



## Akaroa Treated Wastewater Options Consultation (2020)

# SECOND DRAFT SUBMISSION

Released August 10<sup>th</sup>, 2020 for

**Further Public Comment and Support**

Includes:

**Executive Summary and  
Short-form Submission**

- Visit [www.friendsofbp.co.nz](http://www.friendsofbp.co.nz) to endorse this submission any time up to August 22, 2020.
- We welcome feedback to: [info@friendsofbp.org.nz](mailto:info@friendsofbp.org.nz)
- Final submission will be released August 20
  - It will include your feedback and our Long-form submission backed by expert legal, engineering and quantity surveyor opinions
- We encourage you to make a personal submission. Please read our notes for assistance

## Executive Summary

Friends of Banks Peninsula Inc. has been closely involved with the Akaroa wastewater issue since 2007. In its submission to the Council's wastewater consultation in 2017 the Society advocated a staged approach toward recycling the wastewater back into Akaroa to address its chronic water shortages. **Reuse gained the most public support of all the options in the 2017 consultation.**

**Since then the need to treat water as a precious resource and build future resilience has escalated** with Akaroa experiencing greater water restrictions, the impacts of climate change being better understood and the revelation that **60% of the wastewater flows are in fact storm and ground water caused by massive levels of infiltration** into Akaroa's broken and leaking sewer network.

Treatment and disposal of Akaroa's sewage is an essential service. A new treatment plant and disposal system requires a very substantial investment of funds and must be safe, efficient and sustainable well into the future. It must be as risk free as possible because the need for **sewage treatment cannot be 'switched off' if a system fails.**

The sudden and on-going shock of the COVID-19 pandemic has further highlighted the need for resilience and fiscal prudence, but the Council is now faced with an enormous escalation in the costs of the Akaroa wastewater system. **The options are similar to those proposed in 2017 but costs have increased by between 116% - 245%**, mainly because the water volume is more than double that previously thought due to the level of infiltration. This peaks during times of heavy rain or prolonged wet weather when it cannot be irrigated, driving the need for huge and expensive storage ponds and the addition of a raw sewage pond opposite the Treatment Plant near the town entrance.

**We consider it would be a gross misuse of public funds for the Council to construct a costly new wastewater disposal system without fixing the pipes fully first. Failing to do so results in a system that is much bigger and therefore more expensive and offensive than it needs to be, and at the same time lacks capacity for future expansion, and leaves Akaroa vulnerable to the effects of climate change, and continuing water shortages in summer.** Future generations will be saddled with debt and a sub-standard wastewater and water system.

**We therefore oppose all the land based options.** Land based disposal is inherently constrained in the volume of water it can take – an issue the Council has not had to face before now because the current discharge to the sea is not limited by volume. **The Inner Bays scheme is the worst** because it has the greatest impact on existing communities, is the most land-constrained and has the highest potential for environmental impacts as it drains to streams flowing to poorly flushed mudflats. We do not agree with the harbour outfall either as proposed. We therefore have not chosen between harbour and land-based disposal, nor have we ranked the land-based options, since we consider all options to be unsustainable management to differing degrees.

**We ask the Council to stop, fix the pipes, and develop an appropriately sized and holistic solution based on re-use of the wastewater.** This is likely to involve treating the water to a potable standard so that it becomes available for use in a multitude of ways and removes health concerns.

**The Council needs to apply its Integrated Water Strategy to give the town future resilience with a strategic and staged approach.** Storm water infiltration, sewage treatment and disposal, and drinking water shortages need to be considered together, working with new central government initiatives as they develop. The end result would be appropriately sized, holistic and much better value over the life of the system, in addition to addressing tangata whenua cultural concerns.

We expand these arguments in our Short-form submission, and provide more detail and technical backup in our Full submission.

## Short-form submission

Christchurch City Council has a difficult problem that it needs to address - the disposal of Akaroa's wastewater. It has been searching for a solution since 2007 and this is the fifth time it has consulted on the issue.

At the last round of consultation in 2017, the community expressed a strong preference for a re-use solution to address Akaroa's chronic summer water shortages. However, this consultation had to be abandoned because the solutions proposed were designed based on faulty data and significantly undersized. No hearings were held, but a staff report summarising the community responses was released and showed that re-use was the most popular choice.

