BEFORE THE TARANAKI REGIONAL COUNCIL

under. the Resource Management Act 1991

in the matter of: Resource consent applications by Remediation New Zealand for resource consents to discharge waste material, treated stormwater & leachate, and to discharge emissions into the air from composting operations, at State Highway 3 1460 Mokau Road, Uruti ("Applications")

LEGAL SUBMISSIONS FOR TE RÜNANGA O NGĀTI MUTUNGA

Dated: 24 March 2021

SOLICITORS:

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Introduction

- 1. For Te Rūnanga o Ngāti Mutunga ("Ngāti Mutunga"), the Mimitangiatua awa represents a link between their tūpuna and present and future generations. This link is a part of their tribal identity. Ngāti Mutunga see it as their responsibility, as kaitiaki, to ensure that the values and tikanga of their tupuna as well as the water itself endures and is passed on to future generations. This will not be possible should these Applications be granted for the duration recommended (10 years, to expire in June 2028).
- 2. Ngāti Mutunga opposes the grant of any consents that would enable Remediation NZ ("RNZ") to accept any more waste onto the site. They acknowledge that consents will be required to enable RNZ to responsibly clean up the site, given the material that already exists there. Any consents issued should be for a short-term for the sole purpose of enabling the site to be remediated as soon as possible.
- 3. Mr Tuuta, Chair of Ngāti Mutunga, will set out who Ngāti Mutunga are and why Ngāti Mutunga oppose any further acceptance of waste materials at the Uruti site. The Mimitangiatua awa is under statutory acknowledgment and is one of four awa recognised as such in the Ngāti Mutunga Claims Settlement Act 2006.
- These submissions focus on legal issues, including:
 - a. 'Renewal' applications.
 - b. Burden of Proof.
 - c. Evidence of adverse effects.
 - d. Evidence on how the operation is going to change.
 - e. Sections 105 and 107 RMA.
 - f. Planning documents, hierarchy and 'Part II'.
 - g. NPS-FM 2020 including Policy 3-24.
 - h. Conclusion.

'Renewal' applications

- An application to 'renew' a discharge permit is technically a "new consent for the same activity" (s124).¹ The terminology 'renewal' is often used as a shorthand.
- 6. Caselaw provides that in a renewal such as this:²
 - a. You must recognise that the current discharge consents have expired.
 - For the purposes of the assessment of effects, the receiving environment is to be imagined as if the current discharges do not actually exist.³
- 7. That is, there is no presumption that the discharge permits will be rolled over.
- 8. In this Committee's Decision of 2010 the consents were given a defined term, upon which they were to expire, for the following reasons:

"[92] The applicant has stated in evidence that poor management has resulted in non-compliance in respect of odour, so there remains risk that full compliance will not be achieved. <u>Granting longer term consents is not</u> <u>appropriate for the community under these circumstances</u>.

[93] A duration of 8 years provides the application enough commercial surety to implement any required upgrades, and allow Council to review the effectiveness of these upgrades within a reasonable timeframe. ...

(Emphasis).

- The focus at that time was on odour, but more generally it was to bring the operation up to a level at which it would comply with the suite of discharge permit conditions.
- 10. Eight years was given to implement upgrades. Sufficient investment has not occurred. RNZ have had numerous opportunities. In 2015 BTW recommended that further analysis be carried out by RNZ for the purpose of addressing adverse effects from contaminate pathways in the Haehanga catchment⁴, including:

"Although outside the budgetary scope of the current investigation some consideration should be given to determine the 'time lag' of transport of chloride

¹ Aratiatia Livestock Ltd v Southland Regional Council [2019] NZEnvC 208 at [22].

² Ngati Rangi Trust v Manawatu-Whanganui Regional Council [2016] NZHC 2948

³ I.e. for the purposes of s 104(1)(a) of the Act.

⁴ BTW "Uruti Composting Facility Management Plan" attached to "Remediation NZ Limited Monitoring Programme Annual Report 2014-2015" TRC Technical Report 2015-68.

(and other contaminates) through the hydrological system as a response to outflow events in summer. ... The downstream impact to stream biota has yet to be quantified as continuous 'time series' groundwater and surfacewater data are currently unavailable.

The preliminary Conceptual Site Model has been developed (Appendix D) but as yet is not confirmed. The CSM has identified potential hydrogeological 'exposure pathways' for contaminates in the Haehanga Catchment, such as the chloride loaded porous surface soils being in direct contact with the shallow water table, and the reaches of the Haehanga Stream 'gaining' water from the groundwater table However, considerable more information is required to confirm the CSM, in particular the identification of downstream receptors for all contaminates potential leaving the site"

- 11. The recommendations in that Report were not acted upon.⁵ The TRC Compliance Reports⁶ show ongoing complaints on odour, prosecution for odour non-compliance, unauthorised discharges and elevated contaminants in surface water, stockpiling compost material outside bunded areas, and other infringements including 'administrative' - such as receiving unauthorised material on-site and mis-recording. These Compliance Reports make for alarming reading.
- 12. For over 8 years, it has been incumbent on RNZ to come to this hearing with detailed information on improvements that *have* occurred. Not improvements that *will* occur.
- 13. To now operate on a presumption that the consents are going to be renewed, would render ineffectual this Committee's Decision in 2010. Yet, as I explain, some comments in the Officer's Report appear to proceed on that basis.

Burden of Proof

14. Applications for a discretionary activity can be granted or declined. The burden of proof to establish that consents should be granted, on the 'balance of probabilities', is on the applicant: ⁷

⁵ Referred to in the evidence of K Beecroft at [17] and [96]-[97].

⁶ Summarised in Attachment 3 of Anne-Maree McKay's evidence.

⁷ Shirley Primary School v Christchurch City Council [1999] NZRMA 66 at [136(1)] approved by the Court of Appeal (Ellen France J) in Ngāti Rangi Trust v Genesis Power Ltd [2009] NZCA 222 (obiter): ... it need only be noted I see no difficulty with the statement in <u>Shirley Primary School v Telecom Mobile</u> <u>Communications Ltd</u> [1999] NZRMA 66 at [121] that "[i]n a basic way there is always a persuasive burden" on an applicant for a resource consent. As the Environment Court said in <u>Shirley</u>, that approach reflects the requirement that a person who wants the court to take action must prove his or her case. In addition, as the court observed at

^[122] there are also statutory reasons for speaking of a legal burden on an applicant:

"In all applications for a resource consent there is necessarily a legal <u>persuasive burden of proof</u> on the applicant. The weight of the burden depends on what aspects of Part II of the Act apply".

- 15. As Panel members you are required to consider, test and weigh the evidence. This includes expert evidence. Ms McArthur is the most experienced freshwater ecologist giving evidence at this hearing. Mr Easton has particular expertise in stormwater. Effects on water quality here are wider than just stormwater. They include diffuse water quality effects from all activities, point source discharge effects, and subsequent effects on aquatic life.
- 16. Some comments in the Officer's Report appear to turn 'on its head' the evidential burden. For example, that adverse effects are not significant or irreversible.⁸ Even if this were correct, that is not the legal test.
- 17. The burden is on RNZ to show that the adverse effects of the operation, as proposed, will meet "sustainable management", as expressed in the relevant planning documents. There is no burden on <u>Ngāti Mutunga</u> to establish that physical effects on the Haehanga Stream flow onto the Mimitangiatua awa. The Applicant's evidence should include robust water quality analysis whether there are potential adverse (physical) effects in the Mimitangiatua. There is no burden on Ngāti Mutunga to show that fish have been killed. As Ms McArthur states: "[*u*]*nless there is an obvious gross pollution incident resulting in wide-scale fish kills*" measurement of physical effects on individual aquatic species is difficult to prove absolutely.⁹ The adverse effects on freshwater ecology here are more subtle, they are insidious.

Evidence of adverse effects

- 18. In renewal consents, the decision-maker has the advantage of considering the actual effects of the activity (currently), to gain a better understanding of what the effects may be if the renewal applications are granted. This is part of the evidence that is to be weighed.
- 19. Ms McArthur's evidence is that:

•

[&]quot;Since the ultimate issue in each case is always whether granting the consent will meet the single purpose of sustainable management, even if the Court hears no evidence from anyone other than the applicant it would still be entitled to decline consent."

