

BEFORE THE CANTERBURY REGIONAL COUNCIL

IN THE MATTER of a proposed plan
change under Schedule
1 to the Resource
Management Act 1991

AND

IN THE MATTER of a submissions by **TE
NGĀI TŪĀHŪRIRI
RŪNANGA** and **TE
RŪNANGA O NGĀI
TAHU** on **PROPOSED
PLAN CHANGE 7 ON
THE CANTERBURY
LAND AND WATER
REGIONAL PLAN**

**RESPONSES OF BARRY BRAGG TO HEARING PANEL QUESTIONS ON BEHALF
OF TE NGĀI TŪĀHŪRIRI RŪNANGA and TE RŪNANGA O NGĀI TAHU**

9 December 2020

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INTRODUCTION

1. On 1 December 2020, the Hearings Panel requested written responses to questions related to my evidence in chief, dated 22 July 2020.
2. I have set out the Panel's questions and my responses below.

QUESTION ONE

3. Referring to paragraph [32] of my evidence in chief, the Panel has stated:

Given that nitrate concentrations are high in the Eyrewell area and contribute to high concentrations downstream in the Kaiapoi spring fed rivers, I'm sure the Tuahuriri whanau would not be comfortable with the stable but high nitrate concentrations.

4. I understand from evidence presented to the Hearings Panel that high nitrate concentrations are of concern to Ngāi Tūāhuriri. For that reason, Ngāi Tūāhuriri are fully engaged in decisions that NTF makes with respect to managing the farms and reducing our environmental footprint. We measure our groundwater concentrations every quarter and know average concentrations are consistently below the national drinking water standard; we regularly share these results with Ngāi Tūāhuriri. We also have a lysimeter installation that measures the nitrogen load coming off one of our dairy farms which is consistently lower than Overseer modelling; again, these results are shared with Ngāi Tūāhuriri. An example of continual improvement is their support as co-sponsors of our latest regenerative farming pilot.
5. The Panel has asked what initiatives NTF has planned to reduce nitrate concentrations discharges over and above what NTF is currently doing.
6. The initiatives covered in my evidence in chief from paragraph [7.9] to [7.13], and the matters outlined above, are significant and it is my understanding that they are not part of business as usual (**BAU**) for many other farming businesses.

7. In addition NTF is investigating the following:
- (a) Currently working to secure funding from the Ministry of Primary Industries for a large scale project which would improve soil quality and reduce losses to ground. We are working with AgResearch, Manaaki Whenua and Lincoln University to develop a research program which scientifically validates the positive impact of alternative farming practices known as regenerative farming. We have been working on this for a number of months and have already submitted an initial proposal which MPI have asked us to further refine. We will create two data sets which can be compared to illustrate the differences of the two practices. The program is scheduled to run for 5 years.
 - (b) Miscanthus grass has nitrate digesting benefits which are being investigated further by NTF. NTF is following trials being conducted by Fonterra who has been spreading waste water on to plots of Miscanthus grass and measuring its leaching profile.
 - (c) Cleartech effluent management system. Ravensdown and Lincoln University have developed an Effluent Treatment System (**ETS**) called ClearTech. This system can be retrofitted between a dairy shed and the effluent pond which uses a coagulant to treat the effluent. The coagulant is used to “clean” effluent by binding to the fine particles and separating the water from the solids. The heavier solids drop to the bottom of the tank leaving a layer of cleared water on-top. The water is then reused as yard wash water and the effluent solids are piped to the effluent pond. Recycling water in this way can take significant pressure off ground water takes. In the treated Farm Dairy Effluent (**FDE**), ClearTech kills up to 91% of E.coli and reduces Dissolved Reactive Phosphate concentrations by up to 99%. The coagulant used in the clarifying process ties up the phosphate, turning it into a slower release form of phosphorus. These reductions show that land application of treated FDE is less likely to cause adverse environmental impacts on water quality than spreading untreated FDE.
 - (d) Further investment into precise irrigation management to reduce drainage and therefore leaching. We are upgrading our variable Rate

irrigation system to further improve water use efficiency to minimise drainage and therefore leaching

- (e) Our long term approach is to aggregate the cumulative effect of multiple initiatives with proven efficacy, as opposed to implementing any one initiative in isolation.
- (f) 'Smartwater' a joint research project with Canterbury University and the Ngāi Tahu Research Centre which considers how a water quota exchange system could be implemented in our catchment. The idea is to give an incentive to efficient water users and reduce nutrient impact with reduced costs, as opposed to a fixed pricing model like the current system. It is proposed to have a pilot scheme up and running for the 2021/22 irrigation season.

QUESTIONS TWO, THREE AND FOUR

8. The Panel premised its next questions for two reasons:

- a) For the sake of integrity and reputation of whanau and of the Iwi;
- b) I understand from WIL, that Ngāi Tahu Farming is giving some of its water allocation, to contribute to MAR for Silverstream to dilute nitrate concentrations, acknowledging that the reductions of nitrates can only be achieved at the source and is the reason that Treena Davidson's evidence states Ngā Rūnanga will agree with MAR only if it's as a further mitigation measure alongside on farm nitrate reduction measures?

