Memorandum

To	The Hearing Committee
From	Kim Giles, Consents Officer Nathan Crook, Environmental Scientist – Soil & Water Quality Colin McLellan, Consents Manager
File	05838-3.0, 05839-3.0
Document	2118498
Date	2 March 2021

Consents 5838-3.0 and 5839-3.0 to discharge contaminants from composting operations:

- **to land, including in circumstances which may result in those contaminants (or other contaminants emanating from those contaminants) entering water in the Haehanga Stream catchment;**
- **directly into an unnamed tributary of the Haehanga Stream; and**
- **to air.**

Applicant	Remediation (NZ) Limited
Postal address	PO Box 8045, New Plymouth 4342
Site location	1460 Mokau Road, Uruti
Grid references	Generally between grid references: 1732658E-5684545N and 1731656E-5686190N, and at 1732740E-5685038N (approximate location of discharge to unnamed tributary)
Legal description	Sec 34 Pt Sec 4 Blk II Upper Waitara SD
Catchment	Mimi
Tributary	Haehanga

Table of contents

List of Appendices

1. Purpose

1. This report provides the Taranaki Regional Council (Council) officers' assessment of applications lodged by Remediation (NZ) Limited (RNZ) against the provisions of the Resource Management Act 1991 (RMA).

2. Introduction

2. RNZ is a vermicast (worm casting) and compost production company that supplies organic fertiliser to both organic and conventional growers. These products are produced from a range of locally sourced organic waste streams such as paunch[1] and chicken mortalities.

3. The Uruti site is 641 ha in total area and the composting operations (which occupy a small area of the site), are situated approximately 1.3 km inland of State Highway 3. The operational area is illustrated in Figure 1, which shows two composting pads (Pads 1 and 2), the drilling mud/stockpile pad (Pad 3), worm beds, the wetland treatment system, and the irrigation pond system.

4. Pad 2 receives paunch that is used in vermicast production. Pad 1 receives a range of organic material that is blended with shredded greenwaste and untreated sawdust, and windrowed. Pad 3, previously referred to as the "drilling mud pad", has until recently, been used to process drilling waste and organic material such as chicken mortalities[2] and fish waste.

5. RNZ has lodged an application to renew consents 5838-2.0 and 5839-2.0. The consents expired in June 2018 but in accordance with Section 124 of the RMA, RNZ has continued to operate under the expired consents.

6. RNZ's application was received on 30 November 2017. The information provided with the application was generally of a lower quality than expected for applications of this nature.

7. The application was publicly notified on 12 January 2019.

8. Several requests for further information were made in accordance with section 92 of the RMA. The information provided in response to these requests was often inadequate.

9. The final version of the application, essentially being the further information requested, was provided on 15 June 2020.

10. Our assessment of RNZ's application takes into account the information provided with the application and subsequent information provided during the course of processing the application. A detailed description of the application is provided in Section 4 of this report.

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[1] Partly digested grass from a cattle beast's stomach at slaughter.

[2] Dead chickens regularly collected from poultry farms.

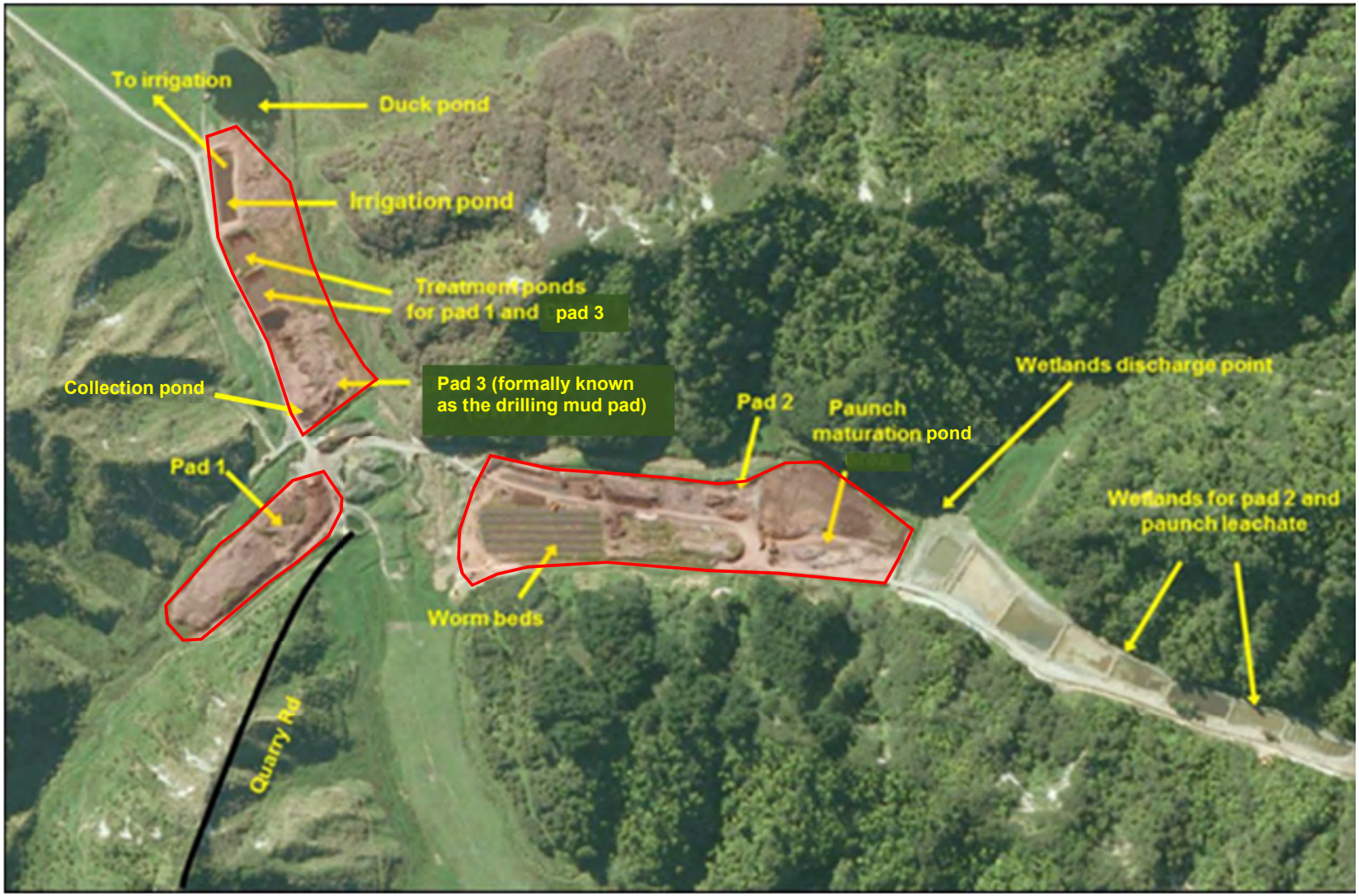

Figure 1: Operational area

11. This report contains our assessment of RNZ's application under the RMA, including our recommendation that the consents be issued for a duration of 10 years (from the date of expiry of the previous consent), subject to conditions that include:

- specifying the type of material that can be accepted onsite;
- requiring daily reporting of accepted material;
- requiring specific site management practices to be undertaken;
- limiting the concentration of contaminants in the receiving environment;
- requiring the preparation and implementation of monitoring and management plans;
- requiring the preparation of a site reinstatement plan, including the requirement for a bond.

3. History

12. The site was initially established following the removal of composting operations from the old Winstone Aggregates quarry site, Manutahi Road, Bell Block. Closure of the composting operations was due to the incompatible nature of the activity with surrounding land use (being nearby residential houses), which resulted in odour incidents.

13. The Council granted consents 5838-1.0 and 5839-1.0 on 24 July 2001, relating to activities associated with the composting and vermiculture operations at the current site. At the time of processing the applications, the Council determined that the effects from the proposed activities were no more than minor and the consents were processed on a non-notified basis.

14. Applications to renew these consents were publicly notified on 21 March 2009 on the basis that the actual and potential adverse effects of the proposal were more than minor. The Council received 13 submissions and a hearing was held on 6 May 2010, following two prehearing meetings.

15. The principal points of contention at the hearing were odour, effects of discharges on water and soil, public health effects, and consent duration. RNZ's poor compliance history was also discussed.

16. Legal counsel for a number of submitters argued that overall, the recommended conditions of consent would not ensure the effects of the composting operation were avoided, remedied, or mitigated such that the community would be provided for, therefore the applications failed to meet the statutory purpose of the RMA and should be declined.

17. On 27 May 2010, a Council appointed Hearing Committee ('the Committee') determined that the applications be granted for a period of 8 years, subject to conditions which placed emphasis on the use and appropriate management of treatment facilities. The Committee noted RNZ's poor compliance history but was satisfied that their prior conduct should not be the basis for determining the applications.

18. The Committee granted the consents for a duration of 8 years as there was still a risk that full compliance would not be achieved (therefore granting longer term consents was not appropriate for the community). It was also noted that 8 years would provide the applicant enough surety to implement any required upgrades, and that it was likely the cost of renewing the consents again in 2018 would be low if an adequate level of compliance was achieved.

19. The renewed consents authorised the waste types listed below (plus any other waste material not listed, but approved by the Council):

- small volumes of animal manure from meat processing plant stock yards;
- green vegetative wastes;
- biosolid wastes[3], including but not limited to pellets from wastewater treatment plants;
- mechanical pulp and paper residue (excluding any pulping waste that has been subject chemical pulping or treated or mixed with any substance or material containing chlorine or chlorinated compounds);
- solid drilling cuttings from hydrocarbon exploration with a maximum hydrocarbon content of 5% total petroleum hydrocarbons prior to mixing or incorporation;
- water based and synthetic based drilling fluids from hydrocarbon exploration with a maximum hydrocarbon content of 5% total petroleum hydrocarbon prior to mixing or incorporation;
- vegetable waste solids (being processed by-products);
- fish skeletal and muscle residue post filleting (free from offal);
- poultry industry waste (eggshells, yolks, and macerated chicks); and
- farm dairy oxidation pond solids.

20. Although there were no conditions restricting the volume of material being brought to site, a condition of consent limited the surface area of Pads 1 and 2 to 3,500 m^2 and 4,000 m^2, respectively. The size of these Pads has become progressively larger over the term of the expired consents and they are now approximately double the size specified in the consent conditions.

21. The consents were also granted on the basis that the activities would be undertaken as described in the applications, i.e.:

- material received on Pad 1 would be blended with shredded greenwaste and then screened and blended for sale;
- paunch received on Pad 2 would be wedge piled, fed to the worm beds, and then screened and dried to form vermicast (which is then sold);
- drilling waste received in the collection pond would be blended with bulking agents (shredded greenwaste and sawdust) prior to being stockpiled in rows for composting, and then processed through the vermiculture process.

[3] Organic material resulting from the treatment of domestic sewage.

22. However, it has become evident through the current consent renewal process that the only material that has since left the site, is the vermicast[4]. Almost all of the other material received onsite for the past 10 years, including some unauthorised material (but also authorised organic material that could otherwise be composted), has been deposited into the collection pond, blended with bulking agents, and then stockpiled on Pad 3.

23. As a result, the stockpile on the Pad 3 is now greater than 20,000 tonnes. This material does not comply with composting standards (after approximately 15 years) which RNZ believes to be a result of ineffective turning of the material and not turning it frequently enough. This has caused what's referred to in RNZ's application as a "legacy" issue, as they have been unable to sell this product off-site due to its association with drilling activities.

24. It also means that RNZ has not produced any saleable compost from the site in the last 10 years, other than the vermicast.

25. RNZ's poor compliance record is addressed later in this report.

4. The proposal

26. Contrary to what was described in the previous applications (2010), the current application indicates that the vermiculture and composting processes operate completely separate to one another i.e. none of the material received on Pad 1, or the drilling waste, have gone through the vermiculture process as previously stated.

27. RNZ's application includes a description, and estimated volumes, of the material they propose to receive during the renewed consent term (some of which is not currently authorised). The description of material is included in Table 1 below, and the estimated volumes in Appendix 1 of this report.

28. The application states that following consultation with Ngāti Mutunga, biosolids waste will no longer be accepted onsite. And as a result of the issues associated with the existing stockpiled material, RNZ also stopped receipt of all drilling waste material as of 31 December 2020.

29. The proposed vermiculture[5] and composting processes are illustrated in the overall process diagram (Figure 2), and discussed in more detail in Section 4.

30. The proposal outlined below is generally as described in RNZ's application.

[4] The end-product of the breakdown of organic matter by worms i.e. worm faeces.

[5] The cultivation of annelid worms (earthworms or bloodworms), particularly for use in composting.

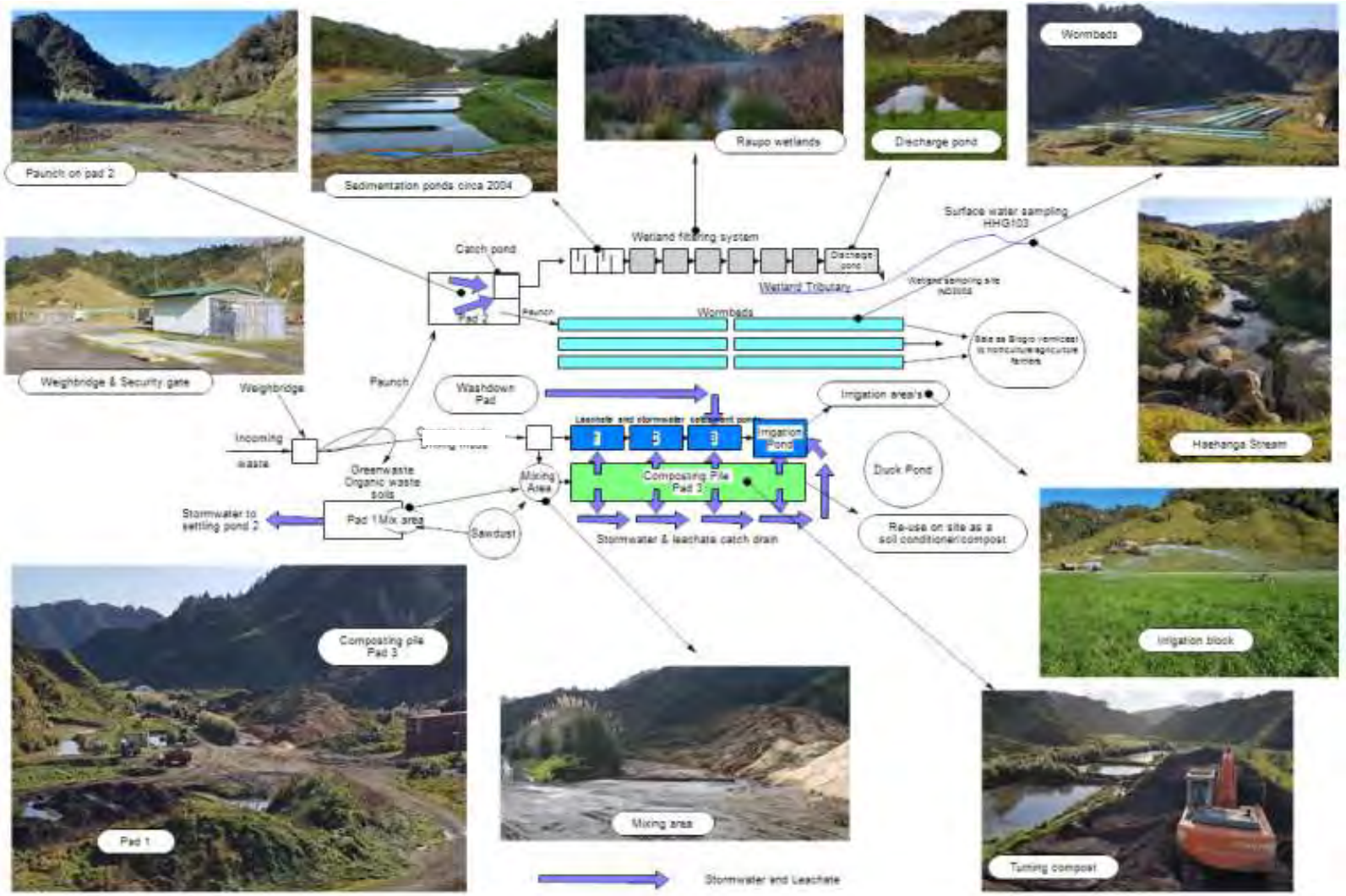

Figure 2: Overall process diagram

Table 1: Description of proposed waste streams

Material	Description
Paunch grass	Grass from the gut of animals which is recovered at the abattoir during slaughter. This material contains nutrients and beneficial organic matter, and is ideal for vermiculture and composting.
Poultry industry waste	An industry waste stream including eggshells, yolks, macerated chicks, and chicken mortalities.
Green vegetative wastes	Greenwaste including lawn clippings, tree prunings etc. Greenwaste is the main bulking agent, as it has the correct carbon to nitrogen ratio for optimal composting. It is sourced from greenwaste collection services in Taranaki and the Colson Road Transfer Station.
Sawdust	Untreated sawdust is used as a bulking agent, predominantly for the drilling waste streams, however it will also be used to ensure the correct carbon/nitrogen ratio is achieved in the composting of food scraps. The sawdust is sourced from Taranaki Pine.
Molasses	Out of spec material from stock feed or molasses manufacturing plants.
Dairy industry waste	Waste that may be in liquid or solid form and includes cheese, milk powder, cream, whey, casein or other dairy extracts.
Food scraps from domestic household and commercial restaurant collection	Food scraps from the New Plymouth kerbside collection, including bones, food scraps (fruit, vegetables, meat, bread, dairy, cooked food), kitchen paper towels, cut flowers, drink scraps (coffee grounds, tea leaves/bags), eggshells and seafood shells.
Palm kernel/grain or other stock feed	Palm kernel that is out of spec, contaminated, or otherwise unable to be sold.
Grease trap waste (from food service industries)	Waste from the cleaning/emptying of grease traps associated with restaurants and other service industries that are required to trap grease prior to discharging to municipal waste.
Tallow	A rendered form of beef or mutton fat.
Pea fat	Waste fat from freezing works/abattoir activities.
Water treatment sludge	Sludge from the water settling ponds at the New Plymouth Water Treatment Plant.
Soil remediation	'Soil remediation' is used to describe small batches of soil that is, or is alleged to be, contaminated.
Mechanical pulping and paper residue	Untreated mechanical pulp and paper residue from the pulp and paper industry. Excludes pulping wastes that have been subject to chemical pulping or treated or mixed with any substance or material containing chlorine or chlorinated compounds.
Prolick	An animal feed/supplement waste product that is out of spec, or cannot be sold for some other reason.
Canteen waste from Powerco and Fonterra	Typically small amounts of food scraps, similar to that from the New Plymouth kerbside collection.
Diatomaceous earth mix	Used for water filtration at both the New Plymouth Todd Energy Aquatic Centre and Fonterra Kapuni. Diatomaceous earth is a naturally occurring rock which requires replacement periodically in order to be effective (for filtration purposes).

Animal manure from meat processing plant stock yards, stock truck effluent collection facilities, and dairy farm oxidation pond solids	Similar to paunch, manure collected from yards and ponds at meat processing facilities requires disposal. Stock truck effluent collection facilities also need to dispose of collected effluent, and occasionally dairy farm oxidation ponds also need to dispose of solids offsite.
Vegetable waste solids	Processed by-product waste.
Fish skeletal and muscle residue post filleting	Fish industry waste (excluding offal).
Other material in emergency situations	Recent events such as poultry shed fires, and the COVID-19 outbreak have proven the essential nature of the composting facility, as waste meat, poultry, and tannery hides all required disposal when New Zealand's borders were closed. At all times, RNZ request that their consents allow for the receipt of organic material to deal with such emergencies, with approval from the Council.

4.1 Vermiculture operation

31. Vermiculture uses earthworms to decompose organic material, namely paunch. RNZ states that they receive approximately 4,000 tonnes of paunch annually from Riverlands (Eltham). Paunch, shredded greenwaste, stockyard solids, and buffering materials such as sawdust provide the bulk of material that is fed to the worms.

32. The vermiculture operation is carried out from Pad 2, which receives paunch only. The paunch is deposited into a pond on Pad 2 for storage. The lower section of Pad 2 is used as a worm breeding bed. When required, the paunch is removed from the pond and is spread across windrows, approximately 3 metres wide by 0.5 metres high, which are raked and covered (Figure 3). The worms within the beds digest the paunch and convert it into vermicompost[6] and then to vermicast.

Figure 3: Vermiculture beds

[6] Humus-like material produced by worm composting.

33. In order to feed the worms, the covers are taken off the worm beds and a layer of paunch is placed on top. The worms move into the new layer of paunch and initially turn it into vermicompost. This is repeated several times before the top layer of vermicompost (along with the worms) is taken off and placed on the ground to form a new worm bed. The material left behind within the old worm bed is known as vermicast, which is then screened and dried to form the final product.

34. A typical windrow is illustrated in Figure 4[7].

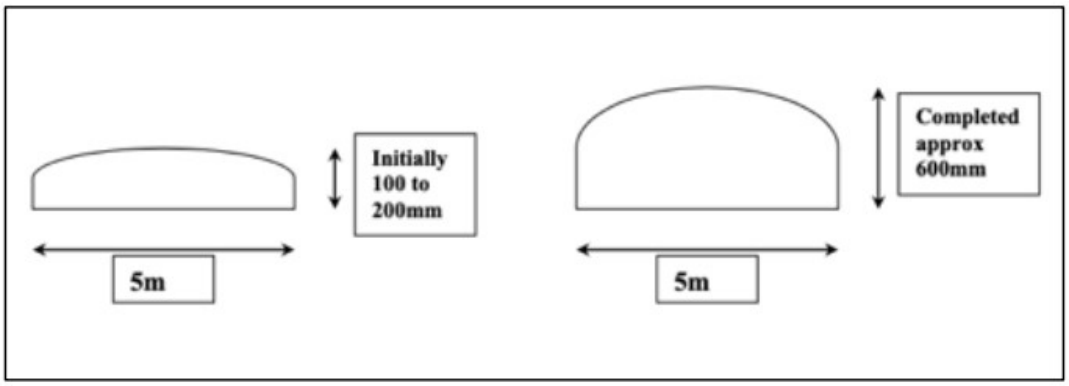

Figure 4: Diagram of a typical windrow

35. RNZ's application states that the vermiculture process undertaken is certified organic. In addition to supplying nutrients to plants, vermicast also improves soil structure leading to an increase in water and nutrient holding capacities of soil.

36. The process involves an extended period of standard aerobic composting over a minimum of 35 – 40 days. The temperatures associated with vermiculture are a lot lower than that of greenwaste composting and typically range between 20°C and 30°C. The general process for vermiculture is as follows:

- Windrows are covered with mats to retain moisture and reduce wind effects;
- Worms aerate the windrows during the natural vermiculture process, however the windrows need to be aerated approximately every 30 days to ensure the whole windrow is digested and that the environment is kept aerobic;
- Digestion by the worms, provides an aerated environment as well as increases the soil surface area. The larger surface area allows a host of critical bacteria to have access to more compost at any given time;
- In order to obtain total pathogenic mitigation, a time period of 80 – 120 days is required (however this can be altered to suit the waste line to ensure total disinfection);
- Beds (vermicast) are harvested on a four monthly basis. A base of at least 50 mm remains to ensure no topsoil/clay is collected, eliminating the potential for contamination;
- Vermicast is then prepared for sale by drying it and either mixing, selling as is, bagging or making it into liquid vermicast products;
- Vermicast is sampled annually for a wide range of analytes in accordance with strict organic certification procedures.

[7] Remediation (NZ) Ltd (September 2017). Organic Production Protocols – Greenwaste Composting and Vermiculture.

37. Stormwater runoff and leachate from the paunch pond is directed to a wetland treatment system (WTS), which is described below.

4.2 Wetland treatment system

38. Leachate from the vermiculture process enters the WTS. The WTS has an initial sediment retention pond ('maturation' pond), followed by seven ponds in series. The maturation pond allows solids to settle out before pumping to each section. The pond is de-sludged on an 'as required' basis, with the sludge material applied to the compost pile on Pad 1.

39. Once the leachate has passed through the WTS, it is collected in a 1,000 m^3 capacity pond and pumped back to the top tier of the wetland during dry conditions. The total holding capacity of the WTS is approximately 5 million litres.

40. Each tier of the wetland is planted with various species of plants (including kuawa, raupo, and jointed baumea) to deal with varying nutrient levels of leachate. The plant species located in the first tiers have been selected as they are resilient to the higher concentrated loadings from the leachate as it enters the system. A discharge outlet is situated at the uppermost extent of each tier to increase the residence time of the leachate in each of the separate areas.

41. Tier 1 contains a series of filter socks, positioned parallel to one another, which are designed to remove solids from the leachate (Figure 5). Each section thereafter also has a filter sock at the exit weir.

42. The stormwater and leachate passes through the WTS to the final pond before discharging to the unnamed tributary of the Haehanga Stream.

43. Plant die-back (raupo) can reduce the treatment capabilities and capacity of the WTS, which in turn can lead to higher ammonia levels in the discharge and/or contribute to higher levels by the breakdown of plant protein. RNZ's application states that the wetland was cleaned out and areas replanted with raupo in early 2019, after RNZ identified that there had been little management and maintenance of the wetland since its installation. RNZ believes this increased the retention time within the wetland, ensuring that the system continues to function as it should.

Figure 5: Tier One of the WTS

4.3 Composting operation

44. Composting is described as the controlled microbial transformation of organic materials under aerobic and thermophilic conditions into a soil conditioner and organic fertiliser. The composting operation blends organic material with carbon rich products (such as sawdust and greenwaste) which is then windrowed and left to mature. The composting process is carried out by a large number of micro-organisms and depending on the raw inputs can take a number of months (or in the case of drilling muds, a number of years) to mature.

45. Typically, the composting process occurs in two phases. The first "composting" phase is signified by high temperatures and rapid decomposition. Generally, time-temperature requirements are met within the first month or so in order to destroy pathogens. Composting is generally completed within six weeks.

46. The second "curing" phase is signified by lower temperatures and a slower rate of decomposition. Curing creates 'mature' compost that can be applied to soils without causing adverse effects i.e. will no longer reheat upon remixing/turning. Curing typically takes about 6 months. Mature compost is moist and cool, has an earthy smell, and a friable texture.

47. RNZ uses a technique called 'windrow composting' whereby material is placed in long rows with a triangular cross-section. The windrows are turned on a regular basis to:

- Mix the material and ensure uniform conditions throughout the pile;
- Increase airflow through the pile, ensuring that the pile remain aerobic and increasing the rate of decomposition;
- Meet the conditions for destroying plant and animal pathogens.

48. This composting process is based on best practice guidelines provided within the New Zealand Composting Standard[8]. The initial composting phase should be for at least four to six weeks, followed by an additional one month (at least) of curing time[9].

49. RNZ's application states that generally, the key to maintaining correct temperatures (signifying that the composting process is correctly maintained) is to ensure that the initial waste input mix is correct, particularly in terms of moisture content (40-50%), and that there is adequate airflow through the windrows. If odour is present then the windrow is turned to improve aeration. In the event of a breakdown in the process, immediate steps are taken to measure moisture content, pH, temperature, and take the necessary action.

4.3.1 Pad 1

50. Pad 1 will receive organic material which will then be blended with shredded greenwaste and untreated sawdust to achieve the required carbon/nitrogen ratios, windrowed and left for up to 4 weeks before being turned. The mixture will be turned up to five times as it moves towards the back of the pad where it's then left to maturate. Untreated sawdust and completed compost will also be stored on this pad.

51. Material will typically be on Pad 1 for 24 weeks, after which time it is composted. If, after 24 weeks there is a shortage of space for the additional material coming through, the composted material can be removed off the pad to another area onsite while it matures, prior to removal from the site.

52. Product that has completed the composting process is tested against the NZ Composting Standard. If it is within the A1 standard, the compost will be sold or used off-site. If the compost conforms to the B1 standard, it will be used onsite as a soil conditioner/bunding (discussed in more detail in Section 4.3.2). This is illustrated in the compost flow model (Figure 6).

[8] New Zealand Standard: NZS 4454:2005 Compost, Soil Conditioners and Mulches.

[9] New Zealand Standard: NZS 4454:2005 Compost, Soil Conditioners and Mulches. Appendix K – Best Practice Guidelines for Composting Systems.

53. During the composting process generally 50% of the mass is lost which leaves 4,000 tonnes of product for removal as compost per year (based on 8,000 tonnes of material received). RNZ expects that 3,000 tonnes of this product will be A1 grade compost which will be removed from the site. The remainder of the product is likely to be B1 grade which is proposed to be used onsite. Any surplus B1 grade material will be blended with composting material until it meets A1 grade and is exported.

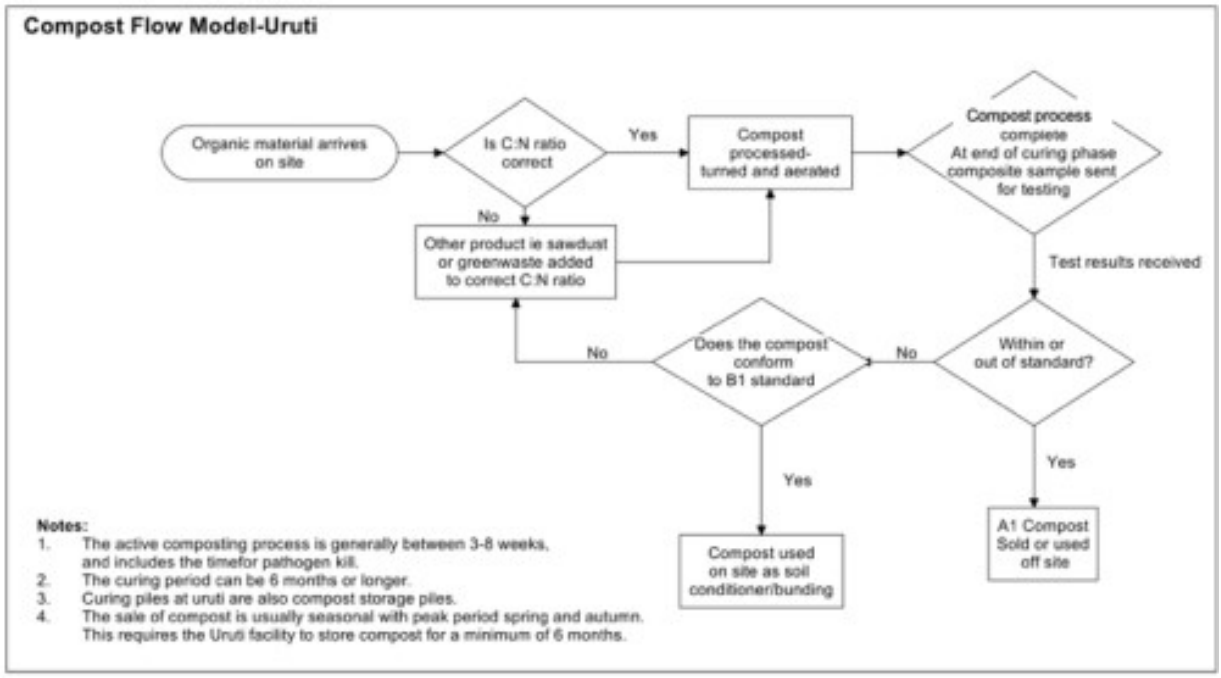

Figure 6: Compost flow model

54. RNZ propose to receive up to 8,000 tonnes of organic product per annum, including kerbside food waste collection from the New Plymouth District Council (NPDC). A list of the proposed organic material (including volumes) is included in Appendix 1. The proposed volumes are based on volumes received to date, and also on anticipated volumes from kerbside food waste and other contractual arrangements.

55. RNZ's application states that once drilling waste is no longer received, and the >20,000 tonnes of existing stockpiled material is completely removed, it will be possible to process up to 30,000 tonnes of organic material through the site per year.

56. Stormwater and leachate from Pads 1 and 3 is collected and directed to a pond treatment system (PTS) before being irrigated to land. The PTS consists of a dewatering and collection pond, a silt pond, a skim pond, settling ponds 1 and 2, and an irrigation pond. The treatment system is described in more detail in Section 4.4.