In the three years since, while the search for alternative solutions has been underway, the need for re-use in Akaroa has become even more apparent. Last summer, (2019/20) a total outdoor watering ban was abruptly introduced after stream levels dropped precipitously. The public and government agencies are much more aware that climate change will increase the frequency and intensity of storms and droughts, as the impacts begin to be felt around the country. Scientific research has revised predictions for the worse. Akaroa is identified as a settlement that is likely to be water stressed in the future<sup>1</sup>. The Resource Management Act has been amended to require particular regard to the effects of climate change.

We share the disappointment expressed by the Akaroa Treated Wastewater Reuse Options Working Party in its Joint Statement. The land based options now being proposed are substantially the same as those on offer three years ago, but with the added problem that there is now *more than double* the volume of wastewater to deal with, due to the massive levels of infiltration through leaking pipes – 61% in an average year, rising to 68% in the wettest years is due to stormwater inflow and groundwater infiltration.

The cost of all options has risen dramatically because they have to deal with this extra water. Genuine reuse in Akaroa, where the water is most needed, is once again pushed down the list of priorities, and plans to fix the sewer pipes are conservative and substantially fail to deal with the problem.

The three land based disposal systems presented are all flawed, and none more so than the Inner Bays Scheme currently favoured by the Council staff. While the Harbour Outfall solution is an improvement over the previous one as it now includes the core infrastructure for beneficial re-use, it still fails to address the cultural requirements and still disposes of the bulk of the water.

Hence in this submission the Friends of Banks Peninsula is once again asking the Council to design a holistic solution that facilitates re-use of the water in Akaroa. This argument has become even more compelling given the impending impacts of climate change and the susceptibility of the network to infiltration.

In coming to this view we have kept abreast of developments via the Akaroa Wastewater Working Party, reviewed the technical documents, taken professional advice and conducted community meetings to understand the public views.

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<sup>1</sup> CCC Infrastructure Strategy 2018-2048 pp52,100

## **Consideration of issues common to the Land-based options in the consultation document**

We find that all of the land based options presented by the Council are flawed.

- All the irrigation options proposed are disposal options, aimed at getting rid of the water. Native trees have been selected to absorb the water, rather than pasture based options, because they enable winter irrigation and therefore reduce storage requirements. Nevertheless, they all require major earthworks and construction of massive storage ponds to facilitate the disposal on the *minimum* feasible areas of land.
- Disposal of wastewater to intensively planted native trees is a first for New Zealand. The land and storage requirements are based on theoretical modelling that is highly sensitive to assumptions, particularly around the ability to irrigate throughout the winter. Assumptions used to determine the area of land for disposal and size of storage include:
  - soil absorption rates,
  - that irrigation during wet weather up to the point where 50mm has fallen in a single day will not exacerbate slips or harm the plants,
  - the ability of native trees to take up nitrogen, and,
  - weather patterns based on historical data rather than future predictions.
- Should any of these assumptions prove incorrect then the storage and land irrigation areas will be too small – resulting in the need for system expansion or release of water, along with nutrients and other potential contaminants, to streams. The anticipated level of nutrient leaching for the Inner Bays option could be as high as that of a dairy farm.
- Population growth parameters are also minimal. There is insufficient growth capacity to accommodate any growth in Akaroa if the residential areas of Takamatua are reticulated.
- The water is directed away from where it is most needed - the Akaroa catchment from which it emanates. Re-use of the wastewater in Akaroa would be a major step toward resolving Akaroa's water shortages.
- No outflow buffer is incorporated into the system, meaning water will leave the treatment site without testing for compliance. This leaves storage ponds and the irrigation fields at risk of receiving contaminated water.
- Whilst establishing some small new areas of native bush brings some benefits, it comes at a very high cost. A genuine biodiversity and carbon sequestration project would seek to maximise the area of native trees and minimise destructive and carbon emitting construction. The area would be as large as possible to provide maximum benefits. The extra \$10 million or more that the land-based options cost than harbour outfall could be used instead to secure thousands of hectares of marginal land for native regeneration and ultimately sequester more than a million tonnes of CO<sub>2</sub>. The land that would be planted is all currently good productive agricultural land.

## **Consideration of issues specific to each of the individual Land-based options**

### ***Inner Bays option***

The Inner Bays option would require consent as a non-complying activity, due to its reliance on some level of discharge to a water body. It carries considerable economic, social and environmental risks due to the complexity of the system proposed. Common risks such as odour or midges and engineering risks are compounded by the proximity to populated areas and downstream infrastructure.

