



FRIENDS of Banks Peninsula Inc.

Akaroa's Community Environment Society since 1990

Akaroa Treated Wastewater Options Consultation (2020)

THIRD DRAFT SUBMISSION

Released August 16th, 2020 for

Further Public Comment and Support

Includes:

**Executive Summary and
Short-form Submission**

- Visit www.friendsofbp.org.nz to endorse this submission any time up to August 22, 2020.
- We welcome feedback to: 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

Akaroa's wastewater network is being replaced at a time when the challenges of climate change are becoming increasingly clear, with potable water supplies and storm and wastewater systems particularly at-risk. This adds to Akaroa's current issues of water shortages, and an old and leaking wastewater network that suffers from extreme infiltration and inflow of storm water.

The Council's Integrated Water Strategy recognizes these issues, but the wastewater disposal options proposed in the current round of consultation do not address them; rather they leave the system even more vulnerable to climate change impacts, at an extremely high per-connection cost.

Friends of Banks Peninsula therefore does not support any of the proposed options, and instead puts forward an integrated approach to reduce, reuse and recycle the treated wastewater in Akaroa, where water is most needed. We ask Council to reject their current proposals and instead adopt this approach to build sustainability and future resilience to climate change in this community.

A new wastewater 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 costs of the Akaroa wastewater system have escalated substantially. **The options are similar to those proposed in 2017 but their costs have increased by between 116% - 245%.** The volume of water is more than double that previously thought and it is now established that **over 60% of the wastewater flows are storm and ground water caused by extreme levels of infiltration** into Akaroa's broken and leaking sewer network. This peaks during times of heavy rain or prolonged wet weather when land-based options are unable to irrigate, driving the need for huge and expensive storage ponds. A raw sewage pond to smooth out these large peaks is also required for **all** options, opposite the Treatment Plant near the town entrance.

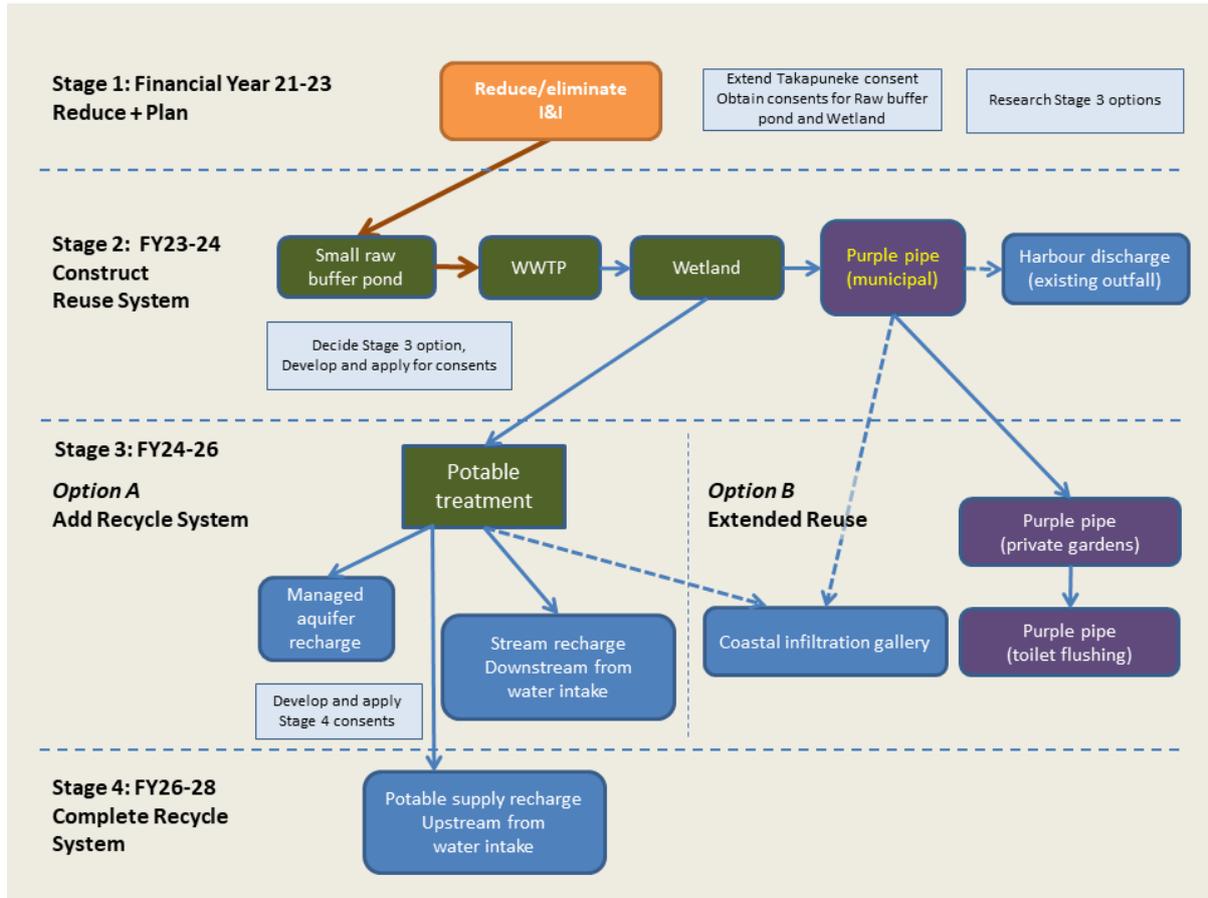
We consider it would be a gross misuse of public funds for the Council to construct a costly new wastewater disposal system without fully fixing the pipes first. Failing to do so results in a system that is much bigger, more expensive and with greater negative impacts than necessary, while at the same time lacking capacity for future expansion. Having high levels of infiltration (especially in wet weather) has not been a major issue for the Council to date because the discharge to the sea is not limited by volume. Moving to a land-based volume limited system without dealing with unlimited inflow is a recipe for disaster when we face increasingly intense storms and sea level rise. Future generations will be saddled with debt and a sub-standard wastewater and water system.

