever-present risk.

If the Inner Bays irrigation scheme option is chosen, the dam would have to be adequately designed and constructed so that risks to downstream properties are appropriately addressed.

3.11 Option is not re-use

1. [9.14.1-9.14.6] compare the proposed irrigation rate to the short-term maximum irrigation rates recommended by Beca/PDP and conclude that because the proposed irrigation rates are around half these maxima, the proposal is beneficial re-use (because it is not watering to the maximum rate possible)

a. The irrigation rate is limited by the long term acceptance rate (LTAR), not the short-term rates

b. The rates selected for all land-based proposals are the maximum allowed by the LTAR

c. The irrigation schedule includes watering up to and beyond field capacity, including when it is raining. As well as being bad practice (because it increases nutrient leaching and erosion risk), it is of no benefit to the plants or soil, and may in fact be harmful. It also reduces the ability of the soil to break down contaminants in the applied wastewater.

d. If the land-based proposals could irrigate up to the short-term application rates as suggested, the land area/storage and subsequent cost of these options would be significantly reduced. Instead, PDP illustrate that the current proposals would not be viable if the available land area reduced by any significant amount

e. For these reasons the land-based proposals are clearly disposal as defined by the US EPA

PDP have provided irrigation rates they believe are appropriate as technical experts in soil science.

These rates are based on on-site infiltration and were subject to review by the Akaroa Wastewater Technical Experts Group who had a focus on soil science and irrigation rates. This group was made up of experts from the Council, the Ngāi Tahu parties and FOBP.

3.12 Negative effects on historic sites

1. [9.13.2] Says proposed ponds do not encroach in former sawmill site.

a. It is the site entrance and the dam burst bunds that encroaches on the former sawmill site and is extremely close to Pavitt Cottage.

The site entrance has not yet been finalised and the final arrangement of the earthworks will be subject to an archaeological investigation and sizing based on I&I reduction. The earthworks for the site will also need resource consent.

b. The current site access from Sawmill Road is the only apparent feasible entrance to the site for the construction of the storage ponds – an exercise requiring extensive earthworks and heavy equipment.

This statement is not correct. There are many options for site access.

c. This is part of the offence created by the storage pond.

Staff acknowledge that FOBP find the storage pond offensive.

2. [9.13.3] [9.13.6] states proposed ponds are located more than 100 meters from Pavitt Cottage and its setting and given this buffer distance ii is anticipated there would be minimal effects on the cottage and that the Project team does not expect the ponds to have a negative effect on nearby properties.

a. The impacts on the cottage and its environs during construction will be extreme. Its peaceful setting turned into a heavy industrial site similar to an open cast mine, with all vehicles passing on the narrow road immediately in front of the cottage and then onto the site entrance along side

b. The ongoing effects will be an ugly structure visible from the approach to the cottage, and which has the potential to develop odour and breed midges, and collapse.

c. The bunds around the dam wall cannot be planted.

d. Maintaining a viable use for heritage buildings is critical for their ongoing maintenance and preservation. Pavitt Cottage relies on income from guest accommodation. The proximity of the storage dams will reduce the attractiveness of the cottage to guests.

e. For these reasons the negative effects on nearby properties, and the heritage values are extreme.

We acknowledge the concerns of FOBP. The planning assessment in section 5.7.2.1 of the Beca options report stated that it was anticipated that there would be minimal effects on the cottage.

3. [9.15] states there were concerns from submitters about the effects on nearby historical sites, and the project team state they do not expect the proposal would have adverse visual effects or adverse effects on heritage features.

a. The site entrance will be directly over the principal archaeological site. This site entrance will be traversed by heavy machinery and trucks for a lengthy period of time while the storage pond structure is excavated. This will involve earthmoving machinery excavating a 2.7ha hole in the paddock above the Pavitt Cottage and constructing a 4m high dam wall

b. The archaeological sites behind the Pavitt Cottage will be planted in forest

c. The forest will come to within 5 metres of the rear of Pavitt Cottage. This will obliterate the current heritage setting. The current view from the Pavitt Cottage connects it with its heritage setting, looking through a vista of the original fruit and nut trees planted by the settlers to the Williams cottage further up the valley.