The Inner Bays solution is not practical because it:

- Relies on the Council managing to purchase several private properties – one of which is potentially earmarked for another public purpose.
- Critically relies on achieving at least a 20% reduction of inflow and infiltration (I&I) up-front, without making this a budget priority (the budget is capped).
- Relies on modelling assumptions around the wetland function, tree canopy intercept rates, storm frequencies and nitrogen uptake. There is little scope for error because the expansion capacity is very limited and the catchments drain to shallow inner harbour mudflats. Further private properties will need to be purchased if the system is undersized.
- Exposes many people and private properties to risk due to the close proximity to communities, large storage pond above houses threatening downstream infrastructure if it fails, and the principal area for storage and disposal including a registered archaeological site in a historically sensitive area.
- Creates greater impacts on Akaroa itself with substantial earthworks at Pond Site 10 at the town entrance, and laying the pipe along SH75, adding to the effects of constructing the new Wastewater Treatment plant and terminal pump station, along with substantial network alterations.

### ***Goughs Bay option***

Goughs Bay would be a discretionary consent and would require pumping the wastewater over the crater rim to an outer headland area.

The Goughs Bay scheme is somewhat more practical than the Inner Bays, but carries different risks:

- The longer pipe and pumping water over the hill carries some risk,
- Unlike the Inner Bays proposal, the scheme would be barely visible, much further from any houses and has room for expansion should it turn out to be undersized. Based on the land purchase costs, we presume the Council plans to purchase and retain the bulk of the farm for future expansion.
- However, the system has raised environmental concerns from locals passionate about the biodiversity of the area, and the landowner who was at one stage a willing participant has become alienated by the process and withdrawn his support. The neighbouring farm owner also has concerns about impacts on his antibiotic-free status being compromised by any leachate from the irrigation area next to his boundary.
- The ability to successfully establish irrigated native trees is unknown, given the altitude and exposed nature of the site.

### ***Pompeys Pillar option***

Pompeys Pillar would also be a discretionary consent and would require pumping the wastewater over the crater rim to an outer headland area. While it is similar to the Goughs Bay option in these respects, we consider it less practical because:

- The ability to successfully establish irrigated native trees is unknown, but likely to be even more difficult given the exposed nature of this coastal headland.
- The proposal to exclude the Outstanding Natural Landscape zone creates an unnatural visual effect on the headland.
- The land has been farmed by the same family since the 1800s and is currently in transition to the next generation. Removing this piece of the farm leaves it unviable. This would impose a severe social injustice upon the family and their longstanding relationship with their land.

Having considered the land-based options and found them to be flawed, our response to the first consultation question – presented as a simplistic choice between disposal to the harbour or to land – now depends on the conditions under which a harbour outfall *could* be granted, and whether it is more sustainable than the land-based-options. Our legal advice concurs with that set out in the Consultation document: a Resource Consent could be granted for a Harbour Outfall provided other options have been adequately considered and none are found to be practical. Costs must also be taken into account.

**Consideration of Costs**

Cost is an important factor when considering the practicality of the land based options, given that the Harbour Outfall has significantly lower capital and operating costs.

In our view the consultation document has been disingenuous in its presentation of the option costs. The options proposed are for the disposal of the treated wastewater, but the costs presented include the construction of the new Wastewater Treatment Plant, terminal pump station and pipe network that have already been consented. These are a constant across the options and account for approximately \$30 million of the total cost of each. Operating costs of the treatment plant and the disposal options have also been bundled together. Taking out the costs of the treatment plant, the relative differences between the proposed disposal options are:

**Table 1 Costs of the disposal component of each option**

Option	Capital cost	Operating cost p.a..
<b>Harbour outfall</b>	\$18 million	\$0
<b>Inner Bays</b>	\$27 million	\$40,000
<b>Goughs Bay</b>	\$35 million	\$177,000
<b>Pompeys Pillar</b>	\$40 million	\$177,000

We are concerned about the validity of these costs because a re-costing exercise was carried out by the Council in March 2020. The result was the cost of the consented Treatment Plant and ancillary works was increased by \$6 million, the cost of the Inner Bays disposal was reduced by \$10 million and the cost of the Harbour Outfall was increased by \$8 million. These substantial differences from the most recent figures produced by Beca result from large changes to overheads and contingencies, markedly increased costs of overland pipes and reduction in planting costs and various other additions and omissions.

Notwithstanding these concerns, based on these costings, all the options come at an extremely high cost per connection. Akaroa has around 830 connections and the total cost is \$57,000 - \$68,000 per connection.

A new wastewater system must be safe, efficient and serve the community well into the future. In considering practicality and weighing costs the Council must consider the ongoing operational costs and the risk of future costs if the system does not perform as required, or greater capacity is needed. Council should also take into account the additional funds that will still be needed to improve Akaroa’s water supply and to fix the sewer pipe network.