4.3.2 Pad 3 / existing stockpiled material

57. Pad 3, formally referred to as the 'drilling mud pad', now holds more than 20,000 tonnes of stockpiled material. Previously, drilling waste material along with organic material (such as chicken mortalities, fish waste, hatchery waste, and any other organic material), was unloaded into the collection pond on Pad 3. This material was removed with a digger and blended with bulking agents, such as shredded greenwaste, sawdust, and wood shavings, and then stockpiled on Pad 3 (Figure 7).

Figure 7: Pad 3 composting pile

58. RNZ has since acknowledged that significant nutrients were being lost from this process (and unnecessarily added to the irrigation pond), as the material was beginning to break down in the collection pond before being removed and blended. This is supported by Figure 8 which shows the ammoniacal nitrogen (NH_4) levels in the irrigation pond increasing significantly around this time (September 2017), while the volume of greenwaste remained largely unchanged.

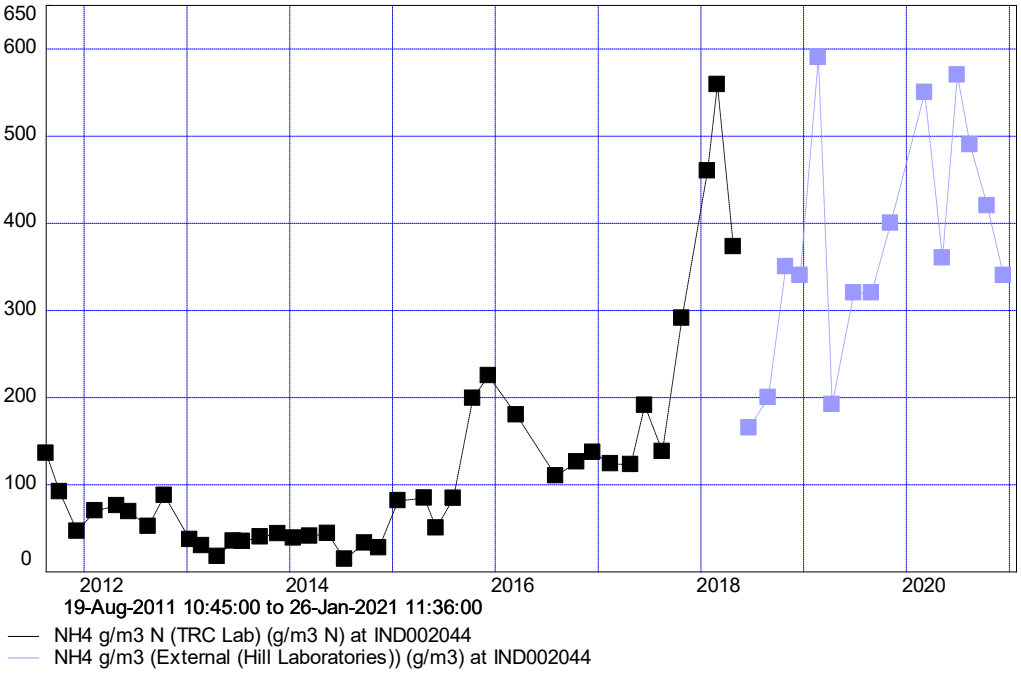

Figure 8: NH_4 irrigation pond since August 2011

59. The purpose of initially depositing this material directly into the collection pond is unclear. As a result, RNZ's application states that all solid waste is now deposited directly to Pad 1 and blended straight away. However, Council staff have observed that material continues to be deposited directly into the pond, and there is no recent blended material on Pad 1 (apart from the sheep/lamb skins).

60. The acceptance of drilling waste material over the previous consent term has created significant barriers to removal of the stockpiled material off-site. Therefore RNZ stopped the receipt of drilling waste material as of 31 December 2020, and none of this material has been received since this date.

61. RNZ's application states that the stockpile has since been turned and reformed into shorter windrows to maximise breakdown of the contaminants within them. Again, this has not been observed by Council staff.

62. If possible, RNZ would still like to sell this material and are therefore continuing to investigate options for this to occur. Alternatively, they propose to use this material as a soil conditioner around the Uruti site, noting that it can be used to support growth, and enhance the Anthropic (high risk) soils in the upper irrigation blocks.

63. RNZ propose to do this as a permitted activity in accordance with Rule 29 of the Regional Fresh Water Plan (RFWP). RNZ believes they can comply with the permitted standards of Rule 29, however in order to meet the standard that states "*the discharge shall not be noxious, dangerous, offensive or objectionable to such an extent that it has or is likely to have a significant adverse effect on the environment*", the material must first be analysed to demonstrate compliance with the following:

- Draft Guidelines for the beneficial use of organic material on production land 2017;
- Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (revised 2011);
- New Zealand Standard (NZS4454:2005) Composts, Soil Conditioners and Mulches;
- Land application of wastes from oil and gas wells: Landcare Research 2015.

64. It should be noted here, that the Council do not agree with this assessment and the discharge of this material to land has been assessed as a discretionary activity along with the other discharges from the site.

65. A portion of the existing stockpiled material was sampled in June 2019. For testing purposes, the two sources of material were referred to as compost stream 1 (from the drilling mud pad), and compost stream 2 (from the greenwaste pad).

66. Results indicated that the material from compost stream 1 (drilling mud) still had significant levels of contaminants such as soluble salts, total recoverable sodium, benzo (a) pyrene (BaP), and total hydrocarbons (TPH) (C_{10}-C_{14} and C_{15}-C_{36}). Therefore this material could not be discharged to land around the site, and instead needed to be further composted with greenwaste and tested again 6-9 months later.

67. Results for the material from compost stream 2 (greenwaste) indicated that the parameters were marginally above guideline values for viable pathogenic helminth ova, total recoverable sodium, benzo (a) pyrene, and TPH C_{10}-C_{14}. It was noted that some of the assessed material was below guideline values, while other parts were slightly above guidelines values. RNZ was able to blend this material together (as it is likely that this would bring the concentrations of TPH and BaP down to below guideline values) and then use it (4,000 tonnes) as a soil conditioner on a newly developed irrigation block.

68. If the stockpiled material is unable to be sold RNZ propose to utilise the material as follows:

- increase the cold air drainage bund – 10,000 tonnes;
- use as a soil conditioner on irrigation areas – 4,000 tonnes already used in January 2020, and ongoing 500 tonnes per year (potentially increasing to 1,000 tonnes per year).

69. Cold air drainage typically occurs when air in contact with terrain surfaces is cooled and flows downslope and/or downvalley. It is a generic term that is often used to describe downslope (katabatic) and downvalley air flows. Cold air drainage bunds aim to prevent odour from travelling offsite during inversion/cold air drainage conditions. While the bunds are essentially another stockpile of the material, it is noted that they:

- are not irrigated, and are therefore not exposed to the risk of leaching from regular irrigation, nor the added nitrogen in irrigation water;
- are high and deep, meaning the material in the middle is not exposed to leaching and the breakdown of organic nitrogen will be very slow due to the lack of oxygen and microbial activity;
- are shaped so that water flows off them, rather than soaking through them, reducing drainage/leaching during rainfall;
- would have the same nitrogen loading effect on the environment as compost, as the nitrogen levels are similar to that of Taranaki topsoils (0.61%).

70. Approximately 4,000 tonnes of stockpiled material has already been used to enhance new irrigation areas. RNZ propose to add an additional 500 tonnes of this material to the irrigation areas each year, as it will improve the soil's capacity to grow pasture, and retain and disperse moisture.

71. RNZ's application states that, if for some reason the material is unable to be applied to land around the site (e.g. fails to meet the necessary standards), and cannot be sold offsite, then the worst case scenario is that the material will be permanently stockpiled on Pad 3 (i.e. revegetated and stabilised).

4.4 Pond treatment system (PTS)

72. RNZ's application states that well managed composting facilities should not generate a lot of leachate, however it may be produced as excess rainwater runs through and out of the compost piles. The leachate is likely to contain nutrients and organic matter, and may include ammonia. Leachate and stormwater from Pads 1 and 3 flow to the PTS, where the stored liquid is aerated and irrigated to land. The volume of leachate irrigated to land over the last two of monitoring periods, varies between 17,000 and 19,000 m^3 per annum.

73. The PTS comprises of a series of ponds and an irrigation pond (Figure 9). RNZ's application states that the base of the pads and the ponds are constructed from 1 metre of compacted papa clay, forming an impermeable liner. The pad perimeters are bunded to contain any stormwater and organic leachate, and exclusion drains, bunds, and diversions are situated around the ponds to divert clean stormwater away from operational areas.

74. Stormwater runoff typically occurs immediately following rain events. The stormwater volume depends on a number of factors, including the moisture content of the soil and the intensity of the rain. The majority of contaminants contained within the stormwater will be in the 'first flush' of water leaving the site, therefore the concentration of contaminants will likely be higher after smaller rainfall events as a result of lower dilution. As the windrows act like sponges, slowly releasing moisture as well as absorbing it, there may also be some drainage (leachate) from the site after rainfall events have stopped.

75. A washdown pad is also used to clean trucks after they have offloaded organic waste. Water used for washing is pumped from the washdown supply pond. Washwater is collected in a settling pond which overflows to a collection sump and then discharges into a skim pond. The skim pond then discharges to the first settling pond and is eventually irrigated to land with leachate and stormwater from Pads 1 and 3.

76. Routine maintenance is undertaken on the pond system which typically involves scooping out sediment from the ponds on a monthly or annual basis and adding this to the existing stockpiled material.

4.4.1 Duck Pond

77. The 'Duck Pond' is a source of freshwater which maintains its level by groundwater inflow. During particularly dry conditions, water can be pumped from the Duck Pond into the irrigation pond to maintain dilution levels in the irrigation fluid (in accordance with the permitted limits of Rule 15 of the RFWP).

78. There is no instantaneous flow from the pond, however a very small percentage of the total pond volume is pumped at any one time (well below 10%). The pump used to take water is small, with a maximum rate of approximately 5 L/sec. This is used infrequently to fill the small truck wash pond during dry weather, and it typically runs for 5-10 minutes for this purpose. If water is required for dilution, the pump rate is restricted to 1.5 L/sec for approximately 8 hours.

79. Recent sampling results have shown a level of contamination in the groundwater bore adjacent to the Duck Pond (GND 003009), which possibly indicates surface water/groundwater interaction between this pond and the bore, and possibly the Haehanga Stream. Given the proposed changes to the management of, and inputs to the irrigation pond, it is possible that dilution may not be required in the future, therefore RNZ is currently reviewing the need for the Duck Pond. A dam has been constructed in the upper catchment which may be able to provide the water necessary for dilution, washwater, and fire water supply, if required.

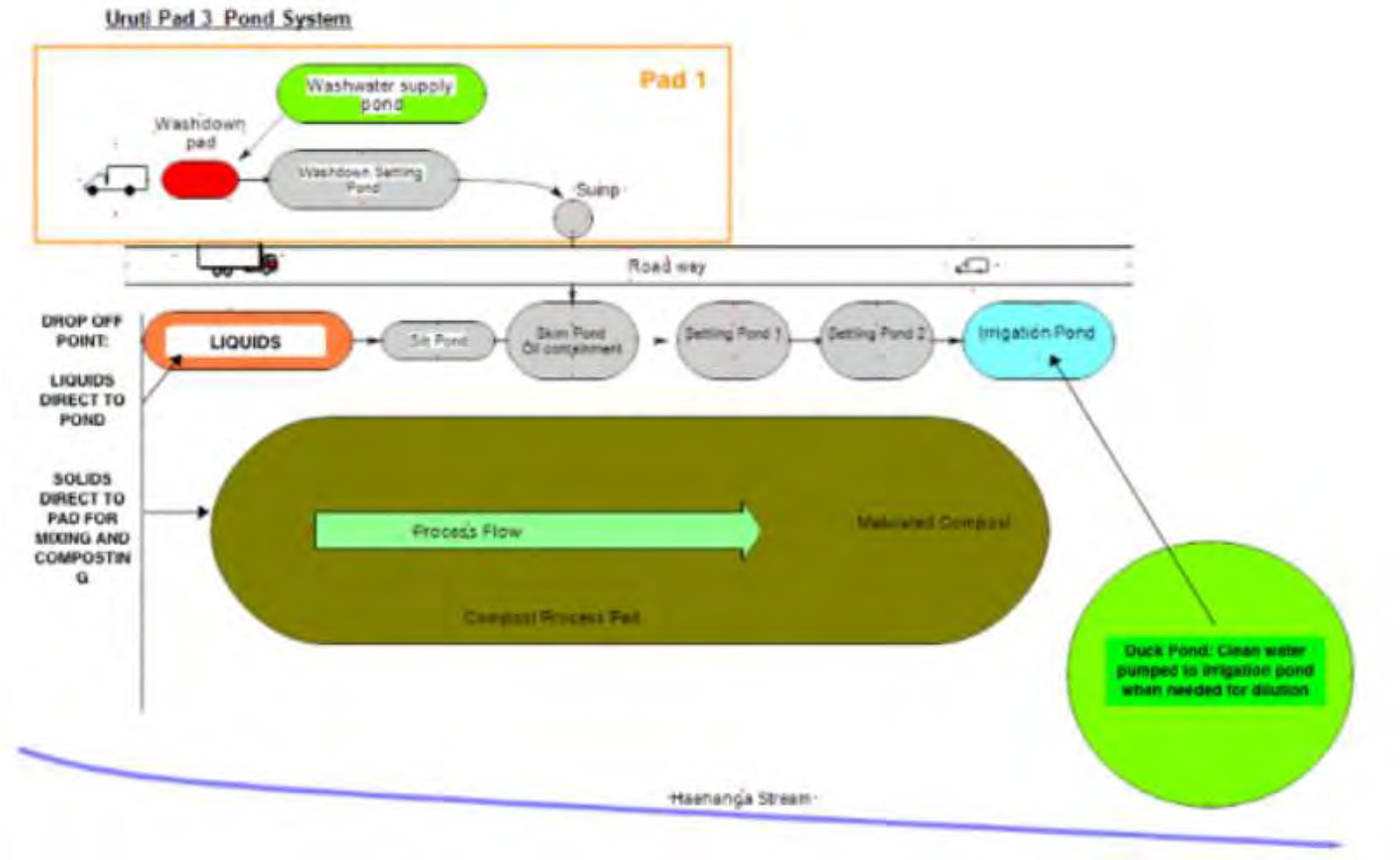

Figure 9: Pond treatment system

4.5 Discharges to land

80. The discharge for which consent is sought is the culmination of the collection of all potentially contaminated stormwater flows and leachate in the irrigation pond, and the discharge of this material to land via irrigation. RNZ's application states that this discharge is managed in accordance with the Leachate and Stormwater Management Plan (Appendix F of RNZ's application), which outlines the irrigation process. The various components of this plan are summarised below.

4.5.1 Irrigation block areas

81. RNZ has recently increased the total area of land used for irrigation purposes from 7 ha to 13.18 ha. There are 8 separate irrigation areas, the size of each area is shown in Table 2 below:

Table 2: Size of irrigation areas

Area	Ha
L1	1.31
L2	1.61
L3	1.47
L4	2.25
L5	1.42
U1	0.61
U2	2.53
U3	1.98
Total area	13.18

82. The location of the irrigation areas is illustrated in Figure 10 below.

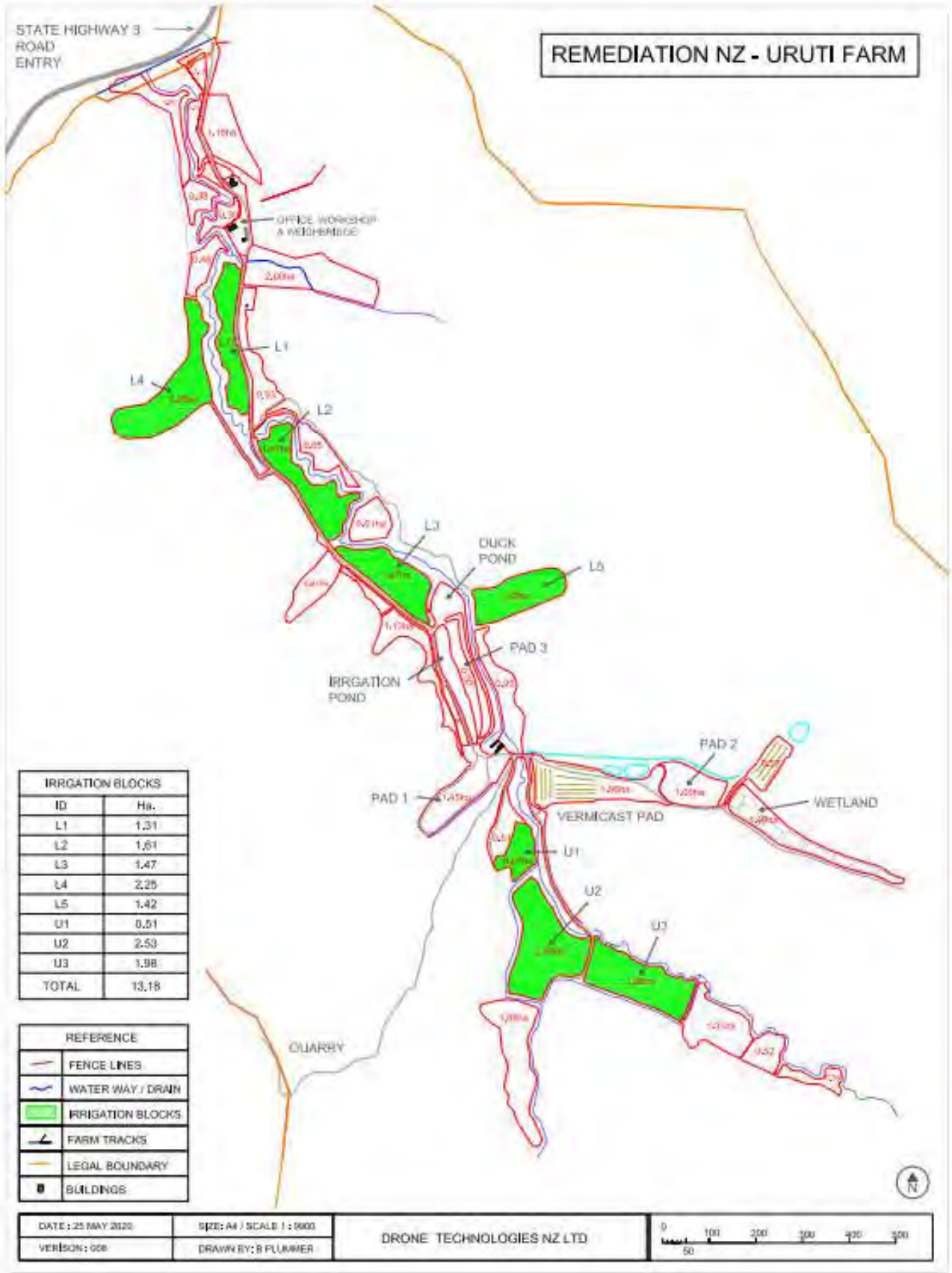

Figure 10: Irrigation area

4.5.1 Irrigation block soils

83. The irrigation blocks have been assessed as high or low risk (in relation to loss of effluent to the surrounding environment) as defined in the Farm Dairy Effluent Design Code of Practice (FDEDCOP) [10]. The nature of the soil determines the capacity of the soil to handle irrigation, and influences the rate, timing and frequency of irrigation. Therefore the 'risk' relates to the risk of surface runoff or subsurface drainage occurring.

84. High risk soils comprise:
- coarse textured soils e.g. sandy soils where soil water is not readily held in the soil profile and rapidly drains;
- soils with fine textured soils e.g. soils with high clay content in which soil cracks may occur as a result of wetting and drying cycles (soil water favours movement down these cracks when the soil is draining);
- soils with subsurface drainage;
- soils with impeded drainage or low infiltration rate;
- soils with a slope exceeding 7^{o}.

85. Low risk soils comprise all other soils whereby:
- water flows through the soil profile under the influence of gravity;
- water tends to drain through the soil profile in a relatively even manner, wetting the whole soil profile (matrix flow);
- soil surface inputs displace and drain water situated deeper in the soil profile (piston effect).

86. The soils in the lower effluent blocks (L1 – L5) have been classified as Orthic brown soils from the Whangamomona Complex loams. An assessment of the soil in the test pits indicated that the top 300 mm of the soil profile consisted of a silty loam that is moderately well drained. This soil meets the definition of **'low risk'** for irrigation purposes.

87. The soils in the upper irrigation blocks (U1 – U3) have been assessed as Anthropic i.e. constructed by or drastically disturbed by human activity. The soil in the test pits indicated that the profile had limited topsoil over a subsoil comprising a mixture of brown soils and papa. The subsoil showed a compacted soil structure and was assessed as having a low infiltration rate. Therefore due to the risk of ponding and overland flow, this soil meets the definition of **'high risk'** for irrigation purposes.

4.5.2 Irrigation management

88. The principle applied to irrigation of low risk soils is that it is important that the volume of material applied during each application does not exceed the water holding capacity of the soil in the plant root zone (to avoid ponding). The soil's PAW_{30} (profile available water in the top 30 cm) describes the maximum amount of water that can be held in the soil that is extractable by plants.

[10] Dairy NZ (September 2015). Farm Dairy Effluent (FDE) Design Standards and Code of Practice, Version 3

89. Appendix AB of the RNZ's application uses methodology from the FDEDCOP to calculate the soil's PAW_{30}, which was then used to determine the maximum application depth for both the low risk soils and the high risk soils at Uruti.

90. The FDEDCOP states that the maximum application rate must not exceed the soil infiltration rate. If effluent is applied at a rate greater than the soils infiltration capacity, effluent will pond on the soil surface and there is a risk of runoff to water. Therefore, the FDEDCOP has also been used to calculate the relevant application rate for both soil types.

91. The proposed application depths/rates are shown below (the full calculations are included in Appendix AB of RNZ's application).

	Low risk soils (L1 – L5)	**High risk soils (U1 – U3)**
Maximum application depth	30 mm	10 mm (travelling irrigator) 25 mm (sprinkler pods)
Maximum application rate	15 mm/hr	10 mm/hr

4.5.3 Irrigation model

92. RNZ has developed an irrigation model that is designed to proactively manage the pond levels to ensure there is sufficient capacity to accommodate a 1 in 10-year 60 minute storm event. The model uses predicted 30-day rainfall data from a weather forecaster on a weekly basis to calculate the predicted volume of stormwater for the following week i.e. days 8-14. The irrigation plan is then updated each Monday morning to account for the predicted volume, and the pond level is reduced during the week, by irrigating to a level that will provide sufficient capacity for the following weeks predicted rainfall.

93. RNZ also uses 3-monthly forecasts to predict when the weather is likely to be wetter than normal. The average rainfall data is entered into the model and multiplied by a correction factor to account for a 3 month prediction i.e. normal = 0; wetter than normal = +10%; and drier than normal = -10%.

94. The full model is included in Appendix F2 of RNZ's application.

4.5.4 Storage capacity

95. The Uruti site experiences frequent low intensity storm events, which have the potential to generate high contaminant concentrations. A 1 in 10-year 60 minute storm event, and a rainfall figure of 43 mm per hour, have been used to evaluate the likely discharges from the site. RNZ's application states that this figure is very conservative. The site's runoff coefficient has been calculated to be 0.25 (using the MBIE Verification Method E1/VM1[11]), which RNZ's application states is also very conservative given the composting material provides a very high degree of permeability.

96. RNZ calculated the estimated runoff from Pads 1 and 3 to be 438 m^3/hr.

[11] Ministry of Business Innovation and Employment (January 2017). Acceptable Solutions and Verification Methods for New Zealand Building Code Clause E1 Surface Water.

97. RNZ propose to maintain at least 1 metre of freeboard in the pond, which provides a capacity of approximately 652 m^3, should a 43 mm/hr rain event occur. In these situations, once the freeboard is filled, then the pond would need to be irrigated down again quickly. As a result of the low risk soils in the lower irrigation areas, it is not necessary to wait until there is a soil moisture deficit to enable safe irrigation.

98. Pad 2 is maintained to ensure 1000 m^3 of capacity is provided at all times, providing more than enough for a 43 mm/hr rain event.

4.5.5 Three-tier response management system

99. In 2015, BTW Company prepared a report[12] which includes a site management plan and operational recommendations in relation to soil and groundwater resources in the Haehanga catchment. The plan incorporates both landuse and management controls, such as operational thresholds, monitoring timeframes, and remediation options considered necessary to mitigate adverse effects on the receiving environment.

100. Included in this report, is a framework that incorporates a three-tier decision tree to guide site operations (detailed in Appendix H of RNZ's application). Within each of the operational tiers, specific constituent threshold values are set to protect the soil and groundwater.

101. The framework tiers are included in Table 3 below. RNZ's application states that this system is currently being implemented at the site.

Table 3: Three-tier response guidelines

Tier	Operation Status of irrigated area
One	Surveillance or normal operation of site
Two	Alert or increased level of monitoring with deferred irrigation
Three	Action or remediation options initiated and irrigation ceases

102. In summary, tier one represents normal site operations which involves weekly and monthly sampling of leachate fluid, soil quality and groundwater. Tier two signifies an 'alert' level of site operation which involves an increased level of monitoring with deferred irrigation on areas that are deemed overloaded for certain constituents. Tier three represents an 'action' level of site operation whereby irrigation is to cease on all affected areas, and remediation is initiated to improve the health of soil and groundwater. If tier two monitoring results suggest no improvement in the levels of contaminants after six months, then the guideline recommends a move to tier three.

103. The trigger or threshold values used for soil quality are included in Table 4:

[12] BTW Company Ltd (2015). Uruti Composting Facility Management Plan.

Table 4: Three-tier framework for soil quality in the irrigation blocks

Tier	Receptor	Target or Trigger	Monitoring frequency	Timeline for change
One	Soil	Chloride – 0 to 700 mg/l (based on the surrender criteria for NZ land farms criteria) Sodium Absorption Ratio 0 - 6	Monthly	N/A as standard operation phase
		TPH (Total Hydrocarbons) C7 – C9 <2700mg/kg C10 – C14 <58mg/kg C15 – C36 <4000mg/kg	3 Monthly	N/A as standard operation phase
Two	Soil	Chloride –700 to 1800 mg/kg Sodium Absorption Ratio 6 - 18	Monthly	If the Chlorides within the soil stay within this tier for 6 months, consider moving to Tier 3 Consider clean water irrigation to allow recovery from elevated SAR
		TPH (Total Hydrocarbons) TPH <20,000mg/kg	Monthly	Upper limit for bioremediation to be effective for hydrocarbons, leachate fluid to contain no TPH
Three	Soil	Chloride – >1800 mg/kg Sodium Absorption Ratio >18	Monthly	Initiate soil remediation measures (refer to section 5) of the BTM report) alongside clean water irrigation
		TPH (Total Hydrocarbons) >20,000mg/kg	Monthly	Initiate soil remediation measures (see section 5)

104. The trigger or threshold values used for the irrigation pond are included in Table 5:

Table 5: Three-tier framework for fluid in the irrigation pond

Tier	Receptor	Target or Trigger	Monitoring frequency	Timeline for change
One	Leachate Fluid (Irrigation pond)	Chloride – 0 to 2000 mg/l results in an Areal Loading of approximately up to 17,600mg/m^2/day	Weekly	N/A as standard operation phase
		TPH (Total Hydrocarbons) 0 – 2,500 mg/l (Half of 5% TPH consent limit)	Monthly	N/A as standard operation phase
Two	Leachate Fluid (Irrigation pond)	Chloride –2,000 to 10,000 mg/l	Monthly	If rainfall and soil moisture are expected to increase, irrigation can continue, however, if drier periods are forecast, irrigation should cease especially over summer months.
		TPH (Total Hydrocarbons) 2,500 – 3,000mg/l	Monthly	
Three	There are no tier 3 levels for the irrigation pond material. Irrigation is ceased at level 2			

105. The trigger or threshold values used for groundwater are included in Table 6:

Table 6: Three-tier framework for groundwater quality in the monitoring bores

Tier	Receptor	Target or Trigger	Monitoring frequency	Timeline for change
One	Groundwater	Chloride – 0 to 1000 mg/l and Conductivity – <350 uS/m	Bimonthly	N/A as standard operation phase
		TPH (Total Hydrocarbons) All fractions of hydrocarbons under detectable levels (essentially background level)	Biennially	N/A as standard operation phase
Two	Groundwater	Chloride –1000 to 2000 mg/l and Conductivity – 350 to 700 uS/m	Monthly	All irrigation to this zone.
Three	Groundwater	Chloride – >2,000 mg/l and Conductivity – >700 uS/m	Monthly	Initiate gro remediation (refer to section BTW report)

106. RNZ's application states that results of previous monitoring in relation to the three-tier thresholds indicate that seldom do contaminants reach tier three levels. On occasions where tier three was reached, results indicated that management changes addressed the problems, with levels returning to within tier one or two on the following sampling occasion.

107. However it is important to note here, that the tiered system is a methodology developed using landfarm surrender criteria[13]. Landfarms are very different from composting activities in that they are typically undertaken on a one-off application basis, as opposed to long term application of material and fluid. Therefore, it is questionable whether this system is an appropriate means of measuring and mitigating the impact on the receiving environment.

4.6 Discharges to water

108. The only direct discharge to water is runoff (i.e. leachate) from Pad 2, which is pumped through the WTS (described in section 4.2), and then discharged to the Haehanga Stream. The discharge is monitored and tested for a number of contaminants. The adverse effects associated with this discharge are discussed further in section 11.3 of this report.

[13] Constituent limits that the soil must meet before the consent can be surrendered.

4.7 Discharges to air

109. Site operations have the potential to create discharges of odour and dust. The key sources of odour are the main receiving pond/drilling mud pad, and the compost piles when the compost is turned. Discharges of dust can occur as a result of vehicles using the access track.

110. RNZ's application states that site management practices have been developed and implemented to minimise/mitigate the production of odour from site operations. These measures include identifying odorous materials arriving onsite and covering them with sawdust (if they are not processed immediately); turning the windrows on a regular basis to ensure the rows do not turn anaerobic; and turning the windrows when weather conditions limit odour drift towards the northern boundary of the property, and nearby residents.

111. There have been significant issues with odour discharges from the site in the past, and RNZ has made changes to management practices as outlined above. The site no longer receives dissolved air flotation (DAF) waste (potentially very odorous) that was causing a large number of odour complaints about 10 years ago, however odour complaints continue to be made by neighbouring landowners. The adverse effects associated with air discharges are discussed further in section 11.1.5 of this report.

5. Existing environment

112. The subject site is situated in the Haehanga valley, south of Uruti, on the southern side of State Highway 3. The property is 641 ha and the composting operations are situated approximately 1.3 km inland (south) of the highway. The predominant land use in the surrounding area is dry stock and sheep grazing. The site location is shown in Figure 11 below.

113. The composting and vermiculture operation takes place on the river flats that run alongside the Haehanga Stream and its tributaries. The surrounding hills are steep with a mixture of grass cover, scrub, and regenerating native bush. The valley floor is generally comprised of shallow alluvial soils with a papa clay base whereas the surrounding hills would most likely be either siltstone or sandstone overlain by ash in the mildly sloping areas or thin soils in steeper areas.

114. The topography and geology creates an erosive-type environment that naturally generates a sediment load within the watercourses, especially during heavy rainfall events. The Haehanga Stream responds quickly to rain events rising to a high swift flow as it channels stormwater off the steep hills in the upper reaches of the Haehanga catchment.

115. RNZ has fenced and undertaken riparian planting along a portion of the Haehanga Stream. This prevents stock access in these areas and as the plants within the riparian margin mature, shade will be provided to the stream which in turn, should encourage higher levels of oxygen saturation. The monitoring undertaken by the Council suggests that low levels of dissolved oxygen naturally occur in the stream.