The statement that native plantings will be within 5 metres of the rear of Pavitt Cottage is incorrect. The rear of the cottage is 10 metres from the boundary (see figure below) and the native plantings would be 5 metres beyond that, so the distance between the plantings and the cottage would be 15 metres. Planting native trees is a permitted activity in the Christchurch District Plan.

d. The view shaft up the valley will be removed as this forest develops.

e. The proximity of forest to the building creates a fire risk unless only low flammability species are planted.

Please refer to the answer to Q56 regarding fire risk.

f. The view shafts from Robinsons Valley Road, Sawmill Road, up the stock route and from many private properties will be of the storage pond.

g. This structure will:

i. Be part empty or empty most of the time revealing an inner black plastic liner

ii. Bunds cannot be planted to screen it because this would obscure leaks

iii. There will be a fence around the outside of the structure and a road around the top

There will not be a road around the top of the bund crest. It will be wide enough for a ute to drive on if necessary for maintenance.

iv. Introduces an industrial and threatening element to the character of the landscape, with the heritage features either subsumed by the wastewater scheme or in its grim shadow.

The pond is south of Pavitt Cottage and the former sawmill site, so will not cast a shadow on them.

4. [9.15.2] Report states there will be opportunities to adjust the designs to accommodate any historical features that may be impacted.

a. Does not state how this will be achieved and we do not consider it feasible.

We would seek advice from an archaeological expert and Heritage NZ in the matter of where significant archaeological areas lie. We would then design to work around these features as far as possible.

b. The areas behind the Pavitt Cottage up to the Williams Cottage would need to be excluded from the irrigation field. If this was done the Council would need to find additional land elsewhere.

Most of the areas discussed are already excluded from the proposed irrigation area so we are unclear as to the accuracy of this comment. There is additional irrigable land available at Hammond Point should we need to exclude additional areas.

d. There is no other feasible site entrance because there is a deep gully between the pond and Sawmill Road. The site entrance must be beside the Pavitt Cottage over the mill site.

This statement is incorrect. There are many options for site access.

e. The visual and amenity impacts could be made less if the storage pond was elsewhere or much smaller. The present system does not enable this and is the configuration the Council has settled on after 4 years of investigations.

If FOBP are suggesting the scheme would be acceptable (or more acceptable) if the storage were located elsewhere then that would be an extremely helpful comment.

We note that preliminary designs for the storage were undertaken in 2018 and 2019.

f. We do not believe it is feasible to adjust the design. The problem requires a different solution.

We disagree with this statement.

5. Omitted – the report does not consider the significance of the Pavitt Cottage and associated Sawmill site.

a. This is the site of the first power sawmill in Canterbury, a significant development that changed and accelerated the deforestation of the area.

b. Its significance has been recognized through the erection of a heritage site marker, the publication of a book about the enterprise. It features on the back cover of Gordon Ogilvie's "Banks Peninsula Cradle of Canterbury", the definitive reference book on Banks Peninsula.

c. The cottage is the mill owners home, and has had a number of owners over the years.

d. Descendants of the original owners have fully restored it and now hold it in trust for all descendants to enjoy

e. It is the turangawaewae for all these families, many mill workers and the focal point of the community of Robinsons Bay to this day

The presence of the Cottage and surrounding historic features of the cottage are covered in the Beca options report and in the staff report. The intrinsic value of the cottage to its trustees and community have been expressed in submissions by those people.

6. [15.10.5] States that project team agree that the heritage site should be protected and conserved, but do not state how this will be done. See earlier statements that we do not think this is feasible. The heritage site will be obliterated.

We will be seeking advice from an archaeological expert and Heritage NZ in the matter of where significant archaeological areas lie. We would then design to work around these features as far as possible.

Other issues raised by FOBP not in the Officers Report

The officers report has not addressed many of the big issues such as the risk that the system is undersized, the lack of room for expansion, vulnerability to climate change or taking an integrated three waters approach to deal with Akaroa's other pressing water issues.

These matters are discussed earlier in this response.