On the basis of the costs presented it is clear that the land-based options presented are all significantly more expensive than the harbour outfall. This represents a significant sunk cost toward directing water away from Akaroa rather than facilitating re-use.

## Consideration of Harbour Outfall

We have then looked at the impacts and sustainability of the Harbour Outfall option.

- A Harbour Outfall would present the lowest risk as it uses proven technology and is the simplest to operate. It provides the greatest degree of certainty and resilience as it is not inherently limited in the volume of water it can process, and is entirely gravity fed. It will require the least energy and has the lowest operating cost.
- The disposal of the treated wastewater to the centre of the harbour would mean its rapid dispersal. The outfall would be much further away from the shore than the current outfall, negating impacts of nitrogen or nutrient build up.
- In terms of social and environmental wellbeing the Harbour Outfall scores well. There is no need to acquire private land, no treated wastewater storage ponds required, no risks from irrigation failure and no visual effects.
- In terms of sustainability, while the outfall itself is a disposal option, the option directs the water through Akaroa where it is most needed, rather than constructing infrastructure elsewhere. The pipe would be run through the town providing the core infrastructure for a purple pipe re-use system in Akaroa. This is markedly different from the scheme for which consent was declined in 2015 and is now based on the Friends of Banks Peninsula submission to the 2017 consultation.
- The addition of the purple pipe system provides reassurance that water will always be treated to the consented standard as an outflow buffer pond is included at the treatment site and the water will receive additional UV treatment prior to release from the site.
- The first stage of the purple pipe re-use can come on stream at the minimal extra cost of \$270,000 (as opposed to \$3.7 million for the land based options).
- **Our issue is that the design as planned does not address the Ngāi Tahu cultural concerns. We urge the Council to work with Ngāi Tahu to explore whether a wetland or some other form of land-contact could be used to achieve this– particularly if the Harbour Outfall is part of a staged pathway toward a long-term sustainable solution maximising water re-use.**

The search for land based disposal has been ongoing for many years, and in our view none of the land based options are practical or cost-effective. Notwithstanding cultural concerns, the Harbour Outfall at this stage is therefore the best of the options currently being presented.. The long process of looking at alternatives has now suggested that there are ways to incorporate a treatment process that restores mauri prior to discharge to a water body. This has been used to facilitate the Inner Bays option and we note also proposed for the Duvauchelle scheme.<sup>2</sup>

Should the Council select the Harbour Outfall option, then in our view it should only be **as a stepping stone toward a better solution**. Council must therefore give serious consideration to continued interim use of the existing outfall rather than sinking funds into a scheme that would be a transitional solution only.

## A better future-looking solution

We would be extremely disappointed if, after all these years, the Council settled on the basic Harbour Outfall proposed without first reconsidering more holistic solutions. This could involve a higher treatment standard, appropriate cultural treatment, maximising re-use in Akaroa and then residual discharge to a water body such as the streams in the Akaroa catchment from which the

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<sup>2</sup> Beca Report July 2020 Appendix D, p2

water was originally taken, or to the Harbour. Another option could be re-use combined with Managed Aquifer Recharge.

The Working Party was discouraged from progressing investigations of such mixed mode solutions by Council staff. However, the Inner Bays option favoured by staff relies on discharge to a water body – using the wetland concept developed by the Ngāi Tahu parties. Without this discharge in wet years, the Inner Bays scheme would be the most expensive option, if it could be made to work at all.

The wetland concept is a positive development and potentially key to finding a workable solution to this difficult problem of meeting cultural requirements and at the same time building future resilience by maximising water re-use and allowing disposal of any unwanted water (particularly in winter) either to a water body or aquifer.

In September 2019 the Council adopted its 'Integrated Water Strategy'. This recognises that water is a taonga, fundamental to the life of our communities. It is an overarching strategy that sets a vision and framework to manage water resources in an integrated way over the next 100 years. It sets goals and objectives for infrastructure efficiency and resilience through integrated three waters (water supply, wastewater and surface water) management and a proactive risk-based approach. This includes ensuring the sustainability of water supplies and wastewater systems, understanding and adapting to climate change and sea-level rise and reducing wastewater overflows and infiltration.