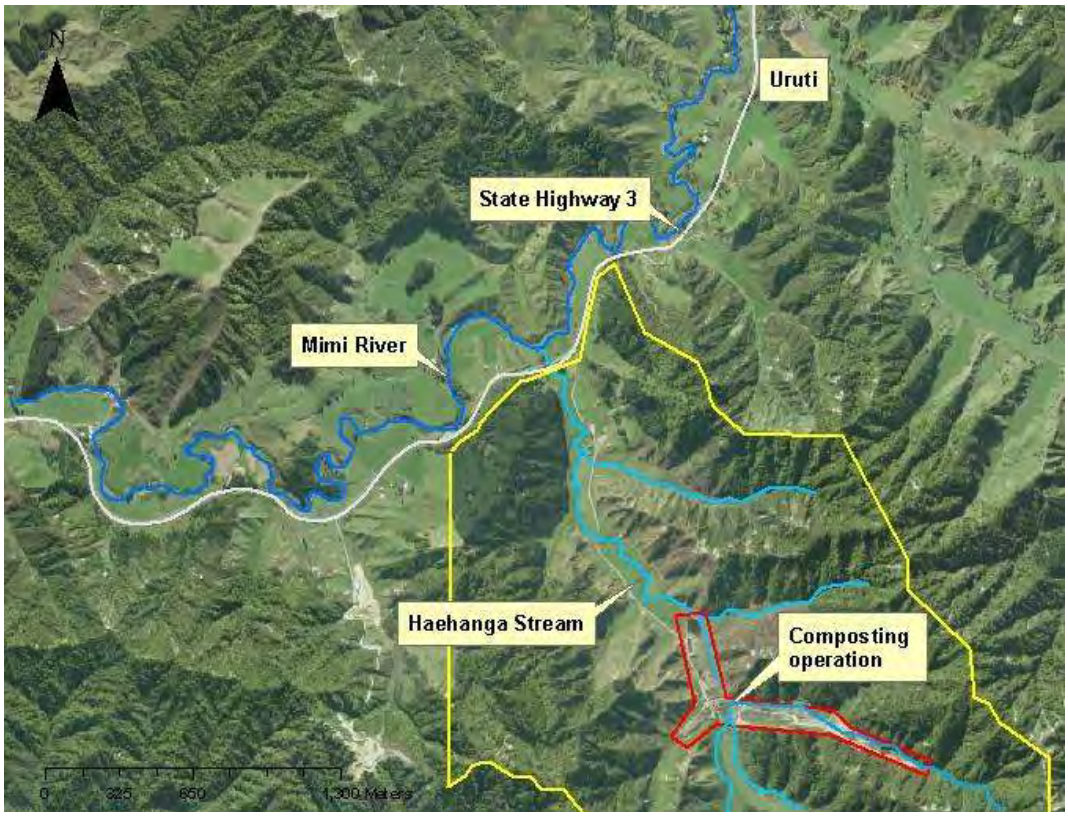

Figure 11: Location of the subject site

5.1 Surface water

116. The site is located within the Haehanga Stream catchment which is a sub catchment of the Mimi River. The Haehanga Stream catchment is almost entirely within the property boundaries of the subject site. The Haehanga catchment has a flat area of approximately 558 hectares which is 0.4% of its parent catchment.

117. The Haehanga Stream and its tributaries are meandering in nature with stream beds comprising of silt. During moderate flows the Haehanga Stream has very slow flow and is a low energy environment. The lack of riffles due to its silt bed reduces the natural aeration of the water. The natural stream conditions are representative of other streams in the Mimi catchment.

118. The main stem of the Haehanga Stream originates within the application site and flows for approximately 4.5 km prior to joining the Mimi River. Using a fish prediction and distribution programme developed by NIWA[14], the following native fish species are predicted to be present within the Haehanga Stream catchment: Longfin Eel, Shortfin Eel, Banded Kokopu, Inanga, Redfin Bully and Common Bully. Council Officers have had confirmed recordings of the following native species: Inanga, Common Bully, Eels and Koura.

[14] National Institute of Water & Atmospheric Research (January 2008). Predictions of the distributions of native freshwater species for New Zealand rivers and streams.

119. There are no known existing barriers to fish passage within the downstream Haehanga Stream catchment. RNZ has been working to ensure all of their instream structures provide fish passage. One particular culvert still needs some repair in order to provide fish passage during summer low flows. This work is proposed to be undertaken during summer 2020/21.

120. The Mimi River has a flat catchment area of approximately 1333 km², and the valley floor consists of shallow alluvial silts on a papa base. The Mimi River catchment is listed in Appendix 1A of the RFWP as a catchment with high natural, ecological and amenity values. The catchment is valued for its recreational and fishery values, and its aesthetic values, specifically:

- its whitebait fishery;
- good diversity of native aquatic fauna, including eels, whitebait; bullies and torrent fish;
- good scenic values including steep cliffs with puketea forest;
- high ecological values in the upper reaches;
- its estuary considered to be an area of outstanding coastal value.

121. The Mimi River is also a Statutory Acknowledgement Area whereby the cultural, spiritual, historical, and traditional association of Ngāti Mutunga with the Mimi River has been recognised. The statement of association is as follows:

The traditions of Ngāti Mutunga illustrate the cultural, historical and spiritual association of Ngāti Mutunga to the Mimi River within the Area of interest. For Ngāti Mutunga, traditions such as these represent the links between the world of the gods and present generations. These histories reinforce tribal identity, connection and continuity between the generations and confirm the importance of the Mimi River within the area of interest to Ngāti Mutunga.

The tupuna had considerable knowledge of whakapapa, traditional trails and tauranga waka, places for gathering kai and other taonga, ways in which to use the resources of the Mimi River, the relationship of people with the river and their dependence on it, and tikanga for the proper and sustainable utilisation of resources. All of these values remain important to the people of Ngāti Mutunga today.

The full name of the Mimi River is Mimitangiatua. The river was also known as Te Wai o Mihirau. Mihirau was an ancestress of the Te Kekerewai hapu and was a prominent woman of her time. The name Te Wai o Mihirau is referred to in the Ngāti Mutunga pepeha:

> *Mai Te Wai o Mihirau (Mimi River) ki Te Wai o Kuranui (Urenui),*
> *koia tera ko te whakararunganui taniwha*

There are a number of pā and kāinga located along the banks of the Mimi River. These include Mimi-Papahutiwai, Omihi, Arapawanui, Oropapa, Pukekohe, Toki-kinikini and Tupari. There were also a number of taupā (cultivations) along the banks of the river.

Arapawanui was the pa of Mutunga's famous grandsons Tukutahi and Rehetaia. They were both celebrated warriors, especially Rehetaia who took the stronghold of Kohangamouku belonging to Ngāti Mutunga's southern neighbours Ngati Rahiri.

The Mimi River and associated huhi (swampy valleys), ngahere (large swamps) and repo (muddy swamps) were used by Ngāti Mutunga to preserve taonga. The practice of keeping wooden taonga in swamps was a general practice of the Ngāti Mutunga people.

The Mimi River has nourished the people of Ngāti Mutunga for centuries. Pipi, Pupu (cats eye), tio (oyster) and patiki (flounder) were found in abundance at the mouth of the river. Inanga (whitebait) were caught all along the banks of the river.

The Mimi River has always been an integral part of the social, spiritual and physical lifestyle of the Ngāti Mutunga people. Ngāti Mutunga also used the Mimi River for baptizing babies. When members of Ngāti Mutunga were sick or had skin problems they were taken to the river to be healed.

All elements of the natural environment possess a life force and all forms of life are related. Mauri is a critical element of the spiritual relationship of Ngāti Mutunga whanau to the Mimi River.

To the people of Ngāti Mutunga, all the rivers and their respective valleys are of the utmost importance because of their physical, spiritual and social significance in the past, present and future.

5.2 Soils and groundwater

122. The soils in the area are classified as Orthic brown soils from the Whangamomona Complex loams. These soils have a high clay content (NZ Soil Classification V4)[15]. Orthic brown soils have a weakly structured subsoil, and occur in places where summer drought is uncommon and which are not waterlogged in winter.

123. Soil profiles indicate a shallow soil with a papa clay base and varying coarse to fine sandy/clay horizons. Soil testing also shows that chloride concentrations in the soil beneath the irrigation areas are highly elevated compared to non-irrigated areas.

124. Groundwater at the site is close to the surface, with water levels between 0.28 and 1.2 metres below ground level (the highest groundwater levels were recorded in winter and spring). There appears to be a close hydraulic connection between the Haehanga Stream and shallow groundwater[16].

5.3 Climate

125. RNZ's application states that the climate in the Uruti Valley is generally mild and temperate. Rainfall is high, even in the driest months of the year, compared to other parts of the region. The average temperature is between 13°C and 14°C.

126. The area experiences moderate rainfall. The closest meteorological station to the site is located at Kaka Road (records began in 1990). This site has a mean annual 1 hour rainfall of 26.2 mm, and a mean annual 1 day rainfall of 117.2 mm.

[15] BTW Company (2015). Uruti Composting Facility Management Plan.

[16] BTW Company (2015). Haehanga Catchment Preliminary Groundwater Investigation.

127. The largest 1 hour rainfall event, and 1 day rainfall event recorded since 1 January 2015 was 40 mm, and 185.5 mm respectively (recorded in March 2018). The total rain recorded between 1 January 2020 and 31 December 2020 was 2216.5 mm.

128. A report prepared by AECOM NZ Ltd[17] describes the typical wind direction at the site, which has been summarised below.

129. Analysis of hourly wind data (recorded by RNZ's automated weather station) for a 2-year period between 1 May 2017 and 1 May 2019 indicates that the site experiences winds from all directions, however the predominant winds are from the southeast and the northwest. Seasonal wind roses for this period are included in Figure 12, and indicate that:

- in summer, the prevailing winds are from the southeast;
- in autumn, the prevailing winds are form the southeast, with a significant component of winds from the northeast;
- in winter, the prevailing wind directions are from the southeast, with a significant component of winds from the northeast;
- in spring, the prevailing winds are from the southeast.

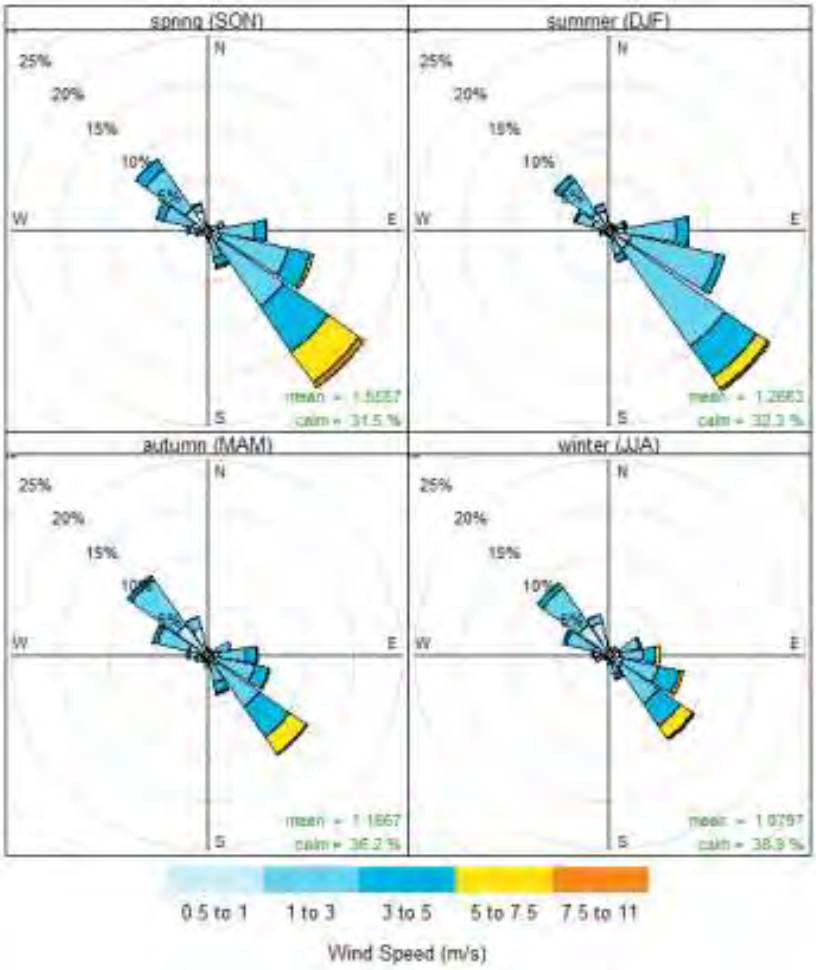

Figure 12: Seasonal wind roses – May 2017 to May 2019

[17] AECOM NZ Ltd (2019). Assessment of Odour Effects, Revital Group – Uruti Composting Operations.

5.4 Resource consents

130. Other consented activities within the Haehanga catchment include realignment and/or diversion of streams, instream structures, and discharge of quarry stormwater. All of these consents are held by RNZ.

131. There are also a number of existing consents within the wider Mimi catchment, including consents for:

- agricultural discharges (farm dairy effluent and poultry wastewater);
- instream structures;
- quarry stormwater discharge;
- water take.

6. Consultation

132. RNZ consulted with Ngāti Mutunga prior to lodging the consent applications, and a site visit was undertaken on 28 September 2017. Following a request for further information, RNZ representatives met with Ngāti Mutunga on 18 April 2018 and 17 May 2018. Ngāti Mutunga representatives have visited the site again since.

133. RNZ also held meetings and discussions with all immediate neighbours.

7. Activity status

7.1 Consent 5838-3.0

134. The *Regional Fresh Water Plan for Taranaki* (RFWP) details Taranaki Regional Council objectives, policies and rules in relation to fresh water management. The RFWP has been operative since 2001.

135. The discharge of waste material to land (prior to composting) is a discretionary activity under Rule 44 of the RFWP as it does not meet the permitted standards/terms/conditions of Rule 29 – in particular, the waste material is not generated on the site.

136. The discharge of combined stormwater and leachate (from the WTS) to water is a discretionary activity under Rule 43 of the RFWP as there is no permitted activity rule for the discharge of contaminants to water.

137. The discharge of combined stormwater and leachate (from Pads 1 and 3) to land is a discretionary activity under Rule 44 of the RFWP as this activity is not specifically provided for in Rules 21-42.

138. The discharge of material from the existing stockpile to land as a 'soil conditioner' is a discretionary activity under Rule 44 of the RFWP as the activity does not meet the permitted standards/terms/conditions of Rule 29 – in particular, the waste material is not generated on the site.

**Although RNZ's application states that the discharge of material from the existing stockpile to land around the site is a permitted activity in accordance with Rule 29 of the RFWP, we do not agree with this assessment. Therefore, this activity has also been included in the assessment of consent 5838-3.0 (to discharge contaminants to land and water).*

139. The taking of water from the Duck Pond can be undertaken as a permitted activity in accordance with Rule 15 of the RFWP, provided the standards/terms/conditions are complied with. The standards of Rule 15 are attached as Appendix 2.

7.2 Consent 5839-3.0

140. The *Regional Air Quality Plan for Taranaki (RAQP*) details objectives, policies and rules relating to air quality management in Taranaki. The RAQP became operative in 2011.

141. The discharge of emissions into the air, namely odour and dust, from composting operations is a discretionary activity under Rule 55 of the RAQP. There is no permitted activity rule for the discharge of contaminants to air from composting activities.

8. Notification

142. The applications were publicly notified on 12 January 2019 (with the submission period closing on 11 February 2019). Notice was served on a total of 8 people, including individuals and organisations.

9. Submissions

143. A total of 22 submissions were received. Of the 22 submissions, 10 were in support of both applications, and 12 were in opposition of both applications. An additional submission, in support of both applications, was received after the closing date.

144. A summary of the submissions is provided in Table 7 below.

Table 7: Summary of submissions

Submitter	Consent(s)	Stance	Details	Decision requested	Additional requests	Request to be heard?
Glen & Dawn Bendall	Both	Oppose	• RNZ must cease operations now. • Cannot be subjected to toxicity or pathogens in the air as immunity is low due to chemo and radiation. • Have video footage of chemicals coming from Haehanga Stream into the Mimi Stream. • Witnessed drilling mud and radioactive material, oil and gas deposits of highly toxic material from Methanex being trucked to RNZ, and poured to ground with no containment and left – then leaching to streams and out to sea. • Constant complaints were made regarding chemical stench and vomiting odour from RNZ – TRC would send someone out to say there was no smell. • Never been able to view the site. • Talked to previous RNZ workers and advised they were told to open catchment ponds to flooded river. • A 600kg Fresian, Hereford steer died of toxicity after drinking from the Mimi Stream, downstream of RNZ. • Toxic waste washes down Mimi Stream out to sea near fishing reserve and campground, affecting fish and aquatic life and detriments human health. • Stench from diseased rotten carcasses coming from poultry, dairy, beef, sheep and human waste along with highly toxic chemicals affects the community of Uruti. • Rat plagues that are never-ending. • Putrid, rotten, stenching chemical smell disrupts duck egg production. • Budgie which used to be kept on the front balcony died after continuous days of stench; • Not a wormfarm, instead a highly toxic dump. • Not signposted. • Submission will be sent to prime minister.	Decline		Y
Sydney Arthur & Jennifer Una Baker	Both	Oppose	• A constant chemical, vomiting stench so cannot open windows to house on hot days to let air in as the stench will enter the house. • Unable to have BBQ's on verandah due to chemical, vomiting stench. • Have video footage of chemical discharge discharging from Haehanga Stream into Mimi Stream, on more than occasion. • A 600kg Fresian, Hereford steer died of toxicity after drinking from the Mimi Stream. • Constant cost of rat bait for vermin control as rat population is prolific. • Have asked to see RNZ operation but not been able to. • Have ongoing questions from the public asking what the smell is when they drive past, and what is the business operating from the address. • Budgie which used to be kept on the verandah dies after days of chemical, vomiting stench. • RNZ open settling ponds to clean them out during floods. • Have noticed a pad being constructed of massive size further up the valley from the existing composting pads. • Not a wormfarm, instead a toxic dump.	Decline		Y

			• RNZ accept drilling mud and chemicals that must be properly contained and treated, however trucks turn up to site and dump the chemical directly to the ground. • Site is not signposted, with no telephone number to call. • All very well for RNZ staff to turn compost at 4pm and then go home to Inglewood, Stratford, Hawera and New Plymouth leaving us with the stench which causes headaches, stomach aches, and is not good for mental health. • Why are RNZ still operating even though they have not had consents for 12 months?			
Vikki Ann Bazeley	Both	Oppose	• Objectionable odour from the RNZ site can be smelt beyond the boundary on a fairly frequent basis. • We have to virtually lock ourselves in our house with all windows and doors closed which has a detrimental effect on our mental health. • Odour from the RNZ operation encroaches on our land and affects our quality of life that we have worked hard to maintain. • We have tried hard to work with RNZ to no avail. • A real estate agent stated that the operation will have a large effect on our future sales prospects – our property has a GV of 310k – the agent informed me that we would be lucky to sell for 250k. • Dust occurs at times when trucks enter the driveway, why has this not been sealed? • No community liaison has taken place in accordance with consent condition 16 (5839-2).	Decline	If granted: • RNZ find us another property the same size with the same facilities without cost to us.	Y
Paora Laurence	Both	Oppose	• The Haehanga Stream, Mimitangiatua River and their tributaries present significant cultural and food gathering for our iwi. • In the last few years there have been many discharges of pollutants and a continual slick flowing down the river which has impacted on the food and water quality. • It's getting harder to catch fish, rare to catch a decent kai of whitebait, too dirty to swim in and bless taonga and ourselves in the Mimitangiatua River. • The latest TRC monitoring report identifies a number of consent non-compliances, including the fact that testing of drilling wastes prior to arrival onsite was not being undertaken – this indicates that there is a lack of transparency and honesty around the whole operation. • The proposed mitigation of adverse effects contained in the assessment of cultural effects prepared by Landpro Ltd, are being ignored. • Where is the evidence that samples and reports are being done weekly? • The streams have already been compromised by wastewater discharges. • Fencing and riparian planting has still not been undertaken despite this being a requirement of previous consents – words are words, action has not been done. • Perched culverts onsite are prohibiting the flow of our ancestral ika, hence creating enormous detrimental effects to the breeding cycle of kokopu, koaro etc.	Decline		Y
Carol Anne Shenton	Both	Oppose	• The operation is having adverse effects on the environment, the water quality and structure of the Haehanga and Mimi Awa. • The site is too close to the river/river flats and despite some measures having been made to protect leaching, it's unreasonable to expect that they will be/are fail safe. • The environment is at risk as is the quality of water, restricting the availability of kai (unpolluted).	Decline		Y

Urs Singer	Both	Oppose	• The latest TRC monitoring report states that RNZ demonstrated an overall need for improvement in their level of environmental performance. The report demonstrated that MCI testing showed downstream deterioration and surface water analysis indicated two exceedances with respect to consent conditions. • RNZ's assertion that completing riparian planting will enable people to safely drink the water, swim in the river and catch and eat kai is laughable. • Consultation included a one page letter being sent to the owner/occupier – it is unclear as to what consultation has occurred and with whom. • In previous years, locals have been outspoken with regards to odour from the site. • In a five week period in 2010, there were 24 complaints about the smell coming from the site. • RNZ should not be granted further consents to destroy a river for years to come.	Decline		Y
Climate Justice Taranaki Incorporated	Both	Oppose	• Based on annual monitoring reports since 2012/13 it is clear that there have been problematic effects from the discharges to the environment, including escalating chloride levels in the groundwater and in the Haehanga Stream; episodic presence of hydrocarbons in the soil etc; BTEX detected in groundwater and irrigation fluids; elevated levels of un-ionised ammonia in surface water; and deteriorated macroinvertebrate communities. • Monitoring reports have also revealed repeated unauthorized incidents, non-compliances and breaches of consent conditions. • RNZ also have a history of non-compliance at the landfarm facility they previously operated at Manutahi, including incidents where cows were found grazing on drilling waste not fully treated and waste fluids were leaking from storage pits. • There is a lack of transparency concerning the complete process and outputs of the operation. • Question the comprehensiveness of environmental monitoring and testing of the various products that leave the site. • Seeking the clarification from Bio-Gro NZ concerning RNZ's various operations and products. • RNZ's large scale waste management operation is likely to release volatile organics and other chemicals that are toxic to humans, animals and the environment. • Elevated levels of ammonia is a known precursor of nitrous oxide (a greenhouse gas). • RNZ contribute to the perpetuation of industrial farming and fossil fuel exploration, and extend their impacts to environments and communities beyond the source.	Decline	If granted: • Seek conditions to exclude all petrochemical wastes (solid drill cuttings, water and synthetic based drilling muds, produced water, fracking fluid flowback, well workover fluids, etc) from the raw materials that are acceptable onsite. • Consents be granted for a duration of no more than 10 years, not the requested 18 years.	Y
Anne-Maree McKay	Both	Oppose	• Support and encourage the practice of vermiculture and composting as an efficient and environmentally friendly method of disposal, however do not support this particular site. • My family have lived in the area for many generations and have seen the slow demise of the Uruti Valley and consequently, the Mimi River. • The existing environment is too unstable for such a facility to operate safely. • As tangata whenua it has been heartbreaking to watch our tipuna awa Mimitangiatua deteriorate over recent generations – RNZ has been directly responsible for making us and our kaumatua feel unsafe bathing in and drinking from the Mimi River, which was	Decline	If granted: • 5 year renewal. • 3 monthly testing. • Monthly site visit from TRC. • 6 monthly cultural health monitoring by local iwi with minimum health requirements as agreed by Ngāti	N

			once used for ceremony, bathing, gathering kai, drinking, spiritual cleansing, health ailments, and much more. • Also disheartened to hear about the many previous consent breaches, most of which when unpunished, and the failure to comply with many of the previous consent regulations, even when given plenty of timed to do so. • In such a fragile environment, there is no room for error or incompetence, the results could be catastrophic to our land, river, and sea.		Mutunga, TRC and RNZ. • Complete riparian planting across entire site.	
Rawiri McClutchie	Both	Oppose	• Same concerns as Ngāti Mutunga Iwi.	Decline		N
Te Rūnanga o Ngāti Mutunga	Both	Oppose	• The significance of the Mimitangiatua River to Ngāti Mutunga is demonstrated by the large number of pa, kainga, urupa, ceremonial sites and tauranga waka and ika that are located within it catchment area. • It was and remains an important source of mahinga kai for Ngāti Mutunga including many taonga species. • Ngāti Mutunga have a cultural, spiritual, historic, and traditional relationship with the Mimitangiatua awa and its catchment area including the Haehanga Stream. • The Ngāti Mutunga Claims Settlement Act (2006) lists the Mimitangiatua River as being recognised by the Crown as a Statutory Acknowledgement area for Te Rūnanga o Ngāti Mutunga – the property boundary of the RNZ site is less than 200 metres from the main stem of the river, and the Haehanga Stream (a tributary of the Mimi) runs through the site. • The applications to renew is not the most appropriate or suitable way to achieve the purpose of the RMA or the objectives of the RFWP/RAQP, and is not designed to accord with nor assist the Regional Authority to carry out its functions to achieve this purpose. • The applications will not properly give effect to and is contrary to and inconsistent with the National Policy Statement for Fresh Water Management 2014, the Regional Policy Statement for Taranaki 2010, the Regional Air Quality, Freshwater and Soil Plans for Taranaki; • The renewal of the consents will have significant adverse effects on the environment, which will not be, nor are capable of being, adequately or appropriately avoided, remedied or mitigated – this is compounded by a history of non-compliance from the exercise of the current consents by the applicant. • The applications are not a sustainable use of the land resource and do not properly consider alternatives. • The applications will not achieve sustainable management and are contrary to the purpose and principals of the RMA.	Decline		Y
Taranaki Energy Watch (TEW)	Both	Oppose	• TEW is a grassroots community group supporting communities to protect their health and environment from the effects of oil and gas exploration and production in Taranaki, NZ. • Concerned that well workover fluids, hydraulic fracturing fluids, and produced water should not be disposed of onsite. • MPI and Landcare Research recommend testing for radioactivity with drilling waste for land farming and this approach is also relevant for composting waste and should be included at Uruti.	Decline	If granted: • Verification that NORM are not present (by screening for radioactivity of muds). • No acceptance of well workover fluids, hydraulic fracturing	Y

			• Concerned with the fate of the drilling waste and are not satisfied with the information provided with the application, the existing consents and the Council monitoring reports. • It is not clear what organic and non-organic materials are in the Revital products, and in what quantities, where they go, and if they have been derived from drilling waste. • It is not evident where the composted/soil conditioner materials are used on site. There also appears to be contradictory information (in the TRC monitoring reports) as to the fate of the drilling waste. • It is noted that there are significant quantities of oil and gas waste received onsite however there appears to be no analysis of how this is processed to reach required endpoints. • Incomplete information provided about hay, silage and crops, and the specifications they should meet – there should be required endpoints for hydrocarbons in the irrigation areas before hay, silage or cropping can occur. • It is not clear whether the bund height has been increased (as identified in the monitoring report 2016/17). • Composting of large amounts of drilling wastes is a potentially significant source of fugitive air discharges – the primary contaminants of concern are BTEX compounds, PAHs, and VOCs which have not been addressed in the application or the existing consent.		fluids, and produced water. • Recommend endpoints for the composting material similar to that supported by MPI and Landcare Research for landfarms, plus testing for benzene, toluene, ethylbenzene, and xylenes (BTEX), polycyclic aromatic hydrocarbons (PAH), and heavy metals.	
Urenui & Districts Health Group Incorporated	Both	Oppose	• Discharge from the site result in objectionable odour and dust, which affects neighboring properties but is also smelt strongly when driving past. • Concerned as we have no way of knowing the health issues that may arise from inhalation, dust residue on the skin, and ingesting the dust particles. • A large percentage of the neighboring properties have residents with compromised immune systems and health conditions. • Hundreds of seagulls visit the site everyday – what contaminants are being eaten by the birds and then released in other areas through bird faeces which will affect wildlife and human health. • Community members visiting the Mimi River have complained about hydrocarbon smells and irritated skin, and fish numbers are not what they once were – is the discharge of leachate contributing to this? • Uruti has a high rainfall/regular surface flooding which contributes to contaminants being carried easily down river.	Decline	If granted: • Monthly monitoring of the site through an independent organisation. • Allow community stakeholders to do a site walkthrough. • 100% compliance with consent conditions otherwise the facility is closed down. • No discharge to waterways.	Y
Fonterra Kapuni	Both	Support	• RNZ provide a service not provided elsewhere in Taranaki; • RNZ enable sustainable disposal of waste materials that would otherwise be disposed of to landfill.	Approve		N
Ross Whelan (Contract Resources)	Both	Support	• RNZ provide a service not provided elsewhere in Taranaki; • RNZ allow us to dispose of waste in an environmentally friendly way. • Would otherwise have to travel to the landfill in Wellington to dispose of waste.	Approve		N
Tegel Foods Ltd	Both	Support	• The composting facility is an important element of waste management within Taranaki, by providing a sustainable solution for a variety of organic wastes; • Support appropriate consenting of the facility to enable its continued use by the community.	Approve		N
Clelands Timber	Both	Support	• RNZ provide a service not available elsewhere in Taranaki;	Approve		N

			• RNZ provide a sustainable disposal option for waste material that would otherwise be sent to landfill.			
Brough Earthworks Ltd	Both	Support	• RNZ provide a service of sustainable waste disposal that is not found elsewhere in Taranaki. • Waste material would otherwise have to go to landfill thus creating a greater problem than currently exists in relation to landfills.	Approve		N
Blackstock Roadsweeping	Both	Support	• Use the facility regularly. • Well-constructed drop off and washdown facility (unlike Colson Road landfill) and its accessibility enables us to empty after hours to meet customer needs in emergencies.	Approve		N
Waste Management NZ Ltd	Both	Support	• RNZ offers a local place to dispose of our customer's compostable material. • If consent was refused, it would give us no local (Taranaki) disposal point increasing costs to our customers significantly.	Grant		N
Envirowaste NZ Ltd	Both	Support	• We are a national waste service provider with 55 operating sites within NZ. • Sites include collection depots, materials recovery facilities, transfer stations, cleanfill, landfills and solid and liquid hazardous waste treatment facilities. • Work closely with RNZ both in the supply of product for sale and the supply of raw materials for RNZ to process. • Support both applications.	Grant		Y
Intergroup Ltd	Both	Support	• RNZ provide a service not provided elsewhere in Taranaki, and in doing so they enable the sustainable disposal of waste material that would otherwise be disposed of to landfill.	Grant		Y
New Plymouth District Council (NPDC)	Both	Support	• Support facilities that enable organic waste to be processed for beneficial reuse, rather than disposal to landfill. • This is consistent with both the Taranaki Waste Management and Minimisation Strategy and also our Waste Management and Minimisation Plan, both of which identify organic wastes as a priority and alternatives to landfill should be made available where feasible. • RNZ provides a local regional disposal option for organic waste. • With the eminent closure of the regional landfill at Colson Road, and the need to transport waste outside of the region for landfill disposal, the provision of a local alternative for organic waste processing continues to be an important disposal solution for a number of organic waste streams. • Provided environmental effects can be managed and minimised, we support the granting of consents that will enable the facility to continue operating.	Grant		N
Late submission:						
Rawiri Mako – Anzco Foods	Both	Support	• RNZ provides us with a service that is a major part of our environmental business. • Using RNZ to dispose of our paunch material in an efficient and sustainable manner allows us to concentrate on processing rather having to worry about odour issues within the town. • Losing this service could be troublesome for us.	Grant		N

9.1 Pre-hearing process

145. A pre-hearing meeting was held on 31 August 2020. Present at the meeting were:

Colin McLellan	Taranaki Regional Council (Chair)
Kim Giles	Taranaki Regional Council
Nathan Crook	Taranaki Regional Council
Kerry O'Neill	RNZ
David Gibson	RNZ
Colin Kay	RNZ
Kathryn Hooper	Landpro (on behalf of RNZ)
Paul Cummings	Ngāti Mutunga
Marlene Benson	Ngāti Mutunga
Anne-Maree McKay	Ngāti Mutunga
Sarah Ongley	Counsel for Ngāti Mutunga
Katie Beecroft	Lowe Environmental (on behalf of Ngāti Mutunga)
Sarah Roberts	Taranaki Energy Watch
John Oxenham	Urenui & Districts Health Group
Urs Signer	Climate Justice Taranaki (and an individual submitter) (via zoom for part of the meeting only)
Dawn Bendall	Neighbour
Glen Bendall	Neighbour
Jenny Baker	Neighbour
Paora Laurence	Individual submitter

146. The meeting was held on a 'without prejudice' basis. RNZ presented a summary of the proposal and the changes that had been made since notification of the application. Submitters raised queries and concerns they had relating to the proposal.