Refer also New Zealand Kennel Club Inc v Papakura District Council W100/2005 at [18]: "In short, there should be no presumption that what exists should remain simply because it would be difficult or expensive to remove it, or some similar reason. The proposal must stand or fall on its own merits when assessed under s104 and Part 2 as a discretionary activity."

⁸ Officer's Report comments at [374].

⁹ McArthur at [102].

a. The current operation is having a "significant" adverse effect on water quality and freshwater ecology, as clearly evidenced by a more than 25% reduction in SQMCI between upstream and downstream comparison sites. This is a standard used in other regional plans to measure significant adverse effects.¹⁰

b. TRC's Freshwater Officer also says that recent biomonitoring results suggest "... the wetland system discharge, stormwater run-off, or potential leachate run off/through flow from the irrigation areas into the Haehanga stream are likely contributing to the decline in macroinvertebrate health".¹¹

- c. The discharge from the constructed wetland to the Haehanga Stream causes the stream to grade from an A band to a D band, for the attribute of 'ammonia toxicity' using the upstream comparison site in the affected tributary catchment.
- At times very elevated *E. coli* has been recorded at sites lower in the Haehanga catchment that significantly exceed standards for safe human contact with water.¹²
- e. The ponds that collect leachate and stormwater provide minimal treatment.¹³
- f. There is evidence of potential subsurface leaching to surface water from the irrigation pond,¹⁴ from the vermiculture beds¹⁵ and to groundwater and surface water from the irrigation fields¹⁶
- g. It can be concluded the Haehanga Stream contributes nutrients and possibly other contaminants through to the Mimitangiatua River (although the degree to which this occurs is not known due to lack of sampling).¹⁷

¹⁰ McArthur at [51] – [52] – referring to Proposed Natural Resources Plan for Greater Wellington, Plan Change 6 Hawkes Bay Regional Resource Management Plan and Horizons One Plan.

¹¹ Biomonitoring of the Haehanga Stream in relation to discharges from the Remediation (NZ) Limited composting site at Uruti, January 2021 (Clements 10 March 2021).

¹² McArthur at [81] – [82].

¹³ McArthur at [97] and s42A Report at [97]. Ms Beecroft at [48] "The wastewater is relatively high strength having undergone little more than flow balancing (minimal treatment) through the pond treatment system".

¹⁴ McArthur at [101].

¹⁵ McArthur at [72] and [95].

¹⁶ McArthur at [104] and Table 1.

¹⁷ McArthur at [116].

- h. There is evidence from Ngāti Mutunga that meta-physical effects in the Haehanga stream, flow through to the Mimitangiatua.
- 20. Ms Beecroft's evidence is that:
 - TRC monitoring shows frequent exceedances of the Tier one and Tier two chloride triggers in the existing consents, and that these triggers are inappropriate for long term application of material and fluid.¹⁸
 - b. Officer's Report at [399] "Monitoring has demonstrated that the site activities are having an impact on groundwater (particularly in relation to chloride concentrations)."
 - Irrigation pond ammoniacal nitrogen is high as are the loads of nitrogen (almost entirely made up on ammoniacal nitrogen) applied to land.¹⁹
 (The Officer's Report says "*exceedingly high*").
 - d. Nitrogen, in particular ammoniacal nitrogen measurements in surface waterways indicates a much higher nitrogen loss to water is occurring than is a predicted by RNZ's OVERSEER analysis.²⁰ This, together with groundwater results, suggests the irrigated wastewater is draining to groundwater with little renovation in the soil "[t]his occurs when either the rate of irrigation is too high for the soil type, the soil type is prone to bypass flow (typically due to cracking) or wastewater is applied when the soil is saturated from rainfall."²¹ It seems that one or more of these issues is occurring with the land irrigation of this wastewater.
 - e. No evaluation of phosphorus has been provided.
- 21. These are the effects currently occurring. It is correct that some of these effects have technically been compliant with consent conditions (e.g. the Tier 1, Tier 2 standards for soils). However, they are established effects. With more knowledge in 2021 we know there are significant adverse effects occurring. This should not come as a surprise to the RNZ given previous advice the company received.
- 22. There is also *non-compliance* with consent conditions. For example, RNZ has not completed its riparian planting plan.²² Completion of riparian

¹⁸ Beecroft at [61] agreeing with s42A report at [107].

¹⁹ Beecroft at [63].

²⁰ Beecroft at [85].

²¹ Beecroft at [85].

²² Condition 26 of consent 5838.2 requires that "The consent holder shall maintain the areas of riparian planting, undertaken in accordance with option 1 of riparian management plan RMP383, by ensuring the

planting/fencing of the Haehanga Stream and its tributaries was a condition on the 2010 consent. For this Plan RMP 90383 - now referred to in proposed condition 27 - the Officer's Report recommends a further period (until August 2023) be allowed for it to be completed.

- 23. As I will discuss further, consent conditions where there has been noncompliance, need to be specific. There are different views between TRC and RNZ on the extent Plan RMP 90383 has been completed. To prevent such argument, the riparian planting plan should identify things like tree spacing, species composition, maintenance and replacement conditions and buffer widths.
- 24. I note that completing the Riparian Plan is important but is not a 'silver bullet'. Providing for ecosystem health, threatened species and mahinga kai values requires *all* issues (habitat as well as water quality) to be addressed – riparian margins as well as instream contamination.²³

Evidence on how the operation is going to change

- 25. RNZ is asking you to accept that improvements RNZ intends to make at the site will improve these effects in the receiving environment:
 - For the subsurface leaching problems, stormwater control and the disposal of irrigation water (containing stormwater and leachate) – relatively immediately.²⁴
 - For instream levels of the Haehanga Stream or its tributaries by 1 June 2026.²⁵
- 26. The problem that Ngāti Mutunga has with this proposal is:

- 24 E.g. Condition 7 stormwater runoff is going to be prevented from entering the pads or Paunch Maturation Pond, and all such runoff is to be directed through the wetland system.
- Conditions 9 & 13 60 days following the commencement of these consents all ponds that contain stormwater and/or leachate shall be lined with material that has permeability not exceeding 1×10^{-9} ms⁻¹ to prevent leakage, adn within 90 days the Duck Pond, Collection Pond and other ponds associated with Pad 3 are to be filled & remediated.

ongoing replacement of plants which do not survive, the eradication of weeds until the plants are well established, and the exclusion of stock from the planted areas."

²³ McArthur at [136].

Conditions 11 & 12 – raw waste material is going to be mixed with greenwaste compost within 3 hours of being received onto site (rather than discharged straight to the 'collection pond' or stockpiled on Pad 3). Conditions 14 & 15 – recording of the rate and volume of discharge from the Irrigation Pond is going to occur with appropriate equipment.

²⁵ Condition 19: discharges shall not give rise to [new] ammonia and nitrate nitrogen concentration limits in the Haehanga Stream or any of its tributaries by 1 June 2026.

- a. The consent conditions proposed by TRC Officers would not adequately manage adverse effects.²⁶
- b. What has been recommended in consent conditions bears little resemblance to the application documents (AEE) or the evidence. It is unclear the methodology RNZ intends to use to make these changes, and what the changes will achieve. There are references to improved site management practices but gaps e.g. how can RNZ say that the wetland treatment system remains appropriate (with improvements to its design and maintenance) when the loads and concentrations that need to be treated by that system are not stated and potentially unknown consent conditions would allow an unlimited volume of a large number of varying "Acceptable Wastes" to continue to be received on site.²⁷
- c. Ngāti Mutunga does not believe these improvements will occur. The AEE June 2020 stated:²⁸ *"It is intended that this AEE and application demonstrate the commitment to improvement at the highest levels within the company."* Since that time, TRC have issued 3 abatement notices and 6 infringement notices.²⁹
- 27. The Officer's Report says that "a consent authority, when it imposes conditions is entitled to assume that the applicant and its successor will act legally and adhere to rules and conditions".³⁰ There is a more fundamental issue here there is insufficient evidence that such conditions can be met:
 - Soils have not been characterised to determine suitability of irrigation rates and proposed regime.³¹
 - Insufficient information on the composition of compost for discharge as a soil conditioner.³²
 - Unclear what the future irrigation wastewater quantity will be (Ms Beecroft has assumed that RNZ intends no changes to flow will occur over the future term of the consent).³³

²⁶ McArthur at [117] – [119].

