

Garrett Hall and Jolanta Gussenhoven

Wastewater co-design for small communities: A case study from Te Tai Tokerau / Northland



water
NEW ZEALAND
CONFERENCE & EXPO
17-19 OCTOBER 2023
Tākina, Te Whanganui-a-Tara Wellington

Introduction

- Background to the Taipa Wastewater Transformation Project
- Kaupapa of the Wastewater Working Group
- Best Practicable Option development
- Long-list, short-list and preferred option
- Success factors and learnings
- Next steps

Taipa WWTP

- Receives wastewater from approximately 2,600 people in Coopers Beach, Mangonui, Taipa and Cable Bay in the Far North District.
- Pond and wetland-based system that discharges treated wastewater into a farm drain, that flows into the Parapara Stream then ultimately Doubtless Bay.
- The discharge of treated wastewater to the Parapara Stream has a long-standing history of offensiveness to hapū and the local community.



History

- Taipa WWTP commissioned in 1990
- Key cultural concerns around:
 - impacts on kaimoana and traditional food gathering sites,
 - health effects on swimming
 - discharge of wastewater derived from another catchment
 - effects on sites and places of significance to hapū
- Regional Council hearing in 2019, subsequent Environment Court appeal process and mediation between parties.
- Consent Order issued in March 2021



Source: Google Earth Pro



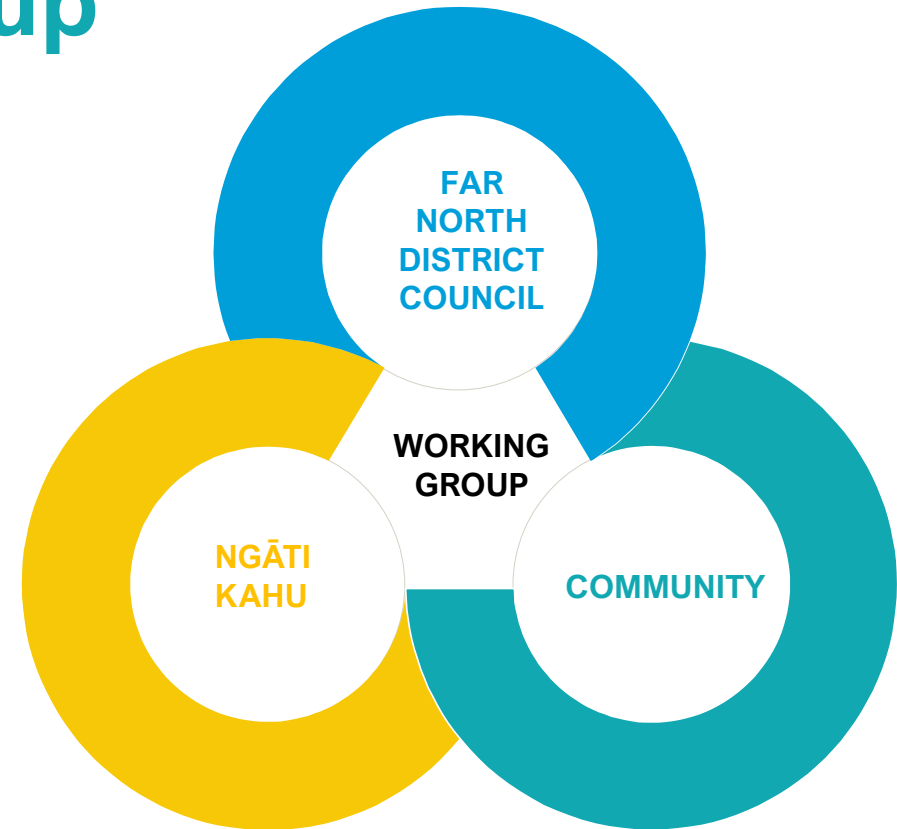


Consent Order

- Condition 7 – required Far North District Council (FNDC) to establish a Working Group
- Condition 10 - requirement to assess options for the treatment and discharge of wastewater and identify the Best Practicable Option (BPO)
- Conditions 11 and 12 – requirements to investigate land discharge
- Condition 13 – if land discharge not practicable, then upgrade required to meet discharge to water standards