**We cannot see how it could be sustainable and integrated management to spend many millions of dollars building a wastewater system that is extremely expensive per connection, but leaves Akaroa with its sewer network of broken pipes, increasingly vulnerable to climate change effects including raw sewage overflows, and Akaroa town with worsening water shortages.**

#### **Focus on re-use**

Council staff and engineers have looked at non-potable re-use via a purple-pipe network, but appear to have focussed on non-potable re-use for toilet flushing only. Experience overseas has shown there are many ways to recycle highly treated wastewater, including:

- Stream replenishment (returning the treated water to the stream just below where it was taken)
- Managed Aquifer Recharge
- Non-potable network (purple pipe) to the gate for outdoor uses such as garden watering
- Non-potable network (purple pipe) to houses for toilet flushing (and potentially other uses such as washing machines if the treatment level is high enough)
- Indirect potable reuse: treat to potable standard and return to the streams above the intake
- Direct potable re-use: treat to a potable standard and return to the potable supply reservoir

Any of the options could be combined with some form of land contact to address cultural concerns.

**We submit that the Council must take a holistic, sustainable Three Waters approach in line with its Integrated Water Strategy and address all these issues with a set of affordable staged steps:**

1. **Set up a staged program to fund delivery in the 2021 LTP**, starting with network upgrades to fix the pipes, followed by a correctly sized new Treatment Plant. The staged funding program provides the framework to support any consents necessary including renewal of existing infrastructure. The timeframe should recognise that the Takapuneke consent would need to be extended if any of the consultation options is chosen; until at least 2024 for the Harbour Outfall or 2028 for any of the land-based options. This creates a time baseline for a holistic stage approach.



2. **Fix the broken pipe network.** It is absurd to build a hugely expensive new wastewater system to cope with the existing flows when more than 60% of the wastewater being processed is not sewage, but storm and ground water that has infiltrated the leaking pipe network. The pipes are compromised and the level of infiltration is well beyond the Water NZ thresholds for excessive I&I<sup>3</sup>. Where infiltration occurs, raw sewage can also leak out. Infiltration is at its most extreme when demand for water is the lowest. Moving to a land-based volume limited system without dealing with unlimited inflow is a recipe for disaster. Fixing the pipes first means money will be saved later by building an appropriately sized system. This system will be much more climate resilient because storm effects on the network and treatment plant will be much less and the frequency of raw sewage overflows and leakage greatly reduced as a result.
3. **Rethink and look for a reuse solution** while this I&I work is being done (along with initiatives to reduce water consumption), and design the eventual solution based on *actual* sewage flows.
  - **Plan to treat the wastewater to a drinkable/potable standard** so that all forms of re-use become possible, including managed aquifer recharge, stream replenishment, non-potable re-use inside and outside the home and, eventually, potable re-use.
  - **Collaborate with the Ngāi Tahu parties** to reach consensus on how to make both re-use and the disposal of excess flows culturally acceptable via a wetland or other land contact approach (such as MAR).
4. **Build the treatment plant and disposal system to facilitate re-use** as far as practical in a cost-effective manner, starting with municipal indoor and outdoor purple pipe use, and potentially adding managed aquifer re-charge and/or replenishing Akaroa's streams so the water take in summer has a lower impact on stream health.
5. **Aim to introduce further water re-use over time**, as the regulatory framework in New Zealand enables this. Add purple pipe re-use to homes where practical and when roads are being dug up for other reasons, initially for garden watering and then toilet flushing. Aim to ultimately be able to return the recycled water to the water supply reservoir for supplementing the water take from Akaroa's streams and to the potable supply network.
6. **Achieve carbon neutrality by planting pond site 10** or other Council land, such as Misty Peaks.

The Akaroa wastewater project requires a large investment at a time of great economic and climate change uncertainty.

We seek genuine beneficial re-use through treatment to the highest standard (drinkable/potable) so that the water becomes an asset and can be reused in Akaroa during times of shortage and the remainder dealt with in a way that recognises cultural concerns and improves the environment for the whole community. This would meet with the Council's Integrated Water Strategy, result in a solution built for the future and enable the Council to be in step with new government initiatives

**Council can elect to borrow to invest in one of the presented options, leaving the issues of leaking pipes, climate resilience and water shortages unresolved and a high level of debt for future repayment. Alternatively, it can choose to look at the Three Waters in an integrated way and design and invest in a solution built for the future and in conjunction with new government initiatives, including the recently released national Freshwater Policy Statement. We strongly urge it to choose the latter course.**

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<sup>3</sup> Water New Zealand I&I 2015, p13

*<Note: we will provide further information on the proposed solution in the final release of the submission on August 20. This will also include our technical Long Form submission and the views of our expert legal, technical and quantity survey experts.>*