All the land-based options have high risks and constraints, are untested and with positive outcomes overstated. Of these, **the Inner Bays scheme is the worst. It has an unacceptable impact on existing communities, is the most land-constrained and has the highest potential for environmental impacts as it drains to streams flowing through the irrigation areas to poorly flushed mudflats.** Goughs Bay and Pompeys Pillar involve pumping over a high hill and have unwilling landowners. Harbour Outfall does not meet the cultural needs of mana whenua. We consider all options to be unsustainable management to differing degrees, and therefore have not chosen between harbour and land-based disposal, nor have we ranked the land-based options.

In the past 5 years the legislative framework has changed markedly to put a focus on future resilience as the impacts of climate change become better understood. Hence, the Council needs to set aside yesterday's thinking and design an integrated long-term solution that provides resilience for future generations.

We present our alternative Reduce, Reuse and Recycle approach overleaf and expand our arguments in our Short-form submission, and provide more detail and technical backup in our Full submission.

Figure 1 Integrated Akaroa Wastewater concept based on a Reduce, Reuse and Recycle philosophy



We envisage the integrated solution being introduced in 4 stages, completing in 2028. This matches the timeframe for the Council’s proposed land-based options which require the Takapūneke outfall to continue until 2028 to allow the native tree areas to establish sufficiently prior to full irrigation.

- Stage 1.** Council invests in maximum reduction of stormwater inflow and groundwater infiltration (I&I). Consents are obtained for the additional new components of the wastewater system and to retain the Takapūneke plant and existing harbour outfall until Stage 3. Research is done on Stage 3 options.
- Stage 2.** The new Wastewater Treatment Plant (WWTP) is constructed at Old Coach Road along with a much smaller raw buffer pond, larger wetland and purple pipe system along Akaroa’s main street. The old Takapūneke plant closes at this stage. The disposal still connects through to the existing harbor discharge pipe as an interim solution to disposing of unused water. The wetland assists to restore the mauri of the water. No additional sunk cost is invested in a new harbour outfall. A decision is made on which Stage 3 option to pursue and appropriate consents are obtained.
- Stage 3. Harbour outfall ceases** either through the development of recycling or extended re-use.
 - Option A** –Under our preferred option, 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.
 - Option B** – 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.
- Stage 4.** If Option A has been selected, then once NZ government standards permit, the potable water is recycled back to the drinking supply via stream discharge above the intake.