²⁷ Beecroft at [50] and McArthur at [129].

²⁸ Page 78 under 4.9 "Compliance With Existing Consents and Environmental Performance".

²⁹ Officer's Report page 42, Table 9 List of incidents between 1 October 2020 and 31 January 2021.

³⁰ At [162] Referring to 88 The Strand Ltd v Auckland City Council (2002) NZRMA 475, at [19].

³¹ Beecroft at [91].

³² Beecroft at [57].

³³ Beecroft at [70].

- Unclear how the routine harvesting of baleage from the irrigation areas will be managed or monitored.³⁴
- e. Site nitrogen balance predicted does not take into account losses from roads, pads, ponds or wetland.³⁵ Yet these additional losses are likely occurring. Stormwater falls/flowpaths are not detailed/established. Difficult to achieve an impermeable layer in natural clay liners. The current consent conditions <u>already</u> state (condition 6) *"Any pond(s) used on site for the purposes of stormwater and leachate treatment shall be constructed and maintained in a manner which avoids seepage of wastewater through the pond walls entering the surface water".*
- f. No feedstock characterisation or reception process outlined regarding management of different materials based on risk profile.³⁶
- g. Unclear how/where the leachate/run-off from the vermicomposting rows will flow and/or be captured.³⁷
- 28. 'Adaptive management' for the site is mentioned but it is not outlined how it will occur. Adaptive management usually involves starting small, with an adequate prediction of potential adverse effects, and then increasing the activity if 'alerts' or 'triggers' are not reached.³⁸ 'Adaptive management' is not an approach relying on unspecified future technologies in order to meet consent conditions.
- 29. With the history of non-compliance, the detail on these matters should not be left to management plans to be certified by TRC. Where compliance has been poor, consent conditions should be specific, clear and accurately worded so that compliance can be readily ascertained without the need for subjective judgment.³⁹
- 30. In Cox v Kapiti Coast District Council [1994] NZRMA 282 the then Planning Tribunal considered an application for a childcare centre in a residential neighbourhood and stated:

"In our opinion where a person potentially affected by an activity has reasonable cause to fear amenity detraction from noise then an applicant is

³⁴ Beecroft at [75].

³⁵ Beecroft at [81].

³⁶ Beecroft at [89].

³⁷ Beecroft at [99].

³⁸ E.g. definition of "adaptive management" in Resource Management (National Environmental Standards for Marine Aquaculture) Regulations 2020.

³⁹ New Zealand Kennel Club Inc v Papakura District Council W100/2005.

under an obligation to call evidence which allays those fears by either providing them groundless or by producing proposals to deal with potential harm."

- 31. In that case the proposals to allay neighbours' concerns about amenity relied heavily on 'trusting' the good management of the applicant because the applicant was reluctant to accept conditions imposed on it that would limit flexibility. That is, the mitigation measures proposed depended to a large extent upon the management of the childcare centre. As there were doubts around the ability to manage the childcare centre in this way, the application was declined.
- In this instance, the conditions recommended by TRC rely heavily on management plans.⁴⁰ There are no controls, for example, on the volumes of waste to be received and how each waste stream/feedstock is to be managed. This is not the right case to leave key details to future management plans.
- 33. There needs to be some evidential foundation as to how these conditions are going to be met, given:
 - a. The history of non-compliance at this site.⁴¹
 - b. The inadequacy of the management plans that have been submitted with the AEE.⁴²
 - c. Management plans approved by TRC under the 2010 consent have enabled a 'legacy' of 20,000 tonnes of compost contaminated with drilling waste to accumulated on the site, not able to be sold or (presently) not able to be discharged to land.
 - d. Management planning has allowed "... organic material (that could otherwise be composted) is also being deposited directly into the collection pond and continues to be added to the existing stockpiled material, which is in turn contributing to the 'legacy issue' that is a

⁴⁰ Condition 21 Pond System Management Plan (PSMP), condition 26 Nitrogen Management Plan (NMP), condition 34 (soil conditioner certification), condition 36 (Contingency Plan), Condition 37 Site Exit Plan (SEP).

⁴¹ New Zealand Kennel Club Inc v Papakura District Council W100/2005: "... a Consent Authority should not assume that an applicant will not comply with the terms of a consent, and decline a consent for that reason... But that is not to say that a history of non-compliance, or poor compliance, is irrelevant in the process. It can be taken into account for some purposes: see eg <u>New Zealand Suncern Construction</u> <u>Ltd v Auckland City Council</u> [1997] NZRMA 419. It is legitimate, we think, to have regard to such a history in considering conditions which might be attached to a consent under s108 to at least mitigate adverse effects.... <u>Useful conditions generally, and especially where past compliance has been poor, will be specific, clear, and accurately worded so that compliance can be readily ascertained (not least by the applicant itself) without reliance on the discretion or subjective judgment of any individual or group. "(Emphasis)</u>

⁴² Beecroft at [51] and [112].

significant problem for RNZ." (s42A Report at [190]). The chlorides in this pile leach into the pond system ([219]).

34. The Officer's 42A Report states ([438]):

"Overall we believe RNZ's proposal to compost organic waste material into a saleable produce, while undertaking the activities in accordance with recommended consent conditions (and appropriately mitigating any adverse effects), is consistent with Part 2 of the RMA."

35. This appears to be a proposition that a composting activity could theoretically be managed upon this site. It does not reflect the application documents or the evidence. It requires a significant leap of faith. Saying 'consent could theoretically be granted' is looking to another reality than the one we face.⁴³

Section 105

- 36. In relation to discharge permits, section 105 requires you to have regard to:
 - a. The nature of the discharges and the sensitivity of the receiving environment.
 - b. The applicant's reason for the discharge.
 - c. Any possible alternative methods of discharge, including discharge to another receiving environment.
- 37. The sensitivity of the receiving environment is high. The Haehanga Stream enters the Mimitangiatua awa.

Catchment	Recreational & fishery values	Aesthetic & scenic values	Comments	
		Good scenic values, steep		
	Whitebaiting.	cliffs with puketea forest.		
Mimi	Good diversity of native aquatic fauna including	High ecological values in upper reaches.	Retained native vegetation.	
	eels, whitebait, bullies and torrent fish.	Estuary considered to be an area of outstanding coastal value.	U	

Specific values recognosed in the RPS and RFP for the Mimitangiatua River catchment (reproduced from Appendix I of the RPS).

⁴³ Although the Officer's Report recommendations are highly qualified e.g. at [432]:

[&]quot;Our recommendation to grant the applications assumes that the adverse effects on river values can be adequately avoided, remedied or minimised and that aquatic offsetting and/or compensation is appropriate for any residual effects. If that is not the case, then the activity cannot be allowed." (Emphasis).

- 38. Policy 3.1.4 Freshwater Plan provides: "The high natural, ecological and amenity values of those rivers and streams listed in Appendix 1A will be maintained and enhanced as far as practicable. Adverse effects of activities on these values will be avoided as far as practicable, or remedied or mitigated".
- As stated, the significance of the Mimitangiatua awa to Ngāti Mutunga is also acknowledged by statute.
- 40. Yet the alternatives assessment produced by RNZ is very brief.⁴⁴ The alternative of moving the operation elsewhere does not appear to have been discussed.