The report does not address significant matters in the FOBP submission including:

1. That the system is at significant risk of being undersized due to

a. the sensitivity of the assumptions used to model the system capacity

We have addressed these points above and in the answer to Q68 from the hearings panel.

b. Pushing all design parameters to their maximum limits

We are unclear which design parameters have been pushed to their maximum limits. The design as proposed is conservative.

c. Native Tree irrigation system is a first in NZ. Native trees may not have the ability to absorb nutrient and water volume as predicted, particularly in wet weather

Please see the answer to Q71 from the hearings panel.

d. Population growth modelling proving incorrect

Please see the answer to Q43 from the hearings panel.

2. That there is no expansion capability in the Inner Bays scheme without further private land acquisition

Please see the answer to Q68 from the hearings panel.

3. That I&I needs to be more fully addressed to provide climate resilience

We agree that I&I must be reduced.

4. That the shallow mud flat bays, being susceptible to nutrient build up, are at risk if wastewater drains to the streams due to any of the above reasons.

Noted.

In relation to Question 5

Kelly, Samantha

Subject: FW: ATWHP - Response from CDHB

From: Kelly, Samantha
Sent: Wednesday, 28 October 2020 10:16 am
To: Cotter, Pauline <Pauline.Cotter@ccc.govt.nz>; Davidson, Mike <Mike.Davidson@ccc.govt.nz>; Harrison, Nigel <Nigel.Harrison@ccc.govt.nz>; Peden, Tori <Tori.Peden@ccc.govt.nz>; Templeton, Sara <Sara.Templeton@ccc.govt.nz>
Cc: Pizzey, Brent
Subject: ATWHP - Response from CDHB

From: Angela Sheat
Sent: Wednesday, 28 October 2020 7:35 am
To: Pizzey, Brent
Subject: Akaroa Wastewater Submission

Hi Brent
Finally have had a response from Sarah Burgess at the Ministry.
Her response brought to mind what she had said originally to me.
The response is:
The issue with 'purple pipe' type schemes is they would fall through the cracks of some parts of the regulatory framework that currently supports drinking-water and sanitation – it's not just the environmental effects that need to be addressed. Non-potable re-use of treated wastewater would also require a robust risk management framework, and a plumbing code that extended that risk management into private homes where Council has limited powers. There are many areas where non-potable reuse falls through the cracks of the current system which was not developed with this in mind. The Ministry considers a multi-agency approach will be required to set up a new framework or incorporate the new activity into existing ones. I'm not saying it can't be done, but it's something that Taumata Arowai will need to sort out as the three waters regulator.

I also return to the point that non-potable reuse should not be used as a solution to a wastewater discharge problem, and if CCC considers that Akaroa has a drinking-water supply capacity issue they should work through the ways and means of conserving potable water, assess possible new sources and identify the best option from a public health perspective.

I hope this brings a clearer picture for the panel.

Regards
Angela Sheat
Health Protection Officer
Community and Public Health
A Division of the Canterbury District Health Board

In relation to Submitter 34080 Kevin Simcock

Kelly, Samantha

From: Bourke, Mike
Sent: Wednesday, 28 October 2020 2:19 pm
To: Kelly, Samantha
Subject: Fwd: Your idea to Combine Wastewater flows at the Akaroa Golf Club

Hi Sam
Email for the panel.
Cheers Mike
Get Outlook for iOS

From: Bourke, Mike <Mike.Bourke@ccc.govt.nz>
Sent: Wednesday, October 28, 2020 8:57:35 AM
To: O'Brien, Bridget <Bridget.Obrien@ccc.govt.nz>; Kylie Hills (Kylie.Hills@ccc.govt.nz) <Kylie.Hills@ccc.govt.nz>; Hu, Barry <Barry.Hu@ccc.govt.nz>
Subject: FW: Your idea to Combine Wastewater flows at the Akaroa Golf Club

Hi
Kevin's idea and Andrew Brough's response.
Cheers
Mike

Mike Bourke
Senior Technician Water & Waste Planning
Asset Planning -Water & Wastewater

Christchurch City Council

From: Andrew Brough
Sent: Tuesday, 27 October 2020 3:12 PM
To: Kevin Simcock
Cc: Bourke, Mike
Subject: Your idea to Combine Wastewater flows at the Akaroa Golf Club

Hi Kevin

Thanks for the chance to chat with you about your idea to combine the treated wastewater from Akaroa and Devauchelle to discharge these on and under the Akaroa golf course.