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.

Friends of Banks Peninsula is Akaroa's community environment society. It 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 reusing the wastewater in Akaroa to address its chronic water shortages. **Reuse gained the most public support of all the options in the 2017 consultation.**

However, this consultation had to be abandoned because the solutions proposed were designed based on faulty flow meter data and were therefore significantly undersized.

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 precipitously¹. 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 future². The Resource Management Act has been amended to require particular regard to the effects of climate change, the Council has developed its Integrated Water Strategy, the Canterbury Air Regional Plan has been released, and the government has announced Three Waters reform and funding

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 an integrated solution that facilitates re-use of the water in Akaroa, eventually recycling it back to the potable supply. 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.

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

¹ <https://newsline.ccc.govt.nz/news/story/council-closely-watching-water-levels-in-banks-peninsula>

² CCC Infrastructure Strategy 2018-2048 pp52,100

major earthworks and construction of very large storage ponds to facilitate the disposal of the water on the *minimum* feasible areas of land. Genuine reuse for biodiversity and carbon sequestration would seek to **maximise the area of native trees** and minimise destructive and carbon emitting construction. The area would be as large as possible, not as small as possible as these systems propose.

- **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 amount of nitrogen taken up by native trees, 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 minimal.** There is insufficient 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.
- **Water will leave the treatment site without testing for compliance** because no outflow buffer is incorporated into the system. This leaves storage ponds and the irrigation fields at risk of receiving contaminated water.
- **The land that would be planted is all currently good productive agricultural land.** Removing productive pasture from service has the risk of increasing environmental harm by requiring further development or intensification elsewhere.

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 the highest economic, social and environmental risks due to the complexity of the system proposed 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 the most heavily 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 threatening downstream infrastructure, including residences, if it fails. This also exposes property owners to financial risk.

- Uses a significant archaeological site in a historically sensitive area as its principal area for storage and disposal.
- Creates the greatest cumulative impacts on the Inner Harbour communities, and adds more sites to the already large inner harbour footprint of the new Akaroa Wastewater Treatment plant and terminal pump station, along with the new proposed Duvauchelle scheme.

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 of pump failure. However, it does open the potential to include high-level fire ponds, which would be of general benefit.
- 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 close 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, it is less practical and acceptable 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 for over 7 generations and is currently in transition to the next generation. Removing the land identified for wastewater from production leaves the farm unviable. This would impose a severe social injustice upon the family and their longstanding intergenerational relationship with their land.**

Consideration of issues specific to the Harbour Outfall option

Harbour Outfall as proposed would be a non-complying option because it involves a direct discharge to Akaroa Harbour without first making land contact, and would only be consentable in this form if there are no other acceptable alternatives. However, it is otherwise a practical option:

- It presents the lowest risk because 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 one, 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. The enhanced level of treatment minimises any environmental and health impacts.

- 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, and meaning this option can be easily expanded in future to include non-potable re-use. 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 a purple pipe system would provide 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 purple pipe re-use can come on stream at the low extra cost of \$270,000 (as opposed to \$3.7 million for the land based options).

From an environment, economic and social perspective the Harbour Outfall has the least impacts of the options proposed.

The issue is that there is likely to always be some level of residual disposal, and the continued use of a harbour outfall as proposed does not meet Ngāi Tahu’s cultural needs.

Should the Council consider adopting a harbour outfall, we urge it to work with Ngāi Tahu to explore whether a constructed sub-surface wetland or some other form of land-contact could mitigate cultural concerns for the entire wastewater flow. 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. A wetland with 2-3 days of contact is already incorporated into the Inner Bays option and supported by the Ngai Tahu parties, and is essential to the feasibility of the Inner Bays option. A wetland discharging every winter is now also proposed for the Duvauchelle scheme.³ If wetlands are considered able to restore mauri of the water in this way, then serious consideration should be given to making use of them to treat all flows, particularly where this facilitates reuse.

Consideration of Costs

Cost reflects the use of resources, and is an important factor when considering the practicality of the options.

