Akaroa Treated Wastewater Disposal Options - Consultation Sessions – Questions and Answers – Part 2

Question	Answer
1. What about antibiotics/hormones - will they still remain in the treated wastewater?	The removal of antibiotics and hormone contaminants in wastewater treatment processes is a complex process involving various mechanisms such as absorption, biological degradation, chemical degradation, and filtration. Overall, a proportion of antibiotics and hormones are expected to be removed by the treatment process but the removal efficiency cannot be stated with certainty.
2. Is there anywhere in NZ we could use as a case study?	A number of similar municipal membrane filtration and membrane bioreactor wastewater treatment plants are in operation in New Zealand including at Kawakawa, Rotorua, Tirau, Putaruru, Te Aroha, and Matamata and Turangi. Irrigation of treated wastewater to land is also undertaken at Taupo, Rotorua, Blenheim and Masterton.
3. How far would droplets travel for spray irrigation?	The distance travelled by wastewater spray droplets is influenced by droplet size, topography and wind conditions. The low pressure K-line irrigators proposed for the spray irrigation option emit relatively large droplets of water that will tend to settle onto the land surface reasonably close to the spray nozzles. The provision of shelter belts around the boundary of spray irrigation areas will also reduce the risk of spray drift by reducing wind velocities and filtering droplets from air passing through them. It would be possible to turn off the irrigation system automatically when the wind reached a certain speed; this is done at Blenheim.
4. How much more expensive would it be to make the treated wastewater drinkable?	To further treat the wastewater to a drinkable standard would involve additional membrane treatment (reverse osmosis) plus ultraviolet disinfection. Reuse of wastewater as drinking water does not eliminate the need for land irrigation altogether because the reverse osmosis membrane can only process about 70% of the wastewater. The remaining 30% of the flow is discharged as a waste stream, containing all of the nutrients, dissolved solids and other contaminants that were present in the wastewater treatment plant discharge flow. For the year round irrigation to pasture option (Option 2), the reduction in amount of wastewater irrigated to land achieved through water reuse will allow the land area to be reduced from 25 ha to 10 ha. The additional treatment plant cost is estimated at $2 million, and this would be offset by $2M of cost savings accrued through reduced land area, smaller storage ponds and less reticulation required for irrigation. So the cost would be the same as for Option 2. For the year round irrigation to trees option (Option 1), there is no reduction in land required as the area required is determined by nutrient loading not by the quantity of wastewater applied. So the cost would be $2 million more than for Option 1.
5. If land is saturated and a major rain event occurs, what will happen?	Land instability is a naturally occurring feature of loess soil slopes on Banks Peninsula. The land irrigation system will be operated with the goal of not significantly increasing the risk of instability over and above that which occurs naturally. This will be achieved through monitoring soil moisture content, ceasing wastewater application when land has reached a specified moisture level, and by not applying wastewater to land during the winter months.

Question	Answer
6. Will run-off be a problem considering the land is clay?	The underlying soils in the proposed irrigation area are composed of loess overlying bedrock. Loess is moderately water permeable. The operation of the land irrigation scheme will involve modelling and monitoring of soil moisture water content. Wastewater will be applied at a controlled rate and will not be applied when soils are saturated in order to avoid surface run-off.
7. What concentration and loading of nitrates can be expected in the groundwater and runoff?	Initial design of the land irrigation options, including irrigation both to trees and pasture, has been based on applying nutrients at a rate that matches the uptake by trees or pasture. The intention with this design is to manage and minimise the passage of nutrients through the soil and into groundwater. Design work is at an early stage and further work on any preferred land irrigation scheme will need to be conducted to assess the specific risk and potential concentration and loading of nitrates to groundwater.
8. If you need capacity over winter, could it be re-used e.g. to clean boats, water the garden etc.? Could there be a point for collection of reuse water?	The quality of the proposed treated wastewater will mean that it can be used for garden watering, boat washing or toilet flushing. In fact one of the options considered was the use of the treated wastewater in a "third pipe" system that would reticulate the treated wastewater to all properties for this very use. However this option with all these uses would only use about 20% of the treated wastewater so other options would also be required. It was also very expensive but would be an option at some time in the future. It may be possible to include a collection point for recycled water in the design of the treatment plant.
9. What is the flow on effect from water on the surface?	There will be no flow on effect from the water held in storage as the storage pond will likely be lined and covered. For the subsurface flow wetland options (Options 3 and 4), there would be no water on the surface, and for the infiltration basin options (Option 3 and 5), the water would pond on the surface for a short time only before draining away. There would be no ponding on the surface for the irrigation options (Options 1 – 3) as the wastewater would be applied at low rates. So there would be no opportunity for mosquitos to breed for any of the options.