Section 107

- 41. Under section 107, if certain effects arise, then the application can only be granted on an exceptional or temporary basis. One of these effects is *"significant adverse effects on aquatic life"* (s107(1)(g)).
- 42. The current un-ionised ammonia limit from the wetland discharge is allowing significant adverse effects on the environment. There is unequivocal evidence from Ms McArthur that ammoniacal nitrogen from the site's operation is contributing to significant adverse effects.
- 43. The Officer's Report recommends rolling over the current ammoniacal nitrogen limit until 2026, stating that although this does not comply with the NPS-FM 'bottom line', that the NPS-FM requires the community, through the regional planning process, to develop a timeframe for compliance with proposed standards.⁴⁵ The Officer's Report recommends graduating to improved (but also inappropriate) limits in 2026. Ngāti Mutunga disagrees with this interpretation of the NPS-FM.
- 44. That the activity does not comply with the National Objectives Framework in the NPS-FM (NOF) is highly relevant. The bottom lines in the NOF have been established by a Freshwater Science and Technical Advisory Group made up of some of NZ's most respected water quality scientists. Ammoniacal nitrogen is a *toxicity* attribute. It would be surprising, and arguably contrary to giving effect to

⁴⁴ Officer's Report at [417] "RNZ's application states that large holding ponds could be constructed and the stormwater and leachate irrigated back over the composting pads. However, they consider this to be impractical due to the large stormwater volumes that would need to be discharged. The option of discharging stormwater and leachate from vermiculture activities to land instead of water has not been discussed."

⁴⁵ Officer's Report at [187].

the remainder of the NPS-FM, if the community decided these toxicity levels should continue for a period of time (in the freshwater planning process).

- 45. Granting a consent below national bottom lines would be *contrary to* enabling effective community consultation to occur. Freshwater plans are to be notified in 2024 with rules coming into effect immediately. Granting such consent will *undermine* the ability for the community to achieve its aspirations for the Mimitangiatua catchment in a timely way.
- 46. Even if the Officers' interpretation of the NPSFM 2020 is correct i.e. that applicants are allowed 'transition' time to meet national bottom lines - the NPS-FM cannot 'override' section 107 of the RMA. The applications need to be analysed according to s107(1)(g). They have not been.

Planning documents, hierarchy and 'Part II'

- 47. There is no longer an 'overall judgment' approach to by applied to your assessment, and the policy documents provide direction.
- 48. As to whether you refer back to Part II of the Act, although Taranaki Freshwater Plan is old, it contains important policy.
 - a. Regional Freshwater Plan for Taranaki:

Mimitangiatua is recognised as a catchment with high natural, ecological and amenity values.

Refer Attachment 1 - selection of relevant policies of the RFP. Policy 6-22(b):

"Discharges of contaminants or water to land or water from point sources should:

(b) <u>maintain or enhance</u>, after reasonable mixing, <u>water quality of a</u> <u>standard that allows existing community use of that water for contact</u> <u>recreation</u>, and water supply purposes, and maintains or enhances <u>aquatic ecosystems</u>."

(Emphasis)

b. Ngāti Mutunga Iwi Management Plan

Refer the evidence of Anne-Maree McKay.

- 49. There must be a fair appraisal of the relevant objectives and policies of these planning documents.⁴⁶
- 50. Even if recourse is to be had to Part 2 of the Act, this can't be done in a way that would subvert these important policies.
- 51. Under Part 2, you must recognise and provide for "[*t*]he relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga" (s 6(e)).

National Policy Statement Freshwater Management (NPS-FM) 2020

- 52. Mr Tuuta will speak to the concepts of Te Mana o Te Wai and Ki Uta Ki Tai in the NPSFM 2020. Te Mana o Te Wai expresses Treaty principles, including the principles of rangatiratanga and active protection.⁴⁷ Every regional council must give effect to Te Mana o Te Wai.⁴⁸
- 53. The Officer's Report indicates a view that community consultation (e.g. under the freshwater planning process) is required before we can understand what 'Te Mana o Te Wai' means. For the Mimitangiatua and its tributaries, we do not need to wait. The evidence is before you. Evidence will show strong ancestral connections between Ngāti Mutunga and the Mimitangiatua. The current operations are having significant adverse effects on the mauri of the Mimitangiatua and are not giving effect to Te Mana o Te Wai.
- 54. Te Mana o Te Wai has been relevant to consent decisions since at least 2015. The Environment Court decision in *Sustainable Matatā* concerned a proposal to discharge wastewater to land that may enter surface water.⁴⁹ In that case, no regional plans or regional policy statements had been prepared to implement (then) NPS-FM 2014. This did not prevent the Court making a full assessment of provisions of the NPS-FM including, importantly, Te Mana o Te Wai. The Court discussed the relational aspect of Te Mana o Te Wai, in that particular waterbodies are linked with the identity of tangata whenua, noting that such waterbodies are found in tribal pepeha. The Court found that, while not a

⁴⁶ Te Rūnanga o Ngāti Awa v Bay of Plenty Regional Council [2019] NZEnvC 196, (2019) 21 ELRNZ 539 upheld by the High Court decision at paragraph [82].

⁴⁷ Aratiatia Livestock Ltd v Southland Regional Council [2019] NZEnvC 208 at [22].

⁴⁸ Policy 3-2(2) NPS-FM. Refer also Policy 1 "Freshwater is managed in a way that gives effect to Te Mana o Te Wai".

⁴⁹ Sustainable Matatā v Bay of Plenty Regional Council [2015] NZEnvC 90. Discharge of town wastewater to land - in a worst-case scenario there would be no attenuation of Nitrogen and Phosphorus before the wastewater surfaced in farm drains and there could be an increase in N and P pumped from farm drains into the Channel, thus entering the Tarawera River.

discharge into water per se, "evidence was that all of the iwi would consider that the mauri of these waters, would be affected by the proposal given the certainty that there will be some nutrient and phosphorus loadings discharged into the [Old Rangitaiki Channel] and from there into the Tarawera River".⁵⁰ The Court found that, if Nitrogen and Phosphorus were not reduced there, relational values associated with Te Mana o Te Wai in the catchment would be affected. Those parameters were required to be reduced.

55. The point is, the Court's decision was made after hearing the evidence, including from tangata whenua. The Court did not need to await a further freshwater plan process.⁵¹

Policy 3-24 NPS-FM 2020

56. Ngāti Mutunga agrees with the Officer's interpretation of 3-24 of the NPSFM 2020 that the discharges will result in a loss of "river values".⁵² Loss of these river values must be <u>avoided</u>, unless the council is satisfied there is a functional need for the activity in that location *and* the effects management hierarchy is applied. "Avoid" denotes very directive policy intent. I address these two conjunctive tests "*functional need*" and "*effects management hierarchy*" as follows:

Functional need

57. Wave energy turbines have a functional need to be located in the coastal environment⁵³, a water bottling plant has a functional need to be located next to the resource that it utilises (an aquifer - it must be bottled at source),⁵⁴ some roads have a functional need to traverse wetlands/streams due to the fact that roads need to be able to be able to be built and sections of road need to be connected.⁵⁵ A composting and vermiculture plant does <u>not</u> have a functional

(a) Human wastewater is significantly attenuated;

(c) Levels of N and P discharged to the ORC are reduced."

⁵⁰ Above cited at [405].

⁵¹ Refer above-cited at [423] – [424]: "We conclude from this evidence in relation to freshwater policy that wastewater or discharge from the [Land Application Field] into surface water is not acceptable to tangata whenua, and increased N and P will affect their relational values associated with Te Mana o Te Wai in the catchment. These values are more consistent with the improvement and enhancement of the ORD and require adequate mitigation. ... We conclude that the National Policy Documents would be met if:

⁽b) All e-coli are removed'

⁵² Officer's Report at [376].

⁵³ Crest Energ Kaipara Ltd v Northland Regional Council [2011] NZEnvC 26 at [23].

⁵⁴ Te Rūnanga o Ngāti Awa v Bay of Plenty Regional Council above-cited footnote 46.

⁵⁵ Waka Kotahi NZ Transport Agency v Manawatū-Whangani Regional Council [2020] NZEnvC 192.

need to be located at this position in the Uruti Valley. The resource it uses is land.

