

Personal submission of Dr Robyn Manuel (27 September 2023)

To: Hearing Commissioners, Northland Regional Council

Submitter: Dr Robyn Manuel

Submission on: Revised Consent Conditions for Opononi/Omapere Wastewater Treatment Plant and the Kohukohu Wastewater Treatment Plant

Applicant: Far North District Council

Description of activity: Short term discharge permit to wastewater

Land based disposal of treated wastewater must be properly considered by the Far North District Council. Their position that the economic cost of land based disposal prevents the genuine consideration of culturally and environmentally superior and alternative solutions, is ignoring its obligations under the Resource Management Act to consider all 4 wellbeings when making a decision.

An approach that can consider the solutions available in a transparent, technically robust culturally appropriate way is needed to properly inform the decision making process. The Mauri Model Decision Making Framework has been applied to other wastewater solutions in Aotearoa NZ and resulted in more inclusive solutions that have brought the community together to find the best solution.

The FNDC's modified application for a 3 year renewal of their resource consent (to continue discharging into the Hokianga Harbour) is culturally and environmentally denigrating the mauri of the Hokianga Harbour.

I support the maximum of three years for each WWTP with an **enforceable mandate to find a land-based solution** through partnership with the appropriate Hapū and the local community, who have selected their own people and developed their own terms of reference.

My recommendations are that:

The 3 year consent is extended one year at a time and is dependent on the achievement of the following milestones:

End Year 1 must have

- The Community decision making group (Hapu and Community Liaison and Implementation Group) is formed
- An assessment process created that is based on impacts on mauri and mauri ora

- Completed the design for a pilot installation of black water pre-treatment and land based disposal solution
- Commenced installation of the pilot black water pre-treatment and land based disposal solution
- Have confirmed the design brief for each of the waste water treatment networks
- Have identified multiple potential land discharge sites for appropriately sized treatment clusters that remove the toilet flush from the existing network.

End Year 2 must have

- Completed the design for each of the waste water treatment networks
- MOUs for land disposal sites suitable for each treatment cluster
- Mauri based assessments of the design solutions
- Design solutions for the modifications to the existing plant to adapt to grey water influent only
- Funding arrangements confirmed
- Contract let for the modifications to the existing plant
- Advertised tender documentation for first two clusters so that these can be implemented once six months of trials monitoring the pilot project provides proof of concept.

End of Year 3 must have

- made substantial progress installing decentralised black water vermicomposting pretreatment clusters with low pressure network to land disposal
- Contract in place to adapt the existing plant to optimise performance for grey water treatment before discharge

I support that:

- The purpose of the Hapu and Community Liaison and Implementation Group (HClig) is to find a culturally and environmentally appropriate land-based treatment and discharge solution and begin staged implementation within the three-year time frame.
- The HClig take control of the Terms of Reference, the times, dates and places of meetings
- The milestones to arrive at this solution be part of the Terms of Reference
- The monitoring include Matauranga Māori forms of monitoring
- The monitoring standards are not lowered, but remain at least maintained or raised

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**Notes:**

It is assumed that consenting of cluster systems during the three year consent period is the most efficient staged approach to alleviating the cultural offense caused by the existing system.

Assessment of options and regular monitoring of improvements in water quality must be carried out to inform marae, Iwi and the community.

Three monthly assessment reports should be provided to the HClig. Each report is to:

- quantify the progress made on the transition to land based treatment and disposal
- determine the cumulative impact on mauri of the receiving environment and,
- determine the cumulative impact on mauri ora

Constant monitoring of water quality parameters is undertaken at all discharge locations.

## **Supplement to submission of Dr Robyn Manuel (28 September 2023)**

To: Hearing Commissioners, Northland Regional Council

Submitter: Dr Robyn Manuel (Verbal submission made by Dr Kēpa Morgan on her behalf)

### **Submission on: Revised Consent Conditions for Opononi/Omapere Wastewater Treatment Plant and the Kohukohu Wastewater Treatment Plant**

Applicant: Far North District Council

Description of activity: Short term discharge permit to wastewater

Land based disposal of treated wastewater must be properly considered by the Far North District Council. Their position that the economic cost of land based disposal prevents the genuine consideration of culturally and environmentally superior and alternative solutions, is ignoring its obligations under the Resource Management Act to consider all 4 well-beings when making a decision.