147. The main issues identified and discussed at the meeting were:

- Receipt of drilling waste and the fate of the existing stockpile;
- Adverse effects on the receiving environment, in particular the Mimi River, as a result of site operations;
- Ongoing discharges of offensive and objectionable odour;
- Adverse effects on human health.

148. No issues were resolved. All issues were outstanding at the end of the meeting.

10. Compliance history

149. The Council undertakes routine compliance monitoring inspections as part of a comprehensive monitoring programme for the site and its various activities. The monitoring programme includes inspections focusing on raw materials, leachate, stormwater and odour control, and also includes collection of water samples for physicochemical analysis and biomonitoring surveys of receiving waters.

150. Annual monitoring reports are prepared by the Council. The overall compliance ratings (between 2012 and 2020) are shown in Table 8 below.

151. At the time of writing this report, the 2019/2020 monitoring report is still in draft form as it is awaiting feedback from RNZ. However, we do not expect it to change considerably (if at all) so it has been considered in preparing this report.

Table 8: Summary of compliance history

Monitoring period	Compliance status	TRC document #
July 2019 – July 2020	Improvement required	2618686
July 2018 – July 2019	Improvement required	2329090
July 2017 – July 2018	Improvement required	2151902
July 2016 – July 2017	Good	1970516
July 2015 – July 2016	Improvement required	1778644
July 2014 – July 2015	Improvement required	1611705
July 2013 – July 2014	Poor	1410283
July 2012 – July 2013	Good	1263401

152. Table 8 shows that RNZ has predominantly required improvement in terms of their compliance with existing consent conditions. 'Improvement required' is defined in the monitoring reports as "*repeated interventions to meet administrative requirements of the resource consents were made by Council staff. These matters took some time to resolve, or remained unresolved at the end of the period under review. The Council may have issued an abatement notice to attain compliance*". However, it should be noted that the non-compliance is mostly related to the composting part of the operation (and not the vermiculture process).

153. The main issues (and reasons for non-compliance) include the following:

- poor record keeping;
- non-compliance with management plans;
- receipt of unapproved material;
- lack of maintenance;
- required monitoring/sampling not undertaken;
- unauthorised discharges to surface water.

154. The site also has a history of complaints. Since 1 June 2016, the Council has received 26 complaints in relation to the Uruti site. They were primarily about odour, however some were regarding discharges to water or land. The Council has issued 4 abatement notices and 7 infringement notices (between 1 June 2016 and 31 January 2021).

155. Between 1 October 2020 and 31 January 2021, there have been 8 incidents, 3 abatement notices issued, and 6 infringement notices issued. The incidents that occurred between 1 October 2020 and 31 January 2021 are set out in Table 9.

156. This demonstrates that since 1 June 2016, 3 out of 4 abatement notices and 6 out of 7 infringement notices, have been issued in the last 4 months.

Table 9: List of incidents between 1 October 2020 and 31 January 2021

Date	Incident	Details	Enforcement Action Taken
2 October 2020	Odour complaint	Objectionable odour detected beyond the boundary of the property.	Infringement notice and abatement notice
14 October 2020	Stockpile of compost material	During routine monitoring it was found that green waste was being stored on a concrete pad outside of the designated bunded areas resulting in any leachate being able to flow overland into the Haehanga Stream	Infringement notice
14 October 2020	Acceptance of unauthorised material	During routine monitoring it was found that Intergroup (South Taranaki) had dumped a load of waste oil and associated sludge at the RNZ facility. Insufficient checks and balances by RNZ to prevent this.	Infringement notice and abatement notice to RNZ Infringement notice and abatement notice to Intergroup
30 October 2020	Odour complaint	Objectionable odour detected beyond the boundary of the property.	Infringement notice
4 November 2020	Reporting of false information on the inwards goods register.	After acknowledging that waste oil had been deposited at the site (as was accurately recorded on the acceptance docket by the truck driver), RNZ proceeded to report this material on the inwards goods register to TRC as 'grease traps'	Infringement notice
	Increased BOD in receiving water	Increase in BOD noted in receiving water at HHG000106 (refer to Figure 13) Further sampling was carried out and BOD was found to be compliant.	None
9 January 2021	Acceptance of unauthorised material	Cement returns were accepted onsite without approval.	14 day letter sent
11 January 2021	Odour complaint	Objectionable odour detected beyond the boundary of the property.	Infringement notice

157. A recent example of non-compliance (4 November 2020) included insufficient checks undertaken by RNZ which led to a load of waste oil and associated sludge being received onsite. This was then falsely reported on the inwards goods register as 'grease traps', and an infringement notice was later issued.

158. The Council was also recently informed of a truck allegedly carry drilling wastes entering the site on 9 January 2021. RNZ has since confirmed that the truck deposited cement washings (not drilling waste), however this material is not authorised by their existing consent and is therefore another breach of conditions. The Council sent RNZ a letter, requesting an explanation within 14 days.

159. RNZ's compliance history was raised and briefly discussed at the pre-hearing meeting. It has also been raised by the general public who have complained about the site and its environmental effects.

160. Submitters are concerned that RNZ has not complied with conditions of the expired consents, and has not managed the site as described in their 2008 consent application i.e. the drilling waste 'compost' was never put through a vermiculture process. Instead, it has been stockpiled on Pad 3 for at least 10 years, and occasionally used around the Uruti site, meaning the original intent of the consents has not been met.

161. The Courts have considered whether an applicant's prior conduct can be taken into account by a consent authority when considering a resource consent application.

162. While *"a consent authority, when it imposes conditions is entitled to assume that the applicant and its successors will act legally and adhere to rules and conditions"*[18], the High Court has held that while an applicant's prior conduct cannot be used to override the more explicit statutory criteria, it can be considered in a peripheral way, as consideration of those matters could promote the general objectives of the RMA.[19]

So long as reliance upon these "other matters" (under section 104 of the RMA) *would promote the underlying objectives of the Resource Management Act, and so long as they did not conflict with any express criterion obviously intended to have priority, there would seem to be nothing to prevent them from being taken into account.*

163. RNZ's application acknowledges historic incidents and complaints, and states that it has been focusing on improving site performance. Specific measures to improve site management/environmental impacts are currently being implemented, including the following:

- further expansion of the irrigation area to a total of 13.18 ha (confirmed by way of drone survey);
- steps to manage the compost that has been unable to be sold off-site due to its association with drilling activities;
- changes to site operations to reduce nutrient and contaminant loads in the irrigation ponds;
- detailed understanding of the nitrogen cycle onsite, and steps to mitigate N losses/leaching;
- the decision to cease the receipt of drilling waste material as of 31 December 2020.

164. However, RNZ's continued non-compliance is one of the reasons submitters have said they do not have confidence in RNZ to comply with their renewed consents, and have therefore requested that the site be shut down.

165. As set out above, case law has held that RNZ's compliance history and its failure to comply with existing conditions, can be taken into account when assessing the proposal as a whole against section 5 of the RMA. In line with precedent case law, we consider that an appropriate way to deal with these matters is through additional monitoring, reviews of the recommended conditions, and an appropriate consent term. Our recommended monitoring is discussed further in Section 15, however major changes include provision for:

- (at least) weekly site inspections;
- installation of surveillance cameras;
- installation of an in-situ water quality monitoring sonde[20] to measure real-time water quality of the Haehanga Stream.

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[18] *88 The Strand Ltd v Auckland City Council* (2002) NZRMA 475, at [19].

[19] *NZ Suncern Construction Ltd v Auckland City Council* (1997) 3 ELRNZ 230, at 244.

[20] An instrument probe that automatically transmits information about its surroundings.

166. A consent term of 10 years (from the date of expiry of the previous consent) has been recommended.

11. Assessment of Effects

167. The proposed activities have the potential to result in adverse effects on the environment, primarily from the discharge of leachate and/or stormwater to land, and emissions of odour to air.

168. Potential effects include those on surface water and groundwater, ecological effects, effects on soil, effects of the stockpiled material, odour effects, and effects on cultural values.

169. The key parts of RNZ's AEE have been summarised below, along with our comments.

170. In order to distinguish between the two onsite activities, the discharges from the composting operation and the discharge from the WTS (Section 11.3), have been discussed separately.

11.1 Effects of the composting operation

11.1.1 Effects on surface water

171. The composting operation has the potential to generate contaminants, in particular from stormwater flows and leaching of organic nutrients from windrow piles. Leachate forms when water passes through wastes that are soluble or contain soluble parts. As the waste products accepted onsite are degradable, the combustion/degradation process can lead to soluble compounds being formed from insoluble ones. If leachate reaches surface water, it can result in the following adverse effects on water quality:

- increase in BOD (biological oxygen demand) from the breakdown of carbon based organic material which has a high oxygen demand;
- increase in unionised ammonia levels from the breakdown of nitrogenous organic material;
- increase in suspended solids;
- alteration of the pH and temperature from the chemical and biological degradation of leachate contaminants;
- the introduction of organic compounds which may be detrimental when in high concentrations.

172. Biological oxygen demand is a common measure of organic contamination, as high levels often encourage the growth of heterotrophic micro-organisms that require oxygen to create energy, and thus deplete the water of its oxygen content. As a result, the oxygen available for respiring organisms, such as macroinvertebrates and fish, is lowered.

173. Heavy growth of these micro-organisms can also physically smother the stream substrate, affecting habitat quality. Fish are also particularly sensitive to ammonia either through direct caustic damage to the gills and other tissues, the blocking of its key metabolic pathways, or a reduction in the ability of the fish to excrete waste ammonia from its body.

174. An increase in the suspended solids concentration can cause discolouration of the water, and have associated effects on water quality and aquatic ecosystems, including:

- smothering of aquatic life as a result of a sediment build-up in the streambed;
- destruction of habitat;
- reduction in the amount of light and oxygen available;
- temperature changes and increases in turbidity.

175. RNZ's application states that with respect to the composting operations, a number of onsite measures have been established in order to avoid, remedy, and mitigate the above effects on water quality. In the first instance, these effects are avoided and/or mitigated by managing liquid contaminants so that they do not enter water, which is achieved by irrigating the contaminated stormwater and leachate to land. But also by:

- managing the irrigation and soil loading capacity;
- monitoring and reporting;
- managing onsite infrastructure (sediment traps, bunds, treatment systems, diversion systems);
- managing ponds and solids levels.

176. As discussed in Section 4.5.3, an irrigation model is used to ensure that the PTS has sufficient capacity in the event of a 1 in 10 year storm occurring for a period of 60 minutes. Thirty-year rainfall and evaporation data from a NIWA virtual climate station (located near the site), along with extensive local knowledge of the local climate, have been used to develop the model.

177. The purpose of the model is to assist in managing the liquid waste to ensure that there is enough capacity in the pond system to contain large rainfall events. It works on the basis that enough wastewater is irrigated from the pond in the week before predicted rain, in order to maintain a freeboard of about 1 metre at all times.

178. In conjunction with the irrigation model, an investigation into the loading capacity of the soils has also been undertaken. As a result, the loading capacity of the soils is well understood and irrigation will be managed to ensure that the soil is not over-irrigated (or irrigated in inappropriate conditions) causing runoff to surface water, and nutrients are absorbed into the soil and not leached through the soil profile.

179. Low application rate sprinklers (K-Line pods) have recently been purchased for use in the upper irrigation areas. These allow wastewater to be irrigated at a low rate more frequently, instead of using the travelling irrigator (which irrigates at a higher rate). Bunds have also been established around the perimeter of the irrigation areas to prevent overland flows reaching surface water. This is particularly important in the new upper irrigation areas due to the anthropic nature of the soils[21].

180. Appendix X1 of RNZ's application summarises the results of the water quality sampling undertaken between 2011 and 2020 (sampling locations are shown in Figure 13 below). The graphs show multiple spikes above consented limits at sampling sites HHG103 (below the wetland), HHG115 (below the main composting pad), and HHG150 (twin culverts). RNZ's application states that the majority of these breaches were attributable to poor site maintenance/management, many of which triggered enforcement action by the Council. The breaches mainly involved direct discharges of contaminants to water as a result of overtopping/leaking of bunds, or careless placement of material.

Figure 13: Water sampling locations

[21] Soils constructed by, or drastically disturbed by people.

181. Our comments are included in the following paragraphs.

182. The graphs below are taken from the latest Council monitoring report (2019-2020 monitoring period). They show the incremental increases in certain contaminants down the length of the Haehanga Stream (albeit within existing consented limits). Figure 14 shows the increase in ions (conductivity) within the surface water as a result of onsite activities. Conductivity is essentially a measure of the water's salinity, as this increases when conductivity increases (i.e. dissolved salts and other inorganic contaminants conduct electrical current). Similar increases were also recorded for chloride (Figure 15).

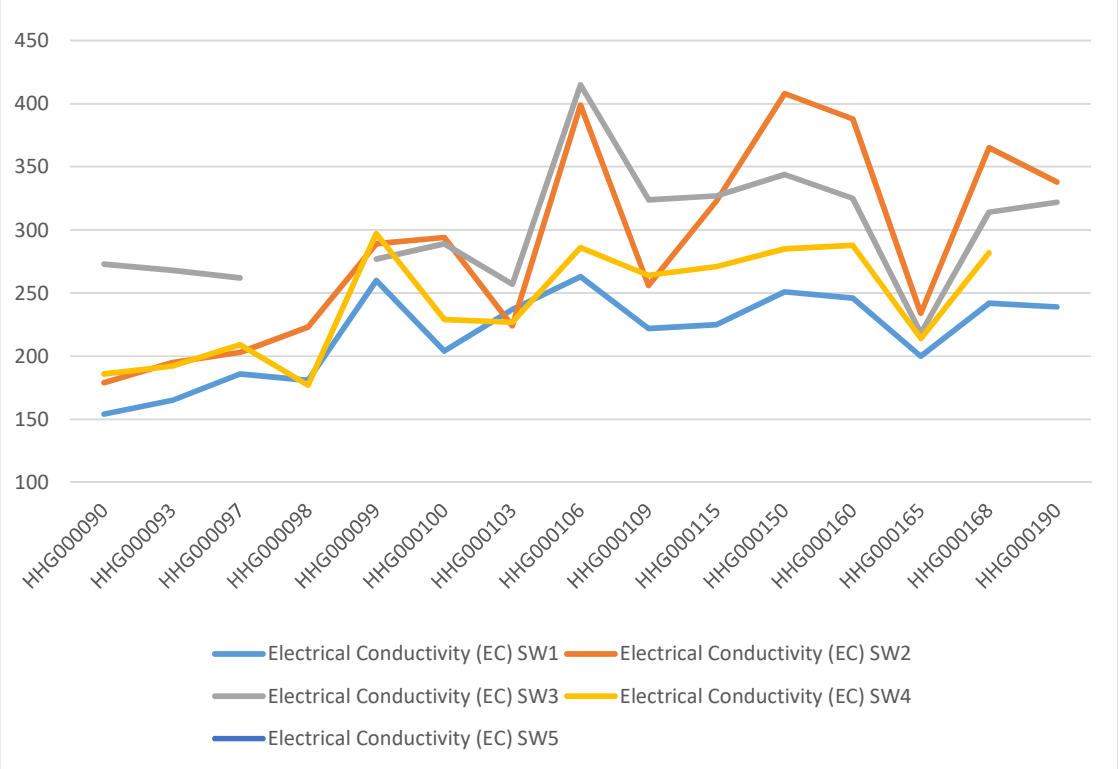

Figure 14: Conductivity uS/cm by site Haehanga Stream 2019-2020

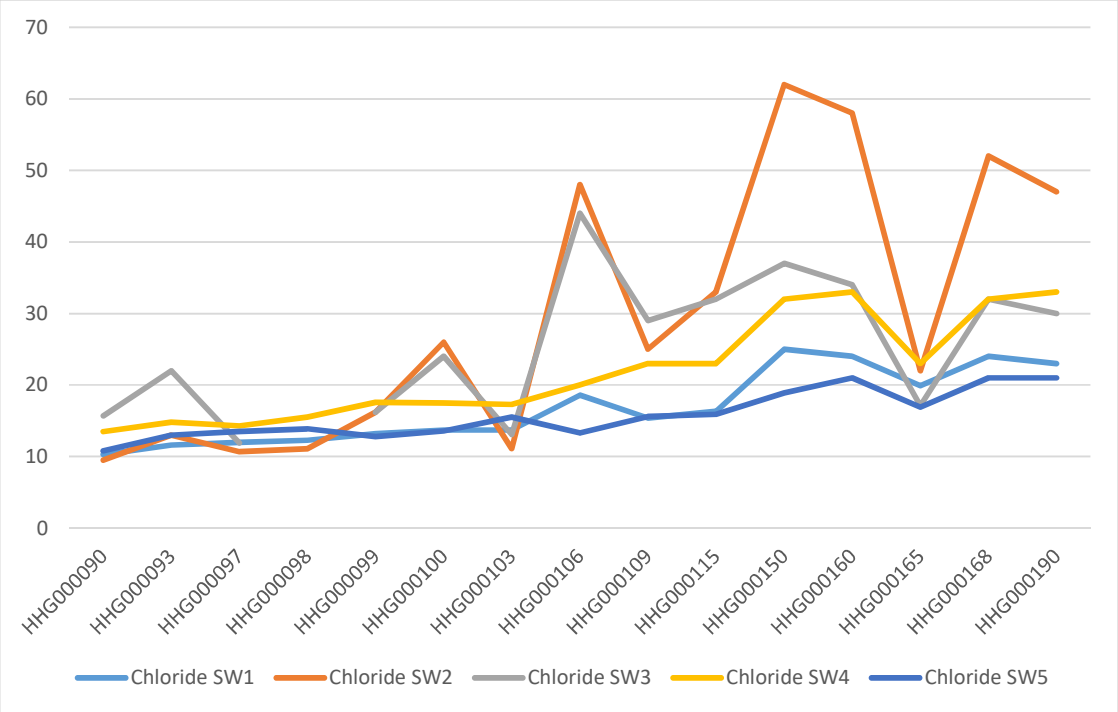

Figure 15: Chloride g/m^3 by site Haehanga Stream 2019-2020

183. Figure 16 illustrates the ammonia concentrations for each sampling site. It is worth noting that the elevated result in the centre of the graph (relating to the discharge point below the WTS) was compliant with consented limits for un-ionised ammonia, and given the time of the year, is likely to be a result of plant die-back.

184. However, this graph also shows the steady increase in the concentration of ammonia down the length of the stream. This is particularly relevant when looking at HHG165, which is a monitoring location on an unnamed tributary of the Haehanga Stream that flows from an undeveloped area of the site (located to the east of the main gate), and its corresponding low ammonia concentrations. RNZ has flagged this as a future development area, so existing monitoring trends suggest that the contaminant levels in this tributary will also begin to increase if this area is used for future irrigation.

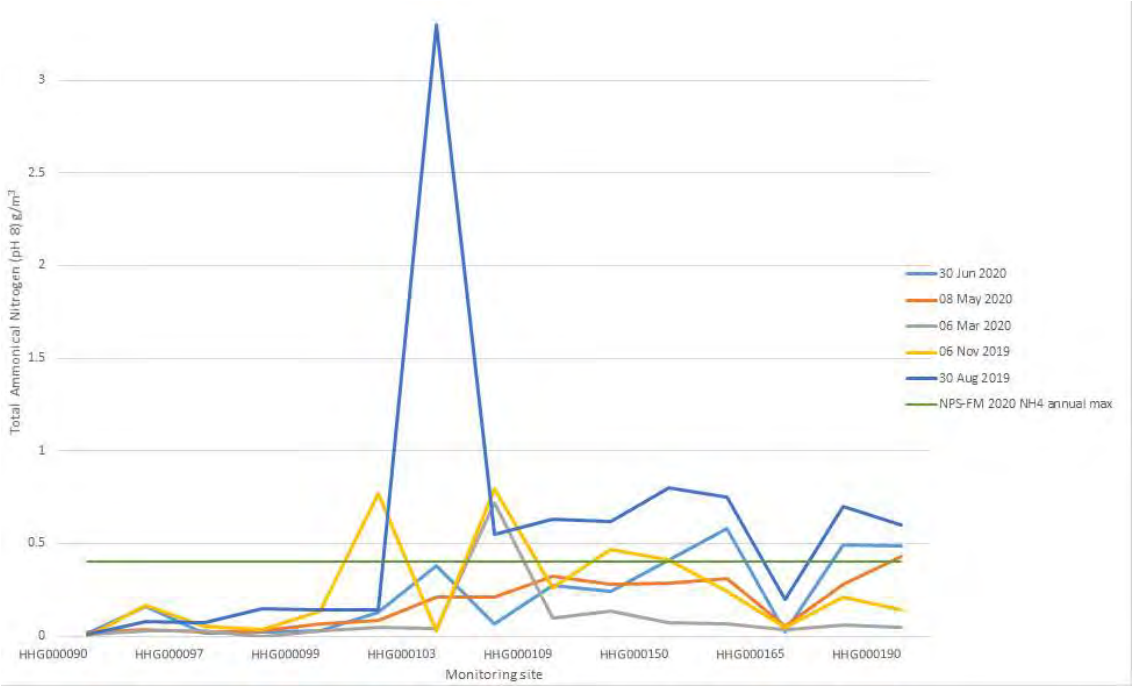

Figure 16: Ammonia g/m^3 by site Haehanga Stream 2019-2020 (adjusted to pH 8)

185. It is also worth nothing here that the *National Policy Statement for Freshwater Management 2020* (NPS-FM) includes national bottom line values for various contaminants in rivers and lakes. The national bottom line value for ammonia is 0.24 g/m^3 (annual median) and 0.40 g/m^3 (annual maximum), with the aim of protecting 95% of species from toxic effects (Figure 17).

186. Sampling site HHG190 is the most downstream site within the property boundary. The median concentration of ammonia for this site (since 2005) is 0.33 g/m^3, meaning it exceeds the national bottom line for ammonia toxicity in relation to ecosystem health. The annual maximum of 0.40 g/m^3 in the NPS-FM was also exceeded on three occasions this monitoring period.

187. The NPS-FM requires the community, through the regional planning process, to develop a timeframe for compliance with the proposed standards. In any case, recommended consent conditions require that the concentration of ammonia in the receiving environment meets at least the national bottom line value by 1 June 2026.

Value (and component)	Ecosystem health (Water qualit	
Freshwater body type	Rivers and lakes	
Attribute unit	mg NH_4-N/L (milligrams ammoniacal-nitrogen per litre)	
Attribute band and description	**Numeric attribute state**	
	Annual med	Annual maximum
A 99% species protection level: No observed effect on any species tested.	≤0.03	≤0.05
B 95% species protection level: Starts impacting occasionally on the 5% most sensitive species.	>0.03 and ≤0.24	>0.05 and ≤0.40
National bottom line	**0.24**	**0.40**
C 80% species protection level: Starts impacting regularly on the 20% most sensitive species (reduced survival of most sensitive species).	>0.24 and ≤1.30	>0.40 and ≤2.20
D Starts approaching acute impact level (of death) for sensitive species.	>1.30	>2.20
Numeric attribute state is based on pH 8 and temperature of 20°C. Compliance with the numeric attribute states should be undertaken after pH adjustment.		

Figure 17: Ammonia toxicity ecosystem health (rivers and lakes) NPS-FM 2020

188. RNZ's application states that they have invested significantly in new management systems for the Uruti site, including ongoing training and providing more detailed work instructions for staff, where applicable. Therefore, provided the new management systems are followed and adhered to, the site is able to operate in a manner whereby the effects on surface water will be no more than minor.

189. The problem with this is the reliance on site management to ensure adverse effects are avoided or mitigated, as RNZ has not demonstrated the attitude or capability that is needed to manage the site properly during the previous two consent terms. It has also become apparent that some of the proposed site management practices are not currently being undertaken as suggested. For example, RNZ's application states that as of April 2020 material is no longer discharged straight into the collection pond unless it is liquid waste, and that all solid waste is now deposited directly to Pad 1 or Pad 3 and blended directly. At the time of writing his report Council staff have observed that, although it appeared RNZ did this for a brief period in June 2020, it was evident during recent visits to the site that all material continues to be discharged directly into the collection pond.

190. In addition, 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 significant problem for RNZ.

191. Understandably, this does not give the community any confidence that the site will be managed as proposed in RNZ's AEE. It is not the Council's normal practice to include site management practices as specific consent conditions, as these are normally included in a management plan. Instead, conditions normally specify effects that need to be avoided and/or mitigated as a result of consented activities.

192. However in this case, given RNZ's previous site management and the resulting adverse effects, we have recommended that certain site management practices are also reasonably specified in the consent conditions. Recommended conditions also prohibit the discharge of any new material to the stockpile.

11.1.2 Ecological effects

193. The Council's monitoring programme for the site includes biological monitoring of the receiving environment. Techniques such as 'streambed kick' and 'vegetation sweep' are used to collect samples from the Haehanga Stream catchment and assess the impact of the consented activities on macroinvertebrate communities. Different types of macroinvertebrate are identified, the number of different types counted (taxa richness), and MCI and SQMCI scores are calculated for each sample site.

194. The MCI is a measure of the overall sensitivity of the macroinvertebrate community to the effect of nutrient pollution in streams. It is based on the presence/absence of taxa with varying degrees of sensitivity to pollution. The SQMCI accounts for taxa abundance as well as sensitivity to pollution, and may reveal more subtle changes in communities. Significant differences in either the MCI or the SQMCI between sites indicate the degree of adverse effects of the discharges, and enables the overall health of the macroinvertebrate communities to be determined.

195. A macroinvertebrate survey was conducted in January 2020. Overall, the survey found that macroinvertebrate communities of the main stem of the Haehanga Stream were slightly below average health. Undesirable heterotrophic growths[22] were not recorded at any of the seven survey sites (Table 10).

Table 10: Biomonitoring sites in the Haehanga catchment

Site	Site Code	GPS coordinates (Easting- Northing)	Location
1	HHG000090	1732685-5684577	Upstream of extended irrigation area
2	HHG000100	1732272-5684972	Downstream of extended irrigation area
T2	HHG000098	1732747-5685043	Upstream of wetland discharge point
T3	HHG000103	1732692-5685042	Downstream of wetland discharge point
5	HHG000115	1732124-5685478	25 m downstream of last pond and swale collection area
6	HHG000150	1731673-5685796	30 m downstream of lower irrigation area
7	HHG000190	1731611-5686514	50 metres upstream of State Highway 3 bridge

[22] An organism that cannot synthesize its own food and is dependent on complex organic substances for nutrition.

196. The lowest MCI score of 66 was recorded at Site 6 (downstream of the lower, most used, irrigation area). The highest score of 82 was recorded at Site T3 (downstream of the wetland discharge point). While the amount of habitat available at Site T3 covered a small area, the quality of the habitat was better than any of the other sampled sites. This is likely in part due to the mostly shaded stream channel and overhanging vegetation on the northeast side, which deters the growth of periphyton and 'undesirable' heterotrophic growths, and also helps to maintain a lower water temperature.

197. All of the sampled sites along the main stem of the Haehanga Stream lack streambed shading for the majority of the day, which causes the water temperature to increase up to 28°C in summer. This temperature is outside the thermal preference (and sometimes tolerance) of many instream species. Algal and periphyton growths were also recorded as abundant during the previous survey, which can often be the result of unshaded streambeds.

198. Figure 18 below shows the difference in temperature between Site 1 (upstream of upper irrigation area) and Site T2 (upstream of the WTS discharge point). The two sites are both upstream of site activities, however Site 1 is not fenced from stock and lacks any riparian planting. Site 1 is a marshland habitat with pools and no discernible flow, and it has a soft bottom, often grass with no cobble or boulder and very little wood debris. Site T2 on the other hand is similar to Site T3 in that it is mostly shaded, and its habitat comprises large and small cobble with some gravel as well as wood debris with riffle habitat throughout.

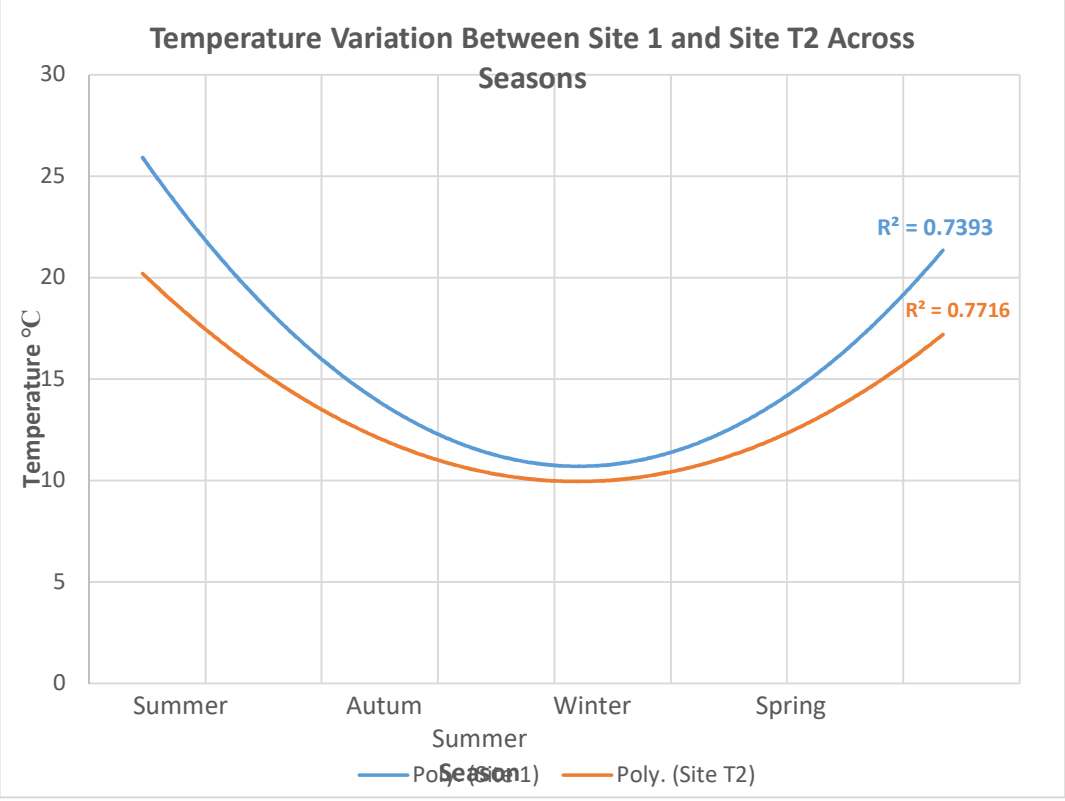

Figure 18: Seasonal temperature comparison between Site 1 and Site T2 (2010 – 2019)

199. During previous surveys, Chironomus bloodworms have been recorded as abundant at various sites, which is typically an indication of an organic discharge. An abundance of this taxon can also be associated with low dissolved oxygen concentrations, which has been evident in the Haehanga Stream at times (particularly during the warmer months).

200. During the most recent survey, Chironomus was not recorded at Sites 1 and T3 (upstream of composting activities), recorded as very abundant at Site 2, and common at Sites 5, 6, and 7. As stated in the latest monitoring report, this suggests a progressive increase in the organic enrichment of the Haehanga Stream.

201. However as a result of upstream conditions, particularly at Site 1 (i.e. no stock exclusion or riparian planting), it is difficult to assess the impact of site activities on the macroinvertebrate community health of the stream. For the same reason, it is also difficult to determine whether composting activities are having detrimental effects on the fish community within the Haehanga Stream.

202. Due to the way the Haehanga Stream is being managed as a whole i.e. placement of culverts (impeding fish passage), stock access to tributaries and the upper stream (causing pugging, bank erosion, suppression of riparian vegetation growth), and the loss of riparian margins (leading to increases in temperature and sedimentation), monitoring cannot accurately determine if any detrimental effects on the fish community are directly associated with the wastewater discharge.