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 these common costs, 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.
Harbour outfall	\$18 million	\$0
Inner Bays	\$27 million	\$40,000
Goughs Bay	\$35 million	\$177,000
Pompeys Pillar	\$40 million	\$177,000

- **We are concerned about the validity of these costs after 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 increased by \$6 million, the **cost of the Inner Bays disposal reduced by \$10 million** and the **cost of the Harbour Outfall increased by \$8 million**. These are substantial differences compared to the most recent figures produced by Beca and result from large changes to overheads and contingencies,

³ Beca Report July 2020 Appendix D, p2

markedly increased costs of pipelines, 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 designed, or if 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.

Summary of our views on the options presented

Should the Council take the view that it must select one of these options, we make the following observations:

- **Harbour Outfall** should be modified with some form of land contact to restore mauri to water, such as a constructed sub-surface wetland. Given the large cost difference this and the land-based options, it would still be the lowest-cost option with the least environmental and social impacts. The costs (particularly contingency and design overheads) should be reviewed as there may be considerable further savings.
- **Goughs Bay** should be reworked in collaboration with the landowner, neighbouring community and Wildside stakeholders to find an acceptable solution that maximises benefit and minimises disruption during construction. An acceptable solution could be either pasture-based, in a manner that is beneficial to the previously-willing landowner (such as CCC accepting they must carry some of the risk associated with regulation compliance and marketing of products from stock grazed on wastewater), or a genuine reforestation project that maximises environmental benefits while minimising impacts on the operation of the farm. While this is a higher cost option it does at least contain space for expansion on the farm, and the opportunity to construct high-altitude fire ponds would bring general community benefits as Banks Peninsula faces a drier future with an elevated fire risk.
- **Pompeys Pillar** would only be acceptable if it could be designed in a way that was acceptable to the farm owners and their neighbours, and therefore avoided the need for compulsory purchase. Otherwise, it is a totally unacceptable option because of the social injustice to the owners.
- **Inner Bays is totally unacceptable** because it has a huge footprint across valuable inner harbour land, involves placing wastewater infrastructure close to many homes with significant ongoing impacts, has no room for expansion without even further incursion on these communities and puts shallow coastal bays of the inner harbour at risk of environmental degradation. We cannot see how these impacts can be satisfactorily mitigated.

We consider it would be a gross misuse of public funds for the Council to construct a costly new wastewater disposal system based on any of the options proposed in its consultation document. 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.

We therefore strongly urge the Council to stop and rethink its path forward. The current options should be set aside and a new integrated solution focussed on reuse adopted that is acceptable to all parties, addresses Akaroa's issues and sets it up for a more resilient future. We now present our suggested solution.