- 58. The National Planning Standard's definition of "functional need" means "the need for a proposal or activity to traverse, locate or operate in a particular environment because the activity <u>can only occur</u> in that environment". This definition differs from "operational need", which states: "The need for a proposal or activity to traverse, locate or operate in a particular environment because of technical, logistical or operational characteristics or constraints." The existence of infrastructure at the Uruti site may create an "operational" need, it does not create a functional need.
- 59. The Officer's Report interpretation of "functional need" ("*it is not practicable to discharge to a different location*")⁵⁶ would undermine the very purpose and intent of that NPS-FM Policy.

Effects management hierarchy

- 60. Even if you do decide that the proposal has a "functional need" to be located at its current site, the effects management hierarchy has not been applied. More than minor residual adverse effects are not proposed to be the subject of a valid offset or aquatic compensation. The retrospective attempt to do so, does not meet the framework.
- 61. The proposal is contrary to Policy 3-24.

Site Remediation and associated conditions (including bond)

- 62. The stockpiling of more than 20,000 tonnes of mixed material that includes drilling waste that has not been able to be remediated. Some such material has already been distributed around the site,⁵⁷ contrary to Rule 29. When consulted on the applications in 2018, Ngāti Mutunga raised concerns the site would end up as a contaminated site like the closed NPDC municipal dump on Okoki Road.⁵⁸
- Ngāti Mutunga opposes the proposal to utilise the mix for bunding and 'soil conditioner'.
- 64. The Officer's recommendation includes to grant consents authorising discharge of "material stored on Pad 3 as at the date of commencement of these consents

⁵⁶ Officer's Report at [377].

⁵⁷ Including approximately 4,000 tonnes to enhance irrigation areas Officer's Report at [70].

⁵⁸ As recorded in Assessment of Cultural Effects, 11 July 2018, contained in the AEE at Table 2, page 7 (Landpro Ltd).

('stockpiled material') to land for use as a soil conditioner". But this activity has not been applied for. In my submission, there is no jurisdiction to grant such an authorisation.

65. The application document that forms the scope for these applications, was for:59

The discharge of: a) waste material to land for composting; and b) treated stormwater and leachate, from composting operations; onto and into land in circumstances where contaminants may enter water in the Haehanga Stream catchment and directly into an unnamed tributary of the Haehanga Stream at Grid Reference (NZTM) 1731656E-5686190N, 1733127E-5684809N, 1732277E-568510N, 1732658E-5684545N & 1732056E-5684927N.

(and to discharge emissions into the air)

66. The public notification (Attachment 2 to these legal submissions) reflected that.

67. This is not an omnibus application like in Westfield NZ Ltd & Ors v Upper Hutt City Council (2000) 6 ELRNZ 335 where the public notification by the Upper Hutt City and Wellington Regional Councils placed each consent application in its proper category. Neither does section 104(5) of the RMA allow the grant of consent for an activity that was not applied for.

- If the drilling mud mix is to be applied to land, additional consent (applications) would be required.
- 69. Site clean-up is going to incur expense. Condition 38(d) provides for an initial bond quantum to be assessed following the preparation of the SEP, and an independent bond assessor to be appointed by TRC should agreement not be reached on bond quantum. The inclusion of a bond condition is welcomed, but the quantum of the bond is (obviously) directly linked to what is going to be required by the SEP.
- 70. Condition 38 states that bond quantum "shall be sufficient to ensure compliance with condition 37 ... in the event of any default by the consent holder".
 Condition 37 sets out some requirements for the SEP, including:
 - a. general requirements (a) (h); and
 - b. that the SEP be reviewed by a "suitably qualified and experienced person approved by the Chief Executive".

⁵⁹ Uruti Consent Renewal Application 2017.

- 71. Ms Beecroft for RNZ has recommended additional requirements in her evidence for the SEP, including the involvement of Ngāti Mutunga.⁶⁰
- 72. There are no provisions regarding what occurs where a dispute arises between TRC and RNZ about whether the SEP meets the requirements in (a) (h). Some of these requirements are vague e.g. (c) "how all stockpiled waste will be removed and appropriately disposed of"; (e) "how irrigated soils and groundwater will be <u>remediated</u>" and (f) "<u>timeframes</u> for undertaking the activities identified …". These items raise the questions, what is the appropriate disposal of the stockpiled waste? To what levels should irrigated soils be remediated? What is a reasonable timeframe for this to occur?
- 73. Given the potential for dispute, the desire of Ngāti Mutunga to have involvement in this plan, and the historical difficulties with managing this operation through management planning, the SEP should be developed and submitted prior to any consents being granted. That is, Ngāti Mutunga does not accept a 3 month time period after any consent is granted for a Site Remediation Plan to be developed and submitted to TRC.
- 74. Accordingly, Ngāti Mutunga seek:
 - a. Directions that RNZ prepare a SEP (in an adjournment).
 - b. Provide an opportunity for all parties to comment on the SEP, with an opportunity for further evidence on it at a reconvened hearing.
 - c. A decision of this Panel on Site Remediation conditions, to be included on the face of any consents granted, and to be completed within an defined, reasonable, timeframe. (The timeframes proposed of 20 or 40 years are not acceptable to Ngāti Mutunga.)

Conclusion

- 75. RNZ has been 'on notice' since this Committee's decision of 2010. RNZ had a limited period of time (at least 8 years) to improve the site operation.
- 76. Now, in 2021, Ngāti Mutunga is being asked to accept ongoing adverse effects to the Haehanga Stream and the Mimitangiatua (spiritual and physical effects) while allowing RNZ to continue to accept additional organic waste streams, of an unknown and potentially increasing volume, when the adverse effects are currently "significant". This creates a high evidential burden on RNZ. Despite

⁶⁰ Beecroft at [110].

lengthy opportunity, there is insufficient evidence from RNZ that effects can be managed to acceptable levels.

- 77. Witnesses:
 - a. Jamie Tuuta (cultural).
 - b. Katie Beecroft (soils/site operations).
 - c. Kate McArthur (water quality/ecology).
 - d. Carol Shenton (cultural).
 - e. Rawiri McClutchie (cultural).
 - f. Anne-Maree McKay (cultural).

Dated this 24th day of March 2021

S Ongley

Counsel for Te Rünganga o Ngāti Mutunga

Selection of relevant Policies of the Regional Freshwater Plan for Taranaki

Policy 4.1.1

Wāhi tapu and other sites or features of historical or cultural significance to lwi and hapu of Taranaki, and the cultural and spiritual values associated with fresh water, will be protected from the adverse effects of activities, as far as practicable.

Policy 4.1.2

Adverse effects of activities on mahinga kai and the habitats of species harvested by Tangata Whenua, will be avoided or mitigated to the fullest extent practicable.

Policy 4.1.6

Procedures and approaches will be adopted to enable lwi and hapu of Taranaki to participate in fresh water management decision making.

Policy 6.2.1

In managing point-source discharges to land and water, the Taranaki Regional Council will recognise and provide for the different values and uses of surface water including: (a) natural, ecological and amenity values;

(b) the relationship of Tangata Whenua with water;

(c) the maintenance and enhancement of aquatic ecosystems, and water quality for fisheries and fish spawning;

(d) use of water for water supply purposes;

(e) use of water for contact recreation.

Policy 6.2.2

Discharges of contaminants or water to land or water from point sources should:

(a) be carried out in a way that avoids, remedies or mitigates significant adverse effects on aquatic ecosystems;

(b) maintain or enhance, after reasonable mixing, water quality of a standard that allows existing community use of that water for contact recreation, and water supply purposes, and maintains or enhances aquatic ecosystems.

Policy 6.5.3

The Taranaki Regional Council will manage the discharge of contaminants to land and water such that any actual or potential adverse effects on groundwater quality are avoided, remedied or mitigate



Taranaki Regional Council

Public Notice of Applications for resource consent

PUBLIC notice is hereby given that the Taranaki Regional Council has received the following application for resource consents.