#### **Holistic Solution Development**

Taking an approach to solution formulation that is a transparent, technically robust and culturally appropriate way is needed to properly inform the decision making process. Concepts driving best practice solutions elsewhere in Aotearoa New Zealand adapt existing technologies to deliver solutions that are aligned to the desired solution characteristics without necessarily being more expensive than historic approaches to wastewater treatment and disposal.

It is essential that appropriate solutions are identified during the three-year window that could be provided by this consent application. Two features that characterise recent best practice for Aotearoa New Zealand were present in the Rotoiti – Rotomā wastewater scheme.

The first feature was adopting a safe-to-fail design approach, assuming that at some time in the future, the wastewater scheme will experience failure(s). In that context, the design priorities become the reduction of risk created by the wastewater network, the reduction of impact at the treatment location, and the reduction of impact at the discharge location.

Addressing these risks in order, a sensible approach is to first reduce the toxicity and cultural offensiveness of the effluent being transported within the wastewater network. Having reduced the potential consequences of a failure within the network, additional treatment options become viable including decentralised and/or optimised treatment and disposal. The risks that are present in terms of wastewater treatment plant failure are most effectively reduced by discharging the most toxic or culturally offensive effluent to land, which is a repeated requirement of Iwi and Hapū throughout Aotearoa New Zealand.

Whilst these types of solutions are often opposed by the wastewater industry as unworkable and by Councils as too expensive, these positions are often informed by assumptions and not supported by thorough engineering analysis and design. The solution adopted for the Rotoiti-Rotomā wastewater scheme was hampered by this thinking and the resulting solution was less than optimum, however the solution does adopt a superior effluent pre-treatment approach before transport in the wastewater network, and disposal to land.

### **Pre-treatment Technology Trial and Feasibility of Vermi-composting Black Water**

The pre-treatment approach went through an independently assessed small scale trial which was successful. As there is likely to be wastewater industry opposition to alternative solutions that reduce the dependence on expensive and technically complicated conventional tertiary treatment approaches such as membrane bio-reactors (MBR) or similar, it is recommended that a trial of an alternative pre-treatment technology, particularly a vermi-composting based pre-treatment trial, be undertaken during the three year consent period.

It is correct that implementing a retrofit of the existing network with the addition of pre-treatment systems at every existing household connected to each of the wastewater networks in the Hokianga could be economically prohibitive. The solution however may be to trial the adoption of vermi-composting based pre-treatment to target the culturally offensive and most toxic portion of the wastewater flow only, the black water (toilet flush).

Black water in the majority of cases exits the household separately from the greywater flows (bathroom, laundry, kitchen). The separation of these flows could be taken advantage of, to selectively treat the black water flows, which are the most offensive culturally, and manage this proportion of the total wastewater flow using pre-treatment and a separate low pressure reticulation system which could be decentralised and the treated effluent disposed to land in the significantly reduced quantities that this approach would facilitate.

The vermi-composting systems used for pre-treatment at Rotoiti are hydraulically limited and during the trial one household exceeded the trigger water levels. It was found that the loading for this household was in the order of five-fold the normal household design. Despite this, on further investigation, the system was found to be functioning as designed, albeit being required to work much harder than it would normally be required to.

Assuming that pre-treatment of black water flows from household clusters (5 to 8 houses connected to each pre-treatment unit), and that disposal to land is technically and economically feasible using this approach, the wastewater challenge becomes less vexing.

### **Repurposing the Existing Infrastructure**

The challenge associated with the existing wastewater network is simplified to one of optimising the infrastructure to collect and appropriately treat the remaining greywater and stormwater flow proportion of the effluent currently being treated at the treatment plants. While this component of the total flow is the larger portion (approximately 80%), the treatment effort required is not as great.

Treatment processes could be optimised to the simpler challenge of treating greywater before disposal. It is anticipated that the destination of treated greywater may be an easier challenge to overcome, as it is likely to be considered less culturally offensive than the current situation with significantly reduced quantities of human waste. Note that this observation does not seek to disempower the relevance of Iwi and Hapū mātauranga Māori. Rather the intention is to identify a potential solution for discussion and consideration as a feasible alternative that provides a superior result to other conventional options being considered.