Kaupapa of the Working Group

- Ngāti Kahu – three representatives appointed by hāpu
- Community – one representative of Broader Doubtless Bay community (appointed by Te Mana o Te Wai Hapū Integration Roopu Charitable Trust)
- FNDC – two senior officers appointed by FNDC, supported by an independent person qualified in wastewater engineering and land discharge systems
- Development of Terms of Reference for the Working Group



Terms of Reference for the Working Group

- **Vision** – to bring back the mauri to the wai, for the benefit of the whanau, hapū and the community
- **Values** – collaborative, interactive, positive, good faith and flexibility
- **Objectives** – key aspects of understanding, working together, supporting education around tikanga Māori, working in the short and long term
- **Decision Making and Recommendations** – follow best practice and make decisions by consensus, report to Council, and if not accepted, revert back to the Working Group to reconsider and make further recommendations
- **Importance of taking time**, rather than rushing to make the wrong decision

Best Practicable Option

The Resource Management Act (RMA) 1991, as amended, defines BPO as follows:

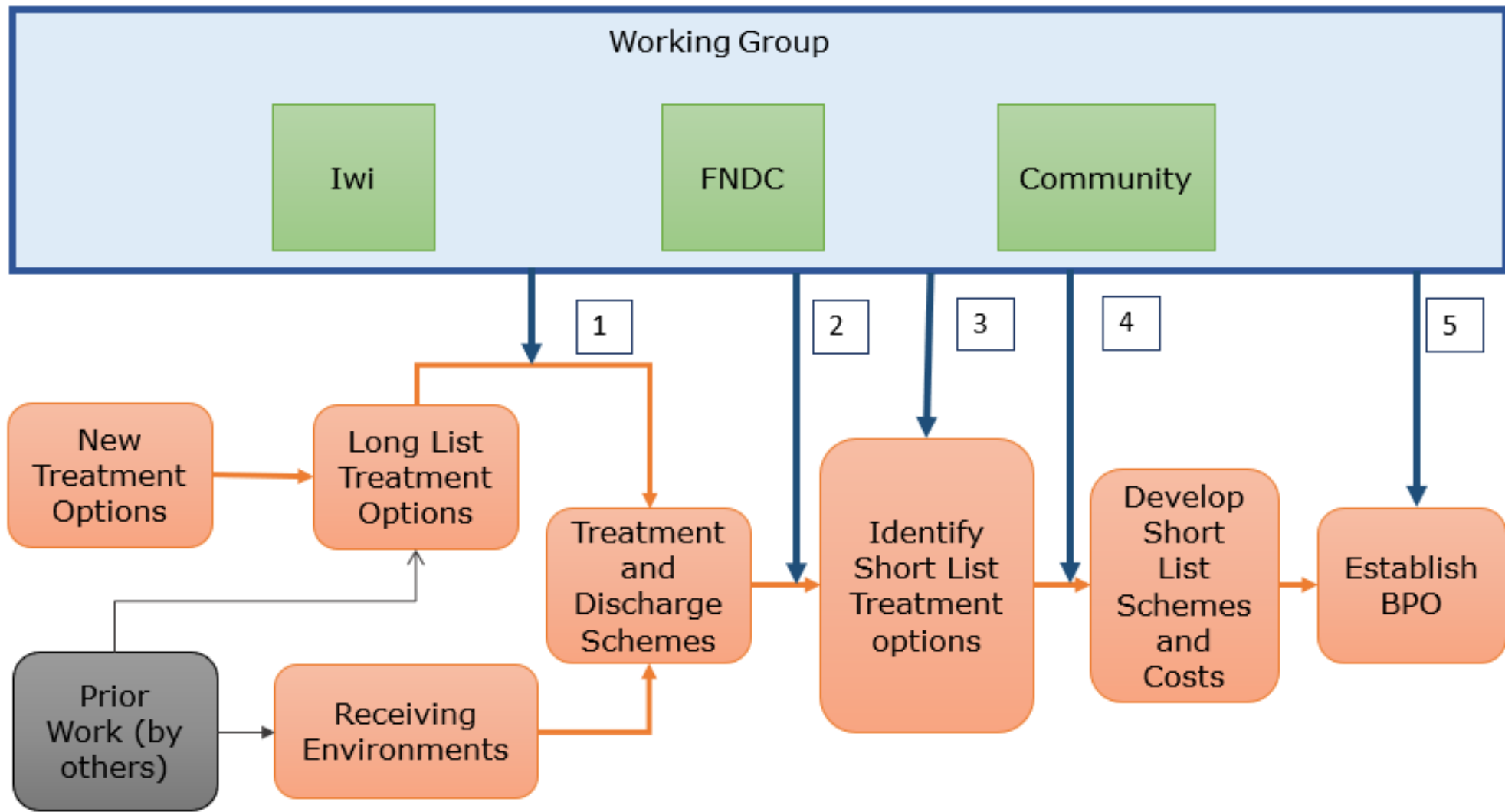
“the best method for preventing or minimising the adverse effects on the environment having regard, amongst other things, to –