The application is to renew resource consents to discharge waste material, treated stormwater & leachate, and to discharge emissions into the air from composting operations

Applicant:	Remediation (NZ) Ltd
Address for service:	PO Box 8045, New Plymouth 4342 or david@revitalfert.co.nz
Location:	1460 Mokau Road, Uruti
Consent No:	5838-3.0
Application lodged:	To discharge:
	a) waste material to land for composting; and
	b) treated stormwater and leachate from composting operations onto and into land in circumstances where contaminants may enter water in the Haehanga Stream catchment and directly into an unnamed tributary of the Haehanga Stream
Consent No:	5839-3.0
Application lodged:	To discharge emissions into the air, namely odour and dust, from composting operations

Any person wishing to make a submission on any or all of the applications may do so by making a written submission to the Taranaki Regional Council. Submissions must be on *Form 13*, which is available from the Taranaki Regional Council offices or may be downloaded or completed online at www.trc.govt.nz.

Submissions are to be completed by sending a written submission to Taranaki Regional Council, Private Bag 713, Stratford 4352 or by email to <u>consents@trc.govt.nz</u>, or by completing an online submission at <u>www.trc.govt.nz</u>. Submissions must be received **no later than 11th February 2019**.

The submission must be dated and signed (unless submitted by electronic means), and include the following information:

- 1. name and contact details of person making the submission (including email);
- 2. details of the application in respect of which you are making the submission, including the application number, name of the applicant, and location;
- 3. the submission, with reasons;
- 4. the decision you wish the Taranaki Regional Council to make, and the nature of any conditions sought by you;
- 5. whether you wish to be heard in support of your submission.

Any person may make a submission on the application, but a person who is a trade competitor of the applicant may do so only if that person is directly affected by an effect of the activity to which the application relates that:

- (a) adversely affects the environment; and
- (b) does not relate to trade competition or the effects of trade competition.

A copy of every submission must also be served as soon as reasonably practicable on the applicant, whose address for service is specified above. This is the responsibility of the person lodging the submission.

The applications and accompanying information may be viewed at the Taranaki Regional Council offices, 47 Cloten Road, Stratford, during normal working hours or on the Council website at <u>www.trc.govt.nz/public-notices</u>. For queries regarding the applications contact Darlene Ladbrook, Senior Consents Administration Officer by email at <u>consents@trc.govt.nz</u>, or by phoning 06 765 7127.

B G Chamberlain Chief Executive Taranaki Regional Council 12 January 2019

REPORT

Haehanga Catchment Preliminary Groundwater Investigation















Haehanga Catchment Preliminary Groundwater Investigation

Remediation New Zealand

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1-7-2015

Date

2-7-2015 Date

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1 INTRODUCTION

1.1 Scope

This report has been prepared for Remediation New Zealand Limited by BTW Company. This short technical report summarises available information relating to groundwater investigations in the Haehanga Catchment, adjacent to the Remediation New Zealand Uruti Composting Facility.

For a full site description and environment setting, readers are directed to the Uruti Composting Facility Management Plan. This report is a follow up investigation to further detail groundwater interactions beneath the composting facility. The investigation comprised a desktop review of available information from the three monitoring bores on site combined with soil profiles and bore permeability tests undertaken on site.

1.2 Objectives

The primary objective of the investigation was to provide addition information to support management of the groundwater resource beneath the Uruti Composting Facility.

Specific objectives were to:

- Undertake a topographical survey of the site;
- Level survey the three monitoring bore heights in Mean Sea Level (MSL) to allow groundwater elevations to be calculated;
- Undertake bore permeability tests so that groundwater velocities could be determined;
- Make recommendations for future groundwater/hydrogeological monitoring to assist site management, and;
- Produce a preliminary or unconfirmed Conceptual Site Model

2 GROUNDWATER SITE WORKS

2.1.1 Monitoring Bore Description

In February 2011, three monitoring bores (GND 2188, 2189 & 2190) were advanced on site, using a 600mm solid stem auger attached to a hydraulic digger (Cowperthwaite, pers comms 2015). The bores were advanced to 4.10metres below ground level (mbgl) for GND 2188, 3.3 m for GND 2189 and 3.45 m for GND 2190. Slotted 51.8 mm diameter PVC pipe was installed in each monitoring bore.

Monitoring bore locations are shown on the site plan in Figure 2.1-2.3. Monitoring bore construction details are in Appendix A. Photographs of the well construction are presented in Appendix B.

Although the bores were advanced under a supervision of a hydrogeologist, bore logs and/or description of the soils and aquifer properties encountered were not recorded. From available site photos taken on the day of installation, the full length of the screen appears to be slotted. This is in contrast to the design specification in Appendix A. Details related to the filter pack, cementing and/or gravel around the screen are also not accurately known. The influence this data gap has on bore development, permeability tests and velocity calculations is uncertain.



Figure 2.1:Uruti Composting Topography Survey-lower part of site. Green dot denotes GND 2190 and reduced level

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Figure 2.2:Uruti Composting Topography Survey-middle part of site. Green dot denotes GND 2189 and reduced level

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2.1.2 Topographic Survey and Conceptual Site Model

GND 2188, GND 2189 and GND 2190 bores heights were surveyed by BTW Company surveyors on January 8th 2015. The survey established coordinates relative to Geodetic Datum (Taranaki 2000) and the elevation of the top of the casing relative to Mean Sea Level (Taranaki Datum 1970). BTW Company recorded spot heights adjacent each monitoring bores to corroborate surface elevation adjacent the bores.

The Topographic Survey formed the basis of the preliminary Conceptual Site Model (CSM) in Appendix D. The CSM was developed in Civil3E software, with all elevations in Mean Sea Level to the Taranaki 2000 Geodetic Datum. At present the CSM is unconfirmed and requires significantly more input to identify other potential contaminate sources and likely downstream receptors, both ecological and human. The preliminary CSM has however, defined the general hydrological setting in terms of hydraulic gradients down the Haehanga Stream, groundwater direction and hydrogeological interactions with the Uruti Composting Facility.

2.1.3 Soil and Aquifer Properties

For a description of the shallow soils encountered on the Uruti Composting Facility to two metres below ground level (mbgl), readers are directed to Section 2.3 in Uruti Composting Facility Management Plan. In brief, the soils encountered across the site were dominated by orthic brown/grey silty soils with increasing clay content at lower elevations across the site and with increasing depth. Surface soils to 250 mm deep were dominated by light brown loams and grey silty topsoil. However, between 250 mm and 1500-2000 mm, soils were characterised as silty clay with medium plasticity, traces of orange clay material, smaller particle sizes and soils were generally more friable. The shallow groundwater table was not encountered on the day of sampling but soils were generally damp below 0.5-0.75 mbgl.

Currently, detailed lithology of the site below 2000mm has not been determined as bore logs were not undertaken at the advancement of the monitoring bores. Subsequently, information which is critical to determining groundwater velocities including aquifer depth, confining structures and aquifer properties below 2000 mm deep were estimated from site visits, the topographic survey and observation of site staff during construction activities. The influence that aquifer properties below 2 metres have on groundwater velocities is uncertain, in terms of over and/or under estimating velocities. For the current groundwater velocity calculations, the aquifer properties were estimated as 'Silty Clay', with an effective soil porosity of 0.01 or 1% to the base of the aquifer (McWorter and Sunada 1977).

Well construction information is also limited but deemed critical to the analysis of slug test data, and as such several of the perimeters required for the Bouwer and Rice Method (1970) were estimated from the monitoring well schematic (Appendix A). These parameters were screen length, base of aquifer and the annular fill above the screen. It is therefore highly recommended that all future monitoring bores installed onsite, accurate bore logs and lithology below 2 m be described, along with accurate bore construction information as to allow recalculation of groundwater velocities.

2.1.4 Groundwater Level Gauging

The monitoring bores (GND 2188, 2189 & 2190) have been gauged for depth of water between 9 and 10 times, from February 2011 to January 2015. Groundwater level data is presented in Table 2.1 and 2.2.