It is correct that the greywater flow from households may include some human waste (washing soiled nappies and clothes) however these contributions as a proportion of the total flows are so small as to be difficult to quantify. It is quite possible that the treatment of

greywater and stormwater flows could be accomplished using screening, trickling filtration, and polishing via a wetland.

### **Potential Option Evaluation**

This is an example of a potential solution that could address the wastewater treatment and disposal needs of the Hokianga communities using safe-to-fail design approaches and disposal to land of the culturally offensive component of wastewater flows.

To ensure that the potential of alternative solutions to appropriately consider the needs of the Hokianga community, an evaluation approach that can seamlessly combine engineering and science alongside mātauranga Māori is needed. It is suggested that the Mauri Model Decision Making Framework could provide a process for evaluation that is better suited to this challenge than other tools created for overseas contexts.

The Mauri Model Decision Making Framework has been applied to other wastewater solutions in Aotearoa NZ and resulted in more inclusive solutions that have brought the community together to find the best solution led by Iwi.

### **Three Year Consent Scope**

The FNDC's modified application for a 3 year renewal of their resource consent (to continue discharging into the Hokianga Harbour) will continue to be culturally and environmentally denigrating of the mauri of the Hokianga. This is disappointing given the time that has lapsed and the lack of progress made on finding viable solutions for the Hokianga communities.

The maximum of three years for each WWTP must therefore include an enforceable mandate to find a land-based solution through partnership with the appropriate Hapū and the local community, who must be empowered to select their own representatives and develop their own terms of reference.

### **Recommendations**

My recommendations are that:

The 3 year consent is extended one year at a time and is dependent on the achievement of milestones stipulated in the consent conditions. Suggested conditions that may align with the development and implementation of alternative technologies could be:

Within the first twelve months of the consent:

- The Community decision making group (Hapū and Community Liaison and Implementation Group) is formed
- The Community decision making group confirm their own Terms of Reference
- An assessment process is adopted that is based on impacts on mauri and mauri ora
- The design for a pilot installation of black water pre-treatment and land based disposal is completed and presented to the Community decision making group
- Installation of a pilot black water pre-treatment and land based disposal solution has commenced or is about to commence
- Multiple potential land discharge sites for nearby treatment clusters have been identified
- A feasibility study is completed for each of the existing wastewater treatment plants considering operation with the removal of black water flows from the existing network

Within the second twelve months of the consent:

- The retrofit design for each of the wastewater treatment plants is completed

- MOUs are in place for land disposal sites suitable for each treatment cluster
- Mauri based assessments of the potential design solutions are completed
- Six months of monitoring results for the trials have been evaluated and draft recommendations are considered by the Community decision making group
- Tender documentation for the installation of the first two clusters is prepared so that these can be implemented once the Community decision making group accept proof of concept
- Consent documentation for the decentralised black water vermi-composting pre-treatment clusters is prepared
- A decision is made by the Community decision making group regarding pre-treatment
- Contracts are let for the design and build modifications to the existing wastewater treatment plants including consent applications
- Funding arrangements are confirmed

Within the third twelve months of the consent:

- Substantial progress installing decentralised black water vermi-composting pre-treatment clusters with low pressure network to land disposal
- Contract in place to adapt the existing plant to optimise performance for grey water treatment before discharge

It is recommended that the consenting of cluster systems during the three year consent period is an efficiency gain worth consideration.

It is recommended that the assessment of options and regular monitoring of improvements in water quality must be carried out alongside marae, Iwi and the community.

It is recommended that high standards of accountability be implemented with regular communications such as providing three monthly assessment reports that quantify the progress made on the transition to pre-treatment and land based disposal.

It is recommended that reporting should also determine the cumulative impact on the mauri of the receiving environment and determine the cumulative impact on mauri ora.

It is recommended that constant monitoring of water quality parameters should be undertaken at all discharge locations.

Ko te mauri matangaro e kore e kite,  
inā rā, ka mātanga te ine i tēnei mea te mauri, ka mātua te Iwi.

Ko te mauri o te wai kia tiaki, ko te mauri o te wai kia tū, ko te mauriora kia ū, kia matāra!

When mauri becomes our intuitive way of knowing, our people and our ways will flourish.  
Let the mauri be revitalized, let the mauri flourish, strive for this persistently.

**Mauri ora**



**Dr Kēpa Morgan DFEngNZ**

Pou Hautū

Mahi Maioro Professionals