- a) The **nature of the discharge** or emission and the **sensitivity of the receiving environment to adverse effects**; and*
- b) The **financial implications**, and the **effects on the environment**, of that option when **compared with other options**; and*
- c) The **current state of technical knowledge** and the **likelihood that the option can be successfully applied**”.*

Discharge to Water Standard

Parameter	Unit	Median	85% Percentile
Total Nitrogen (TN)	mg/L	12	16
Total suspended solids (TSS)	mg/L	20	30
Biological oxygen demand (BOD)	mg/L	20	40
Dissolved oxygen (DO)	mg/L	> 2	> 2
pH	mg/L	> 6.5	> 6.5
Total Phosphorus (TP)	mg/L	10	15
Faecal Coliforms (FC)	cfu/100 mL	1,000	1,500
*Based on pH 8 and temperature of 20°C.			

Note: The Consent Order did not set out any standards for treated wastewater quality for discharge to land.

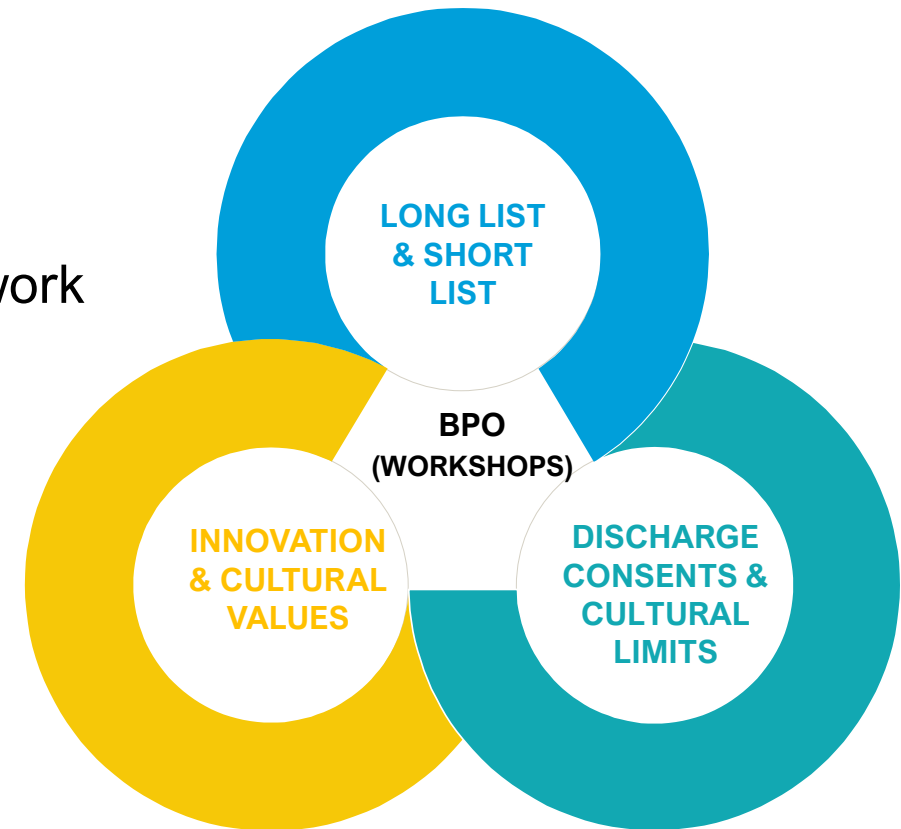


Co-design Model Framework

- 1 – Agree by consensus to accept the list
- 2 – Confirm treatment + discharge combinations
- 3 – Identify Short List using traffic light assessment
- 4 – Additional MCA criteria assessment on Shortlisted Schemes
- 5 – Agree by consensus on BPO