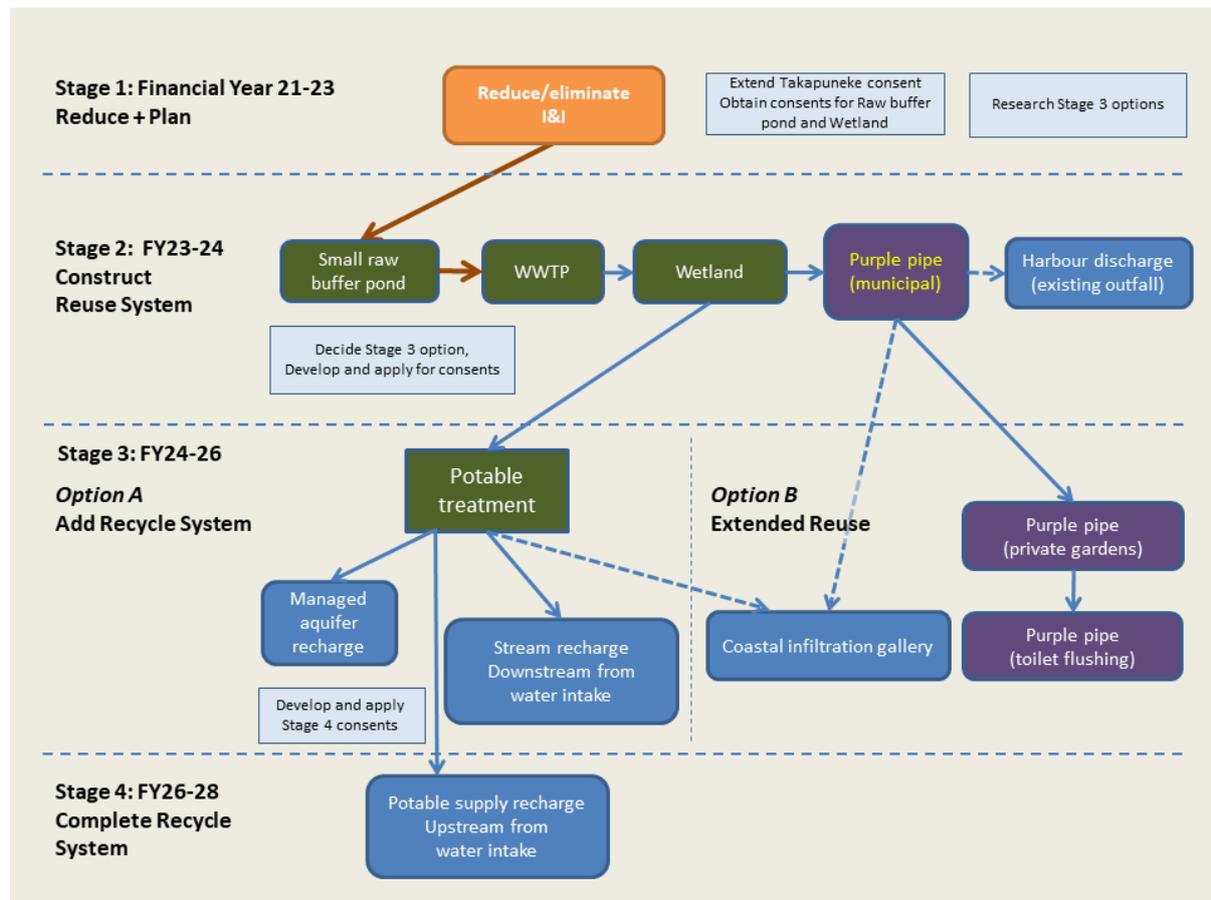
Our proposed Integrated Akaroa Wastewater solution: Reduce, Reuse and Recycle

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 suggest that the Council develop and prepare a staged solution over the next 8 years – the same timeframe as proposed for the implementation of the land-based options⁴. The harbour discharge would cease at about the same time as it would for the land-based options proposed.

We see it being implemented as follows:



Stage 1 Reduce and Plan

Use budget already allocated to reduce inflow as much as possible, principally by tackling the I&I issues thoroughly. This is the key to future resilience, to designing an appropriately sized system, to minimising raw sewage overflows and to provide headroom for future growth. It deals with a problem that must be addressed and frees up limited space at the treatment plant site for other components.

The focus needs to be on the lower parts of the town where groundwater infiltration is likely to be highest, and where rising sea levels will exacerbate the problem. There are two methods – either lining existing pipes or installing a (full or partial) low pressure system. The latter would be completely sealed against I&I, but is more expensive. Some costs could be placed onto property owners.

While the I&I work is in progress, there is time to gain consents for new components of the treatment plant (the raw buffer pond and the wetland) and to research later stages.

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.

⁴CCC Presentation March 2019

This work can commence using funding already allocated in the LTP.

Stage 2 Construct a reuse system

Constructing a reuse system would involve building the new WWTP at the top of Old Coach Road, an appropriately sized raw pond – smaller than planned due to the additional I&I reduction and a **wetland to further treat all of the wastewater after the ultrafiltration process.**

Depending on the amount of I&I reduction achieved there may be sufficient space at Pond Site 10 for a wetland that can treat all flows. If not, then alternative locations have been previously identified, including across the State Highway from Pond Site 10.

The outflow from the wetland would be to a pipe running through Akaroa to the existing outfall. This can be laid at the same time as the new pipe taking wastewater to the Terminal Pump Station. The pipe will provide an initial reuse network through Akaroa, enabling the initial watering of public parks and flushing public toilets.

The plant at Takapūneke will be able to close once the new plant is in place.

Stage 3 Introduce recycling or extend reuse

We suggest two possible options at Stage 3. Either to add potable treatment to enable water recycling or to extend the purple pipe reuse network. Use of the existing harbour outfall would cease during Stage 3 under either option.