9. In response, I note that NTF has discussed point (b) with WIL and believe it to be a misunderstanding. NTF is not directly giving up water but is a shareholder of WIL and would do so as other shareholders would. Our preference is also a reduction in the nitrogen load lost to ground, hence the adoption of initiatives and practices we have, and continue, to make.

10. The Panel has asked the following question:

Has Ngāi Tahu farming read the evidence of Christchurch City Council (CCC) particularly that of Dr Tim Chambers – whose evidence talks about adverse effects on human health due to nitrates being ingested in Christchurch drinking water, his research shows that it contributes (with other factors such as lifestyle) to colorectal cancer and Infantile Methemoglobinemia (blue baby syndrome).

11. I have not read the evidence of CCC but NTF is aware of this research. We work closely with Manawhenua to ensure they understand how we measure and what we measure. An example of this is the well and lysimeter data mentioned above. I am also aware of the evidence presented to the Hearings Panel on behalf of Ngāi Tūāhuriri.

12. Further, the Panel has commented as follows:

We've also read evidence (CCC) that suggests it causes cancer in the bladder, breast and thyroid from ingesting nitrate laden water and vegetables.

Professor Robin Fraser's evidence/research suggests that nitrates are linked to other health effects such as dementia and diabetes.

Given that Eyrewell is a high nitrate concentration area and according to the modelling there is evidence to suggest that nitrates from the Waimakariri area eventually ends up in the Christchurch aquifer drinking water supply.

What would NT Farm's Kaitiakitanga, Manaakitanga and Whanaungatanga responsibility be to the Waimakariri community and city folk who may be affected by these high nitrate concentrations?

13. I explained the philosophy and approach of NTF in my evidence in chief. It is NTF's commitment to whanau and community that led us to invest in the systems we have, install the technology we have, and to go well beyond BAU and measure our actual impact rather than rely on modelling. We work with Manawhenua to get support for our innovations and our environmental performance. While I am aware of concerns raised about the enforceability of Farm Environment Plans (**FEP**), we have successfully gained FEP 'A' grades and Synlait 'Lead with Pride' Gold elite status for our farms which confirms for whānau and the iwi that our initiatives and practices are in fact beyond BAU. Commitment to the whanau and the community extends to demonstrating to other farmers in the zone what can be achieved when going beyond BAU. We are also demonstrating why measurement is important and not just a reliance on modelling.

14. Like the successful woodchip wall at Silverstream, Eyrewell also benefits from high soil carbon content post conversion from forestry. This has an immobilisation effect on nitrogen in the soil which is contributing to lower N loss levels as measured by our lysimeter. The challenge for NTF is how to maintain soil carbon levels which is a key component of the journey into regenerative farming practices.

15. The Panel has also asked:

Has NTF investigated the environmental benefits of zero nitrate herd shed dairy farming? And if they did investigate it, what were the issues with it that resulted in the current activity of dairying on open pasture?

16. Yes, NTF has looked into this form of farming. While the evidence identifies benefits, barns (herd homes) also have disadvantages including:

- (a) animal welfare issues;
- (b) large capital investment;
- (c) increased smell;
- (d) poor fit with NZs point of difference in the global market (ie. cows free to roam on open paddocks in green pastures); and
- (e) sunlight and wind has been shown to kill *Mycoplasma bovis* bacterium which a barn would prevent.

17. Further, the Panel has noted:

In the evidence of Dr Doug Rankin during hearing week 4 at his paragraphs 16 - 20 suggests that all intensive NZ dairy farming allows cattle to excrete waste onto pasture and where urine patches and high fertilizer use is applied, resulting in excessive nitrate leaching.

Whereas intensive cattle farming operating in a number of other countries use herd sheds and feed pads with essentially zero nitrate discharge. All cow effluent

is collected and bio-digested and once stored is treated then sprayed onto pasture in a controlled manner in tune with the optimum weather and season. Dairying in this way, also results in a significant reduction in the amount of fertilizer needed because it effectively recycles nutrients.

18. The Spikey trial referred to in my evidence in chief directly addresses this, and is a good example of going above and beyond BAU.
19. For these reasons, we do not consider that herd homes are the only way to have control over nitrate discharges. Through our farming practices we also have capacity to address nitrate discharges, and will have even more with Cleartech which is a new technology that treats effluent. For a number of years, we have been collecting effluent and allowing natural bacteria to break it down before spreading on farm to reduce fertiliser inputs.
20. Feed still needs to be grown on farm which traditionally requires fertiliser so it would be hard to say nitrate leaching is zero. The panel made the comment that farming in this way could be a zero nitrate practice, this suggests nitrogen losses only comes from cows which isnt true. Potato cropping for example has a similar N loss footprint to dairy farming

Barry Bragg

9 December 2020