Co-design Model Implementation

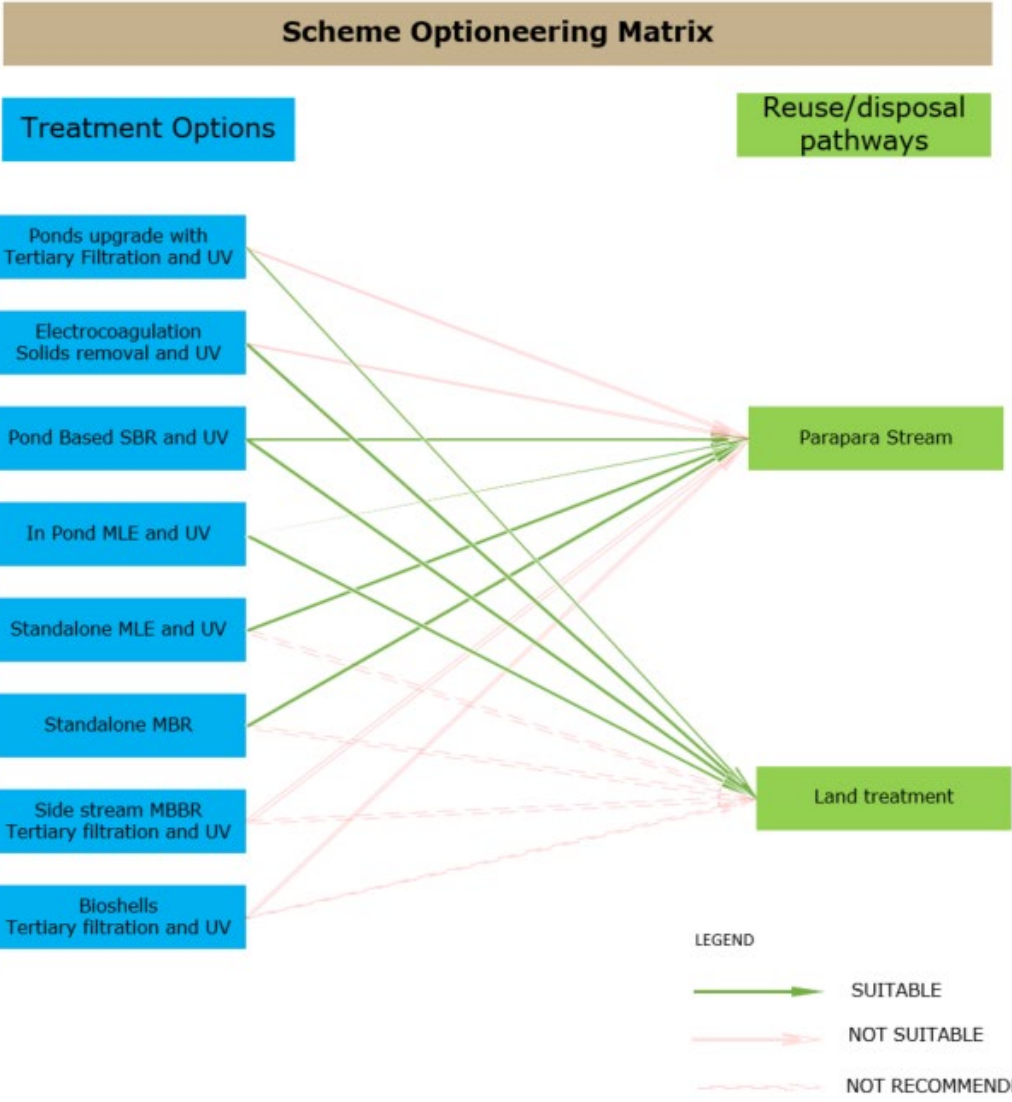
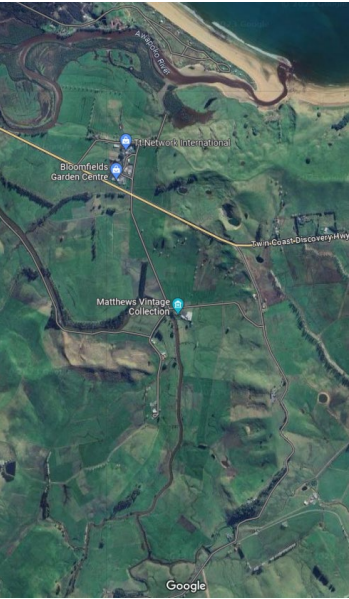
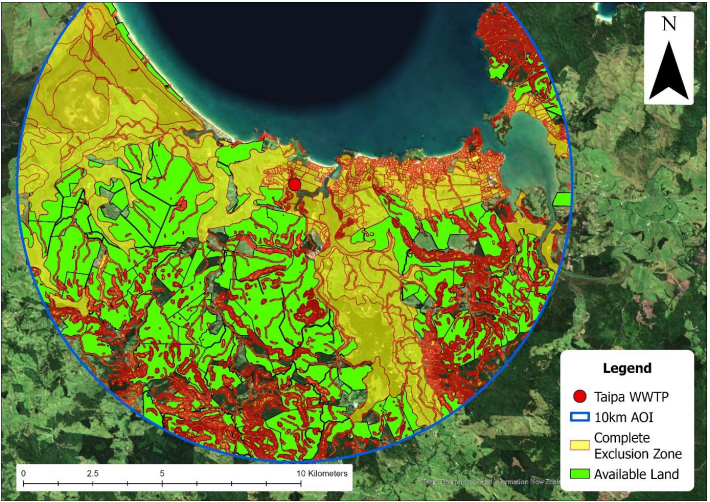
- Long list establishment - continuation of previous work
- Consideration of receiving environment
- Designing the discharge schemes
- Shortlist process
- BPO selection – concession made



Long list of treatment options

Membrane Bioreactor (MBR)	Pond upgrade with dissolved air flotation (Bioshells) and UV	Electrocoagulation (EC)	Pond-based Sequential Batch Reactor (SBR)
Pond upgrade with tertiary filtration and UV	Pond based Modified Ludzack-Ettinger (MLE) plant with UV	New standalone MLE plant with UV.	New side stream Moving Bed Bio Reactor (MBBR) plant with tertiary filtration and UV