203. As a result, the fish survey has been suspended for a period of three years, with this year being the first that no fish survey has been undertaken. The rationale being that improving onsite conditions will allow the Council to effectively monitor for adverse effects related to composting activities. Mitigation measures recommended by the Council's freshwater ecologist include:

- intensive riparian planting and fencing within the catchment;
- the cessation of any instream works;
- the implementation of stringent sediment controls;
- the cessation of eeling;
- ensuring that fish passage is achieved at all times.

204. The monitoring report states that any benefits from implementing the above measures would take several years to eventuate. In the interim, the Council have found an alternative 'upstream site' in a nearby catchment. This new site will form part of the monitoring programme from 2021 onwards, with the intention of providing a more accurate representation of the natural upstream environment.

205. RNZ's application states that they have completed a significant portion of its riparian management plan. However, we have recommended that the entire plan be completed by 1 August 2023.

11.1.3 Effects on soil

206. Soil structure, nutrient balance, and its effectiveness to support pasture cover, can all be adversely affected by onsite activities. Poor quality soil can exacerbate leaching potential, so is closely linked to groundwater quality.

207. Produced water[23] and other drilling waste material, which have been received onsite for approximately the last 15 years, contain hydrocarbons and chloride. High levels of these contaminants in the soil can cause the following adverse effects to occur:

- hydrocarbons leaching through the soil may contaminate groundwater and surface water which can cause implications on human and animal health and ecology;
- aesthetic impacts such as odour and discolouration.

208. The level of contaminants in the soils within the irrigation areas are monitored by taking soil core samples. Figure 19 summarises the soil sampling results obtained between 2014 and 2019.

209. The monitoring results show that:

- Between 2015 and 2016, the chloride concentration of the soil was within the tier three red zone on three occasions;
- Between 2014 and 2019, the chloride concentration of the soil was within the tier two yellow zone on seven occasions;
- Between 2014 and 2018, the SAR of the soil was within the tier two yellow zone on eight occasions.

210. RNZ's application states that concerns raised about soil sampling results are attributable to previous poor site management, and RNZ has since taken significant steps to better understand their system and processes, and to implement mitigation measures identified through this better understanding. The new irrigation areas will provide capacity in the system so that staff are not forced to make poor decisions about application of wastewater, either overloading the system or applying in unsuitable conditions, but most importantly also distributing the material over a wider area so that the build-up of chloride (and other potential contaminants) in the soil is not concentrated in one area.

211. Alongside this is the proposal to apply stockpiled material to the irrigation areas (once it meets specific standards) to improve the soil composition and its ability to cope with the application of wastewater. The soil will continue to be aerated using standard field techniques, improving drainage by breaking up compacted soil and improving the overall soil structure and texture (aeration was undertaken over all blocks in May 2020). Carefully managed, this will be positive for the quality of the soils, encouraging microbial activity and generally improving the capacity of the soil to treat the material that is applied and hold water.

212. RNZ believes that increasing the total irrigation area to 13.18 ha will provide further assurances that the soil quality issues associated with overloading soils and excess irrigation will be able to be managed. The removal of drilling by-products will also result in a significant reduction in chloride levels, as the source of the chloride will essentially be removed. This is likely to result in soil chloride levels trending downwards over time.

[23] Water, with high salt and dissolved solids content, that is produced as a byproduct during the extraction of oil and gas.

Lower irrigation block		Calcium	Chloride	Conductivity	TPH	Potassium	Magnesium	Sodium	NH4	NNN	PH	SAR
	Tier One		0 - 700									0 - 6
	Tier Two		700 - 1800		< 20,000							6 - 18
	Tier Three		> 1800		> 20,000							> 18
Site	Collected	mg/kg	mg/kg	mS/m@20C	mg/kg	mg/kg	mg/kg	mg/kg	g/m3 N	g/m3 N	pH	None
SOL000177	15/05/14	245.4	1559.6	533.4	14.8	641.6	22	483.3		0.42	6.8	7.60218
SOL000177	21/01/15	168.6	1934.7	718.9		1099	14.2	617.2		1.4	6.9	12.26619
SOL000177	1/05/15	162.4	1037	485.3		731.1	12.7	364	4.24	0.07	7.1	7.40825
SOL000177	7/04/16	178.7	2202.6	560.5	<14	838.5	12.3	664.4	0.474	0.76	7.2	12.97103
SOL000177	22/06/16	72.9	156.1	103.7		213.6	4.1	120.2	0.355	0.96	7	3.70881
SOL000177	14/02/17	42.9	97.7	68.1		160.1	2.5	115.4	0.224	0.42	6.6	4.63453
SOL000177	15/06/17	93.5	368.4	153.8	15	206.4	11.2	177.3	0.392	0.37	6.8	4.61437
SOL000177	24/01/18	279	1254.2	585.6		466.9	24.3	624.3	1.36	1.51	7.2	9.62503
SOL000177	22/06/18	9500	580	0.6	<80	2200	4700	570			7.3	
SOL000177	2/11/18	13800	580	0.5	82	2500	5100	520			7	
SOL000177	12/04/19	17200	1060	<0.2	125	3300	4700	660			7.2	

Upper irrigation block		Calcium	Chloride	Conductivity	TPH	Potassium	Magnesium	Sodium	NH4	NNN	PH	SAR
	Tier One		0 - 700									0 - 6
	Tier Two		700 - 1800		< 20,000							6 - 18
	Tier Three		> 1800		> 20,000							> 18
Site	Collected	mg/kg	mg/kg	mS/m@20C	mg/kg	mg/kg	mg/kg	mg/kg	g/m3 N	g/m3 N	pH	None
SOL000176	15/05/14	159.2	1161.4	398.3	15	419.1	14	363.5		<0.05	6.2	7.41447
SOL000176	21/01/15	70.9	748.7	270.3		410.6	8.7	195.4		0.36	6.6	5.82826
SOL000176	1/05/15	238.3	1372.7	554.3		705.5	17.1	359	3.88	0.06	6.7	6.0562
SOL000176	7/04/16	160.1	1827.4	271.1	<15	378.8	10	303.7	0.43	0.78	6.8	6.29382
SOL000176	22/06/16	84.2	315.7	132.6		232.8	5.6	124.4	0.35	0.08	6.4	4.09074
SOL000176	14/02/17	54.6	150.2	77.4		188.5	4.6	153.4	0.169	0.78	7.2	5.35715
SOL000176	15/06/17	77.5	101	76	8	168.3	4.6	68.3	0.443	0.13	5.8	2.03914
SOL000176	24/01/18	83.5	118.5	48.1		23.7	4	46.8	0.325	<0.64	5.8	2.03539
SOL000176	22/06/18	5000	33	<0.2	<90	1620	4900	145			6.8	
SOL000176	1/11/18	5500	54	<0.2	<80	1950	4800	160			6.8	1.2
SOL000176	12/04/19	3900	200	0.2	<70	1360	4300	165			5.5	

SOL 193 Irrigation block		Calcium	Chloride	Conductivity	TPH	Potassium	Magnesium	Sodium	NH4	NNN	PH	SAR
	Tier One		0 - 700									0 - 6
	Tier Two		700 - 1800		< 20,000							6 - 18
	Tier Three		> 1800		> 20,000							> 18
Site	Collected	mg/kg	mg/kg	mS/m@20C	mg/kg	mg/kg	mg/kg	mg/kg	g/m3 N	g/m3 N	pH	None
SOL000193	15/05/14											
SOL000193	21/01/15											
SOL000193	1/05/15											
SOL000193	7/04/16											
SOL000193	22/06/16											
SOL000193	14/02/17											
SOL000193	15/06/17											
SOL000193	24/01/18	103.7	128.9	112.5		40.4	13.5	59.2	0.178	1.09	6.2	1.45163
SOL000193	22/06/18	13,100	73	<0.2	105	1,470	4,500	170			7.4	
SOL000193	1/11/18	10,900	470	0.4	84	1,470	550	340			7	
SOL000193	12/04/19	9,900	270	0.3	148	1,980	3,800	300			7	

S1 - Base line		Calcium	Chloride	Conductivity	TPH	Potassium	Magnesium	Sodium	NH4	NNN	PH	SAR
	Tier One		0 - 700									0 - 6
	Tier Two		700 - 1800		< 20,000							6 - 18
	Tier Three		> 1800		> 20,000							> 18
		Calc	Calc	Calc	Calc	Calc	Calc	Calc	TRC	TRC	TRC	Calc
Site	Collected	mg/kg	mg/kg	mS/m@20C	mg/kg	mg/kg	mg/kg	mg/kg	g/m3 N	g/m3 N	pH	None
S1 - Base line	14/11/19	2800	10	<0.2	<70	880	5100	80			5.6	

S2 - Base line		Calcium	Chloride	Conductivity	TPH	Potassium	Magnesium	Sodium	NH4	NNN	PH	SAR
	Tier One		0 - 700									0 - 6
	Tier Two		700 - 1800		< 20,000							6 - 18
	Tier Three		> 1800		> 20,000							> 18
		Calc	Calc	Calc	Calc	Calc	Calc	Calc	TRC	TRC	TRC	Calc
Site	Collected	mg/kg	mg/kg	mS/m@20C	mg/kg	mg/kg	mg/kg	mg/kg	g/m3 N	g/m3 N	pH	None
S2 - Base line	14/11/19	3000	6	<0.2	<70	910	5100	90			5.8	

Figure 19: Soil sampling results between 2014 and 2019

213. Our comments are included in the following paragraphs.

214. High levels of chloride in the soil can also adversely affect the soil's pH, and increase metal uptake by plants. A high pH may depress or seriously interfere with plant growth. A low pH can turn aluminium soluble, and is likely to limit plant growth.

215. Seven soil samples were collected during the 2018-2019 monitoring period. The locations are illustrated by transects shown in Figures 20 and 21 below.

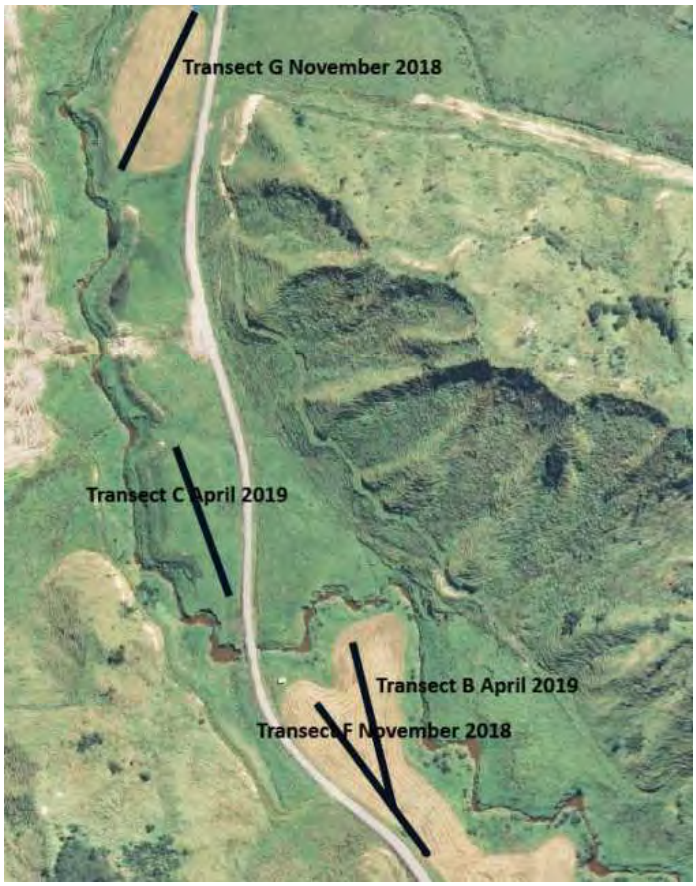

Figure 20: Soil sample locations, lower irrigation areas

Figure 21: Soil sample locations, upper irrigation areas

216. Sample results identified elevated values of chloride, calcium, potassium, sodium, barium and soluble salts in Area J (Transect F), one of the most utilised irrigation areas. The difference in concentrations between this area and Area F (Transect A), one of the newer irrigation areas, is particularly evident when comparing the concentrations of soluble salts i.e. Area J contains four times the amount of soluble salts (3,100 mg/kg) than Area F (700 mg/kg).

217. A similar observation was made during the 2019-2020 monitoring period, whereby five of the eight irrigation areas received more than 2,000 kg per ha of chloride. The newly developed L4 irrigation area, which has not yet been irrigated, has a baseline chloride concentration ranging between 6 and 10 mg/kg. In comparison, area L3 (which has been irrigated to for 10+ years) has a chloride concentration of 680 mg/kg. Similarly, the baseline barium concentration within area L4 ranges between 36 and 39 mg/kg, compared to a barium concentration of 2,300 mg/kg within area L3.

218. This demonstrates that the elevated levels of contaminants within area L3 are directly related to the irrigation of drilling waste leachate to land.

219. While the cessation of the drilling waste stream may result in chloride levels having reached their peak, RNZ still have a significant legacy issue to deal with in the form of the existing stockpile. This material will remain a constant source of chlorides (as it leaches into the pond system) for as long as it takes to process it into a 'soil conditioner'. We note that the stockpile has been in-situ for at least 10 years and still has elevated levels of hydrocarbons.

220. Based on RNZ's proposal to use 500 tonnes of this material onsite per year (on the provision that it complies with prescribed standards), it will take approximately 40 years to completely remove the stockpile, and therefore at least the same amount of time to remove chloride from the leachate.

11.1.4 Effects on groundwater

11.1.4.1 Chloride

221. Irrigating contaminants such as hydrocarbons, chloride, and nitrates to land may result in these contaminants leaching through the soil and into groundwater. Although not often used, contamination of shallow groundwater is of concern as it may also contaminate surface water due to the connected hydrology. And, more importantly, treating shallow groundwater as a sink or as storage for contaminants is not consistent with sustainable management of natural resources.

222. Groundwater is monitored at the Uruti site using seven monitoring bores. Three of these bores were installed in 2011, another three were installed in 2018, and the most recent bore was installed above the new upper irrigation area in 2019. The contaminants of most concern in relation to groundwater monitoring are chloride, and nitrogen (discussed in Section 11.1.4.2).

223. During the 2018/2019 monitoring period it was evident that monitoring well GND3009 was the most impacted. GND3009 is located down gradient of the duck pond (within irrigation area L1), and had a salinity concentration of >2500 g/m^3 and an ammonia concentration of 24 g/m^3. GND2190 (located within irrigation area L2) also recorded elevated results for chloride and total dissolved solids (TDS).

224. During the 2019/2020 monitoring period, the impact on groundwater in terms of chloride, ammonia, TDS, and barium appeared to be short term. Interestingly, the ammonia concentration of GND3009 was >20 g/m^3 during the first three monitoring rounds, but then significantly reduced to near trace levels during the final monitoring round in June 2020 (0.87 g/m^3). Whereas the concentration of nitrate/nitrite nitrogen (NNN) in this well increased considerably during the final monitoring round from below the limit of detection to 34 g/m^3.

225. The chloride concentration of GND2190 remained elevated during 2019/2020 with a figure of ~900 g/m^3, and TDS was also in excess of 1,500 g/m^3. However, the concentration of NNN decreased across the monitoring period.

226. RNZ acknowledges that onsite activities have resulted in chloride leaching, due to the high levels of chloride in drill cuttings and produced water. A significant amount of produced water was received at the site in 2016, and as a result, monitoring showed elevated levels of chloride in the soil and subsequently the groundwater (downgradient of the lower irrigation areas).

227. The impacts of chloride leaching are managed using the three-tier system (described in Section 4.5.5). Chloride in the soil is monitored monthly and if levels are within tier two for more than 6 months, or within tier three, remedial action is required. Chloride levels within the irrigation pond are also monitored. To date, these have been within tier one levels (green zone). However the system identifies actions to take if levels increase, including ceasing irrigation at levels greater than 2000 mg/L if drier periods are forecast, especially during the summer months.

228. Groundwater levels remained in tier two (yellow zone) until 2018, however recent monitoring has shown that levels are now within tier one (green zone). On occasions when monitoring has shown a breach of consent conditions, these have been linked directly to poor management of the site i.e. unauthorised, direct discharge of contaminants to water.

229. RNZ's desktop analysis indicates that levels of approximately 3449 kg/Cl/ha/year are applied to land, based on the concentration of chloride in the irrigation pond (average for 2017-2019 is 1420 mg/L), an irrigation rate of 17,000 m^3/year, and an irrigation area of 7 ha. By increasing the irrigation area to 13.18 ha, the rate decreases to 1832 kg/Cl/ha/year.

230. RNZ's application states that the effects of chloride leaching can generally only be resolved through dilution, so the key way of reducing chloride losses from the irrigation areas is to cease taking drilling by-products altogether. RNZ expects, and we agree, that once drilling by-products are no longer received onsite, chloride levels in the ponds will eventually decrease. This will then follow through the system and it is anticipated that chloride levels in the groundwater will also decrease over time (monitoring will confirm this).

231. Therefore the removal of drilling waste is expected to address any concerns about chloride leaching in the medium to long term. Although it is important to note here that as already stated, the stockpiled material will remain a constant source of chloride until it has been fully processed and used around the site (optimistically 40 years).

232. After the Council made several requests for information to demonstrate the adequacy of the proposed irrigation area, RNZ identified that the existing irrigation areas were insufficient and have since increased the total irrigation area to 13.18 ha. The additional area provides more options for irrigation and enables a greater rest time between applications. Until drilling by-products are removed from the site completely, the development of these additional irrigation areas will help to reduce chloride loading on the lower irrigation area, where groundwater monitoring results are showing elevated chloride levels.

233. Our comments are included in the following paragraphs.

234. RNZ's application states that in most cases surface water sampling results have been within consented limits, and the exceptions to this have typically been as a result of unauthorised discharges to the Haehanga Stream. However, the impermeability of the compost pads has also been raised as a potential source of groundwater contamination. Although RNZ's application states that the pads are constructed of compacted papa clay, approximately 1 metre deep, thereby creating an impervious barrier above the subsurface soil, this has not been verified.

235. An abatement notice issued by the Council in March 2019, required RNZ to engage a suitably qualified expert to identify the source of contaminants entering the Haehanga Stream, which the Council believed may have been caused by the compost pads/ponds being unlined. A stream contamination investigation report was prepared by Kay Consulting Ltd which concluded that the contamination was a result of unauthorised discharges to the unnamed tributary (as opposed to groundwater contamination). The report recommended that RNZ engage a Geotechnical Engineer to investigate the integrity of Pad 3 and the collection pond, should sampling results continue to pick up contaminants in the tributary, however subsequent sampling did not detect contaminants at significant concentrations.

236. In any case, we do not believe the "Pond Treatment System" actually provides any treatment to the stormwater/leachate, and is instead an unnecessary source of odour. Therefore, recommended consent conditions require RNZ to remediate and fill all of the PTS ponds, except the irrigation pond.

237. Recommended conditions also require RNZ to demonstrate the impermeability of the irrigation pond (by a suitably qualified person), provide sufficient storage in this pond, and meter the irrigation discharge.

238. RNZ has stated that groundwater monitoring results are all within the tier 1 response criteria indicating that, all modelling aside, actual effects from discharges to land/water are less than minor. However, it is important to note that the tiered system is a methodology developed using landfarm surrender criteria. Landfarms are very different from composting activities in that they are typically undertaken on a one-off application basis, as opposed to long term application of material and fluid. Therefore we don't believe this system is an appropriate means of measuring the impact on the receiving environment.

11.1.4.2 Nitrogen

239. In response to one of the requests for further information, RNZ commissioned the international consulting firm, AECOM, to prepare a Nitrogen Balance Report ('the AECOM report'). AECOM used the OVERSEER® model, originally developed as an agricultural management tool, to estimate nitrogen loading and losses at the Uruti site.

240. The AECOM analysis calculated the total nitrogen loading over the irrigation areas to be 7550 kg/year, with a loss of 3574 kg/N/year (through leaching and runoff). RNZ's application states that following the preparation of this report, they have further refined onsite practices with the aim of reducing nitrogen losses, and the analysis has therefore been superseded by the modelling undertaken by Kay Consulting (Appendix AA of RNZ's application).

241. The AECOM report identified that a change in management practices would have a significant impact on reducing the nitrogen losses from the irrigation areas. This included things like increasing the irrigation areas, increasing production (i.e. removal of hay bales), and decreasing the application of compost.

242. The AECOM report concluded that removing the stockpiled compost from the site was the best case scenario (as opposed to using this material onsite as a 'soil conditioner'), as this would contribute significantly to the reduction in nitrogen leaching. Although this scenario has been modelled in the report prepared by Kay Consulting, it has not been proposed as RNZ cannot currently sell this product offsite.

243. The analysis by Kay Consulting modelled three different scenarios with the only difference being the volume of (stockpiled) material applied to land as a soil conditioner. The first scenario used none, the second used 1000 m^3 per year, and the third scenario used 2000 m^3 per year.

244. Kay Consulting recommends the application of 1000 m^3 (500 tonnes) of stockpiled material to the irrigation areas (13.18 ha) per year. The OVERSEER® analysis suggests that this will add 114 kg N/ha/year to the irrigation areas and the total nitrogen leached from these areas will be 2,093 kg.

245. The general principle of reducing nitrogen losses is to either reduce the amount applied, and/or increase the amount removed. The main options at the Uruti site include:

1) Increase the irrigation area to which nitrogen is applied – decreases the loading and increases overall uptake by plants;
2) Increase nitrogen export – in the form of compost removed or removal of supplements e.g. hay, baleage, or other crop;
3) Reduce nitrogen application – decreases the concentration of nitrogen in the discharge to land by:
    - reducing nitrogen inputs into the irrigation pond;
    - aeration of the irrigation pond;
    - diluting the pond with fresh water during dry periods.

246. One of the key means of reducing nitrogen losses (and maximising nitrogen export) is removal offsite. Once all of the drilling material is through the composting process and no more of this material is received, it is likely that all compost will be exported from the site and sold through existing sales routes and markets operated by the applicant.

247. In the meantime, RNZ has increased their total irrigation area from 7 ha to 13.18 ha. Prior to this they had planned to 'spell' areas J and H, however they no longer consider this necessary as they believe soil and groundwater contaminant levels have improved, and the increased irrigation area will provide more rest periods between applications.

248. The other key means of reducing nitrogen losses is the removal in hay or other 'cut and carry' feed crops. RNZ has assessed the feasibility of hay removal from the site which is summarised below.

249. The OVERSEER® analysis suggests that 197 tonnes of hay can be removed from 13.18 ha of irrigation area, and that 286 kg/N/ha is removed in that hay. Table 11 summarises the calculation of nitrogen removed in hay cut and carry.

Table 11: Calculation of nitrogen removed in hay cut and carry[24]

	CP	Nitrogen	Hay removed 13.18 ha	Nitrogen removed in hay
	% DM	%	Tonnes (DM)	Kg N/ha
Pasture hay (poor quality)	5 - 10	0.8 – 1.6	197	120- 239
Pasture hay (good quality)	15 – 20	2.4 – 3.2	197	359 - 479
Overseer file	12.50	2.0	197	286

250. The removal of 197 tonnes of dry matter from the irrigation areas has been modelled in OVERSEER®. This level of cut and carry equates to 14,946 kg/dry matter/ha/year removed (OVERSEER® calculates the dry matter produced from the blocks involved). The irrigation areas are not grazed meaning the majority of the dry matter produced from these areas is available for export, also noting that 4 crops per year can be achieved. Accordingly, the removal of 197 tonnes of dry matter from the 13.18 ha per year is feasible.

251. A similar exercise was undertaken based on baleage harvest instead of hay. Based on four cuts of baleage per year, the predicted dry matter yield from the 4.17 ha cut area is 14,964 kg/ha (given there is no stock grazing and water and nitrogen is regularly applied, RNZ consider this feasible). The same formula was used to calculate the nitrogen removal of baleage and this demonstrates that baleage is equally as good as, if not better than, hay for removal of nitrogen (Table 12).

Table 12: Calculation of nitrogen removal in baleage cut and carry

	Crude Protein	Nitrogen	Baleage removed 4.17 ha	Nitrogen removed in baleage
	% DM	%	Tonnes (DM)	Kg N/ha
Baleage	12-17	1.92 – 2.72	197	287-407

252. RNZ has proposed measures to decrease the amount of nitrogen in the irrigation water, including decreasing direct nitrogen inputs into the pond system, and dilution of the irrigation pond during periods of dry weather.

253. RNZ also propose to aerate the irrigation pond which will further reduce the nitrogen concentration in the irrigation water, while increasing the volatilisation of nitrogen gas into the atmosphere. When monitoring of the irrigation pond indicates that nitrogen concentrations are increasing above 200 g/m^3 due to evaporation, fresh water will be used to dilute the irrigation water. This will be undertaken in accordance with the permitted standards of Rule 15 of the RFWP (taking and use of surface water).

[24] Landpro Ltd (26 June 2020). Application to Taranaki Regional Council for Renewal of Resource Consents.

254. Ultimately, once all of the drilling by-products are through the process and are no longer present, it will be possible to irrigate the compost piles with irrigation fluid when they become dry. This will return nutrients to the compost, ensure optimal compost conditions are achieved, and reduce the need to irrigate to land. However, this cannot occur until the stockpiled material is completely removed as the hydrocarbons will contaminate the compost that doesn't contain drilling waste material.

255. RNZ's application states that when assessed on a 'whole farm' level, the total nitrogen losses from the site are very low, as significant offset is provided due to the fact that the remainder of the land is in native bush and not grazed. However, the relevance of OVERSEER® modelling when assessing effects on the environment is widely debated, and caution must be applied when extrapolating long term modelled averages.

256. Our comments are included in the following paragraphs.

257. The report prepared by Kay Consulting uses an average nitrogen concentration of 225 g/m^3 – this being the average concentration of ammoniacal nitrogen recorded in the irrigation between 2014 and 2019. We do not believe this is a true representation of the nitrogen concentration in the irrigation pond, given that the majority of material received at the Uruti site between 2014 and 2016 was drilling waste material. In the last 4 years, the site has received a larger volume of organic material (as drilling activities slowed) and consequently, the concentration of nitrogen in the irrigation pond has also increased (shown in Figure 22).

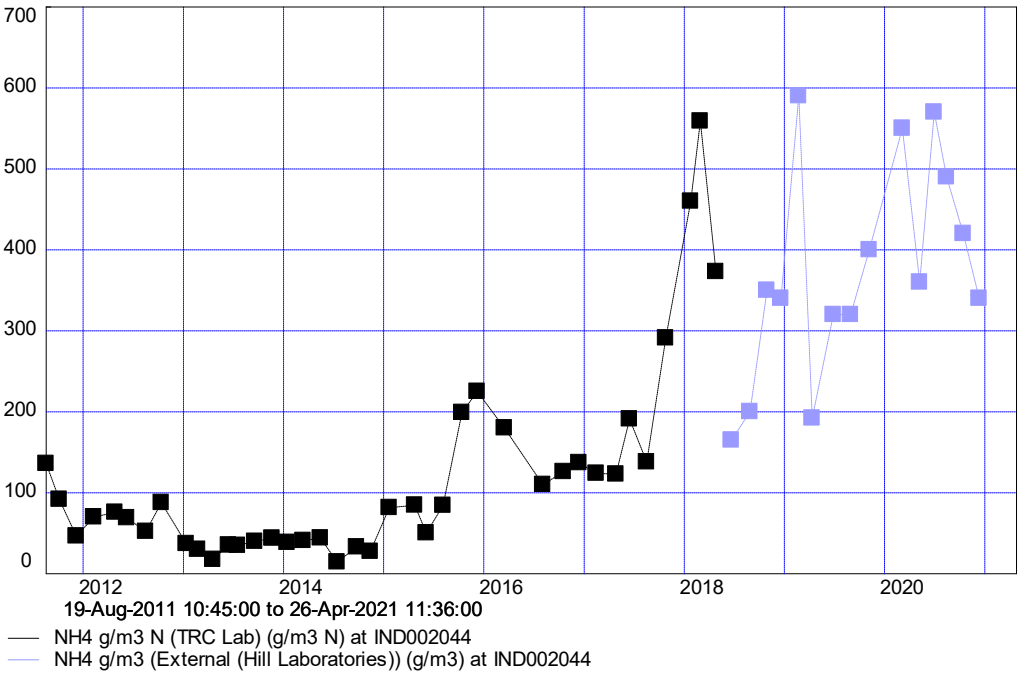

Figure 22: NH_4 irrigation pond since August 2011

258. The average concentration of ammoniacal nitrogen in the irrigation pond in the 2018/2019 monitoring period was 332 g/m^3, and in the 2019/2020 monitoring period the average was 440 g/m^3.

259. Using the 2019/2020 monitoring data – 19,410 m^3 of fluid was irrigated to land (with a nitrogen concentration of 440 g/m^3), which resulted in a total of 8540 kg of nitrogen being discharged to land. Using a nitrogen concentration of 225 g/m^3 (as Kay has done) results in a total of 4367 kg of nitrogen being discharged to land, which is still a very large number but only half of that discharged during the 2019/2020 monitoring year. Therefore the calculations provided by RNZ are extremely conservative, if not a completely unrealistic assessment of the effects of nitrogen.

260. Figure 23 below shows the estimated total nitrogen (kg per ha) applied to each of the irrigation areas during the 2019/2020 monitoring period. It shows that areas L1, U2 and U3 received at least 800 kg/N/ha. The estimated loading for area L1 was close to 1200 kg/N/ha, and in excess of 1200 kg/ha/ha for area U3. Irrespective of how this correlates to groundwater monitoring, these irrigation areas have an extremely high loading rate.

261. It should also be noted that RNZ propose to significantly increase the volume of organic material being brought onto the site, in order to substitute the drilling waste revenue stream. This in turn means that the volume of nitrogen entering the system is also likely to increase, and the effects of this have not been adequately addressed by RNZ.

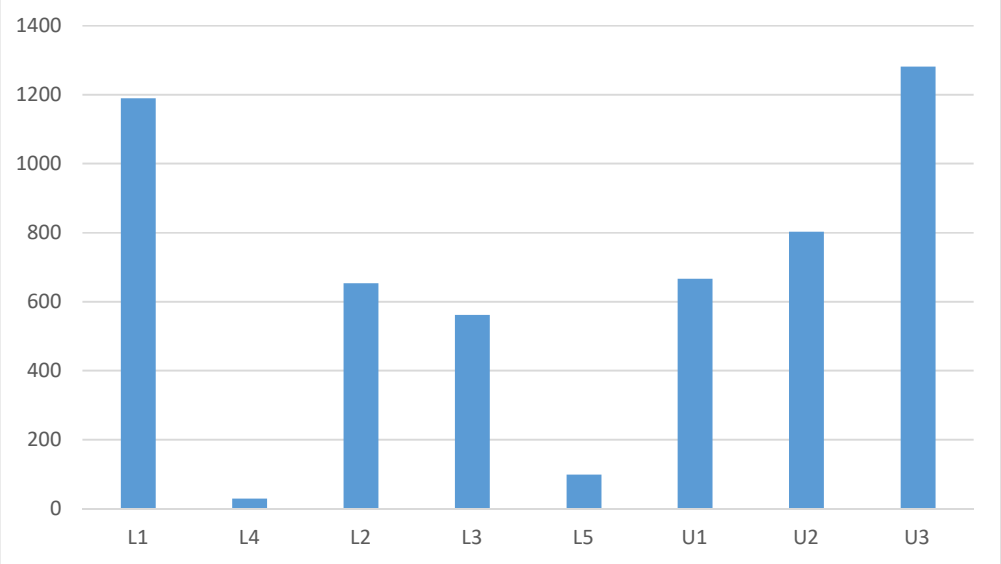

Figure 23: Estimated total nitrogen in kg per ha by irrigation area 2019-2020

262. The process of depositing organic material directly into the collection pond is contributing to a high load of nitrogen (and BOD) within the pond system, as the material starts to break down within the pond before it is removed and put into compost piles. The issues with this are firstly, the nitrogen loading into the pond system and secondly, the loss of nutrients that could otherwise be captured in the compost process. This process is also a potential source of odour.

263. In order to address these issues, RNZ's application states that all waste material will be applied directly into the composting process instead of into the pond. This change in practice should result in less liquid being put through the pond system, and ultimately less wastewater requiring irrigation. However as already stated, RNZ advised that this process ceased as of April 2020 and at the time of writing this report, Council staff have confirmed that material is still being deposited directly into the collection pond.