I understand your scheme to be a combination of irrigation on the ground surface and use of a sand bed for disposal of treated wastewater when irrigation is not feasible utilising the golf course property. The discharge would be the combined flow from both the Devauchelle and Akaroa WWTPs. The idea would be to create beds across the golf course so that the beds could be dosed and rested between applications.

I have discussed the idea and sought feedback from other staff members, and in summary we consider that your option is not worth pursuing further at the Golf club for the following reasons:-

1. The concept relies on drainage through the soils in the base of the sand bed along with migration of the discharged wastewater from areas where drainage is poor to better draining areas of the sand bed. In an on-site disposal trench the base of the disposal trench makes up a relatively small proportion of the total infiltrative surface. If wastewater cannot drain through the base then the water level will build up resulting in sidewall infiltration. In your system large beds will reduce the available sidewall infiltration meaning virtually all the drainage will occur through the base of the bed. In the event that insufficient drainage occurs through the base in one area then it is proposed that the wastewater drains to another area where drainage is better. From the test pitting it was identified that the most free draining area on the golf course was the area upgradient from the school (holes 15&16). Further work was carried out in that area where it was identified that the permeability of the gravels were lower than initially estimated which resulted in significant mounding of the underlying ground water with even moderate rates of discharge (1L/s from Duvauchelle). This mounding would heve resulted in effluent reaching the ground surface. Also, as the mound would be above the level of Pawsons Stream there would be movement of wastewater towards the stream resulting in increased nutrient load on the stream. This mounding was also likely to migrate downstream towards the school with an inherent risk to groundwater emerging at the school. The addition of the Akaroa wastewater flow (median flow of 5L/s (5x that of Duvauchelle)) would only exacerbate this situation. The groundwater mounding calculations indicated that a short term application of wastewater would result in a mound that remained for a much longer duration meaning that subsequent applications of water would be added to the mound remaining from the previous applications until the mounding was excessive. So the idea of resting and redosing sand beds at this location may not be possible.

2. You have suggested thated that the sand beds could be utilised for storage. However, a sand trench/bed in an onsite sewage system is laid horizontally so that there is no fall over its base. The golf course is undulating and to provide the storage required would necessitate the building of a large number of flat beds terraced down each part of the golf course and these separated by a earth wall or artificial membrane. We cannot see how this could be accomplished in a cost effective manner.

3. Even if the sand beds could be created, the estimated storage volume that was calculated was based on all beds being utilised at the same time. This is contradictory to the beds being rested. By filling up the beds with wastewater and with minimal infiltration in some areas then it would be many days for some of the beds to drain away before the next application of effluent would be required (not withstanding the mounding potential discussed above).

4. The current investigations for the Duvauchelle scheme has highlighted the environmental risk of nutrient discharge to the two streams that run through the golf course (in particular the larger Pawsons Stream). The stream currently has nutrient concentrations above allowable concentrations in Canterbury's Land and Water Plan Rule. The impacts of the nutrient load can be mitigated by irrigating as much wastewater as possible when plants are growing (i.e. by storing over winter). The discharge to ground at times when irrigation cannot occur to minimise the storage would result in the discharge of additional nutrients to the underlying groundwater than would occur if the wastewater is irrigated to land. This would more than double the nitrogen loading to groundwater if flow from the Akaroa WWTP was included along with the discharge from the Duvauchelle WWTP. This is likely to result in environmental

effects that will be hard to get a consent for, notwithstanding the matters now we need to have regard to in the new National Policy Statement for Freshwater Management.

5. The stability of land with on site -sewage systems is usually not a problem due to the relatively dispersed nature of the sand bed/trenches. This means that the discharges are separate to each other and not combined into a series of larger beds placed close together where the combined infiltration could result in wider areas of instability not buttressed by areas between them where discharge does not occur. This issue would only likely be a concern on the more undulating parts of the golf course if the beds could be constructed. Note that even on flatter areas the default, minimum, separation distance between trenches is 1 m (normally in on-site systems you would have either a number of trenches or a single bed). So a similar distance between beds would probably be required to minimise the influence of the discharge from one bed on the neighbouring bed. This would reduce the area available for disposal.

If you have any questions about this please do not hesitate to contact me.

Regards

Andrew

Andrew Brough Senior Environmental Engineer
PATTLE DELAMORE PARTNERS LTD