Receiving environment



BPO



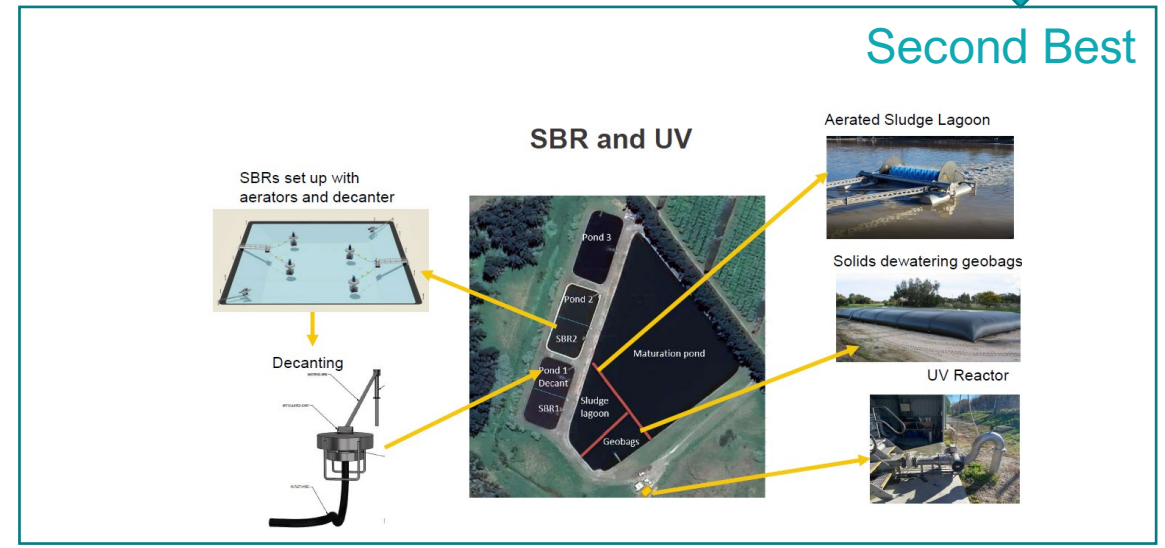
Uncertainty

Trial

Short List

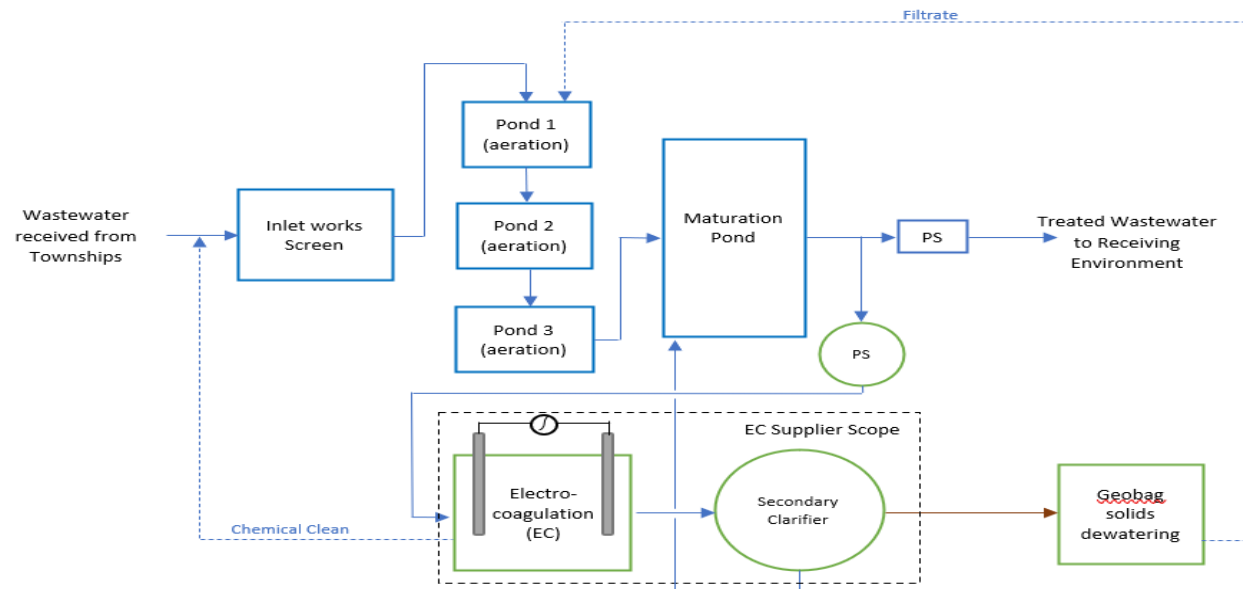
WWTP Options	Take forward to Short List?
Pond upgrade with Tertiary filtration and UV	Maybe – land
Pond upgrade with Electrocoagulation and solids removal and UV	Yes - land (maybe water)
Convert ponds into pond based SBR with UV	Yes – land or water
Convert ponds into in pond MLE plant with UV	No
New standalone MLE plant with UV	No
New standalone MBR plant	Maybe – water
New side stream MBBR plant with Tertiary filtration and UV	No
Bioshells in the ponds with Tertiary filtration and UV	Maybe - land