264. RNZ's application concludes that, with the adoption of proposed mitigation measures, and the adherence to management plans, the effects of nitrogen can be avoided, remedied, or mitigated to the extent that they are no more than minor.

265. Again, in our opinion, this is considered particularly problematic as it relies heavily on RNZ to implement these mitigation measures when their compliance history and site management have been poor.

266. Instead, recommended consent conditions place a limit on the total nitrogen that can be discharged to land (400 kilograms in any 12-month period for 'cut and carry areas' or 200 kilograms in any 12-month period for any other land), and also require a Nitrogen Management Plan to be prepared and approved.

11.1.5 Effects on air quality

11.1.5.1 Dust

267. RNZ's application states that dust effects are mitigated by wet suppression using tractor drawn water tanker as appropriate during dry weather, and ensuring that traffic speeds are kept low on the access roads. Dust has not typically been a concern, with no dust complaints received.

268. The public may consider there to be a risk associated with airborne pathogen release, as pathogens such as Legionella sp, Aspergillus fumigatus (a type of fungus) and other fungal spores, may be present in compost. It is also possible for compost to contain other pathogens such as bacteria and viruses, however none of these pathogens are likely to be carried into the air. Instead, the main risk associated with pathogens is to the workers who are responsible for turning the compost.

269. Our comments are included in the following paragraphs.

270. The dust emitted from the composting site will be made up of airborne particles ranging in size from less than 1 micron up to about 500 microns (a micron is one thousandth of a millimetre). Single particles at the lower end of the size range are invisible to the naked eye but can be seen in the form of dust clouds or as a fine layer of dust on surfaces. Those greater than 50 microns can be seen by the naked eye.

271. Chemically, the dust particles will be a mix of soil and clay minerals, along with lesser amounts of organic matter. There are no specific health effects associated with any of these 'chemicals'.

272. Weather conditions, particularly wind movements and intensity, are usually the primary factor in identifying the behaviour of airborne dust particles. Air movement will carry the dust down-wind from the source, while at the same time causing a dilution effect as the contaminated air 'parcel' is mixed with the surrounding air. Generally dust is distributed along and around the prevailing wind direction with decreasing dust concentrations away from the source. Larger dust particles (greater than 50 microns) will often travel no more than a few hundred metres away from the source before settling.

273. The inhalation of fine particulate matter (PM_{10}) can cause the aggravation of existing respiratory and cardiovascular disease, especially for the elderly, children, and those suffering from asthma and other respiratory illnesses of cardiovascular diseases. PM_{10} is covered by a National Environmental Standard (NESAQ), which is aimed at minimising the risk of these effects[25].

274. If uncontrolled, dust can have a nuisance effect on neighbouring properties by causing a loss of visual amenity, soiling clean surfaces, reducing enjoyment of the outdoors and increasing sediment loads in rainwater tanks. Dust also has the potential to cause adverse effects on plant growth and productivity through reduced sunlight absorption.

275. There are no air quality guidelines in New Zealand for nuisance dust. The Ministry for the Environment has recommended that dust nuisances be controlled through the use of appropriate management programmes, as described in the *"Good practice guide for assessing and managing the environmental effects of dust emissions"*[26].

276. Two submissions specifically mentioned dust. As outlined above, dust particles generally settle within a few hundred metres downwind of the source, and it is also likely that the surrounding steep hill country and vegetation within the site would provide a buffer from any dust generated. Therefore any adverse dust effects are considered to be no more than minor.

11.1.5.2 Odour

277. The process of composting organic waste also has the potential to create unpleasant odour beyond the boundary of the subject site. The *Assessment of Odour Effects*[27] (prepared by AECOM) states that the amount of odour associated with a compost operation is dependent on the raw materials that are used, and probably more importantly the control (and management) of the process.

278. Composting is essentially a natural process, but because it is a decay process there will also be odour. The degree of odour generated relates to the level of aeration that occurs. In aerated composting processes, aerobic bacteria break down the material. If the compost is not adequately aerated, then anaerobic bacteria break down the material which can generate relatively offensive odours.

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[25] Resource Management (National Environmental Standards Relating to Certain Air Pollutants, Dioxins, and Other Toxics) Regulations 2004 have a standard for PM10 of 50µg/m3, as a 24 hour average. This limit is only allowed to be exceeded once in any year.

[26] Ministry for the Environment (September, 2000). Good Practice Guide for assessing and managing the environmental effects of dust emissions.

[27] AECOM New Zealand Limited (June 2019). Assessment of Odour Effects, Revital Group – Uruti Composting Operations.

279. During the composting process, the most common factors that can result in anaerobic conditions which lead to odours arising are insufficient porosity, excess moisture, and excessive stockpile size.

280. If the moisture content is higher than 65%, the pores between the particles will rapidly fill with water. Oxygen diffuses more slowly through water than air; therefore, as moisture content increases, oxygen penetration decreases, and anaerobic conditions will result. Similarly, the particle size and distribution can limit oxygen penetration. Small particle sizes and tight compaction of material will result in small pore sizes; these will fill rapidly with water, thus decreasing oxygen penetration through the compost pile. Excessively large compost piles have a low surface area to volume ratio, these piles will tend to overheat.

281. Once the accepted material is blended with greenwaste and wedge piled, it is left for 4 weeks prior to being turned to minimise the worst of the odour that arises at the start of the process. Piles are then turned frequently to keep them in an aerobic state and are turned when the weather conditions are favourable.

282. AECOM carried out an odour assessment at the subject site on 10 June 2019, to determine an odour impact rating for several different locations within the site, and beyond the site boundary. Investigations were undertaken in accordance with the guidance contained in The *Good Practice Guide for Assessing and Managing Odour in New Zealand* (MfE GPG Odour)[28].

283. The AECOM assessment states that there are situations where the release of a potentially odorous compound does not result in an odour nuisance effect. It is the subjective judgement of an odour's hedonic tone[29] that enables the decision to be made as to whether it is a nuisance or not. The factors that contribute to an odour nuisance effect include the frequency (F) of odour impact, the intensity (I), the duration of exposure (D), the offensiveness (O), and the location (L). This is referred to as a FIDOL assessment, which is used to determine if off-site odours are likely to be offensive or objectionable.

284. A desk-top study and field observations were used to identify the nearest sensitive receptors i.e. residential properties, which are identified in Table 13. The location of these sensitive receptors is identified in Figure 24.

Table 13: Sensitive receptors

Receptor Name	Address	Receptor Type	Distance from the Composting Operations (m)	Direction Relative to the Site
R1	1358 Mokau Road	Residential	1,600	Northwest
R2	1415 Mokau Road	Residential	1,900	Northwest
R3	1429 Mokau Road	Residential	1,700	Northwest
R4	1530 Mokau Road	Residential	1,900	North

[28] Ministry for the Environment (June, 2003). Good Practice Guide for Assessing and Managing Odour in New Zealand.

[29] A measure of an odour's pleasantness.

Figure 24: Location of sensitive receptors

285. The investigation found that odour was only detected downwind of the site, and it was the strongest near the leachate ponds, material drop-off area, and active composting piles. Generally, the intensity of the odour weakened the further the distance from the source. No objectionable or offensive odours were detected at any of the off-site locations. The location of the odour survey points are shown in Figure 25.

286. The AECOM assessment also considered the potential impact of adding the proposed kerbside food waste collection. The report states that the addition of food waste is only an additional 20% of material that will be processed, and the food waste should not be as odorous as the animal waste that is currently onsite. Therefore based on the way the human nose perceives odour, this amount of increase would not result in any noticeable change in intensity of odour from the site.

Figure 25: Odour survey locations

287. The report concludes that there is a low likelihood of off-site odour from site operations being categorised as offensive and objectionable at nearby receptor locations for the following reasons:

- the compost is turned frequently in the early stages, which prevents anaerobic conditions which give rise to offensive odours;
- any odorous waste is either covered with greenwaste, sawdust or mature compost shortly after it is received onsite;
- based on the meteorological data for the area and the site topography, the nearby receptors would most likely only be affected by odours during periods of katabatic flows (cold air draining down the valley), which occur approximately 4.5% of the time;
- there is a large separation distance between the composting operations and the sensitive receptors (greater than 1600 m), and also good separation between the areas of irrigation and the receptors (greater than 550 m). This separation will help dilute any odour that might be generated by the composting operations.
- the surrounding land is zoned rural, therefore it is not unusual to experience rural type odours such as silage or even compost.

288. Our comments are included in the following paragraphs.

289. Submissions from neighbouring landowners state that they are still regularly subjected to offensive and objectionable odour beyond the site boundary. The Council have also received a number of odour complaints during the previous consent term (and following the consent's expiry in 2018). Odour complaints received between 2014 and January 2021 are summarised in Table 14 below.

290. The MfE GPG Odour states that "objectionable and offensive effects from odour can occur from low intensity, moderately unpleasant odours occurring frequently over a long period, or from high-intensity, highly unpleasant odours occurring infrequently". Therefore an objectionable or offensive effect can result from an odorous compound which is either present in very low concentrations, usually far less than the concentration that could harm physical health, or when it occurs in high concentrations.

291. When in high concentrations, the contaminants in the odour may cause direct health effects such as skin, eye or nose irritation. Repeated or prolonged exposure to odour can result in a high level of annoyance, and the receiver may become particularly sensitive to the presence of the odour e.g. considering it to be offensive or objectionable when it may only be noticeable to a normal person.

292. Individuals may react differently to the same odorous compound as their brain responds to the chemicals in the air that they breathe. Therefore odour is very difficult to measure with chemical, mechanical or electronic apparatus, as it is a result of human perception.

293. Table 14 demonstrates that in most cases, Council Officers did not detect an offensive or objectionable odour beyond the site boundary when responding to odour complaints. This can be due to a number of factors, including for example, the time it takes to get to site or the intermittency of the odour.

294. For this reason, odour complaints are very difficult for all Regional Council's to deal with. Consequently, the Waikato Regional Council (WRC) is beginning to implement a new preventative approach to odour management, with the aim of avoiding adverse odour effects rather than trying to manage them. WRC state that they have not been sufficiently successful in managing objectionable odour to date, as they still receive a large number of odour complaints. Their new approach to managing odour is described in an abstract they prepared for CASANZ 2019 Conference[30] and attached as Appendix 3.

295. In summary, the new approach focuses on "*odour prevention involving a greater emphasis on robust up the pipe controls, capturing these controls as consent conditions and enforcing those controls irrespective of the presence of odour. This emphasis on the controls and their enforcement avoids the need to collect evidence of objectionable odour*".

296. The previous method of responding to odour complaints and enforcing the no objectionable odour beyond the boundary condition has been likened to an 'ambulance at the bottom of the cliff' approach, whereby it indicates that an adverse effect may have already occurred.

[30] Waikato Regional Council. Fasten Your Seatbelt – Zero Tolerance Approach to Odour Regulation.

Table 14: Odour complaints received between 1 June 2014 and 31 January 2021

Date	Details	Outcome	Enforcement action taken
23 Jun 2014	A complaint was received regarding odour.	Investigation found that a slight odour was detectable off-site. Odour not considered offensive or objectionable and therefore authorised under Resource Consent.	None.
13 Jan 2015	A complaint was received concerning odour.	An odour survey was conducted at the boundary of the worm farm and at the complainant's boundary. The duty officer detected constant weak hydrocarbon odours at the boundary of the worm farm and very weak intermittent odours at the complainant's property. The odours were not considered offensive. No further action.	None.
25 Jan 2015	A complaint was received concerning an objectionable odour.	Odour survey/assessment was undertaken on Mokau Road at the letter box of the address given by the complainant during our phone conversation, which was west of the composting site. With light air coming out of the west, initial impressions found no odour. Once assessment was completed no odour was detected. No odour was detected at Remediation site entrance or North East of the site entrance.	None.
20 Feb 2015	A complaint was received concerning odour.	An odour survey was conducted near the boundary of the complainant property. Odour associated with composting facility could not be detected. No further action.	None.
11 Mar 2015	A complaint was received concerning odour.	Odour survey was undertaken at two locations on the complainant's property. No Odour was detected. On site there was a very weak hydrocarbon odour when standing next to the 1st pond however no odour was detected beyond the site entrance.	None.
18 Apr 2015	A complaint was received regarding odour.	Inspection found no odour of any consequence to be found.	None.
05 Mar 2018	A complaint was received concerning odours.	An odour survey was undertaken. Only slight intermittent noticeable odours were found beyond the boundary of the site.	None.
14 Mar 2018	A complaint was received concerning odours	Investigation found that no odours were occurring at the time of inspection.	None.
12 Sep 2018	A complaint was received regarding objectionable odour	Odour surveys undertaken in response to a complaint received regarding objectionable odours discharging beyond the boundary of a site used for composting operations. Odour surveys found 'rotten offal' type odours were present at the SH3 site turn off, the odour was distinct and constant. No odour was found at the complainants property at the time of inspection; had the same odour been detected it would have been considered objectionable.	None.
22 Jun 2020	A complaint advised unpleasant odour.	An odour survey was undertaken and offensive odour was found beyond the boundary of the property.	Infringement notice.
23 Jun 2020	A complaint was received concerning a 'horrible' odour. .	An odour survey was undertaken and objectionable odour was found beyond the boundary of the property. The company were advised of the outcome.	Infringement notice.

05 Aug 2020	A complaint was received concerning an odour.	An odour survey was undertaken and no offensive or objectionable odour was detected beyond the site boundary.	None.
16 Aug 2020	A complaint was received concerning an offensive odour.	An odour survey was completed. Odour was detected around the main entrance to the site and either side of it with intermittent odour on the southern side of the site. At the time of inspection the odour was not found to be offensive or objectionable.	None.
17 Aug 2020	A complaint was received regarding odour.	An odour survey was undertaken and no offensive or objectionable odour was detected beyond the site boundary.	None.
18 Aug 2020	A complaint was received regarding odour.	An odour survey was undertaken and no offensive or objectionable odour was detected beyond the site boundary. Odour was detected onsite and the main source was found to be the composting wind rows located on pad 1.	None.
02 Sep 2020	A complaint was received regarding excessive and constant odour.	Odour survey conducted at four locations: odour was detected beyond the boundary of the site but not considered offensive or objectionable (it would be if the odour was continuous).	None.
28 Sep 2020	A complaint was received regarding odour.	An odour survey was undertaken and no offensive or objectionable odour was detected beyond the site boundary.	None.
01 Oct 2020	A complaint was received regarding odour.	An odour survey was undertaken and no offensive or objectionable odour was detected beyond the site boundary.	None.
02 Oct 2020	Five complaints were received concerning an odour.	An odour survey was undertaken and it was found that there was objectionable odour beyond the boundary of the site. The odour was traced to the irrigation pond at the composting facility.	14-day letter Abatement notice. Infringement notice.
30 Oct 2020	A complaint was received regarding an offensive odour.	An odour survey was undertaken and objectionable odour was found beyond the boundary of the site. Odour was traced to sheepskin wind-row composting on Pad 1.	Infringement notice.
21 Dec 2020	A complaint was received regarding an offensive odour.	Odour survey conducted at four locations: odour was detected beyond the boundary of the site but not considered offensive or objectionable (it would be if the odour was continuous).	None.
22 Dec 2020	A complaint was received regarding an offensive odour.	An odour survey was undertaken and no offensive or objectionable odour was detected beyond the site boundary.	None.
02 Jan 2021	A complaint was received regarding an offensive odour.	An odour survey was undertaken and no offensive or objectionable odour was detected beyond the site boundary.	None.
06 Jan 2021	A complaint was received regarding an offensive odour.	An odour survey was undertaken and no offensive or objectionable odour was detected beyond the site boundary.	None.
11 Jan 2021	A complaint was received regarding an offensive odour.	Several odour surveys were undertaken, and objectionable odour was found beyond the boundary of the site.	Infringement notice.
12 Jan 2021	A complaint was received regarding an offensive odour.	An odour survey was undertaken and no offensive or objectionable odour was detected beyond the site boundary.	None.

297. Some of the difficulties with enforcing the no objectionable odour beyond the boundary condition include responding to odour complaints in a timely manner, the complexities associated with collecting evidence, and the fact that each individual has a different perception of odour. In the specific case of Uruti, the site is about an hour's drive from the Council's Stratford office (and potentially further from after-hours duty Officer's residences). Therefore when Council Officers respond to odour complaints, the odour may have changed in the time taken to arrive onsite e.g. less intense, or gone due to changes in wind speed/direction.

298. In the case of most discharge consents, it is common to include consent conditions that limit the effects of the discharge by setting limits on specific contaminants. However, measuring odorous compounds and their effects is not practically possible (due to technology being cost prohibitive among other things), therefore the no objectionable odour beyond the boundary, being a pure 'effects based condition', is always relied on.

299. The MfE GPG Odour states that the no objectionable odour beyond the boundary condition will often require supporting conditions e.g. control equipment/equipment performance requirements, and operating and management requirements. Though it also states that conditions need to balance flexibility for the consent holder, and certainty for the Council and neighbours, and that "*consent conditions must also be practical, and able to be monitored to demonstrate compliance*".

300. It should be noted that even with the use of mitigation measures, this will not necessarily prevent the generation of odour and there are other factors, such as katabatic flows, that influence whether or not odour is contained or dispersed within the site boundary. In addition, 'noticeable' odour is allowed beyond the boundary as long as it is intermittent and not extensive (and therefore not considered offensive or objectionable).

301. It is also worth reiterating that it is very difficult to measure odour with chemical, mechanical or electronic apparatus, as establishing whether or not an odour is offensive or objectionable is dependent on human perception.

302. In any case, recommended consent conditions restrict the type of waste that can be accepted for composting to solid organic material only (i.e. no liquid waste). Recommended conditions also require daily reporting of waste material, installation of surveillance cameras, and provision for at least weekly site inspections.

11.2 Effects of the stockpiled material, and the discharge of this material to land as a 'soil conditioner'

303. Potential effects associated with the large stockpile of material onsite include leachate and stormwater runoff, nitrogen leaching, and odour emissions.

304. RNZ's AEE states that clean stormwater is in the first instance directed around the stockpile so that it does not become contaminated. Any stormwater that is in contact with the stockpile or the area surrounding the stockpiles may entrain contaminants, including nutrients, metals and hydrocarbons, is directed to the PTS via a network of drains for treatment. Effective composting should not generate leachate, however any leachate produced from the stockpile is also directed to the PTS for treatment.

305. RNZ also propose more active management of the stockpile to try and accelerate the breakdown process, and in particular to continue reducing the TPH levels. Active management will not reduce the levels of chloride in the stockpile as this is typically lost through leaching and is therefore collected in the PTS. However, the chloride concentration of the stockpiled material will still need to comply with appropriate limits (maximum 700 mg/kg) before it is able to be discharged to land.

306. With regards to nitrogen leaching from the stockpile, RNZ states that based on a report prepared by Manaaki Whenua[31], it is considered that the level of nitrogen in the stockpile is comparable to natural topsoil in Taranaki. Any leached material (during stockpiling) will be collected and diverted to the PTS.

307. Kay Consulting recommends that 1000 m^3 (500 tonnes) of stockpiled material be applied to the irrigation areas (13.18 ha) per year. The OVERSEER® analysis suggests that this will add 114 kg N/ha/year to the irrigation areas and the total nitrogen leached from these areas will be 2093 kg. When modelled on a whole farm basis, nitrogen leached over the whole farm will be just 5 kg N/ha/year.

308. Our comments are included are in the following paragraphs.

309. Once again, it is important to highlight the fact that the stockpiled material will remain a constant source of chloride until it has been fully processed and used around the site (optimistically 40 years).

310. Recommended consent conditions also require that the stockpiled material cannot be used around the site until the concentration limits comply with those specified in Table 15 below.

311. The limits in this table have been derived from the following:

- The Draft Guidelines for the beneficial use of organic material on production land 2017;
- The Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (Revised 2011);
- New Zealand Standard (NZS4454:2005) Composts, Soil Conditioners and Mulches;
- Land application of wastes from oil and gas wells: Landcare Research 2015.

312. This will ensure that any adverse effects of contaminant leaching are adequately mitigated.

[31] Manaaki Whenua Landcare Research (May 2018). Soil Quality in the Taranaki Region 2017: current status and comparison with previous samplings.

Table 15: Contaminant limits

Constituent	Maximum value (mg/kg unless otherwise stated)
Arsenic [1]	17
Barium – Barite [2]	10,000
Extractable Barium [2]	250
Cadmium [1]	0.8
Chromium [3]	600
Copper [3]	100
Lead [1]	160
Nickel [3]	60
Mercury	1
Zinc [3]	300
Sodium	460
Conductivity	290 mS/m
Chloride	700
TPH C7-C9	120
TPH C10-C14	58
TPH C15-C36	4000
Naphthalene	7.2
Pyrene	160
Benzo (a) pyrene	0.027
Benzene	1.1
Toluene	68
Ethylbenzene	53
Xylenes	48
Pathogen	
E-coli	Less than 100 MPN/g
Campylobacter	Less than 1/25g
Samonella	Less than <2 MPN/g
Human adenovirus	Less than 1 PFU/0.25g
Helminth ova	Less than 1 PFU/0.25g
[1]SCS – Rural Residential MfE 2011b; [2] Alberta Environment 2009; [3] NZWWA 2003, lowest of protection of human health and ecological receptors. (Biosolids to land)	

313. The stockpile is unlikely to generate significant odour given the nature of the material. However, submitters have raised concerns about the health impacts of the existing stockpile and associated hydrocarbons (BTEX), particularly in relation to cold air drainage conditions down the valley. In response to these concerns, the Council undertook a 20 day survey for benzene, toluene, ethylbenzene, and total xylene at a number of sampling sites (Figure 26). Passive absorption samplers that absorb the target gas into activated carbon were employed, and subsequently analysed using gas chromatography to determine the average concentration of the gas in the air during the time of exposure.

314. The results of the survey are detailed in a memo prepared by the Council[32], which demonstrate that the "*hydrocarbon (BTEX) levels are well below MfE 2000 guidelines for air quality, even around the areas where higher levels were expected (the compost pile, leachate ponds, and SH3). There are no public health concerns about hydrocarbons (BTEX) arising from the Remediation (NZ) Ltd site at Uruti during the sampling period and generally given the concentration of hydrocarbons at the site*".

[32] Vladislav Tkachenko (October 2020). Air monitoring survey of hydrocarbon compounds (BTEX) around Remediation (NZ) Ltd site. Environmental Scientist – Air Quality.

315. It should be noted, that the method used provides an average concentration over the period of exposure and therefore does not provide a maximum concentration that may have occurred during the sampling period. However, there is no reason to assume that the BTEX levels sampled are not typical for this site.

316. At the same time, the Council also undertook a survey for the discharge of hydrogen sulphide (H_2S) from the PTS. This survey found recordable H_2S even though the conditions were not favourable and the timeframe was short. The discharge of H_2S gas to air can produce an offensive/objectionable odour in extremely low air concentrations.

317. As a result, RNZ has since engaged consultants to investigate this further.

Figure 26: Location of BTEX sampling sites

11.3 Effects of the wetland treatment system (WTS)

318. The WTS discharges to the Haehanga Stream. Typically this occurs following heavy rain events when stream flows are already high.

319. The WTS is the primary treatment measure for leachate derived from the paunch accepted and stored on Pad 2. Due to the long retention time and ability of the plants to uptake nutrients, this method of treatment is appropriate.

320. Paunch is high in both carbon and nitrogenous based organic compounds, therefore the wetland discharge is analysed for carbonaceous biochemical oxygen demand ($CBOD^5$) and unionised ammonia (NH_3) as these are the most appropriate parameters to assess the treatment capability of the WTS. However the efficiency of the system itself has not been calculated i.e. comparing the concentration of fluid entering the system to the concentration of fluid existing the system.

321. The WTS generally functions as described. When discharges occur, nutrient and sediment concentrations are often already naturally elevated in the receiving environment.

322. Since March 2016, monitoring of the discharge after reasonable mixing (at site HHG000103) found the concentration of $CBOD^5$ to be compliant with consented limits on all sampling occasions. NH_3 at HHG000103 has also been compliant (on all sampling occasions) for the past two monitoring periods.

323. There is typically an annual spike in ammonia concentrations, which is in line with the propagation of plants within the system. This generally occurs in the winter months, when stream flows are higher. There is often no discharge from the WTS during the summer months.

324. The latest macroinvertebrate survey (conducted in January 2020) found Site T3 (below the wetland discharge) to have the highest MCI and SQMCI scores of all the sites sampled. This tributary is mostly shaded due to channelization as well as overhanging vegetation on the northeast side, which deters the growth of periphyton and 'undesirable' heterotrophic growths, and also maintains a lower water temperature. As a result, the quality of the habitat at this site is better than any of the other sites, and the quality of the water is also higher than other sites sampled.

325. Chironomus bloodworms were absent at Site T3 but recorded as 'very abundant' and 'common' further downstream. The abundance of this taxon is often an indication of an organic discharge, although low dissolved oxygen levels can also allow this taxon to dominate the community. If the discharge from the WTS was having a significant adverse effect on the tributary, we would expect to see more of an impact at Site T3.

326. Regardless, it is again worth nothing here that the NPS-FM includes a national bottom line value for ammonia of 0.24 g/m^3 (annual median) and 0.40 g/m^3 (annual maximum). Although the wetland discharge complies with the existing consented limit of un-ionised ammonia, it does not meet the national bottom line value for ammonia. Therefore, recommended consent conditions require that the discharge meets at least the national bottom line value for ammonia by 2026.

327. Recommended conditions also require RNZ to demonstrate the effectiveness of the WTS annually.

11.4 Effects on cultural values

328. RNZ's application includes comments on cultural effects based on pre-application engagement with Ngāti Mutunga. These comments are summarised below.

329. The Mimi River is a Statutory Acknowledgement of Ngāti Mutunga, and is located downstream of the Haehanga Stream. Both the Haehanga Stream and the Mimi River hold high cultural and spiritual significance for Ngāti Mutunga, which is detailed in the Ngāti Mutunga Environmental Management Plan (NMEMP). The NMEMP explains the cultural values of water and details the mahinga kai traditionally gathered downstream from the subject site.

330. The assessment of cultural effects provided by RNZ[33] summarises the mana, historical and spiritual values of the Mimitangiatua River (and its tributaries):

- There are a number of pa, kainga and taupe (cultivations) located along the banks of the Mimi River;
- One of these, Arapawanui was the pa of Mutunga's famous grandsons Tukutahi and Rehietaia. They were both celebrated warriors, especially Rehetaia who took the stronghold of Kohangamouku belonging to their southern neighbours, Ngati Rahiri;
- The Mimi River and associated huhi (swampy valleys), ngahere (large swamps) and repo (muddy swamps) were used by Ngāti Mutunga to preserve taonga. The practice of keeping wooden taonga in swamps was a general practice of the Ngāti Mutunga people for safekeeping in times of war.

331. It also states that operational discharges can on occasion, adversely affect water quality, and in turn the cultural and spiritual health of the Haehanga Stream. Therefore the key to mitigating adverse effects on cultural and spiritual values is ensuring that there is no direct discharge of onsite material to waterways. Also key is ensuring there is appropriate monitoring in place to identify if activities are causing adverse changes in water quality trends early, and taking action before this results in adverse environmental effects.

332. During discussions with Ngāti Mutunga the Iwi raised specific concerns about onsite operations, to which RNZ offered mitigation measures e.g. completing riparian planting and fencing, improving site management, and developing a comprehensive reinstatement plan (at the time of writing this report, the plan has still not been provided after repeated requests from the Iwi). RNZ state that they are committed to continuing their engagement with Ngāti Mutunga regarding the environmental management of the Uruti facility.

333. Our comments are included in the following paragraphs.

334. On 6 November 2020, Ngāti Mutunga placed a rahui (a temporary prohibition restricting access to, or use of a resource) over the Mimi River. Ngāti Mutunga, as Kaitiaki of the river, considered that it was not safe to gather and eat kai or to swim in the river, as a result of the increasingly degraded cultural health and mauri of the water. At the time of writing this report, the rahui is still in place.

[33] Landpro Ltd (July 2018). Remediation New Zealand, Assessment of Cultural Effects, Uruti Facility – Renewal of Discharge Consents.

335. We anticipate that Ngāti Mutunga will present evidence at the hearing about the nature and scale of effects on the Haehanga Stream and the Mimi River. Until we have that evidence we cannot judge whether these effects can be adequately avoided or minimised.

336. In any case, recommended consent conditions require RNZ to prepare a comprehensive site reinstatement plan, including the requirement for a bond.

11.5 Positive effects of the operation

337. As Section 3 of the RMA defines "effect" as any positive or adverse effect, an assessment of the positive effects of the activities has been undertaken by RNZ (summarised below).

338. Composting of organic waste streams at Uruti prevents this material from being disposed of via less favourable methods, such as landfilling. The Colson Road landfill is now closed and all waste is being transported outside of the Taranaki region. Landfills also break down any organic matter they receive under anaerobic conditions thus producing large amounts of methane. Methane has a far higher greenhouse gas index than carbon dioxide given off by the composting process.

339. The Waste Minimisation Act 2008 "*encourages a reduction in the amount of waste we generate and dispose of in New Zealand*", with the aim of reducing the environmental harm of waste and to provide economic, social and cultural benefits for the country. Therefore the conversion of a waste stream into a useable product also needs to be considered. In theory, the organic material received at the Uruti site can be successfully converted into a useable (saleable) product, therefore it could be argued that RNZ provide a necessary service to the social, economic and cultural wellbeing of the Taranaki region. At the time of writing this report, the Uruti operation is the only one in the region that accepts the extensive variety of waste material that they do.

340. Although RNZ has pointed out the positive effects associated with the operation, we do not consider there to be any positive effects of the discharges, which is what these consents are authorising. The positive effects referred to by RNZ above, relate to the use of land for composting, which is regulated by the New Plymouth District Plan.

341. We note that although there may be positive effects associated with the general concept of composting of waste material, RNZ has not produced any saleable compost from the site in the last 10 years, other than the vermicast (and more recently the composted sheep/lamb skins).

11.6 Other matters

342. This section covers matters which were raised as part of the submission process that are outside of the jurisdiction of the Council. However, the following information and comments have been included for information purposes.

11.6.1 Vermin, feral animals, and disease

343. A number of submissions state that the rat population in Uruti is prolific. Although RNZ state that the material utilised does not attract vermin, the latest Council monitoring report states that a significant population of seagulls, biting files, pig tracks, and wild goats have been observed onsite. Culling of feral animals is carried out when necessary (e.g. when damage is caused to worm bed covers), however site observations suggest that this needs more effort.

344. RNZ also state that their composting procedures do not allow conditions to cause pathogen or disease development. As the temperature of the substrate in which organisms/pathogens are located rises, the expected survival time drops rapidly. The maximum critical temperature above which pathogen destruction is very rapid is approximately 55ºC. Since the compost will be produced by thermophilic method i.e. temperatures of 60-70ºC, any residual micro-organism would be destroyed rapidly in the process.

345. In contrast, the most recent Council monitoring reports have stated that pests and vermin are prevalent at the site. Pathogens were also detected after sampling the existing stockpiled material.

11.6.2 Health effects

346. A number of submissions also referred to health issues arising from the composting operation. Following complaints by neighbours to the Taranaki District Health Board (regarding odour discharges), an investigation was launched with "*the objective of assessing whether the odours were a statutory nuisance under the Health Act 1956 and likely to be injurious to health through poisoning arising from chemical contamination of the environment*".

347. The report prepared by the Taranaki Medical Officer of Health[34] states that based on the evidence collected, it is unlikely that toxic emissions from the site are making neighbours sick. However, it also states that the odour beyond the boundary of the site is unnecessarily offensive at times, and it appears likely that symptoms (i.e. headaches, nausea, tiredness, skin/throat/eye irritation) are being caused by odour pollution.

348. The health concerns are predominantly for NPDC and the Taranaki District Health Board (TDHB) to address. However, the Council is responsible for managing odour discharges (as discussed in Section 11.1.5.2), and the RMA also requires the Council to promote activities that enable communities to provide for their health and safety.