Well ID	Date	Well TOC reduced level (m amsl)	Depth to water (m below TOC)	Groundwater Elevation (mamsl)
GND2188	4/02/2011	35.61	0.89	34.72
GND2189	4/02/2011	30.82	0.89	29.93
GND2190	4/02/2011	24.90	0.95	23.95
GND2188	11/02/2011	35.61	0.88	34 73
GND2189	11/02/2011	30.82	0.81	30.01
GND2190	11/02/2011	24.90	0.97	23.93
CND2199	19/08/2011	25.61	0.76	34.85
GND2188	19/08/2011	20.92	0.75	30.07
GND2189 GND2190	19/08/2011	24.90	0.75	24.15
CND2100	26/04/2012	25.61	1.40	24.21
GND2188	26/04/2012	35.01	0.71	20.11
GND2189	26/04/2012	30.82	No data	No data
GND2190	20/04/2012	24.90	No data	No uata
GND2188	21/11/2012	35.61	1.27	34.34
GND2189	21/11/2012	30.82	0.74	30.08
GND2190	21/11/2012	24.90	0.86	24.04
GND2188	14/06/2013	35.61	0.83	34.78
GND2189	14/06/2013	30.82	0.61	30.21
GND2190	14/06/2013	24.90	0.60	24.31
GND2188	14/01/2014	35.61	1.00	34.61
GND2189	14/01/2014	30.82	0.94	29.89
GND2190	14/01/2014	24.90	0.94	23.97
CND3199	15/05/2014	35.61	0.70	34.91
GND2180	15/05/2014	30.82	0.40	30.42
GND2189 GND2190	15/05/2014	24.90		50.42
CHIDALAS	44/40/0044	25.61	0.43	25.10
GND2188	11/12/2014	35.01	0.75	20.54
GND2189	11/12/2014	30.82	0.28	24.67
GND2190	11/12/2014	24.90	0.24	24.07
GND2188	8/01/2015	35.61	1.22	34.39
GND2189	8/01/2015	32.80	1.06	31.74
GND2190	8/01/2015	24.90	1.30	23.60

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GND2188	30/04/2015	35.61	0.703	34.91	
GND2189	30/04/2015	30.82	0.553	30.27	
GND2190	30/04/2015	24.90	0.71	24.19	

Table 2.2:Seasonal C	Groundwater L	evels in th	he Haehanga	Catchment
----------------------	---------------	-------------	-------------	-----------

	-			
GND2188	Min Groundwater RL	34.21	Max Groundwater RL	35.18
GND2189	Min Groundwater RL	29.76	Max Groundwater RL	30.54
GND2190	Min Groundwater RL	23.60	Max Groundwater RL	24.67
GND2188	Summer RL	34.60	Winter RL	34.85
GND2189	Summer RL	30.05	Winter RL	30.23
GND2190	Summer RL	24.15	Winter RL	24.23

2.1.5 Groundwater Velocity

To establish groundwater velocities through the shallow groundwater table, BTW Company staff undertook two bore permeability tests on the monitoring bores GND 2188 and GND 2190 (January 8th 2015).

The 'slug test' method requires removal of a set amount of water, where after recovery of water levels is timed with a stopwatch. The four litre 'slug' was removed by a high rate vacuum pump, and the recovering water level was determined with a calibrated electronic dip tape. Both monitoring bores did not fully recover to their initial water levels after 100 minutes. GND 2188 recorded sudden surges in water levels after several minutes, with erratic variability in water levels during the timed recovery phase. User error and dip failure were ruled out as both BTW Company technicians corroborated the water level measurements and operation of the electronic dip tape in a bucket of water. Groundwater levels in GND 2190 fluctuated in the initial three minutes after 'slug' removal but in the next one hour and 14 minutes water levels stabilised but never fully recovered to initial water level. However, final water levels only measured 10mm below the initial water level.

The erratic water levels in GND 2188 during recovery phase of the 'slug test 'are represented in Figure 2.4.



Due to the inconsistencies recorded in GND 2188, only permeability calculations were undertaken for GND 2190. These calculations were undertaken using the Bouwer and Rice method (1976) available from free software from the USGS website (<u>http://pubs.usgs.gov/of/2002/ofr02197/index.html</u>) and the online Bouwer and Rice calculator (<u>http://www.groundwatersoftware.com/calculator 11 slugtest.htm</u>).

The following calculations were then used to determine hydraulic gradient and linear groundwater velocity following Darcy's Law:

$$i = \frac{dh}{dl} = \frac{h_2 - h_1}{\text{length}}$$

where

i is the hydraulic gradient (dimensionless),

dh is the difference between two hydraulic heads (Length in metres), and

dl is the flow path length between the two piezometers (Length in metres)

Whereas

Groundwater velocity (v) based on Darcy's law and the velocity equation of hydraulics is given

by:

v = Ki/n

where;

K is hydraulic conductivity,

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i is hydraulic gradient in the direction of groundwater flow

n is effective soil porosity (function of grain size and sorting).

Based on these parameters above, average hydraulic gradients and linear groundwater velocities have been estimated. Hydraulic gradients have be determined from the groundwater reduced levels in the monitoring bores GND 2188 to GND 2190 and distances between bores taken from the Topographic Survey (Figure 2.1-2.3).

Yielding:

K= 2.24* 10⁻⁶ or 0.00000224 m/sec

i= average 0.01196

n= 0.01 or 1 % for Silty Clay (McWorter and Sunada, 1977).

Table 2.3; Groundwater Velocities in the Haehanga Catchment

Hydraulic	Average velocity	
Gradient	(m/day)	
0.01196	0.2315	

Table 2.3 above outlines average hydraulic gradients and average groundwater velocities adjacent GND 2190. Due to the limited groundwater gauging data for Winter and Spring months (3 occasions) it's as yet uncertain the impact what higher groundwater elevations have on hydraulic gradients across the Haehanga Catchment, and whether this impacts groundwater velocities. Furthermore, the velocities estimates in Table 2.3 are likely an underestimate for the middle to upper parts of the Haehanga Catchment, which has steeper topography therefore, higher hydraulic gradients and are overlain by more porous silty loamy/clay soils.

2.1.6 Groundwater- Surface water interactions

The interaction between the shallow groundwater table and the Haehanga Stream is a function of the elevation of the water table adjacent the Haehanga streambed. For example, if groundwater elevations in the monitoring bores are greater than the stream bed elevation, in all probability the stream will be gaining water from the shallow groundwater table. Conversely, streams can lose water from the groundwater table by outflow during periods of low groundwater levels when stream flows are high.

The degree of connection between the Haehanga Stream and the unconfined groundwater table changes laterally in space over differing reaches of the stream and over time. As the shallow groundwater table responds to recharge from rainfall, previously losing reaches become gaining reaches (Table 2.4). For example the reach of Haehanga Stream adjacent GND 2190 in December 11th 2015 and April 30th 2015 was probably losing to the Haehanga Stream. Both time periods coincided with 102 and 59 mm of rainfall in the preceding two days, with elevated soil moistures in the range of 44 and 45 %. Conversely, prior to January 8th 2015, Uruti received only 1 mm of rain in the previous eight days, with soil moistures at 32 %, this would have resulted in minimal outflow 'gaining' from the Haehanga Stream to the groundwater table.

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Table 2.4: Stream and Groundwater Elevations (msl)

Date	Bore	Bore elevation	Stream Elevation	GW elevation	Groundwater Connectivity
30-04-2015	GND 2188	35.61	35	34.907	Gaining from stream
30-04-2015	GND 2189	30.82	30	30.267	Losing to Stream
30-04-2015	GND 2190	24.9	24	24.19	Losing to Stream
08/01/2015	GND 2188	35.61	35	34.39	Gaining from stream
08/01/2015	GND 2189	30.82	30	31.74	Losing to Stream
08/01/2015	GND 2190	24.9	24	23.6	Gaining from stream
11/12/2014	GND 2188	35.61	35	35.18	Losing to Stream
11/12/2014	GND 2189	30.82	30	30.54	Losing to Stream
11/12/2014	GND 2190	24.9	24	24.665	Losing to Stream

3 DISCUSSION

This preliminary groundwater investigation in the Haehanga Catchment recorded the clay soils form a semi-impervious shallow groundwater table overlain by more porous silty loamy-clays. The shallow groundwater table has been recorded between 0.25 metres below ground level (mbgl) at lower elevations of the site and 0.43 mbgl at higher elevations. The greatest depth to the groundwater table was recorded on GND 2188 on April 26th 2012 at 1.4 mbgl. The average depth to the groundwater table adjacent GND 2190 (most down-gradient bore) is 0.81mbgl. Therefore the shallow groundwater table is in almost constant interaction with the more porous loamy silty-clay's.