Second Best



Electrocoagulation Trial

- Electrocoagulation system with capacity of 30m³/day
- 12-month trial – to start this year
- Results to inform future design for land or water
- Geobag trial on site



Success Factors and Learning



Northland group Clean Waters to the Sea wants help to appeal wastewater plant consent

Northern Advocate

18 Mar, 2020 11:00 AM 3 mins to read

Save Share



A suspected toxic algal bloom in the wastewater treatment ponds at Taipa last month. Photo / supplied

Doubtless Bay's Clean Waters to the Sea has launched a public campaign to raise funds to appeal to the Environment Court against Northland Regional Council's renewal of consent for the Far North District Council to operate the wastewater treatment plant at Taipa.

Far North 'co-design' approach provides NZ-first wastewater treatment model, quality engagement with mana whenua



By Myjanne Jensen

3 Jan, 2023 08:28 AM 6 mins to read

Save Share



The Taipa wastewater treatment plant serves Taipa (pictured), Mangōnui, Coopers Beach and Cable Bay. Photo / Petrina Hodgson

Taipā Wastewater Treatment Plant Transformation Project to launch electrocoagulation technology trial



By Myjanne Jensen

22 Jun, 2023 05:00 AM 4 mins to read

Save Share



The Taipā Wastewater Treatment Plant serves Taipā (pictured), Mangōnui, Coopers Beach and Cable Bay. Photo / Petrina Hodgson

The trial of new breakthrough technology will prove whether the Far North holds the key to the future of the country's wastewater industry.

Far North District Council has confirmed the Taipā Wastewater Treatment Plant (TWTP) Transformation Project is set to launch a 12-month trial of a small electrocoagulation (EC) technology unit at the Taipā sewage facility.

The project working group (Ngāti Kahu hapu Matakairiri, Ngāti Tara and Ngāti Whata, Clean Waters to the Sea Tokarau Moana Charitable Trust/community representative Andreas Kurmann and Far North District Council) is the first co-design model of its kind and has been working for more than a year to find the best possible option for the failing plant.

Following a series of workshops with engineering consultancy Beca Limited, the group found a slow-rate irrigation (soil moisture deficit) land discharge scheme, plus EC technology was the solution.

Next Steps

- Discharge to land remains a key focus – however land availability / suitability is challenging
- 12-month EC trial currently being finalised
- Working Group continue to be involved throughout the project as kaitiaki

Acknowledgements

- Members of the Taipa Working Group: Hikitia Hita, Julie Rickit and Trudy Allen (Ngāti Kahu representatives), Andreas Kurmann (Doubtless Bay community representative), and Mandy Wilson and Melissa Parlane (formerly FNDC).
- Ben Bowden (formerly FNDC) for his review.

Questions?