[34] Dr Jonathan Jarman (September 2020). Health concerns about smell and odour from Remediation Limited at Uruti.

12. Statutory assessment

12.1 Sustainable Management (Part 2 of the RMA)

349. The Court of Appeal[35] has determined that while decision makers should usually consider Part 2 when making decisions on resource consent applications, where the relevant plan provisions have clearly given effect to Part 2 there may be no need to do so as it *would not add anything to the evaluative exercise*. In other words, *genuine consideration and application of relevant plan considerations may leave little room for Part 2 to influence the outcome*.

350. However it has been more than 20 years since the RFWP was notified, so it is appropriate for the avoidance of doubt that a specific Part 2 assessment is made in this case.

12.1.1 Section 5 – Purpose

351. When determining the application the Council must promote the sustainable management of natural and physical resources. Sustainable management means managing the use, development and protection of these resources in a manner which enables people and communities to provide for their social, economic, and cultural wellbeing, and for their health and safety while:

a) sustaining the potential of natural resources to meet the reasonably foreseeable need of future generations;
b) safeguarding the life supporting capacity of air, water, soil, and ecosystems; and
c) avoiding, remedying and mitigating adverse effects of the application on the environment.

352. In this case, the composting of waste that would otherwise go to landfill aids in minimising the impact that this would have on the environment. The activity therefore increases the social, economic, and cultural wellbeing of the community by providing this service.

353. If well managed, the activity would sustain the potential of natural and physical resources to meet the needs of future generations, while also safeguarding the life supporting capacity of the receiving waters, and mitigating adverse effects on the environment.

354. In promoting sustainable management the Council must:

- recognise and provide for 'matters of national importance' (listed in section 6 of the RMA);
- have particular regard for 'other matters' (listed in section 7 of the RMA);
- take account of the principles of the Treaty of Waitangi (section 8 of the RMA).

[35] RJ Davidson Family Trust v Marlborough District Council [2018] NZCA 316

12.1.2 Section 6 – Matters of national importance

355. In achieving the overall purpose of the RMA, the matters of national importance listed in section 6 must be recognised and provided for. The following matters are of relevance to these applications:

- preservation of the natural character of rivers and their margins, and protecting them from inappropriate use and development (section 6(a));
- the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna (section 6(c));
- relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga (section 6(e)).

356. Natural character is not defined by the RMA. Although it can be thought of as the degree of 'naturalness' (natural elements, patterns, and processes) of a landscape/ecosystem which depends largely on the extent of modification i.e. the greatest 'naturalness' occurs where there is the least modification. There is some impact on natural character of the Haehanga Stream, however this would also be enhanced by the completion of the riparian management plan.

357. Regardless of the extent of adverse effects on water quality/ecology, it is acknowledged that the continued discharges to water will result in adverse effects on cultural values. Ngāti Mutunga's submission indicated that they are generally supportive of reprocessing waste material into a useable product, provided the site is well managed, and any adverse effects are appropriately avoided and/or mitigated. However, we anticipate that Ngāti Mutunga will present evidence at the hearing about the nature and scale of effects on the Haehanga Stream and the Mimi River.

12.1.3 Section 7 – Other matters

358. Other matters to which a consent authority must have particular regard in relation to managing the use, development and protection of natural and physical resources are listed in Section 7 of the RMA. The matters relevant to these applications are listed below:

- Kaitiakitanga –guardianship/stewardship by tangata whenua of natural and physical resources (section 7(a));
- the ethic of stewardship (section 7(aa));
- the efficient use and development of natural and physical resources (section 7(b));
- the maintenance and enhancement of amenity values (section 7(c));
- the intrinsic values of ecosystems (section 7(d));
- maintenance and enhancement of the quality of the environment (section 7(f)).

359. The concept of kaitiakitanga not only creates an obligation to hear and understand what tangata whenua have to say in relation to an activity, but also to take these concerns into account when decision-making. It is acknowledged that the discharges will result in adverse effects on cultural values, regardless of whether or not adverse effects on water quality can be adequately managed.

360. The purpose of the operation demonstrates an efficient use of physical resources by turning waste that could otherwise end up in landfill, into compost. Provided the activities are well managed, adverse effects on the receiving environment can be adequately mitigated, thereby achieving an efficient use of natural resources. The Council also received a number of submissions in support of the activities.

361. We consider that the amenity values of the Haehanga Stream catchment will be enhanced once the proposed riparian planting is established. Stringent conditions of consent have been recommended (including operational controls, and comprehensive monitoring requirements) which aim to ensure that the amenity values of the neighbours are not affected by odour and dust.

362. Regard is had to the intrinsic values of ecosystems in the assessment of effects on surface water, and is reflected in the recommended consent conditions.

363. It is possible that the proposed discharges can be managed such that the quality of the existing environment could be improved/enhanced.

12.1.4 Section 8 –Treaty of Waitangi

364. The principles of the Treaty of Waitangi (Te Tiriti o Waitangi) must also be taken into account. The Waitangi Tribunal and Courts continue to establish the principles of the Treaty of Waitangi and it is recognised that the principles are continuing to evolve.

365. There is some overlap between section 8 and other Part 2 Māori provisions. Essentially sections 6(e) and 7(a) of the RMA incorporate the substantive and active protection aspects of the Treaty principles which are most relevant to the management of natural and physical resources.

12.2 Section 104 – Consideration of applications

366. Subject to Part 2 of the RMA, the Council must have regard to the matters in section 104(1). Matters relevant to these applications are:

> *(a) any actual and potential effects on the environment of allowing the activity;*
> *(ab) any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity; and*
> *(b) any relevant provisions of –*
> *…*
> *(iii) the National Policy Statement for Freshwater Management 2020* (NPS-FM)*;*
> *(v) the Regional Policy Statement for Taranaki* (RPS)*;*
> *(vi) the* RAQP *and the* RFWP*; and*
> *(c) any other matter the consent authority considers relevant and reasonably necessary to determine the application.*

367. RNZ's compliance history is considered an "other relevant matter" under Section 104(1)(c), which has been discussed in Section 10.

368. In accordance with Section 104(2A) of the RMA, the Council must also have regard to the value of the investment of the existing consent holder when considering an application for renewal of consent. RNZ's application states that significant investment has been made over the years, and to replace the site infrastructure today would cost in the vicinity of $3.5 million to $5 million. Therefore RNZ has a major investment that is dependent on these consents.

12.2.1 National Policy Statement for Freshwater Management 2020

369. The National Policy Statement for Freshwater Management 2020 (NPS-FM) includes policies that aim to protect the extent and values of rivers and wetlands. The NPS-FM came into effect on 3 September 2020. Decision makers must have regard to relevant provisions of the NPS-FM.

370. The objective of the NPS-FM is to ensure that natural and physical resources are managed in a way that prioritises (1.3(5)):

a) first, the health and wellbeing of water bodies and freshwater ecosystems;
b) second, the health needs of people (such as drinking water);
c) third, the ability of people and communities to provide for their social, economic, and cultural wellbeing, now and in the future.

371. The policies that are relevant to consent 5838-3.0 are:

- Policy 1 – freshwater is managed in a way that gives effect to Te Mana o te Wai;
- Policy 2 – Tangata whenua are actively involved in freshwater management (including decision making processes), and Māori freshwater values are identified and provided for;
- Policy 3 – freshwater is managed in an integrated way that considers the effects of the use and development of land on a whole-of-catchment basis, including the effects on receiving environments;
- Policy 5 – freshwater is managed through a National Objectives Framework to ensure that the health and well-being of degraded water bodies and freshwater ecosystems is improved, and the health and well-being of all other water bodies and freshwater ecosystems is maintained and (if communities choose) improved;
- Policy 6 – there is no further loss of extent of natural wetlands, their values are protected, and their restoration is promoted;
- Policy 7 – the loss or river extent and values is avoided to the extent practicable;
- Policy 8 – the significant values of outstanding water bodies are protected;
- Policy 9 – the habitats of indigenous freshwater species are protected;
- Policy 12 – the national target (as set out in Appendix 3) for water quality improvement is achieved;
- Policy 15 – communities are enabled to provide for their social, economic, and cultural well-being in a way that is consistent with this National Policy Statement.

372. The primary policy of the NPS-FM is that freshwater is managed in a way that gives effect to Te Mana o te Wai. The definition of Te Mana o te Wai includes the following paragraphs (at 1.3):

Te Mana o te Wai is a concept that refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. It protects the mauri of the wai. Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment, and the community.

373. The approach for implementing Te Mana o Te Wai is prescribed in section 3.2 of the NPS-FM. Fundamental to this approach is that the Council must engage with communities and tangata whenua to determine how Te Mana o Te Wai applies to water bodies and freshwater ecosystems in Taranaki. As a matter of national significance under the NPS-FM, Te Mana o Te Wai is a mandatory consideration for any RMA process involving freshwater, and must be given effect to by all persons exercising functions and powers under the RMA.

374. In the absence of any engagement with the community, giving effect to Te Mana o Te Wai cannot be adequately achieved through the consent process at this time. However recognising that the health and wellbeing of water is the top priority, at the very least any adverse effects on the water and aquatic ecosystems must not be significant and must be reversible. In other words, when the activity ceases, the water must be able to fully recover within a reasonable time period.

375. Of particular relevance to consent 5838-3.0 is Policy 7, which is further refined by subpart 3.24 'Rivers' of the NPS-FM:

(1) Every regional council must include the following policy (or words to the same effect) in its regional plan(s):

"The loss of river extent and values is avoided, unless the council is satisfied:

(a) that there is a functional need for the activity in that location; and
(b) the effects of the activity are managed by applying the effects management hierarchy."

(2) Subclause (3) applies to an application for a consent for an activity:

(a) that falls within the exception to the policy described in subclause (1); and
(b) would result (directly or indirectly) in the loss of extent or values of a river.

(3) Every regional council must make or change its regional plan(s) to ensure that an application referred to in subclause (2) is not granted unless:

(a) the council is satisfied that the applicant has demonstrated how each step in the effects management hierarchy will be applied to any loss of extent or values of the river (including cumulative effects and loss of potential value), particularly (without limitation) in relation to the values of: ecosystem health, indigenous biodiversity, hydrological functioning, Māori freshwater values, and amenity; and
(b) any consent granted is subject to conditions that apply the effects management hierarchy.

376. In this case, we believe the discharge of stormwater and leachate to land and water results in a loss of river values[36] in relation to the Haehanga Stream. However, information provided by RNZ[37] states that clause 3.24 (of the NPS-FM) does not apply to the application as it only applies to physical changes in the river stem. We do not agree with this interpretation, as clause 3.24 states "the loss of river extent *and values*". Therefore we believe there has to be a "functional need"[38] for the activities to occur at the proposed location.

377. We are satisfied that there is a functional need for the activities because the discharges can only occur in that environment. This determination is based on the fact that the discharges are a necessary part of the composting operation, the operation is important infrastructure for Taranaki, it has been operating under existing consents at that location for two decades, and it is not practicable to discharge to a different location.

378. Our conclusion that there is a functional need for the vermiculture operation to discharge to water instead of land is based on our belief that there not sufficient suitable land available.

379. Therefore, the effects management hierarchy needs to be applied. The effects management hierarchy is defined in the NPS-FM as:

> "***effects management hierarchy***, *in relation to natural inland wetlands and rivers, means an approach to managing the adverse effects of an activity on the extent or values of a wetland or river (including cumulative effects and loss of potential value) that requires that:*
>
> *(a) adverse effects are avoided where practicable; and*
> *(b) where adverse effects cannot be avoided, they are minimised where practicable; and*
> *(c) where adverse effects cannot be minimised, they are remedied where practicable; and*
> *(d) where more than minor residual adverse effects cannot be avoided, minimised, or remedied, aquatic offsetting is provided where possible; and*
> *(e) if aquatic offsetting of more than minor residual adverse effects is not possible, aquatic compensation is provided; and*
> *(f) if aquatic compensation is not appropriate, the activity itself is avoided"*

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[36] Loss of value is defined in the NPS-FM as:
"***loss of value***, *in relation to a natural inland wetland or river, means the wetland or river is less able to provide for the following existing or potential values:*
(a) any value identified for it under the NOF process; or
(b) any of the following, whether or not they are identified under the NOF process:
(i) ecosystem health
(ii) indigenous biodiversity
(iii) hydrological functioning
(iv) māori freshwater values
(v) amenity"

[37] Dated 7 December 2020.

[38] Functional need is defined in the NPS-FM as:
"the need for a proposal or activity to traverse, locate or operate in a particular environment because the activity can only occur in that environment"

380. We anticipate that Ngāti Mutunga will present evidence at the hearing about the nature and scale of effects on the Haehanga Stream and Mimi River. Until we have that evidence we cannot judge whether the adverse effects on river values, particularly the loss of Māori freshwater values, is adequately avoided or minimised, or whether there are more than minor residual effects that must be offset or compensated in order for the consents to be issued.

381. We also expect that the committee will hear from RNZ on this matter at the hearing.

12.2.2 Regional Policy Statement for Taranaki

382. The Regional Policy Statement for Taranaki (RPS) is a statutory document which outlines the Regional Council's policies relating to resource management in the Taranaki region. The RPS has been operative since January 2010.

383. The RPS contains a number of policies which are relevant to the applications. However, the majority of these policies outlined in the RPS are refined and expanded on in the RFWP and the RAQP, which are discussed below. Accordingly, only those relevant policies of the RPS which are not already covered by these documents are considered below.

384. The only additional policy in this case is WST Policy 1 – relating to waste minimisation practices. The policy encourages the use of waste minimisation practices and practices to avoid, remedy or mitigate the adverse environmental effects of final disposal by promoting among other things, higher levels of reuse, recycling and recovery of waste.

385. The purpose of RNZ's composting operation is to reprocess waste into a useable product, which in accordance with WST Policy 1, is encouraged within the Taranaki region. The proposed activities are consistent with this policy, provided any adverse effects can be remedied or mitigated.

12.2.3 Regional Freshwater Plan for Taranaki

386. The *Regional Freshwater Plan for Taranaki* (RFWP) became operative on 8 October 2001. It is a statutory document that sets out the Region's objectives, policies and rules in relation to fresh water under the RMA.

387. The policies relevant to consent 5838-3.0 are:

- Policies 3.1.2 & 3.1.3 – relating to protection and enhancement of the natural, ecological and amenity values of fresh water;
- Policies 4.1.1 – 4.1.6 – relating to recognising and providing for the relationship of Tangata Whenua and Iwi and hapu of Taranaki and their culture and traditions;
- Policy 5.1.1 – relating to enabling appropriate use and development of fresh water;
- Policies 6.2.1 – 6.2.4 – relating to adverse effects on surface water quality from the discharge of contaminants from point sources;
- Policies 6.3.1 – 6.3.3 – relating to adverse effects on surface water quality from diffuse source discharges;
- Policy 6.5.3 – relating to adverse effects on groundwater quality from the discharge of contaminants to land and water.

388. Policies 3.1.2 and 3.1.3 provide for the natural character of rivers and their margins from adverse effects on activities, while also safeguarding the life-supporting capacity of freshwater and aquatic ecosystems.

389. Policy 3.1.4 aims to maintain and enhance the high natural, ecological and amenity values of those rivers and streams listed in Appendix IA. Where adverse effects on these values are considered unavoidable, they must be remedied or mitigated.

390. The Haehanga Stream feeds into the Mimi River, which is identified in Appendix IA of the RFWP as a catchment with high natural, ecological, and amenity values. Monitoring has demonstrated that site activities are having an impact on the Haehanga Stream. However, the concentration of contaminants in the stream at the southern boundary of the site (before entering the Mimi) is within current consented limits.

391. Policies 4.1.1 – 4.1.6 recognise the cultural associations iwi and hapu have with rivers, and aims to protect these values and areas from any adverse effects. They also encourage active participation of iwi in fresh water management.

392. Ngāti Mutunga have indicated they are generally supportive of the idea of reprocessing waste streams, however they are concerned about the way the site is managed, and the corresponding impact on the environment. RNZ state that they are committed to continuing their engagement with Ngāti Mutunga regarding the improved environmental management of the Uruti facility.

393. Policy 5.1.1 provides for positive social, economic and cultural benefits to be taken into account when assessing proposals for the use and development of fresh water and riverbeds, while also ensuring that all activities avoid, remedy or mitigate adverse effects on the environment.

394. The adverse effects on the activity have been discussed in section 11, including mitigation measures proposed by RNZ. We consider that there is merit in reprocessing waste material into a useable product, provided the activities are undertaken in accordance with recommended consent conditions.

395. Policies 6.2.1 – 6.2.4 recognise and provide for different values and uses of surface water, require waste reduction or treatment practices that avoid, remedy or mitigate adverse environmental effects, and require that the best practicable option is adopted.

396. Policies 6.3.1 outlines management practices that will contribute to maintaining and enhancing water quality. Policies 6.3.2 and 6.3.3 promote the protection and enhancement of existing riparian vegetation, and the restoration of riparian margins.

397. RNZ has undertaken riparian planting and fencing in accordance with their Riparian Management Plan. Recommended consent conditions require this plan to be completed no later than 1 August 2023.

398. Policy 6.5.3 requires the discharge of contaminants to be managed in order to avoid, remedy or mitigate adverse effects on groundwater.

399. Monitoring has demonstrated that site activities are having an impact on groundwater (particularly in relation to chloride concentrations). Although the concentration of contaminants are currently within consented limits, recommended consent conditions require improved performance.

400. Overall, the proposed activities can occur in a manner that is consistent with the relevant policies of the RFWP, provided they are well managed.

12.2.4 Regional Air Quality Plan

401. The *Regional Air Quality Plan for Taranaki* (RAQP) details Council policies relating to fresh air. The RAQP has been operative since 2011.

402. The policies relevant to consent 5839-3.0 are:

- Policy 1.1 – relating to hazardous, noxious, dangerous or toxic contaminants;
- Policy 1.2 – relating to odour;
- Policy 1.3 – relating to smoke, dust and other particulate matter;
- Policy 2.1 – relating to general management of air quality;
- Policy 2.2 – relating to control of discharges;
- Policy 2.3 – relating to management areas;
- Policy 2.4 – relating to cross-media effects;
- Policy 2.6 – relating to cumulative effects;
- Policy 2.7 – relating to best practicable option;
- Policies 3.1 & 3.2 – relating to protection of the air resource and wahi tapu;
- Policies 5.1 – 5.3 – relating to discharges of contaminants to air from waste management processes.

403. Policy 1.1 states that discharges of contaminants to air should avoid, remedy or mitigate adverse effects by ensuring that discharges do not occur at a volume, concentration or rate or in such a manner that causes or is likely to cause a hazardous, noxious, dangerous or toxic effect on human or animal health, significant ecosystems or structures.

404. Policies 1.2 and 1.3 aim to ensure that any discharges to air of odorous contaminants and/or dust, smoke and other particulate matter beyond the boundary of the property are not offensive or objectionable, and do not result in adverse effects that are hazardous, noxious, or dangerous.

405. It is very unlikely that discharges to air from site activities are having a toxic effect on human health and/or ecosystems.

406. Policies 2.1 – 2.3 aim to promote the air quality objectives of the region and control adverse effects through regional rules, while recognising that some areas of the region are more sensitive than others.

407. Policy 2.4 takes into account adverse effects on other receiving environments such as land and water.

408. Policy 2.6 states that discharges of contaminants to air should not occur at a rate or in a manner that contribute to a cumulative effect which over time, or in combination with other effects, is likely to have an adverse effect on human health and safety, ecosystems, property or other aspects of the environment.

409. Our view is that the discharge of contaminants to air will not occur at a rate or volume which will adversely affect human health other environments i.e. land or water. Recommended consent conditions also seek to limit the nature and scale of the discharges to that proposed in the applications. The remote nature of the site means it is a suitable location for such activities.

410. Policies 3.1 and 3.2 promote the participation of iwi o Taranaki in decision-making processes, and also aim to ensure that any adverse effects on wahi tapu and other places or features of significance are avoided, remedied or mitigated.

411. RNZ state that they are committed to continuing their engagement with Ngāti Mutunga regarding the environmental management of the Uruti facility. We do not believe that the discharges to air, namely odour and dust, will cause an adverse effect on wāhi tapu sites given the large separation distance between these and the operation (the nearest pa site being at least 1 km from the site boundary).

412. Policies 5.1 – 5.3 require discharges of contaminants to air from waste management processes to be managed to ensure that any significant off-site adverse effects are avoided, remedied or mitigated.

413. It is possible that the site can be managed to ensure there is no offensive/objectionable odour beyond the site boundary.

414. Overall, the proposed activities can occur in a manner that is consistent with the relevant policies of the RAQP, provided they are well managed.

12.3 Section 105 – Matters relevant to certain applications

415. Section 105(1) of the RMA states that if an application is to discharge contaminants, the consent authority must, in addition to the matters in section 104(1), have regard to:

(a) the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and
(b) the applicant's reasons for the proposed choice; and
(c) any possible alternative methods of discharge, including discharge into any other receiving environment.

416. The nature of the discharges and the sensitivity of the receiving environments have been assessed in the assessment of environmental effects (Section 11).

417. In relation to alternative methods of discharge, 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.

418. Odour and dust can only be discharged to air. As there is no specific point source of odour, it isn't possible to capture the odour and treat it e.g. in a biofilter.

12.4 Section 107 – Restriction of grant of certain discharge permits

419. Section 107(1) of the RMA places restrictions on the granting of consents to discharge contaminants into water (and to discharge contaminants to land in circumstances where they may enter water). Such permits cannot be granted by a consent authority if they cause any or all of the following effects in the receiving waters after reasonable mixing:

(a) The production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
(b) Any conspicuous change in the colour or visual clarity;
(c) Any emission of objectionable odour;
(d) The rendering of fresh water unsuitable for consumption by farm animals;
(e) Any significant adverse effects on aquatic life.

420. The proposed discharges will not cause any of these effects after reasonable mixing.

13. Summary and conclusions

421. RNZ has applied to renew existing consents to discharge contaminants to land, water and air, associated with composting activities.

422. The vermiculture operation is undertaken on Pad 2, using worms to convert paunch to vermicast, which is then sold off-site. Stormwater and leachate from Pad 2 is directed to the WTS for treatment before being discharged to an unnamed tributary of the Haehanga Stream.

423. The composting operation will be undertaken on Pad 1 (contrary to what was proposed in 2008, no composting has been undertaken on this pad for the last 10 years). This pad will receive organic material which will then be blended with shredded greenwaste and sawdust (to achieve the required carbon/nitrogen ratios), and windrowed. Stormwater and leachate from Pad 1 is directed to the PTS, and then irrigated to land.

424. Pad 3 holds more than 20000 tonnes of stockpiled material. For at least the last 10 years, drilling waste and some unauthorised material, has been deposited directly into the collection pond and then stockpiled on this pad. This material is referred to in RNZ's application as a "legacy issue", as RNZ has been unable to sell this material due to its association with drilling activities. However, almost all of the organic material brought to site during this time, which presumably could have been composted on Pad 1, was also deposited into the collection pond and stockpiled. Hence, no composting has actually taken place.

425. RNZ now proposes to use this stockpiled material onsite as a 'soil conditioner' which, provided it meets the required standards, will take at least 40 years (based on the proposal to use 500 tonnes per year). Despite RNZ's view that this activity is permitted under Rule 29 of the RFWP, the discharge has been assessed as a discretionary activity and incorporated into consent 5838-3.0.

426. RNZ's application includes a list of material that they propose to accept for composting, including material that has previously been authorised. However, recommended consent conditions now limit acceptable wastes to solid compostable organic material only (no liquids). This will ensure that the activity is undertaken as described i.e. as a compost production facility, instead of just stockpiling material onsite.

427. The WTS is intended to provide a form of treatment before discharging to surface water, however due to the nitrogen in the leachate, the concentration of ammonia in the receiving environment is still elevated and must be reduced to comply with the NPS-FM. Recognising that it may take some time to investigate possible alternative options and /or improved technology, recommended consent conditions require that the concentration of ammonia in the receiving environment meets at least the national bottom standard (proposed by the NPS-FM) by 2026.

428. Although RNZ's application describes the collection of stormwater and leachate from composting operations as a "Pond Treatment System", we do not believe any treatment is actually provided. The ponds located between the collection pond and the irrigation pond appear anaerobic, and are considered an unnecessary source of odour. Given that the impermeability of these ponds has not been demonstrated and they are considered a possible source of stream contamination, recommended consent conditions require these ponds to be remediated and filled.

429. RNZ's application describes their three-tier management system as a means of mitigating adverse effects on the environment. However as this methodology is based on landfarm surrender criteria (typically undertaken as a one-off application), we do not believe it is appropriate for managing ongoing discharges. Instead, recommended consent conditions require the discharges to be managed to ensure that constituents in the soil do not exceed specific limits. These limits essentially represent tier one of the management system (green zone), therefore the expectation is that concentrations are never higher than this.

430. The primary policy of the NPS-FM is that freshwater is managed in a way that gives effect to Te Mana o te Wai. Council must engage with communities and tangata whenua to determine how Te Mana o Te Wai applies to water bodies and freshwater ecosystems in Taranaki, in order to inform policies and rules during Regional Plan development. With this engagement yet to occur, Te Mana o Te Wai cannot be adequately implemented through this consent process. In making our recommendation we have had regard to the NPS-FM, including the implementation of Te Mana o Te Wai, however we expect that there will be evidence about this presented at the hearing which will provide the opportunity for further consideration.

431. Having regard to the NPS-FM requires assessment under Policy 3.24. Our assessment is that there is a functional need for the discharges but that they will very likely result in residual adverse effects that are more than minor, particularly as a consequence of the likely loss of Māori freshwater values. We anticipate that Ngāti Mutunga will present evidence at the hearing that will allow that loss to be evaluated. Application of the effects management hierarchy must then follow, which may include the need for additional consent conditions.

432. 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.

433. RNZ's continued poor compliance is of concern. The fact that Council have issued 3 abatement notices and 6 infringement notices in just the last 6 months is a strong representation of RNZ's poor management of the site, and their attitude towards compliance. However as previously noted, while an applicant's prior conduct cannot be used to override the more explicit statutory criteria, it can be considered in a peripheral way, as consideration of those matters could promote the general objectives of the RMA. RNZ's compliance history has been considered as an "other relevant matter" under Section 104(1)(c) of the RMA.

434. Instead, the recommendation is to significantly increase compliance monitoring. Recommended consent conditions require that a comprehensive monitoring programme is prepared that includes provision for a Council Officer to visit the site at least once a week, in addition to camera surveillance that transmits images to the Council in real time. It also requires the installation of an in-situ water quality monitoring sonde to measure real-time water quality of the Haehanga Stream.

435. RNZ proposes to mitigate adverse effects of the activities by the implementation of onsite management practices, including, for example:

- actually composting the material that comes to site instead of depositing it directly to the collection pond and then stockpiling it;
- use of the 3-tier management system;
- extending the irrigation areas;
- managing the site to minimise nutrient losses (e.g. cut and carry).

436. However based on RNZ's compliance history, we don't believe these measures will be actioned and/or that they are adequate to mitigate adverse effects. Instead, RNZ's compliance history has emphasised the need for clear and appropriate consent conditions in order to properly manage the activities into the future if the consents are granted. Therefore we have recommended consent conditions that:

- restrict the type of waste that can be accepted for composting i.e. no more inorganics or liquid waste;
- require daily reporting of waste material;
- require the impermeability of the irrigation pond and paunch maturation pond to be demonstrated;
- require all of the PTS ponds, except the irrigation pond, to be remediated and filled;
- prohibit the discharge of any new material to the stockpile;
- require the irrigation discharge to be metered;
- require adequate storage in both the irrigation pond and the paunch maturation pond;
- require stormwater and leachate from all operational areas to be captured and either discharged to land or the WTS;
- require the effectiveness of the WTS to be demonstrated annually;
- impose a nitrogen cap on wastewater/material discharged to land;
- require the RMP to be completed;
- require the stockpiled material to meet specific standards before it is used around the site;
- require the preparation and implementation of a comprehensive monitoring plan;
- require the preparation of a comprehensive site reinstatement plan, and a bond.

437. In making our recommendation to the Hearing Committee, the following matters have been considered:

- the concerns raised by the submitters within the jurisdiction of the Council;
- the matters of Part 2 and Sections 104, 105, 107 and 108 of the RMA;
- the relevant objectives and policies of the NPS-FM, RPS, RFWP, and RAQP.

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

14. Consent duration and review date(s)

439. RNZ has applied for a consent duration of 24 years.

440. RNZ has a long history of non-compliance. At the time the consents were last renewed (2010), Council officers recommended a consent term of 5 years mainly as a result of poor compliance. The consents were granted for terms of 10 years (from the date of expiry) on the basis that a longer consent term could be considered in 2018, once proposed upgrades were implemented and RNZ had demonstrated a number of years of good compliance.

441. Unfortunately RNZ's compliance history has not improved over the last 10 years. Therefore, we do not believe that the review condition and enforcement options will be sufficient over a long time period should non-compliance continue.

442. Pursuant to Section 123(d) of the RMA, an appropriate consent duration is considered to be 10 years (from the date of expiry of the previous consent), for both the discharges to land and water and the discharges to air. Because the activities are intrinsically linked, it is considered that they cannot be meaningfully separated and assessed on their own merits.

443. It is considered that a duration of 10 years will provide RNZ with an opportunity to steer the business more towards effective and efficient reprocessing of organic (compostable) material, and to demonstrate that they can manage the site as proposed. It also balances certainty for the community about the effects of the activities and how they will be managed.

444. Recommended special conditions provide for reviews of the consent conditions in June each year.

15. Monitoring

445. The Council carries out compliance monitoring, in accordance with Section 35 of the RMA, to ensure that the activity undertaken complies with what is authorised by the consent.

446. RNZ has an ongoing history of non-compliance, and to date, have not demonstrated any commitment to improve. In the event that the consents are granted, a comprehensive compliance monitoring programme will be prepared by the Council, which we believe needs to include at least the following:

- Provision for site inspections to be carried out at least once every week in order to observe factors such as waste acceptance, stormwater and leachate treatment systems, and odour emissions;
- Installation of an in-situ water quality monitoring sonde to measure real-time water quality of the Haehanga Stream;
- Camera surveillance that transmits images to the Council in real time;
- Sampling and testing required to check compliance with the conditions of the consents;
- Annual reports that present the information collected in accordance with the consent conditions and compliance with those conditions.

16. Recommendation

447. Our recommendation is that consents 5838-3.0 and 5839-3.0 to discharge contaminants from composting operations:

- to land, including in circumstances which may result in those contaminants (or other contaminants emanating from those contaminants) entering water in the Haehanga Stream catchment;
- directly into an unnamed tributary of the Haehanga Stream; and
- to air,

be approved for a period ending on 1 June 2028, subject to the following conditions:

General condition

a. The consent holder shall pay to the Taranaki Regional Council all the administration, monitoring and supervision costs of these consents, fixed in accordance with section 36 of the Resource Management Act 1991.

Special conditions

1. These consents authorise the discharge of:

   (a) stormwater and leachate from vermiculture operations, after treatment in the Wetland Treatment System, directly to an unnamed tributary of the Haehanga Stream;
   (b) stormwater and leachate from composting operations by irrigation to land;
   (c) solid organic material to land for composting;
   (d) material stored on Pad 3 as at the date of commencement of these consents ('stockpiled material') to land for use as a soil conditioner;
   (e) stormwater and leachate from stockpiled material to land via irrigation; and
   (f) contaminants to air associated with site operations.

2. The exercise of these consents shall be undertaken in general accordance with the information provided in support of the application for these consents (prepared by Landpro Ltd, dated 26 June 2020). Where there is conflict between the application and consent conditions, the conditions shall prevail.