Seasonal differences are evident in groundwater elevations across the site, with the Winter-Spring months recording higher groundwater elevations. The groundwater flow pattern most likely is subdued to the overall topography, and flowing in a down valley gradient. Groundwater velocities have been estimated in the order of 0.2315 m/day. However, due to inconsistences in slug test data, only permeability calculation for one monitoring bore GND 2190 (lower part of the site) could be assessed. It must be noted that the Clay content of the soil profile was higher adjacent GND 2190 compared to the mid and upper parts of the site. Higher groundwater velocities would be expected through the more porous loamy soils adjacent GND 2189 and GND 2188.

The close hydraulic connection between the Haehanga Stream and the shallow groundwater has been documented as observed by Regional Council Staff. Rainfall recharge to groundwater is influenced by the hydraulic properties of the overlying soils, with the soils storage capacity the main characteristic to determine the recharge rate. At present rainfall recharge estimates which may influence potential contaminate loadings to the shallow groundwater table have not be made.

Appendix C goes some way to document how discharge/outflow events (i.e no rainfall, decreased soil moistures) and continued leachate irrigation results in elevated chloride concentrations in both the surface and groundwater resources. During these discharge events, where stream-flows are low over the summer months, the shallow groundwater table is most likely losing water to the Haehanga Stream. Therefore, limited water within the shallow groundwater table and the Haehanga Stream appears unable to attenuate the continued drainage losses of chloride through the soil profile as a result of continued irrigation.

Although outside the budgetary scope of the current investigation some consideration should be given to determine the 'time lag' of transport of chloride (and other contaminates) through the hydrological system as a response to outflow events in summer. At summer low flow periods, there is likely a greater potential of elevated chloride loadings to the Haehanga Stream and other downstream receptors. The downstream impact to stream biota has yet to be quantified as continuous 'time series' groundwater and surfacewater data are current unavailable.

The preliminary Conceptual Site Model has been developed (Appendix D) but as yet is not confirmed. The CSM has identified potential hydrogeological 'exposure pathways' for contaminates in the Haehanga Catchment, such as the chloride loaded porous surface soils being in direct contact with the shallow water table, and the reaches of Haehanga Stream 'gaining' water from the groundwater table, adjacent GND 2190 in the lower irrigation zone. However, considerable more information is required to confirm the CSM, in particular the identification of downstream receptors for all contaminates potential leaving the site, not only chloride but also metal and hydrocarbons contaminates.

4 **RECOMMENDATIONS**

The following recommendations aim to improve the management of water resources in the Haehanga Stream. These recommendations are additional to the recommendations made in the Uruti Composting Facility Management Report.

Specific recommendations include;

- Undertaking groundwater levels (and conductivity) measurements daily in the existing and proposed monitoring bores.
- Incorporate and align groundwater gauging data with surface water data (quantity and quality) with meteorological information to develop a Uruti Composting Facility Monitoring Plan.
- After 12 months of data collection, use the Monitoring Plan above as the basis for a catchment impact assessment, with the following goals
 - Assess the potential adverse effects to downstream receptors in the Haehanga and Mimi River.
 - 2. Use the monitoring data to gauge the success of the previously recommended site improvements outlined in the Uruti Composting Facility Site Management Plan.
 - 3. Update and confirm the preliminary Conceptual Site Model with the monitoring data. The CSM will assist in future investigations on site, with emphasis on the transport of potential contaminates through the Haehanga hydrological system to important downstream receptors, such as the regionally significant Mimi Stream.
 - 4. Use the updated groundwater and stream flow monitoring and meteorological data to calculate rainfall recharge rates, and then model chloride 'fate and transport' through the soil profile to surface waters.
- Ensure that all future monitoring bores advanced onsite be done so by an approved drilling contractor, so that accurate bore logs and lithology can be determined.
- It is also recommended that the groundwater velocity calculation be updated once the lithology and bore construction data is ascertained for any bores advanced in the upper parts of the site.

BTW Company has prepared this report for RNZ using available data sources, generally accepted practise and standards at the time it was prepared (June 2015). It is noted that the following limitations exist in the data potentially impacting on hydrogeological interpretation.

Information in this report cannot be used or reproduced without the prior authorisation of BTW Company. The following limitations are also acknowledged;

- The lack of lithology data and bore construction information. It is accepted that bore logs are only an indication of inferred ground conditions at the specific location. However, without this data aquifer properties were estimated as clay to the base of the aquifer. For example, although the clay above 2000 mm appears continuous, uncertainty exists at greater depths to whether the clay forms a continuous layer or more permeable loamy/organic soils exist. However, in all probability the underlying papa mudstone would be a deeper confining layer across the catchment. Papa outcrops in the Haehanga Stream substrate are commonplace and observation of staff during construction activities suggest basement geology is between 3-6 metres deep.
- Therefore, the aquifer depths required to calculate the Bouwer and Rice Method (1976) were estimated from general site observations, and from interpreting spot heights from the topographic survey.

REFERENCES

Bouwer, H. and R.C. Rice, 1976. A slug test method for determining hydraulic conductivity of unconfined aquifers with completely or partially penetrating wells, Water Resources Research, vol. 12, no. 3, pp. 423-428.

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APPENDIX A MONITORING WELLS- REMEDIATION NEW **ZEALAND- URUTI**

Monitoring wells – Remediation New Zealand - Uruti



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CASING and SCREENS: PVC: 51.8mm (2-in) satisfactory, slotted screen. Steel, Teflon The location of the three monitoring wells are approximately at:

MW 1 – Baseline at 1732369 E – 5684631 N GND2188

MW2 – Irrigation area 1 at 1732302 E – 5684926 N GND2189

MW3 – Irrigation area 2 at 1731851 E – 5685677 N GND2190

Monitoring well installation

- Final depths should be measured and recorded
- The slotted portion of the pipe should start 0.2m below the ground level as per the schematic. This is not the case in all the bores.
- The top of the monitoring well should be capped to prevent contaminants entering the bore
- The top of the casing should be 300 mm above the ground and sealed so that potential contaminants or small animals cannot get in.
- A 2 meters perimeter fence should be erected around the monitoring well (i.e, 0.5 x 0.5 x 0.5 x 0.5)

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APPENDIX B

MONITORING BORE INSTALLATION





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APPENDIX C

SOIL MOISTURE AND RAINFALL RECHARGE ON CHLORIDE CONCENTRATIONS IN GROUNDWATER

Preliminary Summary

Examination of soil moistures (2003-2015), rainfall statistics, and available water chemistry data record elevated chloride within groundwater during periods of low rainfall and soil moistures (groundwater discharge to stream). During these periods groundwater levels (and most probably stream levels) are reduced (Table 2.1 & 2.2) and there is limited water within the hydrological system to attenuate the irrigated leachate. For example, the highly elevated chloride concentrations recorded in March 2014 in the Haehanga Stream and the monitoring bore GND 2190, coincided with the second lowest monthly rainfall total between 2003 and 2014, a very low soil moisture of 18% (yellow bars in figure below).

It is therefore, recommended that the following be considered:

 Once the water level recorder site has been installed in the Haehanga Stream, a full hydrogeological investigation should be undertaken in 12 months. This investigation should incorporate all the updated data streams including rainfall, soil moisture, groundwater elevations and Haehanga Stream discharge volumes. This will assist in quantifying potential drainage losses and/or adverse effects from the Uruti Composting Facility to surface water receptors downstream.



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APPENDIX D PRELIMINARY UNCONFIRMED CONCEPTUAL SITE MODEL

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