Option A: treat to a potable standard and introduce recycling

Our preference is for potable treatment. We have held many meetings with **the community who repeatedly and consistently request that the water be treated to a potable standard.** This would turn the water from a waste product into a desirable and worry-free resource, opening up many options for direct beneficial reuse and alleviating Akaroa's water shortage issues. It would be a low footprint option as once the water had been treated to a potable standard there is no need to contain it in a separate pipe network.

We envisage potable treatment being achieved through the addition of reverse osmosis (RO) to the already highly treated water that has been through the ultra-filtration plant and the wetland. Issues raised by the Council staff have been the cost of reverse osmosis and the level of retentate remaining that still has to be dealt with. However, reverse osmosis is used widely for wastewater reclamation, particularly in conjunction with membrane filtration, which removes most of the contaminants and reduces maintenance of the RO membranes. Retentate volumes can be minimised by recycling it back through the treatment plant, similar to what Beca propose for the ultrafiltration membrane; again this is standard practice⁵.

Potable treatment opens many possibilities of recycling such as:

- **Managed Aquifer Recharge:** this was supported by the Working Party, but trials that were about to commence were cancelled by Council due to health concerns. Treatment to a potable standard alleviates these concerns. As well as providing further land contact, recycling the water through the aquifers brings the added advantage of boosting their levels to prevent salt water incursion resulting from sea level rise.
- **Stream recharge (downstream):** currently stream takes in Akaroa are limited by the need to retain minimum flow levels, which is often not possible in summer. Returning potable water to the streams would replace the flows taken and may be a way to reduce water shortages. Grehan Stream is the obvious candidate to be recharged because of its proximity to the treatment plant.

Option B: extend the purple pipe network for non-potable reuse

An alternative for reuse is to extend the purple pipe system to include private properties throughout Akaroa:

- **Reticulate non-potable water to property boundaries:** Council staff have identified that a substantial portion of the potable water supplied in summer is used for outdoor use. Therefore, reticulating non-potable water to the property boundary maximises the amount of reuse during summer when

⁵ Engineering consultants to supply references

pressure on the water supply is at its greatest, and minimises disruption by avoiding the need to re-plumb existing buildings.

- **Extend non-potable reticulation to houses for toilet flushing and other internal use:** this increases the level of reuse still further (and all year round) but comes at a significantly higher cost and with substantial disruption as houses would require re-plumbing.

This option would require standards and regulation of reclaimed non-potable water to be put into place first.

Common to both options: coastal infiltration gallery

Both options are likely to require some form of disposal for water that cannot be reused. For Option A, this might result from the need to temporarily suspend stream recharge owing to stream flow conditions, while for Option B some form of disposal will be required for when reclaimed wastewater volumes exceed demand.

A coastal infiltration gallery could be used to disperse excess flows. This idea has been previously suggested in 2016 and not taken up⁶, however there is a key difference between the situation then and now: the water is treated to a higher standard (minimum of purple pipe standard under Option B or potable standard under Option A), and all of the wastewater receives full treatment (no bypass flows).

Stage 4 Introduce full recycling

The final stage closes the loop and achieves full recycling, by returning the fully treated water to the potable supply by one of two means:

- **Indirect potable reuse:** recharge the Grehan stream some distance above the water supply intake, or
- **Direct potable reuse:** return the recycled water to the reservoir at L'Aube Hill.

Indirect potable reuse is by far the most common method used worldwide, because it ensures the recycled water is constantly blended with fresh water to alleviate any issues around degradation over time, and it substantially reduces the “yuck factor” of drinking recycled wastewater. Direct potable reuse would only be considered if there were reasons why stream recharge might not be possible or desirable.

This step would require standards and regulation of reclaimed potable water to be put into place first.

Conclusion

Council could elect to borrow to invest in one of the consultation options, leaving the issues of leaking pipes, climate resilience and water shortages unresolved and a high level of debt for future repayment.

Alternatively the Council can move on from yesterday's thinking and follow its own Integrated Water Strategy by designing and investing in a Three Waters solution built for the future and in conjunction with new government initiatives.

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 dispersed in a way that recognises cultural concerns and improves the environment for the whole community.

<Note: we aim to post our technical Long Form submission on August 21.>

⁶ Beca report July 2020, p18