Acceptable wastes

3. Subject to condition 4 below, the raw materials accepted on site shall be limited to solid compostable organic material, consisting of the following:

- Paunch grass;
- Animal manure from meat processing plant stock yards, and dairy farm oxidation pond solids;
- Green vegetative wastes;
- Mechanical pulping pulp and paper residue (excluding any pulping wastes that have been subject to chemical pulping or treated or mixed with any substance or material containing chlorine or chlorinated compounds);
- Vegetable waste solids (being processing by-products);
- Fish skeletal and muscle residue post filleting (free from offal); and
- Poultry industry waste (eggs, macerated chicks and chicken mortalities);
- Untreated sawdust;
- Molasses;
- Solid dairy industry waste (cheese, milk powder, casein);
- Sausage waste ;
- Domestic household and commercial food scraps from the New Plymouth kerbside collection (bones, fruit, vegetables, meat, bread, dairy, cooked food, paper towels, cut flowers, coffee grounds, tea leaves/bags, eggshells and seafood shells);
- Palm kernel;
- Prolick;
- Food scraps from Powerco and Fonterra;
- Diatomaceous earth mix;
- Activated carbon;
- Ox tails;
- Organic waste from Brooklands Zoo;
- Sheep and lamb skins.

4. Subject to condition (d) below, solid organic compostable material not listed in condition 3 may be accepted on a 'one-off' or temporary basis with the prior approval of the Chief Executive, Taranaki Regional Council ('Chief Executive'). Approval may only be given after the consent holder has made a specific request for authorisation to accept material pursuant to this condition, and provided the Chief Executive with full details of the material including:

(a) the type of material and its origin;
(b) the volume;
(c) the timing/duration of the discharge; and
(d) any other information that the Chief Executive may reasonably request in order to determine the likely effects of the discharge including chemical analysis.

5. The following materials shall not be allowed on site:

   (a) material produced as a result of a dissolved air flotation process;
   (b) biosolid waste;
   (c) any waste that may contain human faecal material or body fluids;
   (d) contaminated soil; or
   (e) any oil and gas related waste.

6. The consent holder shall record the following information for all material accepted onto the site:

   (a) the date and time that the material arrives;
   (b) the type of material with reference to the list of authorised materials in condition 3;
   (c) the weight of each type material; and
   (d) the origin of the material.

   The information required by this condition shall be provided to the Chief Executive, Taranaki Regional Council, within 24 hours of the material arriving on site.

Site operations

7. The site shall be constructed and maintained to ensure that, at all times:

   (a) stormwater runoff is prevented from entering Pad 1, Pad 2, Pad 3, the Paunch Maturation Pond, and any other area used for vermiculture activities; and
   (b) all stormwater and/or leachate from Pad 1, Pad 2, Pad 3, the Paunch Maturation Pond, and any other area used for vermiculture activities shall be discharged to land or directed through the Wetland Treatment System.

   Note: For the purposes of this condition, the location and extent of Pads 1- 3, the Paunch Maturation Pond, and the worm beds are shown on Figure 1, attached as Appendix 1 of these consents.

8. Pad 1, Pad 3 and all worm bed areas shall at all times be constructed, compacted and maintained, including by having a positive grade and low permeability, to ensure that runoff flows directly from them without ponding.

9. From a date no more than 60 days following the commencement of these consents the Truck Wash Pond, Irrigation Pond, Paunch Maturation Pond and any pond that may contain stormwater and/or leachate, shall be lined with material that has a permeability not exceeding $1x10^{-9}$ ms^{-1} to prevent leakage through the bed or sidewalls.

10. From the commencement of these consents, at intervals not exceeding 24 months, the consent holder shall engage a suitably qualified and experienced person to check the permeability of the ponds referred to in condition 9, and provide a report to the Chief Executive, Taranaki Regional Council, that demonstrates compliance with that condition.

11. Within 3 hours of raw waste material being received, it shall be mixed with greenwaste on Pad 1 in the appropriate proportions for composting, and windrowed so that the composting process begins.

12. Under no circumstances shall there be any discharge of waste material to the 'collection pond', or to the material stockpiled on Pad 3.

13. Within 90 days of these consents commencing the Duck Pond, the Collection Pond and other ponds associated with Pad 3 shall be filled with inert solid material and remediated.

Note: For the purposes of these consents, the 'Collection Pond', the Duck Pond and Pad 3 are shown on Figure 1, attached as Appendix 1 of these consents.

Irrigation

14. From a date no later than 60 days after these consents commencing, the consent holder shall measure and record the rate and volume of discharge from the Irrigation Pond at intervals not exceeding 1 minute to an accuracy of +5%.

15. The consent holder shall provide the Chief Executive, Taranaki Regional Council, with a document from a suitably qualified and experienced person certifying that measuring and recording equipment required by condition 14 ('the equipment') has been:

(a) installed and/or maintained in accordance with the manufacturer's specifications; and/or
(b) tested and shown to be operating to an accuracy of ± 5%.

The documentation shall be provided:

(i) within 30 days of the installation of any equipment;
(ii) at other times when reasonable notice is given and the Chief Executive, Taranaki Regional Council has reasonable evidence that the equipment may not be functioning as required by these consents; and
(iii) no less frequently than once every five years.

16. The consent holder shall record the location and area over which wastewater is irrigated and provide the record to the Chief Executive, Taranaki Regional Council, at the end of each calendar month.

17. There shall be no discharge to water as a result of irrigating wastewater to land. To achieve this, practices to ensure there is no discharge to water shall include, but not necessarily be limited to, ensuring that:

(a) no irrigation occurs closer than 10 metres to any surface water body;
(b) the discharge does not result in surface ponding that lasts longer than 30 minutes;
(c) no spray drift enters surface water;
(d) the discharge does not occur at a rate at which it cannot be assimilated by the soil/pasture system; and
(e) pasture cover within irrigation areas is maintained at all times.

18. Except within a mixing zone extending 30 metres downstream of the Wetland Treatment System discharge (monitoring location HHG000103), the discharges allowed by these consents shall not give rise to any of the following effects in the Haehanga Stream or any of its tributaries:

    (a) a rise in carbonaceous biochemical oxygen demand of more than 2.00 gm^{-3};
    (b) a concentration of unionised ammonia greater than 0.025 gm^{-3};
    (c) the presence of total recoverable hydrocarbons;
    (d) a concentration of chloride greater than 150 gm^{-3};
    (e) the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials;
    (f) any conspicuous change in the colour or visual clarity;
    (g) any emission of objectionable odour;
    (h) the rendering of fresh water unsuitable for consumption by farm animals; and
    (i) any significant adverse effects on aquatic life.

19. After 1 June 2026 the discharges allowed by these consents shall not give rise to a concentration of:

    (a) ammonia exceeding 0.4 mg/L (annual maximum) or 0.24 mg/L (annual median); or
    (b) nitrate nitrogen exceeding 3.5 mg/L (annual 95th percentile) or 2.4 mg/L (annual median);

    in the Haehanga Stream or any of its tributaries.

Pond Systems

20. The Irrigation Pond and the Paunch Maturation Pond shall include storage facilities that can contain a volume of wastewater adequate to manage the volume of stormwater and leachate produced, and achieve compliance with the conditions of these consents.

21. From a date no later than 60 days after commencement of these consents, the discharges to land and water shall be managed and operated in accordance with a Pond System Management Plan (the 'PSMP') that has been approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The PSMP shall detail management practices undertaken to ensure compliance with the conditions of these consents and maximise treatment capabilities of the two systems. It shall address, but not necessarily be limited to, the following matters:

    (a) how the build-up of sediment and/or sludge will be managed within the treatment systems, how the level of build-up will be monitored including factors that will trigger active management, and the frequency of undertaking the identified measures or procedures;
    (b) how overloading of each system will be prevented;
    (c) how available storage in the Pond Treatment System will be managed;
    (d) how plant die-off within the Wetland Treatment System will be managed, and the frequency and/or timing of undertaking the identified measures or procedures; and
    (e) how the effectiveness of the Wetland Treatment System in removing Nitrogen is to be demonstrated annually.

22. The discharge from the Wetland Treatment System shall meet the following standards (at monitoring site IND003008):

    (a) the suspended solids concentration shall not exceed 100 g/m³; and
    (b) the pH shall be between 6.0 and 9.0.

Soil quality

23. The discharges shall be managed to ensure that no constituent in the soil in any irrigation area exceeds the maximum value shown in the following table:

Constituent	Maximum value (mg/kg unless otherwise stated)
Arsenic [1]	17
Barium – Barite [2]	10,000
Extractable Barium [2]	250
Cadmium [1]	0.8
Chromium [3]	600
Copper [3]	100
Lead [1]	160
Nickel [3]	60
Mercury	1
Zinc [3]	300
Sodium	460
Conductivity	290 mS/m
Chloride	700
Sodium adsorption ratio	8 (ratio)
TPH C7-C9	120
TPH C10-C14	58
TPH C15-C36	4000
Naphthalene	7.2
Pyrene	160
Benzo (a) pyrene	0.027
Benzene	1.1
Toluene	68
Ethylbenzene	53
Xylenes	48
[1]SCS – Rural Residential MfE 2011b; [2] Alberta Environment 2009; [3] NZWWA 2003, lowest of protection of human health and ecological receptors. (Biosolids to land)	

Groundwater quality

24. The consent holder shall maintain all groundwater monitoring wells on site.

25. The Total Nitrogen discharged to any hectare of land shall not exceed:

    (a) 400 kilograms in any 12-month period for 'cut and carry areas'; or
    (b) 200 kilograms in any 12-month period for any other land (including grazed pasture).

26. From a date no later than 90 days after these consents commence, irrigation of effluent shall be managed in accordance with a Nitrogen Management Plan (the 'NMP') that has been approved by the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The NMP shall detail how effluent irrigation will be managed to ensure compliance with condition 25 above.

Riparian planting

27. The consent holder shall undertake (and maintain) fencing and riparian planting for the entire stream length of the streams on the property, in accordance with the Riparian Management Plan for the property (RMP 90383). The additional fencing and/or riparian planting required, shall be carried out in accordance with the following programme:

Length of stream bank to be fenced and/or planted (m) (in addition to that existing on 1 March 2021)	Completion date
At least 1000	1 August 2021
At least 2000	1 August 2022
All remaining	1 August 2023

Dust

28. The discharges authorised by these consents shall not give rise to suspended or deposited dust at or beyond the boundary of the site that is offensive or objectionable. For the purpose of this condition, discharges in excess of the following limits are deemed to be offensive or objectionable:

    (a) dust deposition rate 0.13 $g/m^2/day$; and/or
    (b) suspended dust level 3 mg/m^3.

    Note: *For the purposes of this condition, the consent holder's site is defined as Sec 34 Pt Sec 4 Blk II Upper Waitara SD.*

Odour

29. The discharges authorised by these consents shall not give rise to an odour at or beyond the boundary of the site that is offensive or objectionable.

    Note: *For the purposes of this condition:*
    - *The consent holder's site is defined as Sec 34 Pt Sec 4 Blk II Upper Waitara SD; and*
    - *Assessment under this condition will be in accordance with the Good Practice Guide for Assessing and Managing Odour in New Zealand, Air Quality Report 36, Ministry for the Environment, 2003.*

30. Within 90 days of the commencement of these consents, the site shall be operated in accordance with an 'Odour Management Plan' (the 'OMP') that has been approved the Chief Executive, Taranaki Regional Council, acting in a certification capacity. The OMP shall be prepared by a suitably qualified and experienced person and shall detail the practices undertaken to ensure that odour is avoided as far as practical and there is no offensive or objectionable odour beyond the site boundary. It shall address, but not necessarily be limited to, the following matters:

(a) identification of all activities on site which have the potential to generate odour (e.g. turning compost piles, removing sludge from ponds);
(b) the conditions and/or time of day when activities identified under (a) above should be undertaken (e.g. during favourable weather conditions and the identification of those conditions) and/or measures that shall be implemented to avoid odours arising (e.g. containment measures);
(c) measures undertaken to minimise odours during receiving and storing material, and throughout the composting and vermiculture processes (e.g. method(s) used to cover material once received, how anaerobic conditions are maintained);
(d) measures undertaken to minimise odours arising in the Wetland Treatment System, and identification of the time of year and/or frequency when undertaken;
(e) measures undertaken to minimise odours arising in the Irrigation Pond and associated treatment measures and identification of the time of year and/or frequency when undertaken; and
(f) an assessment of alternate treatments or methods available that could further minimise odour, and the reasons that they have not been adopted.

Certification by the Chief Executive, Taranaki Regional Council may include, at the consent holder's cost, a peer review by a suitably qualified and experienced person.

31. The consent holder shall review and update the OMP required by condition 30 and provide it to the Chief Executive, Taranaki Regional Council for recertification before 31 December 2023 and at 2-yearly intervals thereafter. Recertification may include peer review by a suitably qualified and experienced person.

32. The consent holder shall maintain a monitoring device that continuously records wind speed and direction in the area of the composting activity. The data shall be provided telemetrically to the Taranaki Regional Council. If this method is not at first technically feasible, the data shall be provided to the Taranaki Regional Council at a frequency and a form advised by the Chief Executive, Taranaki Regional Council until such a time it is technically feasible to telemetric the data.

Discharge of existing stockpiled waste

33. The discharge of stockpiled material to land for use as a 'soil conditioner' shall not occur within 10 metres of any surface water.

34. The discharge of stockpiled waste to land shall only occur after:

(a) the consent holder has provided the Chief Executive, Taranaki Regional Council with the following information:

(i) the volume of material to be discharged;
(ii) a map or aerial image identifying the specific area where the discharge is to occur;
(iii) a calculation of the Nitrogen loading of the discharge proposal;
(iv) test results from a representative sample of the waste to be discharged showing that it meets the standards shown in the table below;
(v) details of the sampling procedure showing that the test sample is representative of the wastes; and

(b) the Chief Executive, Taranaki Regional Council, having assessed the information provided advises that the discharge may occur.

Constituent	Maximum value (mg/kg unless otherwise stated)
Arsenic [1]	17
Barium – Barite [2]	10,000
Extractable Barium [2]	250
Cadmium [1]	0.8
Chromium [3]	600
Copper [3]	100
Lead [1]	160
Nickel [3]	60
Mercury	1
Zinc [3]	300
Sodium	460
Conductivity	290 mS/m
Chloride	700
Sodium adsorption ratio	8 (ratio)
TPH C7-C9	120
TPH C10-C14	58
TPH C15-C36	4000
Naphthalene	7.2
Pyrene	160
Benzo (a) pyrene	0.027
Benzene	1.1
Toluene	68
Ethylbenzene	53
Xylenes	48
Pathogen	
E-coli	Less than 100 MPN/g
Campylobacter	Less than 1/25g
Samonella	Less than <2 MPN/g
Human adenovirus	Less than 1 PFU/0.25g
Helminth ova	Less than 1 PFU/0.25g
[1]SCS – Rural Residential MfE 2011b; [2] Alberta Environment 2009; [3] NZWWA 2003, lowest of protection of human health and ecological receptors. (Biosolids to land)	

Monitoring Plan

35. Within 90 days of the commencement date of these consents, the consent holder shall ensure a Monitoring Plan is prepared. The purpose of the Monitoring Plan is to identify the techniques, methodologies and procedures that will be employed to acquire data in relation to, and to monitor compliance with the conditions of these consents, and the effects of the discharges authorised by these consents. The plan shall include at least the following:

(a) provision for site inspections to be undertaken at least once every week;
(b) installation of an in-situ water quality monitoring sonde to measure real-time water quality of the Haehanga Stream;
(c) camera surveillance of the site with images transmitted to the Council in real time;
(d) requirements for sampling and testing to ensure compliance with the conditions of these consents;
(e) groundwater sampling and testing to determine the risk that groundwater quality may present for surface water; and
(f) annual reports that record the information that has been collected in accordance with the consent conditions and compliance with those conditions.

Note: The Taranaki Regional Council assumes responsibility for the preparation and implementation of the Monitoring Plan for annual compliance purposes.

Contingency Plan

36. The consent holder shall develop and regularly update a 'Contingency Plan' that details measures and procedures that will be undertaken to prevent and remedy any environmental effects from a spillage or any discharge of contaminants not authorised by these consents. The plan and any amended versions shall be provided to the Chief Executive, Taranaki Regional Council.

Site reinstatement

37. Within 3 months of the commencement date of these consents, the consent holder shall engage a suitably qualified and experienced person, approved by the Chief Executive, Taranaki Regional Council, to prepare a Site Exit Plan (SEP) which details how the site is going to be reinstated at the end of its life. A bond is required under condition 38, in relation to performance of the SEP.

The SEP shall address, but is not necessarily limited to, the following matters:

(a) how the site will be reinstated so that no raw materials listed or approved under conditions 3 or 4 of these consents remain on site after the consent expires;
(b) how the site will be reinstated so that no partially decomposed material remains on site after the consents expire;
(c) how all stockpiled waste will be removed and appropriately disposed of;
(d) how any remaining leachate or sludge, resulting from the operation, will be either removed from the site, buried, treated or otherwise to avoid any adverse effects on groundwater or surface water;
(e) how irrigated soils and groundwater will be remediated;
(f) timeframes for undertaking the activities identified in association with (a) to (e) above;
(g) estimates of costs of reinstating the site; and
(h) a recommended initial bond quantum. *Note: this recommendation is not final, and is subject to the process set out at condition 38 (d)(i) – (iii) below.*

The first time the SEP is drafted it shall be submitted for approval to the Chief Executive, Taranaki Regional Council, acting in a certification capacity.

The SEP shall be reviewed by a suitably qualified and experienced person approved by the Chief Executive, Taranaki Regional Council, and submitted to the Chief Executive, Taranaki Regional Council for re-approval at 5-yearly intervals. The consent holder shall implement the approved SEP upon expiry of these consents.

Bond

38. Within 6 months of the commencement date of these consents, the consent holder shall enter into an enforceable written agreement (**bond agreement**) to provide and maintain in favour of the Taranaki Regional Council, a cash bond or bank bond pursuant to sections 108(2)(b) and 108A of the Resource Management Act, on terms and conditions satisfactory to the Taranaki Regional Council in all respects.

The following terms apply in respect of the bond:

(a) the bond quantum shall be sufficient to ensure compliance with condition 37 above in the event of any default by the consent holder;
(b) any bank bond shall be in a form used by a bank registered to conduct business in New Zealand and approved by the Taranaki Regional Council;
(c) the bond agreement shall include the terms and conditions on which the bond will be established, maintained, changed, transferred or surrendered. In the event of the Taranaki Regional Council not agreeing with the consent holder on the terms of the bond agreement, then the dispute shall be resolved through an agreed disputes resolution process or referred to arbitration;
(d) the initial bond quantum shall be determined as follows:
    (i) Upon preparing the SEP, and in accordance with condition 37(g) and (h) above, a suitably qualified and experienced person (approved by the Chief Executive of the Taranaki Regional Council) who has been engaged by the consent holder shall make a recommendation as to the initial bond quantum;
    (ii) The Taranaki Regional Council will then engage a suitably qualified and experienced person to peer review the bond quantum recommended under condition 37(h); and
    (iii) In the event of the consent holder and the Taranaki Regional Council not reaching an agreement on the initial bond quantum, it shall be assessed by an independent bond assessor appointed by the Taranaki Regional Council, and the decision of that person will be final and binding.
(e) the bond quantum may be reviewed and reassessed every two years from the date the initial bond quantum is lodged until a date two years after the date on which these consents have been given effect to. The purpose of the adjustment is to reflect changes in the risk profile of the activity at the site. After that, the bond quantum may be reviewed and reassessed by the consent holder and the Taranaki Regional Council at five yearly intervals for the duration of these consents. The method of review must follow the same procedure set out in condition 38(d) above.
(f) the bond terms and quantum may also be varied or cancelled or renewed at any other time by agreement between the consent holder and the Taranaki Regional Council using the methodology described in condition 38(d);

(g) if at any time the amount of the bond is varied under conditions 38(e) or 38(f), then the consent holder shall, within five (5) working days of the replacement bond agreement being executed, put in place a new bond for the varied amount or the additional amount required in excess of the existing bond;
(h) if the consent is transferred to another party or person, the bond lodged by the transferor shall be retained by the Taranaki Regional Council until a replacement bond is entered into by the transferee to ensure compliance with conditions of the consents unless condition 37 has already been complied with;
(i) at all times the consent holder shall comply with the terms of the bond or varied bond;
(j) the consent holder shall reimburse the Taranaki Regional Council for all reasonable costs incurred in developing the bond agreement and any subsequent reviews or reassessments;
(k) for the avoidance of doubt, the bond agreement may provide for the bond to be held after the expiry of these consents if the SEP is not given effect to and condition 37 not complied with.

Review

39. In accordance with section 128 and section 129 of the Resource Management Act 1991, the Taranaki Regional Council may serve notice of its intention to review, amend, delete or add to the conditions of this resource consent by giving notice of review during the month of June each year, for any of the following purposes:

(a) ensuring that the conditions are adequate to deal with any adverse effects on the environment arising from the exercise of this resource consent, which were either not foreseen at the time the application was considered or which it was not appropriate to deal with at the time; or
(b) setting of specific groundwater quality standards if testing indicates that it is reasonably required to avoid adverse effects on surface water.

Recommending Officer

Kim Giles
Consents Officer

Recommending Officer

Nathan Crook
Environmental Scientist – Soil & Water Quality

Recommending Officer

Colin McLellan
Consents Manager

Appendix 1 of consents 5838-3.0 and 5839-3.0:

Figure 1: Identification of operational components

Appendix 1:

Table 16: Proposed volumes of organic material

Description	Frequency	Amount T/annum	Receiving Area	On site process	Time to process (months)	Final fate of material	Notes
Paunch	Daily (during season)	4,000	Pad 2 (Paunch Pad)	Vermiculture	12	Vermicast – sold off site	Stored pad 2 until fed to worms then exported as vermicast
Composted Product							
Poultry industry waste (eggshells, yolks, macerated chicks, chicken mortalities, sausage waste)	Daily	Commercially sensitive	Pad 1	Composted	12	Compost-on & off site	Stored on site pending final usage
Greenwaste (Bulking agent)	Daily	3,000	Pad 1	Composted	12	Compost-on & off site	Added to the food scrap matrix
Sawdust (untreated)	Weekly	500	As required throughout Pad 1 and 3	Compost matrix	12	Compost-on & off site	Food scrap matrix
Molasses	Occasionally	50	Pad 3	Composted	12	Compost-on & off site	
Dairy industry waste (including but not limited to cheese, milk	Occasionally	Commercially sensitive	Pad 3	Composted	12	Compost-on & off site	

Description	Frequency	Amount T/annum	Receiving Area	On site process	Time to process (months)	Final fate of material	Notes
powder, cream, milk whey)							
Food/household scraps/greenwaste	Daily	3,000	Pad 1	Composted	12	Compost-on & off site	NPDC collection, food and drink manufacturing, commercial/hospitality food waste. (some of the NPDC waste collection may not be food per se, but may be household greenwaste like cut flowers/plants)
Palm Kernel/Grain or other stock feed	Occasionally	300	Pad 3	Composted	12	Compost-on & off site	
Grease Trap Waste	Occasionally	50	Pad 3	Composted	12	Compost-on & off site	
Tello	Occasionally	50	Pad 3	Composted	12	Compost-on & off site	
Pea Fat	Occasionally	50	Pad 3	Composted	12	Soil conditioner-on & off site	
Water treatment sludge	Occasionally	300	Pad 3	Composted	12	Soil conditioner-on & off site	
Soil Remediation	Occasionally	Commercially sensitive	Pad 1	Composted	12	Compost-on & off site	

Description	Frequency	Amount T/annum	Receiving Area	On site process	Time to process (months)	Final fate of material	Notes
Pulp and Paper Residue	Occasionally	Commercially sensitive	Pad 1	Composted	12	Compost-on & off site	
Prolick	Occasionally	100	Pad 3	Composted	12	Compost-on & off site	
Canteen waste (food scraps) specifically from Powerco and Fonterra	Weekly	50	Pad 3	Composted	12	Compost -on & off site	
Diatomaceous earth mix (Fonterra Kapuni, Todd aquatic centre)	Occasionally	50	Pad 3	Composted	12	Compost-on & off site	
Animal Manure from meat processing plant stock yards, stock truck effluent collection and dairy farm oxidation pond solids;	Occasionally	50	Pad 1	Composted	12	Compost-on & off site	
Vegetable waste solids (being processed by-products);	Occasionally	50	Pad 1	Composted	12	Compost-on & off site	
Fish skeletal and muscle residue post filleting (free from offal);	Occasionally	50	Pad 1	Composted	12	Compost-on & off site	

Description	Frequency	Amount T/annum	Receiving Area	On site process	Time to process (months)	Final fate of material	Notes
Estimated other waste streams agreed with TRC	Occasionally	300	Pad 1	Composted	12-36	Compost -on & off site	
Total Composted		**8,000t**				3000t offsite (A1) 1000t onsite (B1)	**After composting 4,000t for disposition (losses in process)**
Oil Industry Product		**T anticipated during phasing out (until 31 December 2020)**					
Drill mud-WBM	Occasionally	1,000	Pad 3	Composted	36	Soil conditioner-on & off site	Until 31 December 2020
Drill mud-SBM	Occasionally	1,000	Pad 3	Composted	36	Soil conditioner-on & off site	Until 31 December 2020
Dirty water-	Occasionally	1,000	Pad 3	Composted	36	Soil conditioner-on & off site	Until 31 December 2020
Produced water	Occasionally	300	Pad 3	Composted	36	Soil conditioner-on & off site	Until 31 December 2020

Description	Frequency	Amount T/annum	Receiving Area	On site process	Time to process (months)	Final fate of material	Notes
Hydrocarbon contaminated soil	Occasionally	500	Pad 3	Composted	36	Soil conditioner-on & off site	Until 31 December 2020
Total		**3,800**				Likely Onsite – B1 Alternatives are however being investigated.	**2,000t product to be used for bunds or soil conditioner once processed.**

Appendix 2:

Rule 29 of the RFWP

Activity	Rule	Standards/Terms/Conditions	Classification	Notification	Control/Discretion	Policy Reference
Discharge of contaminants from industrial and trade premises onto or into land, excluding those provided for by Rules 22, 23 and 42	29	• Only waste generated on the subject property shall be discharged; • The discharge shall not result in surface ponding or runoff of any contaminant into a surface water body; • There shall be no direct discharge of any contaminant into a surface water body; • The discharge shall not be within 25m of a surface water body; • The discharge shall not be within 50m of any existing bore, well or spring used for water supply; • The discharge shall not, either directly or indirectly, cross the boundaries of the subject property; • The discharge shall not be noxious, dangerous, offensive or objectionable to such an extent that it has or is likely to have a significant adverse effect on the environment[27].	Permitted			

Rule 15 of the RFWP

Activity	Rule	Standards/Terms/Conditions	Classification	Notification	Control/Discretion	Policy Reference
Taking and use of surface water[19]	15	• The rate of abstraction for any one property described in a particular certificate of title shall not exceed 1.5l/s; or 5l/s for not more than 30 mins/day for temporary taking and use of surface water[20]; • The volume of abstraction for any one property described in a particular certificate of title shall not exceed 50m^3 in any one day; • No more than 25% of the instantaneous flow, measured at the point of abstraction shall be taken.	Permitted			

Appendix 3:

FASTEN YOUR SEATBELT – A ZERO TOLERANCE APPROACH TO ODOUR REGULATION

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Keywords: odour, nuisance, effect, Resource Management Act.

1. Introduction

Regional Councils are the regulatory authorities in New Zealand with primary responsibility for odour management. Management of odour by the Waikato Region Council (Council) has been undertaken in accordance with the Ministry for the Environment 'Good Practice Guide for Assessing and Managing Odour'. That document focus on how to assess and manage odorous activities for resource consent processing purposes and the management of odour incidents. When complaints occur, the focus of the Council has been to collect evidence of odour to determine whether the regulatory threshold of objectionable odour has been exceeded. The following outlines a strategy aimed at reducing odour incidents by increasing the focus on both preventative measures and the enforcement of these preventative measures.

2. Background

The management of odour by the Council has improved over time and has lowered the number of complaints from sites holding resource consents however odour has not reduced sufficiently nor quickly enough to meet community expectations. A weak link in the process has been the collection of evidence and enforcement against the objectionable odour threshold. The problems are:

i) The difficulty of responding in a timely way to collect the evidence.
ii) The difficulty of collecting evidence to the criminal standard for odour.
iii) The lack of skilled staff resources available at short notice to investigate.
iv) The protracted and expensive court process for prosecution.

The difficulties faced are acknowledged by the court, in the decision on Barber v Horowhenua District Council [2014] NZEnvC 84. The decision stated: *"[31] Identification and assessment of odour discharges is one of the most difficult issues faced by local authorities and the Court. By their very nature, such discharges tend to be ephemeral or transitory. It is common experience throughout New Zealand that councils can receive an odour complaint only to be unable to detect odour when an officer arrives on site, due to fluctuations in the odour between the receipt of the complaint and the officer's arrival."*

Often the result is a long period of complaint and unnecessary suffering by the community before enforcement action is effective. A different approach is required to address odorous activities.

Looking back the previous approach does seem flawed. The threshold was objectionable odour affecting the community, we waited until that was reported and then we struggled to determine if that threshold was exceeded.

3. Strategy

The new approach being implemented by the Council is focussed on odour prevention involving a greater emphasis on robust up the pipe controls, capturing these controls as consent conditions and enforcing those controls irrespective of the presence of odour. This emphasis on the controls and their enforcement avoids the need to collect evidence of objectionable odour.

An evaluation of up the pipe controls has always been part of the consent application process however a detailed evaluation of the controls and capturing these controls as the primary threshold for enforcement is new. These controls must be robust and include both factors of safety and contingency measures. The resulting consent conditions will be very prescriptive. This in turn requires more detail of the process in the consent application and more use of experts by Council to evaluate it.

We know accidents can happen at any time, therefore it is important that the controls are always in place. It follows that conditions containing controls should be enforced irrespective of the presence of odour to ensure the protections are in place when needed. Implementation of this zero-tolerance approach will utilise infringement fines in the first instance but in the event of protracted non-compliance, other mechanisms including prosecution would be utilised.

A simple example for a rendering plant would involve a consent condition requiring all doors to be closed other than when being used for entering or exiting to ensure building capture is effective. An infringement notice would be issued any time a door is found to be left open irrespective of the presence of odour.

It may be argued that if there is no objectionable odour off site we should not enforce a door left open. The situation is analogous to the use of infringement fines for speeding or not wearing a seat belt, if these traffic fines were only issued when there was an accident they would be ineffective. To date we have not used traffic fines for odour prevention we have just been enforcing the odour events which are the traffic accidents.

A final aspect of the prevention approach is that when odour does occur there are conditions of consent that ensure it ceases as soon as possible. This is a final backstop if the process controls have failed and an odour event has occurred. Using the rendering example, this would involve ceasing production immediately and providing for the removal of raw material from the plant. To date, activities have continued to operate whilst odour issues were being resolved. In these cases, the cost of non-compliance has been externalised and picked up by the local community who suffered from the effects of odour.

For consent applications the means to achieve the change in approach are currently available the process controls should be well understood, there is the ability to draft prescriptive conditions, and we have effective enforcement tools. I have outlined above that a shift is required to a more rigorous approach on all three aspects but possibly the biggest shift will be to the use of the enforcement tools irrespective of the presence of odour. Consent holders will be aware of the change in approach as it will be through the consent process that the more prescriptive conditions on process controls will be put in place. Some further education may be required to cement home the change and to put the consent holders on notice of the prospect of enforcement of odour controls irrespective of the presence of odour.

A weakness is that there are many consents in place that will not expire for a long time. To date this issue has not been tackled but there is the ability to review a consent under the Resource Management Act and it may be possible by review to include relevant process controls as conditions.

4. Conclusion

The previous approach which relied heavily on complaint response and enforcing the objectionable odour condition had significant challenges and has resulted in the costs of non-compliance, the objectionable odour, falling on the community. The new approach aims to prevent complaints, make enforcement simpler and faster and ensure the costs fall on the activity causing the odour rather than the community. This approach is a work in progress and it will take some time to determine the most suitable conditions to impose. Additionally, some consented activities which rely heavily on people and procedures will likely remain a challenge. Communicating the message that odour effects are totally unacceptable and must be prevented will be an important aspect of ensuring at risk sites perform. Having conditions in place that stop the activity until the cause of odour is dealt with will be a great motivator.

References

Waikato Regional Council 2007, Waikato Regional Plan. Environment Waikato Policy Series 2007/21.

Ministry for the Environment. 2016. Good Practice Guide for Assessing and Managing Odour. Wellington: Ministry for the Environment.